ALFALFA PEST MANAGEMENT

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Alfalfa production areas

- Trinity-Klamath Mtn
- Intermountain
- Sacramento Valley
- Central Valley
- San Joaquin Valley
- Coastal
- Mojave Desert
- High desert
- Southern Desert Valley
- Imperial Valley
- Riverside
- San Bernardino
- Colusa
- Glenn
- Sutter
- Fresno
- Kern
- Kings
- Merced
- Tulare
- Madera
- Los Angeles
- San Diego
- San Francisco
Numerous occasional pests

### Insects and Mites
- Blister Beetles
- Clover Root Curculio
- Grasshoppers
- Ground Mealybug
- Mormon Cricket
- Sharpshooters
- Silverleaf Whitefly
- Spider Mites
- Threecornered Alfalfa Hopper
- Thrips
- Webworm
Outbreaks Are Complex Events

- Insects
- Development of Tolerance
- Change in behavior
- Variety Selection
- Host Plant Resistance
- Production Practices
- Insecticide Use & Pattern
- Conditions Favorable for Outbreak
- Conditions not favorable for cutting or treating
- Reduced Natural Enemy Activity
- Conditions Favorable for 1st Cutting
- Enhanced Natural Enemy Activity

Human impact

Environment
How to Manage Pests

Alfalfa

Year-Round IPM Program

Tells you what you should be doing throughout the year in an overall IPM program. Includes Year-Round IPM Program Annual Checklist. | Forms and Photo ID Pages |

Year-Round IPM Program for Alfalfa (11/06)

- Winter
- Spring
- Summer
- Fall

UC IPM Pest Management Guidelines

University of California’s official guidelines for pest monitoring techniques, pesticides, and nonpesticide alternatives for managing pests in agriculture, floriculture, and commercial turf. More

General Information

- Integrated Pest Management (11/06)
- Selecting the Field (11/06)
- Transgenic Herbicide-Tolerant Alfalfa (11/06)
- Biological Control (11/06)
- Sampling with a Sweep Net (11/06)
- Crop Rotation (11/06)
- Aphid Monitoring (9/07)

Insects and Mites

- Alfalfa Caterpillar (9/10)
- Beet Armyworm (9/10)
- Blister Beetles (11/06)
- Blue Alfalfa Aphid and Pea Aphid (4/08)
- Clover Root Curculio (11/06)
- Cowpea Aphid (4/08)
Ground Mealybug

- Below ground pest
  - Small - about 1/16" long
  - White powdery secretions
  - Difficult to assess
  - Difficult to treat

- Typically found in heavy clay soils
- Feeding interacts with stressful environmental conditions resulting in devitalization of plant growth
- Crop rotation appears to be only management option – wheat, beans, corn, sugarbeets
Clover Root Curculio

• Below ground pest
  – Small - about 1/32" long
  – White “grublike” larvae
  – Difficult to assess
  – Difficult to treat

• Typically found in sandy soils
• Feeding creates gouges in the tap root.
• Feeding interacts with stressful environmental conditions resulting in devitalization of plant growth
• Root damage is a pathway for fungal infections
Mean number of insects/10 sweeps

Winter Population Dynamics of Select Insects in Untreated Alfalfa

- TCAH nymphs
- TCAH Adults
- PLH
- Lepidoptera

Insect mortality from cold temperatures
# Potato Leafhopper Thresholds

<table>
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<tr>
<th>Provider</th>
<th>Alfalfa Height (inches)</th>
<th>Hoppers/inch of plant height</th>
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<tr>
<td></td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>0.2</td>
<td>0.5</td>
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<td>Hoppers/inch</td>
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<table>
<thead>
<tr>
<th>Provider</th>
<th>3</th>
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<td>Illinois</td>
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</table>
Population Dynamics of the Potato Leafhopper in Spring
Cyfluthrin Treated Alfalfa Stubble vs. Untreated Alfalfa

Mean number of insects/10 sweeps ± SEM

Sample date:
- 5/17/10
- 5/24/10
- 5/31/10
- 6/7/10 6/14/10 6/21/10
- 6/28/10
- 7/5/10
- 7/12/10
- 7/19/10
- 7/26/10 8/2/10 8/9/10 8/16/10
- 8/23/10
- 8/30/10
- 9/6/10
- 9/13/10 9/20/10 9/27/10 10/4/10

Graph shows:
- Control
- Spring stubble treatment
Three-cornered alfalfa hopper

- Three-cornered alfalfa hoppers can be found year-round.

