Cotton Insect Losses Working Group

Subgroup of the Crop Insect Loss and Impact Assessment Working Group

21-22 November 2005

Title: Cotton Insect Losses Workshop

Sponsor: University of Arizona

Credits: 3.0 CA and AZ CEUs, 3 pest mgt.

Maricopa Ag Center

AZ: EX-231-05A CA: A-1489-05 CCA: AZ 01099

Booth Machinery

AZ: EX-231-05B CA: A-1489-05 CCA: AZ 01100

Riverside Coop. Extension, Blythe

AZ: EX-231-05C CA: A-1489-05 CCA: AZ 01001

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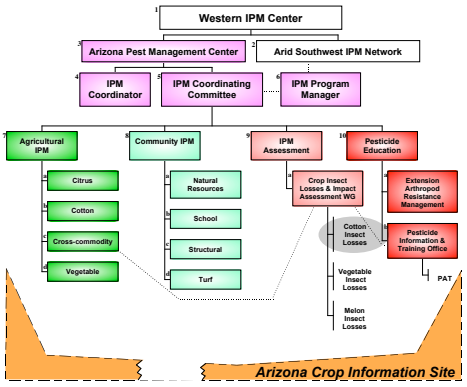

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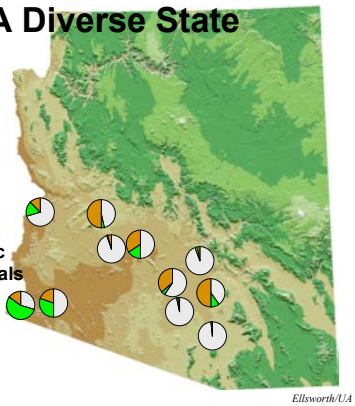
Arizona, A Diverse State

- Diversity of crop communities
- Different pest pressures
- Different economic and agronomic goals
- Varying elevations and climates



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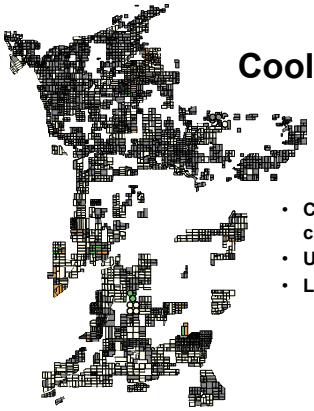

Coolidge / Eloy

- Cotton still a major crop
- Urban pressures
- Land use changes

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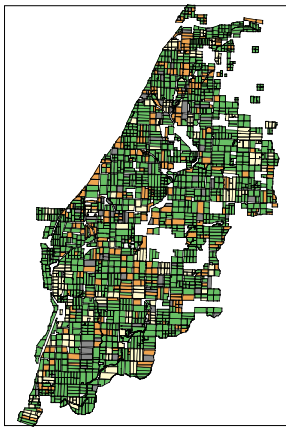

Yuma Valley

- Landscape dominated by vegetables and melons
- Cotton grown as rotation

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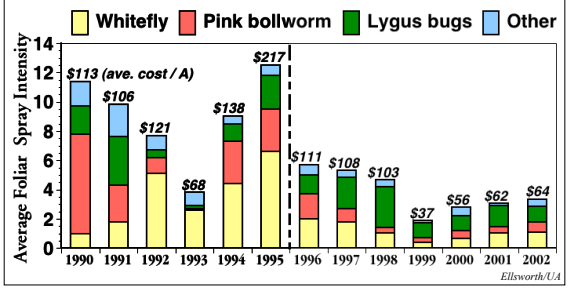
Pest Trends in Arizona (1990-2002)

- An average rarely represents any individual reality,
- But the trends are still valuable to researchers, regulatory authorities, policy makers, and your industry.



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Cotton Insect Losses Working Group

- Goal: *To develop cotton insect losses, control costs, and related insect control information for the state of Arizona (and low deserts of California)*
- Part of Beltwide effort sponsored by National Cotton Council through Mississippi State University
- Your opportunity to ground the process with "real world" data.

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So What?

- In combination with the Pesticide Use Database (derived from 1080 data):
- Section 18 Emergency Exemptions for:
  - Knack
  - Applaud (Courier)
- Defense of acephate, rates above 0.5 lbs ai
- Defense of endosulfan
  - Rates above 0.75 lbs ai
  - Aerial application
  - Open boll restriction (24c)

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So What? (2)

- Quantitative database for measuring user behaviors and adoption of technologies that
- Lead to funding for Extension programs
  - CILIAWG (no, the University doesn't pay for this!)
- Lead to funding for applied research projects
  - E.g., Palumbo receives major PMAP grant to study aphid control in vegetables
- Help to re-direct efforts of University!!
  - Gets the administration's attention by identifying needs and chronicling successes
  - New position 4/05, IPM Program Manager (Al Fournier)
  - Could help justify and re-establish Jenny's position

