Cotton Insect Losses Working Group

Subgroup of the Crop Insect Loss and Impact Assessment Working Group

21-22 November 2005

Arizona, A Diverse State

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

Coolidge / Eloy

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

Yuma Valley

• Landscape dominated by vegetables and melons
• Cotton grown as rotation
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.

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.

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)

So What? (2)

- Quantitative database for measuring user behaviors and adoption of technologies that lead to funding for Extension programs
  - CILAWG (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

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

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
California Pesticide Data

Neonicotinoids

Foliar Spray Intensity

Bt: 1.95 fewer sprays

Bt: $27.60 less insecticides

Bt: 3.18% less yield loss to insects
Arizona Cotton Insect Losses (1990–2004)

- Foliar Spray Intensity
- Whitefly
- Pink bollworm
- Lygus bugs
- Other

IGRs, Bt cotton, & AZ IPM Plan introduced

Non-Bt Cotton
- No Bt gene(s)

Bt Cotton
- Bollgard
- Bollgard II
- Widestrike
- VIP
- BG/RR
- BGII/RR

- All responses 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

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.

2. Reporting Area

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

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.
3. Date submitted (dd/mm/yy)
   • 11/21 or 11/22/05

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)

5. Yield in pounds per acre for this acreage
   • Your best estimate of what you expect the acreage you check yielded.

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 any 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.

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.

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.
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,
     \[
     \text{Ideal yield} = \text{yield} + \%\text{loss}_{\text{other pests}} + \%\text{loss}_{\text{weather}} + \%\text{loss}_{\text{injury}} + \%\text{loss}_{\text{mgt}} + \%\text{loss}_{\text{insects}}
     \]

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.

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.

16. Number of acres receiving ‘at planting’ treatment for early season thrips
   • This includes in-furrow sprays for thrips control.

17. Cost of ‘at planting’ treatments/acre:
   • Both ‘in furrow’ and ‘seed treatment’

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.
19. Cost of Bt cotton per acre of Bt:
• i.e., the technology fee.
• Do you really know what your grower is paying?

20. Percent acres treated by air:
• Up to 100%
• Insecticides only

21. Cost per acre for aerial applications:

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.

23. Percent acres treated by ground:
• Up to 100%
• Insecticides only
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.

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.

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.

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.

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.

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

An Example:

• I check 10,000 acres in S. Texas:

<table>
<thead>
<tr>
<th>Question</th>
<th>(a) Number of acres infested by this pest</th>
<th>(b) Number of acres treated for this pest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type of Cotton</td>
<td>Non-Bt</td>
</tr>
<tr>
<td>29</td>
<td>Roll weevil</td>
<td>4000</td>
</tr>
</tbody>
</table>

...or if you prefer: 100% 100% 10% 20%

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***

Example (2)

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

<table>
<thead>
<tr>
<th>Question</th>
<th>(c) No. of insecticide applications required to control this pest</th>
<th>(d) Cost of one application per acre (include application cost)</th>
<th>(e) Percent reduction in yield due to this pest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type of Cotton</td>
<td>Non-Bt</td>
<td>Bt</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td>1.7</td>
<td>$12.50</td>
</tr>
</tbody>
</table>

Different area or season length
This figure includes application cost Equivalent to 50 lbs lost

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?

(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, 1.3, 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”
(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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Insecticide Survey

<table>
<thead>
<tr>
<th>Pest</th>
<th>Primary Target Pest(s)</th>
<th>Industry</th>
<th>PCA</th>
<th>Grower</th>
<th>County</th>
<th>Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutworms</td>
<td>2%</td>
<td>2500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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://cats.arizona.edu/crops