Defining and Refining Critical Uses of Chlorpyrifos in Alfalfa

Peter B. Goodell, Lori Berger, Rachael Long, Tim Hays and Spencer Halsey

http://cdpr.ca.gov/docs/pestmgt/crit_uses.htm
Why this project?

- Concerns about chlorpyrifos
  - Offsite movement of highly toxic, older insecticide
  - Issues with water quality & air quality
  - Acute and chronic risks to human health

- CDPR request for action plan for critical use of chlorpyrifos

- Needed a farmer/PCA directed input
For which pests is Chlorpyrifos critical?

What alternative AIs or practices are available?

What are the impacts in adopting alternative approaches?

What are Best Management Practices?

What are the gaps in Research, Education & Policy?

Report prepared for CDPR

Update UCPMG; Develop Educational Products

Create Action Plan

Training Workshops

Management Team Development Teams

Crop Teams & Management Team

2014

2015 2016
Four Crops Selected for Project…

- Alfalfa
- Almonds
- Citrus
- Cotton
Rationale for Crop Selection

- Total acres treated
- Variety of crop types
- Critical need for IPM
Chlorpyrifos Use Trends

Pounds AI of Chlorpyrifos

- Orange
- Alfalfa
- Almonds
- Cotton

Year:
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011

Weight:
- 0
- 100,000
- 200,000
- 300,000
- 400,000
- 500,000
- 600,000
Chlorpyrifos Project Management

- Management Team – CDPR (Matteson and Downie) and UCIPM (Goodell and Berger) and Crop Team Leaders from Alfalfa, Almonds, Citrus and Cotton

- Alfalfa Crop Team – Spencer Halsey, Crop Team Leader

- Members:
  - Bob Ferguson, Ferguson Farms, Inc.
  - Larry Godfrey, UC Davis Entomology
  - Tim Hays, Wilbur-Ellis Company
  - Cade Johnson, Leafworks
  - Rachael Long, UCCE, Yolo County
  - Dan Putnam, UCCE, Plant and Environmental Sciences, UCD
  - Jesse Richardson, Dow AgroSciences and California Alfalfa and Forage Association
Chlorpyrifos (Lorsban®) is an important tool for managing specific pests in an IPM program

There is ongoing public concern about chlorpyrifos

The job of Crop Teams is to:
1) Identify critical uses
2) Promote sound decision-making when considering chlorpyrifos use in IPM program
From the Start, Stakeholders Wanted DPR to Know:

- Chlorpyrifos (Lorsban®) is an important IPM tool
- For some pests there are no alternatives
- They fear that tool might be taken away or use made more restrictive
- Need for scientific data to justify any restrictions
- Tool should be reserved for appropriate situations
How is “Critical Use” Determined?

- Role of chlorpyrifos in IPM programs
- Efficacy and cost of chlorpyrifos versus alternative active ingredients (AIs)
- Impacts of alternative AIs e.g., more frequent applications, effects on pollinators and other non-target species
- Availability, applicability and impacts of alternative, non-chemical practices
What Are “Critical Uses”? 

- **Key pests** with no or few alternatives insecticides 
- **Important pests** with alternative insecticides 
- **Occasional pests** with alternative insecticides 

- Does not imply priority or ranking 
- “Criticality Spectrum”
Annual Chlorpyrifos Use in Alfalfa
Pounds AI – 2002-2012

- 0.48 lbs AI/acre
- 41% of acres
Process
Three Facilitated Meetings
March to May 2014

- Identify Critical Pests
  - Start with UC IPM PMG pests for which chlorpyrifos is recommended
  - Add other pests for which chlorpyrifos is applied
  - Consider "heavy-use" pests as a focus
- Evaluate crop loss risk of that pest
- Consider economics of alternatives
- Consider consequences of alternatives
- Reach consensus on a criticality spectrum
Alfalfa Pests Identified Against Which Chlorpyrifos is Used

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<thead>
<tr>
<th>Alfalfa Caterpillar</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>Alfalfa Weevil</td>
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<td>Beet Armyworm</td>
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<td>Blue Alfalfa Aphid</td>
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<td>Cowpea Aphid</td>
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<td>Cutworm</td>
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<td>Leafhoppers</td>
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<td>Pea Aphid</td>
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<tr>
<td>Spotted Alfalfa Aphid</td>
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<td>Webworm</td>
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<tr>
<td>Yellow-striped Armyworm</td>
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</table>
### Critical Uses of Chlorpyrifos in Alfalfa

<table>
<thead>
<tr>
<th>Criticality Tier</th>
<th>Pest</th>
<th>Number of Modes of Action in Addition to Chlorpyrifos</th>
<th>Alternative Practices Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Pests with Few or No Alternatives</td>
<td>Weevil (Alfalfa and Egyptian)</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Blue Alfalfa Aphid</td>
<td>2</td>
<td>Yes</td>
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<tr>
<td></td>
<td>Cowpea Aphid</td>
<td>1</td>
<td>No</td>
</tr>
<tr>
<td>Important Pests with Alternative</td>
<td>Alfalfa Caterpillar</td>
<td>5</td>
<td>Limited</td>
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<tr>
<td></td>
<td>Armyworm (Beet and Yellow-Striped)</td>
<td>5</td>
<td>Limited</td>
</tr>
<tr>
<td></td>
<td>Pea Aphid</td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td>Occasional Pests with Alternatives</td>
<td>Cutworm</td>
<td>3</td>
<td>No</td>
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<tr>
<td></td>
<td>Leafhoppers</td>
<td>3</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Spotted Alfalfa Aphid</td>
<td>2</td>
<td>Yes</td>
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<tr>
<td></td>
<td>Webworm</td>
<td>4</td>
<td>No</td>
</tr>
</tbody>
</table>
Monthly Chlorpyrifos Use in Alfalfa
Pounds AI

46% of Annual Use on Average
Issues, Gaps and Challenges

- Extension (7)
- Research (12)
- Policy (7)
Next Steps

- Getting the word out at meetings and in alfalfa press
- Training and workshops throughout the state in Fall/Winter 2015-16

Continual Improvement in the Face of Constant Change
Thank You

“Over the past dozen years, it seems like we have been playing a game of Jenga® with CDPR; they have pulled one AI after another until we depend on an important product to hold up the pest management system”
7 Issues Identified by Crop Team Policy

**UC**
- Need additional Specialist and Farm Advisors for agronomic crops
- Restore IPM funding

**DPR/EPA**
- Increase the number of AIs
- MRLs for additional AIs for export markets

**Alfalfa and Forage Industry Organizations:**
- Lack of targeted research & extension funding is hampering progress
12 Issues Identified by Crop Team Research

- More insecticides with alternative modes of action and more information on their use
- More information on pest, their biology, life cycles and behavior
- Improve monitoring and decision tools
- More information on management of pests with alternative practices
- Host plant resistance - improve and expand
7 Issues Identified by Crop Team Extension

- Revise & improve UC IPM PMGs
- Improve pest identification and extension outreach effort
- Highlight the complex of variables PCAs must take into account prior to making an insecticide recommendation in alfalfa
- Improve information exchange between PCAs, growers and extension to track regional pest outbreaks