Management of Stink Bugs: a Southeast Perspective

Jack Bacheler
NCSU
Selected tests; 2004-2008:

- Bug damage: yield penalty influenced by phenology
  - 19 tests
- Stink bug thresh. evaluations
  - 28 tests
- Stink bug damage vs. quality:
  - 43 tests
- External boll damage vs. internal damage & yield
  - 40 tests
Progressive protection tests: 20

- GA
- SC
- NC

Legend:
- Green = 2008
- Yellow = 2007
- Orange = 2006
- Blue = 2005
- Red = 2004
Progressive bug protection tests: diagram

- 6 to 8 rows / plot
- 50 -100 ft. / plot
- Pyrethroid + Bidrin

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
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<td>1</td>
<td>3</td>
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<td>5</td>
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<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
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</table>
Examples of data taken:

- Square retention
- Dirty blooms
- Beat cloth samples
- Sweep net counts
- Cadaver counts
- Quarter sized boll damage
- Boll diameters weekly
- Year end boll damage (w, s, w + s)
- Final adjusted yields (Microgin)
Selected Observations
Mean number plant bugs/6 row ft. in check, 1st 5 wks. of bloom 2005-2008 (adults + nymphs)
Retention of upper squares: means for 1st five wks of blooming in check, 2005-2008
Percent dirty blooms: means for 1st five wks of blooming in check, 2004-2008
Proportion of green, brown and southern green stink bugs at selected test locations, 2004-2008

- Green
- Brown
- Southern green
- Other
Bug damage to bolls: extreme variability
Bollworm vs. stink bug damage to bolls and yield loss in NC

(n = 10 & 13 tests)

<table>
<thead>
<tr>
<th>Lb. lint lost / 1% boll damage</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bollworm</td>
<td>12.4</td>
</tr>
<tr>
<td>Stink bug</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Good news #1:
Stink bug damage to bolls vs. yield; Wayne Co., 2004

Good news #2:

Boll damage

Pounds of lint cotton / acre

y = -7.076 x + 1870.7

R^2 = 0.895
Boll age and size vs. yield loss

(approx. 1.25” diam.)
NCSU BollSizer

Safe boll

1 ¼ ”

Quarter size

15/16 ”

College of Agr. & Life Sciences
Yield change from spray at designated weeks of bloom, NC & GA, 2004 - 2007 (n = 16 tests)

Week of bloom

Lb. lint / acre

1-2  2-3  3-4  4-5  5-6  6-7

-5.8 -6.2 10.4 59.3 19.1 -24.0
Relationship between stink bug damage to quarter-sized bolls and yield loss, 2005 - 2006

(Yield difference: treated vs. UT)

<table>
<thead>
<tr>
<th>Location</th>
<th>Yield Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wayne, NC</td>
<td>-479</td>
</tr>
<tr>
<td>GA 2005</td>
<td>-762</td>
</tr>
<tr>
<td>Union, NC</td>
<td>-8</td>
</tr>
<tr>
<td>Scot., NC</td>
<td>-15</td>
</tr>
<tr>
<td>SC 2006</td>
<td>106</td>
</tr>
</tbody>
</table>
Bolls size per week in Wayne Co., NC: 2004

Percent Boll Sizes

- % < 1.25
- % > 1.25

Weeks 2 to 10
Bolls size per week in Wayne Co., NC: 2004

- **Wk 2**: More safe bolls
- **Wk 3**: More safe bolls
- **Wk 4**: More safe bolls
- **Wk 5**: More safe bolls
- **Wk 6**: More safe bolls
- **Wk 7**: More safe bolls
- **Wk 8**: More safe bolls
- **Wk 9**: More safe bolls
- **Wk 10**: More safe bolls

Legend:
- Blue = % < 1.25
- Red = % > 1.25
Bolls size per week in Wayne Co., NC: 2004

Low bug levels

More safe bolls
Bolls size per week in Wayne Co., NC: 2004

Critical Period?