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So What? (3)

- Helps translate your practices into economic terms for your customers and
- Shows tangibly the impact of the consultant on crop production
- Demonstrates in economic terms how valuable new pest control technologies are
- Helps educate growers about the importance of insect pests and pest management to their production

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NCC's Beltwide Cotton Insect Losses Survey

- Survey in existence since 1979
- Each beltwide state with one coordinator (PCE)
- Annual survey of PCAs, industry & University personnel, and growers
- Unique insights into intent of sprays made
- Cotton split into Bt and non-Bt in 1999

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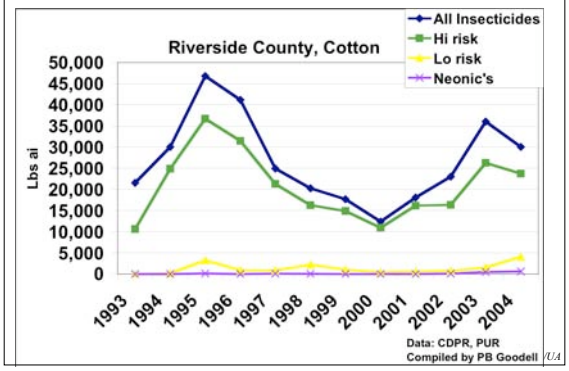
California Pesticide Data



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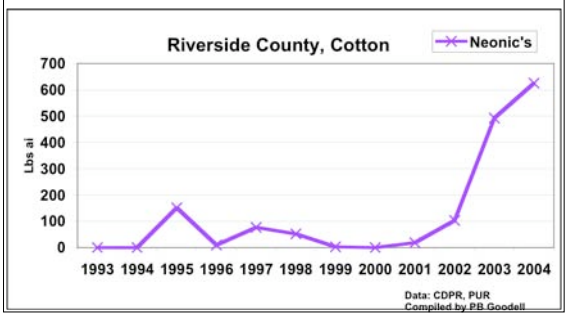
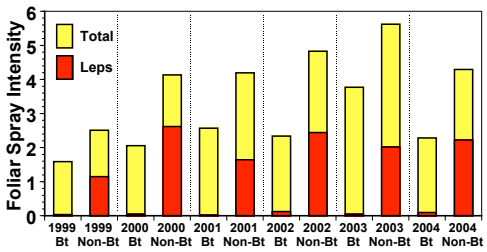
Neonicotinoids



Foliar Spray Intensity



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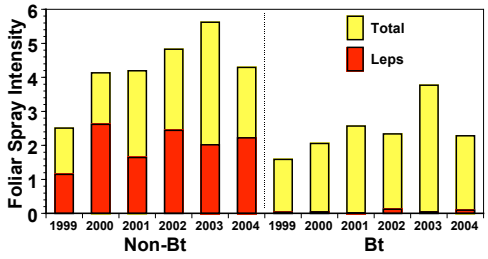
Bt: 1.95 fewer sprays



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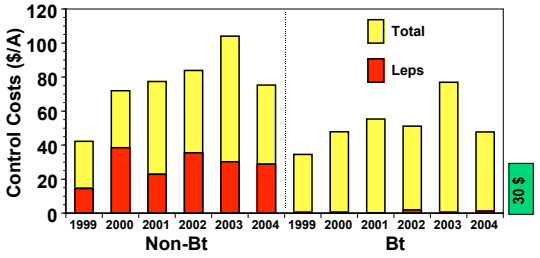
Bt: $27.60 less insecticides



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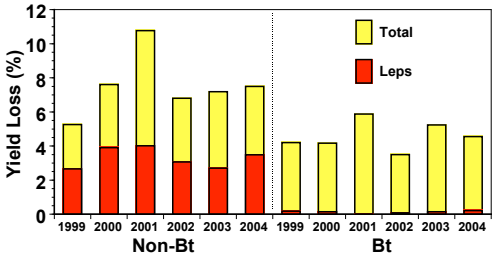
Bt: 3.18% less yield loss to insects



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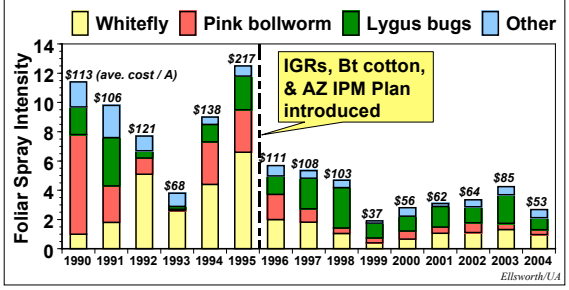
Arizona Cotton Insect Losses

(1990–2004)



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Non-Bt Cotton	Bt Cotton
No Bt gene(s)	Bt gene(s)
	Bollgard
	Bollgard II
	Widestrike
	VIP
	BG/RR
	BGII/RR

- All reponses are by cotton type (Upland only)

Questions

- The Questions depend on a thorough understanding of an "idealized" average yield for the area you are providing estimates for.
- Realized Yield = Idealized Yield - All Losses

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1. Your Name

- Optional; this information will never be shared with anyone; ID purposes only
- Your responses will never appear with your name or alone.
- All information will be combined into an aggregate response for the entire state.

