Soybean Production Management Strategies Comparison

- Loren Giesler, Nebraska Extension Plant Pathologist
- Tom Hunt, Nebraska Extension Entomologist
- Josh Miller, Doctoral Student, University of Nebraska–Lincoln
  Doctor of Plant Health and Pathology Program

The role of insecticidal seed treatments in insect pest management (IPM)

- Tom Hunt, Nebraska Extension Entomologist
- Ron Seymour, Nebraska Extension Educator – Entomologist
- Bob Wright, Nebraska Extension Entomologist

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Insecticidal Seed Treatment in Soybean

Adapted from: Kelley J. Tilmon, OSU

NCSRP Multistate Experiment, 2012-2013

- Funded in part by the Nebraska Soybean Board
- Broad-scale study of thiamethoxam seed treatments
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- Expression in pollen?
- Efficacy against soybean aphid?
- Net return of thiamethoxam vs. IPM (scouting/thresholds/foliar-treatment)?
Thiamethoxam concentration in new soybean vegetation
• Within 3 weeks - thiamethoxam in foliage is equivalent to non-treated plants

What about yield?
2012 Study Design
• Five states, six locations
• Minimum plot size = 40’ x 4 rows (30”); 4 reps
• Three treatments:
  – Naked seed
  – ApronMaxx
  – CruiserMaxx
### STATE TREATMENT YIELD (bu/acre)

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**NCSRP results 2012**

- No significant difference between any treatments
- No intrinsic “yield bump” from seed treatment

**Similar to previous Nebraska Soybean Board Study**

- 3 year, 2 NE locations
- No significant difference between treatments
2013 Study Design

- Added additional states/sites (7 states, 8 locations)
- Added an “IPM treatment” = foliar insecticide applied when aphids reach 250 aphid/plant threshold
- Conducted economic analysis to compare likelihood of return on seed treatment vs. scout+spray
**SOYBEAN MANAGEMENT FIELD DAYS**

**IPM (scout and treat) vs. CruiserMaxx-only:**

**Economic analysis**

- What are the chances of a net return with either approach?
  - thiamethoxam seed treatment
  - scouting/thresholds/foliar-treatment
- Assumes an “aphid year”
- Common assumptions:
  - Soybean price = $11.36/bu
  - Soybean yield = 50 bu/acre
Costs of IPM approach:
$7.44/ac scouting
$7.20/ac application cost
$4.43/ac cost of insecticide
Assume 25% of fields require treatment
= 94.5% chance of positive net return;
average return $21.02/ac

Costs of CruiserMaxx-only approach:
$7.67/ac insecticidal seed treatment
= 66.2% chance of positive net return;
average return of $6.02/ac

If you didn’t scout and spray these treatments you lost money. If you did, you paid for your insect management twice.
Where it Helps

- High probability of early-season pests, such as bean leaf beetle
- Soil pests (wireworms etc.), such as after CRP

Problems with Overuse

- Insecticide resistance – not just target pest!
- The area is blanketed with a neurotoxin – upset natural balance
- Unnecessary expense
Update on current soybean diseases

- Loren Giesler, Nebraska Extension Plant Pathologist
Sudden Death Syndrome

- Pockets in fields
- Symptoms at top of plant first
Sudden Death Syndrome

- Note discoloration at base that can extend up the plant several feet under the epidermal layer.
Brown Stem Rot Management

- Plant resistant varieties where available
- Utilize multi-year rotations (fungus survives in the residue).
- Tillage will help break down residue.
Sudden Death Syndrome (SDS) **Management**

- Variety selection
- Avoid early planting
- Crop Rotation
- Seed treatments
Varieties vary in their susceptibility to SDS.

• Recommendation -- plant high-risk SDS fields last in planting order
• Don’t compromise yield potential to manage SDS
Sudden Death Syndrome (SDS)

- New in 2014: Bayer introduced seed treatment ILeVO®
- Many trials out in 2015

Source: Albert Tenuta OMAFRA

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SOIL SAMPLING

(Use your check off: Free SCN Assays are available)

- Soil sampling is the first step to determine if you have SCN or not.
- This program will be active again in 2016.

SCN Distribution in Nebraska
Year 1 – Non-Host Crop
Year 2 – Resistant Variety
Year 3 – Non-Host Crop
Year 4 – Resistant Variety
Year 5 – Non-Host Crop
Year 6 – Resistant Variety

Know your source of resistance and rotate with other sources.

