Soybean IPM Issues

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Department of Entomology
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Insecticide Seed Treatments (ISTs)

Efficacy of ISTs dependent on several factors:
- Growing conditions
- Rainfall

Effective for ~30 days in soybean
Potential Targets of IST in Soybean

- Thrips
- Threecornered alfalfa hopper
- Grasshoppers
- Bean leaf beetle
- *Colaspis* spp
- Banded cucumber beetle
# Insecticide Seed Treatments: Thrips Control 2010, 2011

<table>
<thead>
<tr>
<th>Product</th>
<th>Company</th>
<th>Active Ingredient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleron IX-409</td>
<td>Monsanto</td>
<td>imidacloprid (48.7%)</td>
</tr>
<tr>
<td>Cruiser 5FS</td>
<td>Syngenta Crop Protection</td>
<td>thiamethoxam (47.6%)</td>
</tr>
<tr>
<td>Gaucho 600</td>
<td>Bayer CropScience</td>
<td>imidacloprid (48.7%)</td>
</tr>
<tr>
<td>NipsIt INSIDE</td>
<td>Valent USA</td>
<td>clothianidin (47.8%)</td>
</tr>
<tr>
<td>Poncho/VOTiVO</td>
<td>Bayer CropScience</td>
<td>clothianidin (40.3%) and <em>Bacillus firmus</em> (8.1%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>% Thrips Control (14 to 21 DAP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceleron IX-409</td>
<td>90</td>
</tr>
<tr>
<td>Cruiser 5FS</td>
<td>98</td>
</tr>
<tr>
<td>Gaucho 600</td>
<td>95</td>
</tr>
<tr>
<td>NipsIt INSIDE</td>
<td>72</td>
</tr>
<tr>
<td>Poncho/VOTiVO</td>
<td>87</td>
</tr>
</tbody>
</table>
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<table>
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<tr>
<td>Poncho/VOTiVO</td>
<td>Bayer CropScience</td>
<td>clothianidin (40.3%) and <em>Bacillus firmus</em> (8.1%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>Yield (bu/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated Check</td>
<td>40</td>
</tr>
<tr>
<td>Acceleron IX-409</td>
<td>41</td>
</tr>
<tr>
<td>Cruiser 5FS</td>
<td>48</td>
</tr>
<tr>
<td>Gaucho 600</td>
<td>45</td>
</tr>
<tr>
<td>NipsIt INSIDE</td>
<td>46</td>
</tr>
<tr>
<td>Poncho/VOTiVO</td>
<td>45</td>
</tr>
</tbody>
</table>
# LOUISIANA RECOMMENDATIONS FOR
CONTROL OF INSECTS ON SOYBEANS

<table>
<thead>
<tr>
<th>Insect</th>
<th>Insecticide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three-cornered alfalfa hopper</td>
<td>Asana XL (0.66)</td>
</tr>
<tr>
<td></td>
<td>Karate Z (2.08)</td>
</tr>
<tr>
<td></td>
<td>Declare (1.25)</td>
</tr>
<tr>
<td></td>
<td>Cyfluthrin (2)</td>
</tr>
<tr>
<td></td>
<td>Baythroid XL (1)</td>
</tr>
<tr>
<td></td>
<td>Mustang Max/Respect(0.8)</td>
</tr>
<tr>
<td></td>
<td>Orthene (Acephate)</td>
</tr>
<tr>
<td></td>
<td>Hero (1.24)</td>
</tr>
</tbody>
</table>

**When to Treat**

**(Economic threshold)**

Starting at pod set, treat for 3 nymphs per row foot or 1 adult per sweep.
## Foliar Insecticides: Threecornered Alfalfa Hopper Control