- Wide host range that includes alfalfa, clovers, cowpeas, grasses, small grains (barley, oats, wheat), soybeans, sunflowers, tomatoes, vetch and weeds.

- There are two population peaks for adults: one in late July/early August and a larger second peak in September/early October.
Population Dynamics of the Three Cornered Alfalfa Hopper in Spring Cyfluthrin Treated Alfalfa Stubble vs. Untreated Alfalfa

Mean number of insects/10 sweeps ±SEM

Sample date:
- 05/17/10
- 05/24/10
- 05/31/10
- 06/07/10
- 06/14/10
- 06/21/10
- 06/28/10
- 07/05/10
- 07/12/10
- 07/19/10
- 07/26/10
- 08/02/10
- 08/09/10
- 08/16/10
- 08/23/10
- 08/30/10
- 09/06/10
- 09/13/10
- 09/20/10
- 09/27/10
- 10/04/10

Legend:
- Control
- Spring stubble treatment
Lepidoptera Population Dynamics in Spring Cyfluthrin Treated Alfalfa Stubble vs. Untreated Alfalfa

Mean number of insects/10 sweeps ±SEM

- Control
- Spring stubble treatment

Natural enemy suppression

Sample date

- 5/17/10
- 5/24/10
- 5/31/10
- 6/7/10
- 6/14/10
- 6/21/10
- 6/28/10
- 7/5/10
- 7/12/10
- 7/19/10
- 7/26/10
- 8/2/10
- 8/9/10
- 8/16/10
- 8/23/10
- 8/30/10
- 9/6/10
- 9/13/10
- 9/20/10
- 9/27/10
- 10/4/10
Season Long Comparison of Alfalfa Plant Height in Spring
Stubble Treated Alfalfa vs. Untreated Alfalfa

Plant height (cm) ±SEM

Sample date

Summer slump

Spring stubble treatment
Control

Sample date
<table>
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<tr>
<th>Variety</th>
<th>Location</th>
<th>Resistance to Root Rot</th>
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<tbody>
<tr>
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<td>HR</td>
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<tr>
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<td>Croplan</td>
<td>MR</td>
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<td>S &amp; W</td>
<td>R</td>
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<tr>
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<td>S &amp; W</td>
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<td>S &amp; W</td>
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<td>W-L Research</td>
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<td>AFX 1060</td>
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<tr>
<td>SW 10</td>
<td>S &amp; W</td>
<td>MR</td>
</tr>
<tr>
<td>WL 712</td>
<td>W-L Research</td>
<td>LR MR</td>
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</tbody>
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Source: NAFA 2016
versus
Beat Net Collections of Three Cornered Alfalfa Hopper Collected from Cyfluthrin Treated Alfalfa Stubble vs. Untreated Alfalfa

![Graph showing beat net collections of Three Cornered Alfalfa Hopper nymphs and adults under different treatments.](graph.png)
Natural Enemies

- Use of insecticides
  - Destruction of natural enemies
  - Treatment costs
  - Environmental consequences
  - Insecticide resistance

- Early harvest of the field
- Treat at economic threshold
- Early in the season natural enemy populations are at their lowest
Epizootic Outbreak

• Natural enemy
  – Pathogen
  – Egyptian alfalfa weevil
  – Needs to be included in pest assessment

• Unpredictable

• When conditions are favorable

• Can impact populations significantly to the point of creating local “extinction”
Thanks for your attention