Stink Bug and Three-Cornered Alfalfa Hopper Management in Soybean

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Louisiana State University Agricultural Center
Three-Cornered Alfalfa Hopper (TCAH)
TCAH Injury

- Feed by random or continuous punctures around stems, branches, petioles, pedicels, and peduncles
Early Season TCAH Injury

- Feeding low on main stem can cause girdling
Early Season TCAH Injury and Loss

- Feeding low on main stem can cause girdling
- Girdling of main stem can cause lodging, stem breakage and stand reduction (Mitchell and Newsom 1984)
- Stand reduction of up to 45% before R1 does not decrease yield (Caviness and Miner 1962)
- > 65% of plants must be girdled before yield reduction occurs (Mueller and Jones 1983)
- Yield loss often does not occur due to compensation by adjacent plants
Late Season TCAH Injury and Loss

- Feeding on pedicels and peduncles during pod set (R3 to R4)
- Reduce # of pods and # of seeds per pod
- 9 to 20 bu/A loss (Sparks and Newsom 1984)
Early Season Girdling with Late Season Lodging
Simulated TCAH Lodging at R5

Percent Plants Lodged

- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%

Significant Yield Loss

Seed Yield

Seed Weight

MRSB0803A
TCAH Control: Insecticide Seed Treatments

Major seed companies will only offer seed treated with ISTs in 2010
TCAH Control: IST 2006
V4 stage, 23 DAP

Adults (Percent)

UTC  |  Gaucho  |  Cruiser
--- | --- | ---

|  | 2.0 oz form/cwt (thiamethoxam) | 1.28 oz form/cwt (imidacloprid) |

MRSB0602A
In 2008, three-cornered alfalfa hopper was not controlled 28 days after planting.

Efficacy of ISTs dependent on several factors:
- Growing conditions
- Rainfall
## Insecticide Seed Treatments: 2008 Yield

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (bu/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTC</td>
<td>51 ± 2 a</td>
</tr>
<tr>
<td>Cruiser 5FS</td>
<td>49 ± 2 a</td>
</tr>
<tr>
<td>Gaucho 600ES</td>
<td>49 ± 4 a</td>
</tr>
</tbody>
</table>

Yields (~ 50 bu/A) were not different between insecticide treatments and untreated checks.
Soybean IST Performance
Mid-South 2003-2008
3.3 bu/Acre Average
79% Probability of Positive Net Return

Catchot – Preliminary Summary 2008
Double-Cropping Soybeans and Wheat
Three Cornered Alfalfa Hopper Control with Cruiser in Soybeans

**Hoppers were caged on soybeans for 72 hours. Soybeans were planted June 10.**
# TCAH Control: Foliar Insecticides

## Louisiana Soybean Insecticide Guide 2008

<table>
<thead>
<tr>
<th>Insect</th>
<th>Insecticide (Lb. Al/ Gallon)</th>
<th>Pounds Active Ingredient Per Acre</th>
<th>Acres Treated Per Gallon</th>
<th>When to Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three-cornered Alfalfa Hopper</td>
<td>Baythroid XL</td>
<td>0.013-0.022</td>
<td>80-45</td>
<td>Three nymphs per row foot or 1 adult per sweep, starting at pod set.</td>
</tr>
<tr>
<td></td>
<td>Asana XL (0.66)</td>
<td>0.03-0.05</td>
<td>22-13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prolex (1.25)</td>
<td>0.0125</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Karate Z (2.08)</td>
<td>0.025</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mustang Max (0.8)</td>
<td>0.017-0.025</td>
<td>47-32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cyfluthrin (2)</td>
<td>0.025-0.044</td>
<td>80-45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Orthene (Acephate 90)</td>
<td>0.75-1.0</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>
TCAH Control: Foliar Insecticides

- Mustang Max 0.8EC (0.0225)
- Hero 1.24EC (0.048)
- Prolex 1.25EC (0.014)
- Discipline 2EC (0.05)
- Orthene 90SP (0.5)
- Brigade 2EC (0.05)
- Karate-Z 2.09CS (0.028)
- Silencer 1EC (0.025)
- Discipline 2EC (0.1)
- Non-treated

Action Threshold: 25 per 25 sweeps

10 DAT
Early season damage often compensated for by adjacent plants.

However, girdled plants which lodge at R5 may cause significant yield loss.