<table>
<thead>
<tr>
<th>Treatment/ formulation</th>
<th>Active Ingredient</th>
<th>% Control</th>
<th>2 DAT</th>
<th>8 DAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baythroid XL + Orthene 90S</td>
<td>beta-cyfluthrin + acephate</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Endigo ZC</td>
<td>lambda-cyhalothrin + thiamethoxam</td>
<td>100</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>Hero 1.24EC</td>
<td>bifenthrin</td>
<td>98</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>Karate Z 2.08CS</td>
<td>lambda-cyhalothrin</td>
<td>96</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Leverage 2.7SE</td>
<td>beta-cyfluthrin + imidacloprid</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Orthene 90S</td>
<td>acephate</td>
<td>95</td>
<td>93</td>
<td></td>
</tr>
</tbody>
</table>

Davis 2012
Stink Bugs
No. of adult stink bugs

<table>
<thead>
<tr>
<th>Date</th>
<th>Total stink bugs sampled</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total adults</td>
<td>3058</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>Total nymphs</td>
<td>299</td>
<td>9</td>
</tr>
<tr>
<td>Brown complex</td>
<td>860</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Green complex</td>
<td>522</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Redbanded</td>
<td>1932</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>43</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Davis et al. 2012
Redbanded Stink Bug Status 2009 to 2011

Weekly samples from late May – early October

Red River Sta
2009: 848
2010: 118
2011: 3

Macon Ridge Sta
2009: 433
2010: 17
2011: 6

Dean Lee Sta
2009: 791
2010: 311
2011: 90

Cold temperatures

Rice Sta
2009: 30
2010: 22
2011: N/A

Ben Hur Sta
2009: 409
2010: 23
2011: 526

New Iberia Sta
2009: 1338
2010: 1370
2011: 427

Drought

10,000 sweeps per location
Why did redbanded stink bug populations decrease in 2010 and 2011?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben Hur</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Chase</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Crowley</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dean Lee</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>New Iberia</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Red River</td>
<td>1</td>
<td>0</td>
<td>18</td>
<td>12</td>
<td>0</td>
</tr>
</tbody>
</table>

Preliminary data indicates that for each hour below 20°F there is 8% decrease in population.
R5 to R8

0 stink bugs/25 sweeps

3 stink bugs/25 sweeps

Action Threshold = 6 per 25 sweeps for redbanded stink bug
# LOUISIANA RECOMMENDATIONS FOR
# CONTROL OF INSECTS ON SOYBEANS

<table>
<thead>
<tr>
<th>Insect</th>
<th>Insecticide</th>
<th>When to Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redbanded stink bug&lt;sup&gt;4&lt;/sup&gt;</td>
<td>&lt;CONTROL&gt; Orthene (Acephate)</td>
<td>Treat for 24 bugs in 100 sweeps.</td>
</tr>
<tr>
<td></td>
<td>Endigo ZC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brigade (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hero (1.24)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leverage 360</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;SUPPRESSION&gt; Cyfluthrin (2)</td>
<td></td>
</tr>
</tbody>
</table>
# Foliar Insecticides: Redbanded Stink Bug Control

<table>
<thead>
<tr>
<th>Treatment/Active formulation</th>
<th>Active Ingredient</th>
<th>% Control</th>
<th>2 DAT</th>
<th>7 DAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baythroid XL + Orthene 90S</td>
<td>$\beta$-cyfluthrin + acephate</td>
<td>100</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Belay</td>
<td>clothianidin</td>
<td>80</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Belay + Orthene</td>
<td>clothianidin + acephate</td>
<td>100</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Besiege</td>
<td>chlorantraniliprole + $\lambda$-cyhalothrin</td>
<td>80</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Brigade</td>
<td>bifenthrin</td>
<td>94</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Brigadier</td>
<td>bifenthrin + imidacloprid</td>
<td>100</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>Centric</td>
<td>thiamethoxam</td>
<td>60</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Endigo ZC</td>
<td>$\lambda$-cyhalothrin + thiamethoxam</td>
<td>87</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Hero 1.24EC</td>
<td>bifenthrin</td>
<td>81</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Karate Z 2.08CS</td>
<td>$\lambda$-cyhalothrin</td>
<td>54</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Leverage 2.7SE</td>
<td>$\beta$-cyfluthrin + imidacloprid</td>
<td>66</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Orthene 90S</td>
<td>acephate</td>
<td>97</td>
<td>68</td>
<td></td>
</tr>
</tbody>
</table>
Perimeter Applications