Soybean Disease Videos on Crop Watch!
Integrated Evaluation of Common Inputs to Increase Yield in Nebraska: Three Year Summary

- Josh Miller, Doctoral Student, University of Nebraska–Lincoln
  Doctor of Plant Health and Pathology Program

Soybean Management Field Day locations from 2013 through 2015.
Specific **early season treatments** used in three-year study. (+) and (-) used to indicate in what year(s) a product was used. All seed treatments were applied to seed prior to planting.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Apron XL – Maxim 4FS - Vibrance</td>
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<tr>
<td>Fungicide</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Apron XL – Maxim 4FS – Vibrance – Cruiser 5FS</td>
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<tr>
<td>Nitrogen</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>UAN</td>
</tr>
<tr>
<td>Fungicide + Insecticide</td>
<td>+</td>
<td>-</td>
<td>+</td>
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</tr>
<tr>
<td>Fungicide + Insecticide + Biological</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>Apron XL – Maxim 4FS – Vibrance – Cruiser 5FS – QuickRoots</td>
</tr>
</tbody>
</table>

Specific **pod set treatments** used in three-year study.

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Yield results for the effect of row spacing at each of the 2013 and 2014 SMFD locations and overall average yields.

### Row Spacing (in.) Location and Yield (bu/ac)

<table>
<thead>
<tr>
<th>Row Spacing (in.)</th>
<th>Minden</th>
<th>Pierce</th>
<th>Waterloo</th>
<th>York</th>
<th>Auburn</th>
<th>Belgrade</th>
<th>Shickley</th>
<th>Snyder</th>
<th>Average</th>
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<tr>
<td>15</td>
<td>74.3</td>
<td>72.2</td>
<td>64.8</td>
<td>73.8</td>
<td>60.7</td>
<td>81.3</td>
<td>80.6</td>
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<td>73.6</td>
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<td>30</td>
<td>79.0</td>
<td>70.5</td>
<td>57.1</td>
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**Prob>F**  
- 2013 Minden: 0.04  
- 2013 Pierce: 0.01  
- 2013 Waterloo: 0.02  
- 2013 York: 0.15  
- 2014 Auburn: 0.15  
- 2014 Belgrade: 0.28  
- 2014 Shickley: 0.86  

**CV(%)**  
- Minden: 7.0  
- Pierce: 6.8  
- Waterloo: 20.0  
- York: 8.2  
- Auburn: 8.2  
- Belgrade: 10.8  
- Shickley: 7.1  
- Snyder: 7.5  

**LSD (α=0.05)**  
- 1.4  
- 1.2  
- 3.1  
- 1.6  
- 0.15  
- 0.28  
- 0.86

Average yield response for the effect of early season inputs. Different letters denote significant difference.
Average yield response by year for the effect of early season inputs. Different letters denote significant differences between treatments within a year. Only 2014 had significant differences.

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- Low disease and insect pressure
Take Home Messages

• Narrower row spacing generally increases soybean yields
• Early season treatments increased populations at all sites and increased yields marginally
• Late season foliar treatments varied in yield response, but positive yield responses only occurred in 2014
• No interaction between early season inputs and pod set inputs was observed
Chemical/Biological Control

Application of fungicides to manage brown spot in Nebraska is typically not warranted with most varieties. Yield loss as high as 10% has been observed in one fungicide trial conducted in south central Nebraska. In irrigated fields or in wet years with a variety which is known to develop brown spot significantly, a fungicide application may increase profitability. If applied, timing of the application should be in the flowering through pod fill stages depending on the time of disease development.

Resources

- sulfur Fungicide Use In Soybean (UNL NebGuide G1862)
- Brown Spot of Soybeans (UNL NebGuide G2099)
- North Central Soybean Research and Education Initiative: Brown Spot (Septoria Leaf Spot)

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SOYBEAN MANAGEMENT FIELD DAYS

General Management Guidelines

- Look for the presence of aphid natural enemies such as lady beetles, green lacewings, insidious flower bugs, aphid mummies, fuzzy aphids, and other insect predators. Predators and parasitoids may keep low or moderate aphid populations in check. Often soybean aphids can be found by examining plants where lady beetles are observed.

- Take note of winged aphids or "broad-shouldered" nymphs. Nymphs with broad or squared-off shoulders will become winged adults. A magnifying glass is helpful to see the "broad-shouldered" nymphs, but the winged adults are easy to see with the naked eye. If the majority of aphids are winged or developing wings, the aphids may soon leave the field and head for another field.

Exploratory Research

Reduced Agent and Area Treatments (RAATs) for Soybean Aphid Management

NebGuide

See “General Management Guidelines” in Soybean Aphid Management in Nebraska (122953)

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• Condensed and easy-to-read summary of UNL research
cropwatch.unl.edu/soycal
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