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2. Reporting Area

- County or Counties; e.g., Pinal Co.

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2a. Subarea

- Farm or farms, or portion of County, etc.; West Pinal Co. or Stanfield or farm name
- This information is not shared with anyone.

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3. Date submitted (dd/mm/yy)

- **11/21 or 11/22/05**

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4. Cotton Acreage to which this estimate applies

- **Number of acres of Non-Bt cotton**
- **Number of acres of Bt cotton, including those that are stacked (e.g., BG/RR)**

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5. Yield in pounds per acre for this acreage

- **Your best estimate of what you expect the acreage you check yielded.**

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6. Potential yield in pounds per acre for this acreage

- **Assume ideal conditions!! "*This estimate represents what the land is capable of realistically producing*."**
- **This means what should this acreage have yielded without <u>any</u> stressors given the constraints of the location, year, and general production practices. (Still an average).**
- **Assume no losses to insects, weeds, other pests, other stresses (heat, water, weather), or even poor management practices.**

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7. Percent reduction in yield by Weather:

- **This could include the "normal" sort of things like rain, hail, and wind, but also don't forget about cold injury to stands or heat stress mid-summer.**

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8. Percent reduction in yield by Chemical injury:

- **Chemical injury can be from any source, but herbicides may be the most common loss here.**
- **This may be due to direct application or through drift problems.**

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9. Percent reduction in yield by All insects combined:

- Start with a number here and now, and then consider revising after you complete the survey.
- Remember,

$$\text{Ideal yield} = \text{yield} + \%\text{loss}_{\text{otherpests}} + \%\text{loss}_{\text{weather}} + \%\text{loss}_{\text{injury}} + \%\text{loss}_{\text{mgt}} + \%\text{loss}_{\text{insects}}$$

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10. Percent reduction in yield by Other pests:

- Insert your list of other pests at the bottom of the page in the margin.
- For example, weeds, diseases, nematodes, birds, etc.

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11. Percent reduction in yield by Other factors:

- Insert your list of other factors at the bottom of the page in the margin.
- A common source of loss may be the management choices / practices made by the grower.

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16. Number of acres receiving 'at planting' treatment for early season thrips

- This includes in-furrow sprays for thrips control.

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17. Cost of 'at planting' treatments/acre:

- Both 'in furrow' and 'seed treatment'

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18. Number of acres planted to transgenic Bt cotton:

- Without RR or other traits.
- I.E., Bollgard or Bollgard II only; not stacked with herbicide-tolerant genes.

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19. Cost of Bt cotton per acre of Bt:

- I.e., the technology fee.
- Do you really know what your grower is paying?

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Insecticide Application

- Foliar insecticides only
- % of acres sprayed by ground (up to 100%)
- % of acres sprayed by air (up to 100%)

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20. Percent acres treated by air:

- Up to 100%
- Insecticides only

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21. Cost per acre for aerial applications:

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22. Average number of treatments by air:

- Your estimate of the number of sprays per acre for your acreage (flights across the field).
- Insecticides only.

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23. Percent acres treated by ground:

- Up to 100%
- Insecticides only

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24. Cost per acre for ground applications:

- It's never free! Even if a grower self-applies, there must be some cost associated with the application.

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25. Average number of treatments by ground:

- Your estimate of the number of sprays per acre for your acreage (trips across the field).
- Insecticides only.

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Insect Management Fees

- Estimate the cost of insect management fees paid by farmers to advisory personnel: crop consultants, fieldmen and/or advisors.
- Again, it's rarely free! If acres are under a full service agreement, some portion of the growers insecticide costs should be for checking costs.

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26. Number of acres for which there was an insect monitor, consultant, or crop advisor:

- You may answer these questions with a percentage (%) or actual acres, whichever you prefer. Try to be consistent.

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27. Number of field visits per week:

- If it is not the same every week for each field, then report a fraction. I.e., 1 or 2 visits might be reported as 1.3, 1.5, or whatever is most appropriate.

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28. Estimated cost per acre for arthropod crop advisory by scouted acre:

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Orientation to Insect Questions

- Answering the insect questions depends on an understanding of terminology used in this survey…

…But first, let's try an example.