ISTs provide control for 21 days.
Stink Bug Injury

❖ Stink bug feeding:

Reduces yield, quality and oil content (Todd and Turnipseed 1974)

Reduces germination (Jensen and Newsom 1972)

Causes delayed maturity (Boethel et al. 2000)
Mid-to-Late Season Injury
Insecticide Termination Trials
## Insecticide Termination Trials

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate/Acre</th>
<th>Sprays (No.)</th>
<th>Yield (bu/A)</th>
<th>Moisture (%)</th>
<th>100 seed wt. (g)</th>
<th>Abnormal seed (#/100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-treated</td>
<td>0</td>
<td>0</td>
<td>29.2 b</td>
<td>18.5 a</td>
<td>10.7 b</td>
<td>19.3 a</td>
</tr>
<tr>
<td>Orthene (R5)</td>
<td>0.8</td>
<td>4</td>
<td>35.0 b</td>
<td>17.6 ab</td>
<td>11.3 b</td>
<td>6.3 a</td>
</tr>
<tr>
<td>Orthene (R6)</td>
<td>0.8</td>
<td>5</td>
<td>39.8 a</td>
<td>16.3 b</td>
<td>11.6 b</td>
<td>7.4 a</td>
</tr>
<tr>
<td>Orthene (R7)</td>
<td>0.8</td>
<td>6</td>
<td>40.5 a</td>
<td>16.0 b</td>
<td>12.1 a</td>
<td>3.8 a</td>
</tr>
<tr>
<td><em>(P&gt;F)</em></td>
<td></td>
<td>&lt; 0.01</td>
<td>&lt; 0.01</td>
<td>0.04</td>
<td>0.09</td>
<td></td>
</tr>
</tbody>
</table>

Insecticide applications started at R4.
Untreated through R7

Treated through R7

Untreated
# Soybean Feed Quality

**Grains:**

**PACKAGE A (USUALLY GRAINS)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Crude Protein</th>
<th>Calcium</th>
<th>NE&lt;sub&gt;L&lt;/sub&gt;, NE&lt;sub&gt;M&lt;/sub&gt;, NE&lt;sub&gt;G&lt;/sub&gt;</th>
<th>Starch</th>
<th>Phosphorus</th>
<th>Moisture</th>
<th>Oil</th>
<th>Magnesium</th>
</tr>
</thead>
</table>

**PACKAGE A + AMINO ACIDS (Corn and Soybeans)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Crude Protein</th>
<th>Calcium</th>
<th>Phosphorus</th>
<th>Magnesium</th>
<th>Starch</th>
<th>Oil</th>
<th>NE&lt;sub&gt;L&lt;/sub&gt;, NE&lt;sub&gt;M&lt;/sub&gt;, NE&lt;sub&gt;G&lt;/sub&gt;</th>
<th>Lysine</th>
<th>Threonine</th>
<th>Methionine</th>
<th>Cystine</th>
<th>Iodophan</th>
<th>Histidine</th>
<th>Moisture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**ANALAB, Inc.**
18246 Waller Road
Fulton, IL 61252
Phone: 800-435-9560
Fax: 815-589-4565
E-mail: info@analabtest.com
# Soybean Quality Results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% SB dmg</th>
<th>Yield (bu/A)</th>
<th>% Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-treated</td>
<td>56 ± 7 a</td>
<td>21 b</td>
<td>19.6 ± 0.5 b</td>
</tr>
<tr>
<td>Treated*</td>
<td>37 ± 6 b</td>
<td>37 a</td>
<td>21.1 ± 0.2 a</td>
</tr>
</tbody>
</table>