- Site-specific targeted insecticide applications

**Figure 2.** Perimeter insecticide applications keep stink bug numbers below the action threshold.

- Mean Number Stink Bugs Per 25 Sweeps from R5 to R7
  - Action Threshold for Redbanded Stink Bug = 6 Per 25 Sweeps

- Untreated Check
- 100 Percent Treated
- 25 Percent Treated

Davis et al. 2011
## 2009 Stink bug Screening Results

<table>
<thead>
<tr>
<th>Variety</th>
<th>RBSB CID</th>
<th>% Dmg Seed</th>
<th>Yield (bu/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S49-47</td>
<td>148 b</td>
<td>50 b</td>
<td>65 a</td>
</tr>
<tr>
<td>4906RR</td>
<td>222 ab</td>
<td>63 a</td>
<td>75 a</td>
</tr>
<tr>
<td>48R14</td>
<td>305 a</td>
<td>55 ab</td>
<td>50 bc</td>
</tr>
<tr>
<td>94Y90</td>
<td>187 b</td>
<td>51 b</td>
<td>65 ab</td>
</tr>
<tr>
<td>4888RR/S</td>
<td>212 ab</td>
<td>56 ab</td>
<td>48 c</td>
</tr>
<tr>
<td>95Y20</td>
<td>14 c</td>
<td>19 c</td>
<td>76 a</td>
</tr>
</tbody>
</table>

*P*-value: <0.0001 <0.0001 <0.0001
Conclusions

✓ Current soybean varieties differ in their susceptibility to the redbanded stink bug

✓ Pioneer 95Y20 had the lowest redbanded stink bug CID and least amount of stink bug damage

✓ These varieties are MG appropriate and yield well under various environmental conditions
Lepidopteran Defoliators
## LOUISIANA RECOMMENDATIONS FOR CONTROL OF INSECTS ON SOYBEANS

<table>
<thead>
<tr>
<th>Insect</th>
<th>Insecticide</th>
<th>When to Treat (Economic threshold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velvetbean Caterpillar³</td>
<td>Methyl parathion (4)  Sevin (carbaryl) (4)  Tracer (4)  Lorsban/chlorpyrifos (4)  Larvin (3.2)  Belt (4)  Karate Z (2.08)  Declare (1.25)  Cyfluthrin (2)  Baythroid XL (1)  Mustang Max/Respect(0.8)  Intrepid (2)  Lannate (2.4)  Hero (1.24)  Dimilin (2)</td>
<td>Treat for 8 worms, ½ inch or longer, per row foot or 300 worms in 100 sweeps.</td>
</tr>
</tbody>
</table>
## LOUISIANA RECOMMENDATIONS FOR CONTROL OF INSECTS ON SOYBEANS

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<thead>
<tr>
<th>Insect</th>
<th>Insecticide</th>
<th>When to Treat (Economic threshold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean looper</td>
<td>Larvin (3.2)</td>
<td>Treat for 8 worms, ½ inch or longer, per row foot or 150 worms in 100 sweeps.</td>
</tr>
<tr>
<td></td>
<td>Lannate$^6$ (2.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tracer$^7$ (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steward (1.25)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intrepid (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Belt (4)</td>
<td></td>
</tr>
</tbody>
</table>
Insecticide Control Options

- Belt
- Intrepid
- Larvin
- Steward
- Tracer
- Prevathon (Coragen) - 2012

Thresholds
Defoliation should not exceed 20% (R1-R5)
Yield loss due to VBC and SBL 2010