Low bug levels

More safe bolls
Dynamic stink bug threshold:

<table>
<thead>
<tr>
<th>Week of bloom</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
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<td>4</td>
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<td>5</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>50</td>
</tr>
<tr>
<td>8</td>
<td>50</td>
</tr>
</tbody>
</table>
Selected tests; 2006-2007:

✓ Bug damage: yield penalty influenced by phenology
   19 tests

✓ Stink bug thresh. evaluations
   28 tests

✓ Stink bug damage vs. quality:
   43 tests

✓ External boll damage vs. internal damage & yield 40 tests
Thresholds evaluated in 2006-2007: 28 tests:

- Weekly spray
- 10%
- 20%
- 30%
- Dynamic
- Untreated
Stink bug threshold evaluation study; NC, GA and SC (13 sites, 2007)

- Weekly: +38.1 Lb. lint/acre, -$32.84, 6.40 app.
- Dynamic: +28.7 Lb. lint/acre, $4.80, 1.54 app.
- Untreated: $0, 0 app.

*Net: $0.65/lb. & $9.00/appl.*
Stink bug threshold evaluation study; NC, GA and SC (12 sites, 2007)

*Net: $0.65/lb. & $9.00/appl.*
Stink bug threshold evaluation study; NC, GA and SC (7 sites, 2007)

<table>
<thead>
<tr>
<th>Method</th>
<th>Lb. lint / Acre</th>
<th>Weekly</th>
<th>10%</th>
<th>20%</th>
<th>Dynamic (50,30,10,10,10,30,50)</th>
<th>Untreated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>+22.9</td>
<td>+14.3</td>
<td>+21.7</td>
<td>+21.6</td>
<td>+14.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-$41.73</td>
<td>-$28.56</td>
<td>$2.50</td>
<td>-$1.35</td>
<td>$0*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.29 app.</td>
<td>2.14 app.</td>
<td>1.29 app.</td>
<td>1.71 app.</td>
<td>0 app.</td>
</tr>
</tbody>
</table>

*Net: $0.65/lb. & $9.00/appl.
Stink bug threshold evaluation study; NC, GA and SC (9 sites, 2006)

<table>
<thead>
<tr>
<th></th>
<th>Lb. lint / acre</th>
<th>Weekly</th>
<th>20%</th>
<th>Dynamic</th>
<th>Untreated</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(50,30,10,10,10,10,30,50)</td>
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<tr>
<td>Weekly</td>
<td></td>
<td>a</td>
<td>bc</td>
<td>ab</td>
<td>c</td>
</tr>
<tr>
<td></td>
<td>+115</td>
<td>+46</td>
<td>+85</td>
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<td></td>
<td>$19.75</td>
<td>$19.90</td>
<td>$38.25</td>
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<td>$0*</td>
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<tr>
<td></td>
<td>6.1 app.</td>
<td>1.1 app.</td>
<td>1.9 app.</td>
<td>0 app.</td>
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</tbody>
</table>

*Net: $0.65/lb. & $9.00/appl.*
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Selected fiber qualities for three stink bug “management” approaches, 2005

Stink bug trials in GA, NC, SC, & AL (n = 11 locations)

<table>
<thead>
<tr>
<th>2005</th>
<th>Untreated</th>
<th>20 % threshold</th>
<th>Aggressively sprayed</th>
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<tbody>
<tr>
<td>Lint/acre</td>
<td>760 a</td>
<td>1125 b</td>
<td>1232 b</td>
</tr>
<tr>
<td>Lint %</td>
<td>34.93 a</td>
<td>36.21 b</td>
<td>36.25 b</td>
</tr>
<tr>
<td>MIC</td>
<td>4.27 a</td>
<td>4.37 b</td>
<td>4.43 b</td>
</tr>
<tr>
<td>UHM (32nds)</td>
<td>35.62 a</td>
<td>36.01 b</td>
<td>36.03 b</td>
</tr>
<tr>
<td>UI</td>
<td>81.18 a</td>
<td>81.63 b</td>
<td>81.60 b</td>
</tr>
<tr>
<td>STR</td>
<td>30.08 a</td>
<td>29.97 a</td>
<td>30.06 a</td>
</tr>
<tr>
<td>Rd</td>
<td>75.37 a</td>
<td>76.81 b</td>
<td>77.23 b</td>
</tr>
<tr>
<td>+b</td>
<td>9.04 a</td>
<td>8.46 b</td>
<td>8.25 b</td>
</tr>
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HVI – Cotton Incorporated
(trial means analyzed as reps)
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New possible lead:

Relationship between external and internal boll damage and yield

Eric Blinks, Ames Herbert, and John Van Duyn