*P>F < 0.001

* Treated 4 times
Species Composition and Identification

Insecticide Control

Successful control

- S. Green & Green Stink Bug
- Large, late-instar nymphs

Difficult control

- Red Banded Stink Bug
Stink Bugs Species Composition - MRS

Red Banded
5
12

Brown Complex
13
19
44
52

Green Complex
83
8

MG IV
MG V
MG VI
Total

2008
Red Shouldered Stink Bug?

Red Banded Stink Bug

Red Shouldered Stink Bug *Thyanta sp.*
Piezodorus guildinii (Westwood, 1837)

- **Identification:**
  - Much smaller than other green stinkbugs
  - Can be distinguished from *Thyanta* species on the basis of a spine extending from the second abdominal segment between the hind coxae
# Stink Bug Control: Foliar Insecticides

## Louisiana Soybean Insecticide Guide 2008

<table>
<thead>
<tr>
<th>Insect</th>
<th>Insecticide (Lb. Al/ Gallon)</th>
<th>Pounds Active Ingredient Per Acre</th>
<th>Acres Treated Per Gallon</th>
<th>When to Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brown Stink Bugs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baythroid XL (1)</td>
<td>0.022</td>
<td>45</td>
<td></td>
<td>Treatment threshold same as for Green/Southern Green stink bugs.</td>
</tr>
<tr>
<td>Orthene (Acephate 90)</td>
<td>0.75</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl parathion (4)</td>
<td>0.5-1.0</td>
<td>8-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyfluthrin (2)</td>
<td>0.044</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mustang Max (0.8)</td>
<td>0.025</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Red Banded Stink Bug</strong> (Piezodorus guildinii)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthene (Acephate 90)</td>
<td>0.75-1.0</td>
<td>NA</td>
<td></td>
<td>24 stink bugs in 100 sweeps.</td>
</tr>
<tr>
<td>Endigo</td>
<td>see label</td>
<td>32-28.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suppression</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyfluthrin (2)</td>
<td>0.044</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Green/Southern Green Stink Bugs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baythroid XL (1)</td>
<td>0.013-0.022</td>
<td>NA</td>
<td></td>
<td>After pods appear, 1 stink bug per row foot, or 36 in 100 sweeps. Stink bugs should be 1/4 inch or larger. Treat soybeans grown for seed at 1 stink bug per 6 row feet or 6 stink bugs in 100 sweeps.</td>
</tr>
<tr>
<td>Orthene (Acephate 90)</td>
<td>0.75</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl parathion (4)</td>
<td>0.25-0.5</td>
<td>16-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mustang Max (0.8)</td>
<td>0.02-0.025</td>
<td>40-32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karate Z (2.08)</td>
<td>0.025-0.03</td>
<td>83-69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolex (1.25)</td>
<td>0.0125-0.015</td>
<td>100-83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyfluthrin (2)</td>
<td>0.025-0.044</td>
<td>80-45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trap Crop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Stink Bug Control: Foliar Insecticides

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karate</td>
<td>Lambda-cyhalothrin</td>
</tr>
<tr>
<td>Centric</td>
<td>Thiamethoxam</td>
</tr>
<tr>
<td>Endigo</td>
<td>Bifenthrin + Imidacloprid</td>
</tr>
<tr>
<td>Orthene</td>
<td>Acephate</td>
</tr>
<tr>
<td>Hero</td>
<td>Zeta-cypermethrin + Bifenthrin</td>
</tr>
<tr>
<td>Capture</td>
<td>Bifenthrin</td>
</tr>
<tr>
<td>Baythroid + Orthene</td>
<td>Cyfluthrin + Acephate</td>
</tr>
<tr>
<td>Leverage</td>
<td>Imidacloprid + Cyfluthrin</td>
</tr>
<tr>
<td>Brigade</td>
<td>Bifenthrin</td>
</tr>
<tr>
<td>Mustang Max</td>
<td>Zeta-cypermethrin</td>
</tr>
<tr>
<td>Prolex</td>
<td>Gamma-cyhalothrin</td>
</tr>
</tbody>
</table>
Insecticide Efficacy Against All Stink Bugs, 2007

- Karate-Z 2.08CS (0.0312)
- Centric 40WG (0.05)
- Centric 40WG (0.0625)
- Endigo 2.06CS (0.056)
- Endigo 2.06CS (0.072)
- Hero 2.08EC (0.13)
- Capture 2EC (0.0785)
- Prolex 1EC (1.54)
- Non-treated

**Results:**

- **2 DAT:**
  - P<0.01
  - Treatments with different letters are significantly different.