Bu/A loss

<table>
<thead>
<tr>
<th>% Defoliation</th>
<th>Yield (bu/A)</th>
<th>Bu/A loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>50</td>
<td>-4</td>
</tr>
<tr>
<td>20%</td>
<td>50</td>
<td>-9</td>
</tr>
<tr>
<td>40%</td>
<td>50</td>
<td>-13</td>
</tr>
<tr>
<td>60%</td>
<td>50</td>
<td>-23</td>
</tr>
<tr>
<td>80%</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>0%</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
# Foliar Insecticides: Soybean Looper Residual Control

<table>
<thead>
<tr>
<th>Treatment/formulation</th>
<th>Active Ingredient</th>
<th>7 DAT</th>
<th>14 DAT</th>
<th>21 DAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belt SC</td>
<td>flubendiamide</td>
<td>100</td>
<td>88</td>
<td>76</td>
</tr>
<tr>
<td>Coragen SC</td>
<td>chlorantraniliprole</td>
<td>100</td>
<td>91</td>
<td>76</td>
</tr>
<tr>
<td>Dimlin 2L</td>
<td>diflubenzuron</td>
<td>29</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Dimlin 2L + Intrepid 2F</td>
<td>diflubenzuron + methoxyfenozide</td>
<td>71</td>
<td>64</td>
<td>10</td>
</tr>
<tr>
<td>Dimlin 2L + Karate 2.08 CS</td>
<td>diflubenzuron + lambda-cyhalothrin</td>
<td>29</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Dimlin 2L + Tracer</td>
<td>diflubenzuron + spinosad</td>
<td>85</td>
<td>64</td>
<td>15</td>
</tr>
<tr>
<td>Intrepid 2F</td>
<td>methoxyfenozide</td>
<td>70</td>
<td>52</td>
<td>35</td>
</tr>
<tr>
<td>Larvin</td>
<td>thiodicarb</td>
<td>65</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Steward 1.25EC</td>
<td>indoxacarb</td>
<td>80</td>
<td>55</td>
<td>19</td>
</tr>
</tbody>
</table>

Davis 2012
## Foliar Insecticides: Soybean Looper Defoliation

<table>
<thead>
<tr>
<th>Treatment/formulation</th>
<th>% Defoliation 21 DAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated check</td>
<td>27</td>
</tr>
<tr>
<td>Belt SC</td>
<td>4</td>
</tr>
<tr>
<td>Coragen</td>
<td>4</td>
</tr>
<tr>
<td>Dimlin 2L</td>
<td>20</td>
</tr>
<tr>
<td>Dimlin 2L + Intrepid 2F</td>
<td>8</td>
</tr>
<tr>
<td>Dimlin 2L + Karate 2.08</td>
<td>18</td>
</tr>
<tr>
<td>Dimlin 2L + Tracer</td>
<td>6</td>
</tr>
<tr>
<td>Intrepid 2F</td>
<td>6</td>
</tr>
<tr>
<td>Larvin</td>
<td>10</td>
</tr>
<tr>
<td>Steward EC</td>
<td>14</td>
</tr>
</tbody>
</table>
Soybean Looper Intrepid LD$_{95}$ 2010

10X to 32X more product needed
Monitoring for Soybean Looper Tolerance to Intrepid 2F Results

✓ Resistance to Intrepid exists in Louisiana soybean looper populations

✓ Do not use low volumes and low rates (4 oz/A)
   There have been reports of 2 oz/A being used. This is NOT a labeled rate

✓ Use high rates (6 to 8 oz/A)

✓ Use other products
  Belt = $12 to $16 per acre
  Intrepid = $10 per acre
Brown marmorated stink bug
(*Halyomorpha halys* Stahl)
Survey Status of **Brown Marmorated Stink Bug - Halyomorpha halys**
2008 to present

Legend:
- Established by Consensus
- Established by Survey
- Being Eradicated
- Eradicated
- Found
- Not Found
- Survey in Progress
- No Survey
Kudzu Bug
ACKNOWLEDGEMENTS:
This work was funded in part by the Louisiana Soybean and Grain Research and Promotion Board.