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An Example:

- I check 10,000 acres in S. Texas:

Question		(a) Number of acres infested by this pest:		(b) Number of acres treated for this pest:	
	Type of Cotton	*Non-Bt*	*Bt*	*Non-Bt*	*Bt*
29	Boll weevil	4000	6000	400	1200
	…or if you prefer:	*100%*	*100%*	*10%*	*20%*

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Understanding Acreages

- Planted acreage: from question #4
- Infested acreage (a): acres on which the pest is present; some insects are ubiquitous, like thrips, and likely are present in some numbers everywhere; others are quite unusual like cutworms.
- Treated acreage (b): those acres which were sprayed for the pest of interest.

Note that losses are reported over all infested acres whether they have been treated or not

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Example (2)

- 1440 (3 bales) and 1540 (3.2 bales) ideal yield

(c) No. of insecticide applications required to control this pest:		(d) Cost of one application per acre (include application cost):		(e) Percent reduction in yield due to this pest:	
Non-Bt	*Bt*	*Non-Bt*	*Bt*	*Non-Bt*	*Bt*
1.4	1.7	$12.50	$12.50	3.5%	3.2%
Different area or season length		*This figure includes application cost*		*Equivalent to 50 lbs lost*	

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Part 'e' should reflect the loss incurred over part 'a'

- That is loss is estimated over all infested acres, not just the treated acreage.
- How much was lost to this pest where it occurred, regardless of whether there were sprays or not?

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(c) No. of insecticide applications required to control this pest:

- On average, how many applications were made to control the pest of interest?
- Fractional sprays are acceptable here (e.g., 0.5, 0.8, 1.5, etc.)
  - E.g., Half your acreage sprayed once for Lygus and the rest twice = 1.5 sprays to control Lygus
- What to do when there are multiple targets of 1 spray?
  - E.g., An acephate spray to control both Lygus (0.9) and Cotton Fleahopper (0.1)
- What to do when tank mixtures are used?
  - E.g., Lorsban + acephate may have been sprayed for PBW (1.0) and for Lygus (1.0) = 2 "sprays"

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(c) No. of insecticide applications required to control this pest (2):

- Sometimes mixtures are used to target only one pest:
  - Danitol + Orthene (low rate) to control wfs = 1 "spray"
- Another PCA (and another rate) might use the same mixture to control two pests:
  - Danitol + Orthene (high rate) to control wfs & Lygus = 2 "sprays"
- Or perhaps:
  - wfs were primary (1.0) and Lygus were secondary (0.5) or 1.5 "sprays"

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Get Started!

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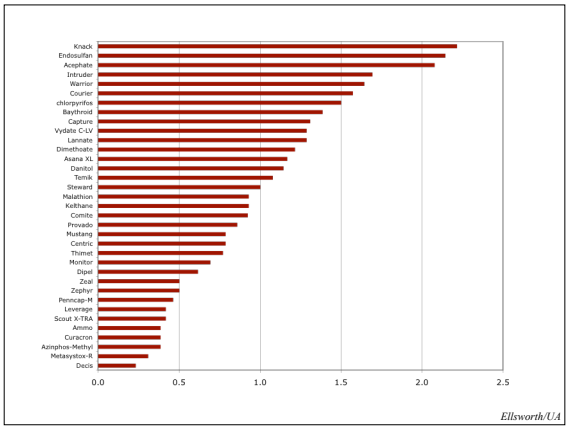

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Insecticide Survey

Never	Rarely (not every year)	Often (every year)	"Go to" Product	Primary Target Pest(s)	○Industry ⊗PCA ○Grower Acres (%) treated with this product	County: Pinal Acreage: 2500 Avg. no. of times treated with product
○	⊗	○	○	cutworms	2%	1

Thank you!

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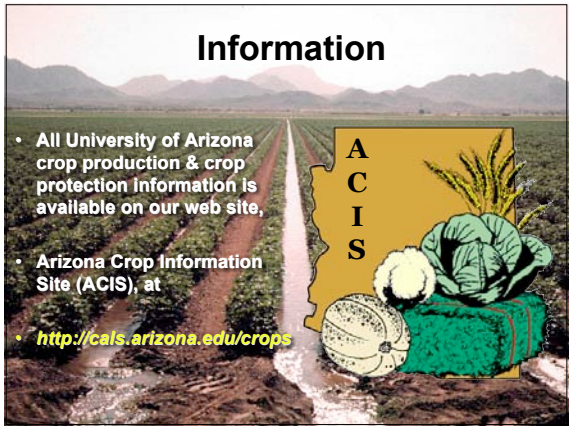
Information



- All University of Arizona crop production & crop protection information is available on our web site,
- Arizona Crop Information Site (ACIS), at
- *http://cals.arizona.edu/crops*