- **7 DAT:**
  - P<0.01
  - Treatments with different letters are significantly different.
Insecticide Efficacy Against All Stink Bugs, 2008

- Karate 2.08CS (0.0312)
- Orthene 90SP (0.9)
- Baythroid XL 1EC (0.0219) + Orthene (0.675)
- Mustang Max 0.8EC (0.025)
- Leverage 2.7SE (0.08)
- Non-treated

Total No./25 sweeps

- 2 DAT
- 7 DAT
- 8 DAT

P<0.01
Insecticide Efficacy Against *Piezodorus*, 2008

- Karate 2.08CS (0.0312)
- Orthene 90SP (0.9)
- Baythroid XL 1EC (0.0219) + Orthene (0.675)
- Mustang Max 0.8EC (0.025)
- Leverage 2.7SE (0.08)
- Non-treated

![Bar chart showing insecticide efficacy](chart.png)

- P<0.01
- NS
Stink Bug Summary

- Significant yield effects through R6
- Seed damage and quality studies suggest injury through R7
- R4-R5 sprays reduced “green bean effects”
Aphids on LA Soybean in 2008

- Numerous reports of aphids on soybean
- Samples collected and sent for identification
- All samples came back as cotton aphid
There is no data on how damaging cotton aphid can be to soybean.

However, with the populations we saw, this may be a potential new threat to LA soybean production.
Aphid Trapping Network

- Set up pan traps 8 locations

Ben Hur
Burden
Chase
Crowley
Dean Lee
Macon Ridge
Opelousas
St. Gabriel
Foliar Insecticides for Aphid Control

Tested on green peach aphid and cotton aphid

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% control*</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTC</td>
<td>0</td>
</tr>
<tr>
<td>Fulfill 50WG</td>
<td>100</td>
</tr>
<tr>
<td>Endigo ZC</td>
<td>100</td>
</tr>
</tbody>
</table>

*3 and 7 DAT
## Pyrethroid Labels for Soybean Aphid

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Active Ingredient</th>
<th>Rate/Acre (fl. oz.)</th>
<th>REI (Hours)</th>
<th>PHI (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asana*</td>
<td>esfenvalerate</td>
<td>5.8 to 9.6</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td>Baythroid**</td>
<td>cyfluthrin</td>
<td>2.8 fl. oz.</td>
<td>12</td>
<td>45</td>
</tr>
<tr>
<td>Mustang Max</td>
<td>zeta-cypermethrin</td>
<td>2.8 to 4.0</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td>Warrior</td>
<td>lambda-cyhalothrin</td>
<td>1.92 to 3.2</td>
<td>24</td>
<td>45</td>
</tr>
<tr>
<td>Pounce*</td>
<td>permethrin</td>
<td>4.0 to 8.0</td>
<td>12</td>
<td>60</td>
</tr>
</tbody>
</table>

* 2(ee) Label  
** Labeled for soybean aphid Suppression

Eileen Cullen - UW Extension, Entomology
Soybean Aphid Insecticide Trial in IA 2003
(highest soybean aphid = 214/leaflet Aug 25)

- Asana XL 6.4 oz
- Baythroid 2.8 oz
- Furadan 8 oz
- Lorsban 16 oz
- Mustang Max 3.5 oz
- Warrior T 3.2 oz
- UTC

Bushels/acre

35 40 45 50

8.5 bu.

courtesy M. Rice Iowa State University
For 2009

- Cotton aphid or Soybean aphid?

- If you find aphids on soybean, please send an email or call
  jeffdavis@agcenter.lsu.edu
  225-578-5618
Thank You

Questions?