ON-FARM NETWORK®
’17 CORN TRIAL & SURVEY RESULTS

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IOWA SOYBEAN Association
Summary of On-Farm Network 2017 Corn Trials*

We will attempt to cover:

1. Corn following Cover Crops trials
2. Results of Biological, Humic and PGR trials
3. Highlights of the Corn Rootworm Beetle survey
4. Corn Nematode survey
5. Progress during the initial season of Multi-Rate Nitrogen trials
This presentation…
How and why does the On-Farm Network conduct corn trials?

- All Iowa soybean growers also raise corn.
- No soybean checkoff dollars are used for corn research. Sponsorship and grants cover trial costs.
- There is a need for unbiased corn production research. We’re already set up for that!
- Corn production influences soybean production issues and vice versa.
- The On-Farm Network was born pioneering 4R nitrogen studies.
On-Farm Network
Cover Crop Trials

Prior to 2016:
Emphasized learning, but key parameters were not well defined.

From 2016-17 onward:
Using best practices, focus on long-term benefits.
  • Erosion control
  • Soil health
  • Building organic matter
  • Weed control
Corn Following Cover Crops – 2015-17
Cereal Rye (& blends) vs. Untreated only
Keys to Corn Following Cover Crops

- Termination
- Stand establishment/residue management
- Nitrogen Management

2018 corn after cover crop opportunities:

- Cover Crop Time of Termination – Early vs. Late
- Nitrogen Management after Cover Crops – Starter/AMS vs. other
- Row Cleaners in No-till & Cover Crops (Limited)
MycoApply EndoPrime™ technology in corn

• Valent MycoApply EndoPrime is a concentrated WP containing four endomycorrhizal fungi in humic acid for in-furrow applications
• Early development work by Valent and the University of Wisconsin indicate yield enhancement in corn
MycoApply EndoPrime™ technology in corn

Outcome

• Non-commercial version led to application rate errors
• Possible tendency for response on highly productive soils?
• Not enough data to draw conclusions
• RETEST in ‘18
Trial Report* - Page 1

- Trial ID
- Trial type
- Imagery – Natural color and IR
- County

*Reports available on On-Farm Network® Replicated Strip Trial Database
https://www.iasoybeans.com/programs/isa-research/get-informed/research-results/online-database/
• Trial details
• Layout of replications within the field
• Yield of individual reps
• Average yield of treatments w/statistical statement
• Spatial graphic of yield & soils map
• Yield level by treatment
• Yield by treatment & soil type
• Combine speed by treatment
• Grain moisture by treatment
• Cumulative rainfall for location vs. 30-yr. average
• State cumulative rainfall map with county outlined
<table>
<thead>
<tr>
<th>Soil Map Unit</th>
<th>Map Symbol</th>
<th>Percent of Trial (%)</th>
<th>Yield (bu/acre)</th>
<th>Yield Difference (bu/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EndoPrime</td>
<td>Untreated</td>
<td>EndoPrime</td>
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<tr>
<td>Canisteo Silty Clay Loam, 0 To 2 Percent Slopes</td>
<td>507</td>
<td>19.8</td>
<td>17.7</td>
<td>222.1</td>
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<tr>
<td>Nicollet Loam, 1 To 3 Percent Slopes</td>
<td>55</td>
<td>15.6</td>
<td>15.4</td>
<td>201.3</td>
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<tr>
<td>Harps Loam, 0 To 2 Percent Slopes</td>
<td>95</td>
<td>7.7</td>
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<td>213.2</td>
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<tr>
<td>Clarion Loam, 2 To 5 Percent Slopes</td>
<td>138B</td>
<td>4.8</td>
<td>6.1</td>
<td>194.2</td>
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<tr>
<td>Clarion Loam, 5 To 9 Percent Slopes, Moderately Eroded</td>
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<td>2.1</td>
<td>1.3</td>
<td>190.8</td>
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<tr>
<td>Okoboji Mucky Silt Loam, 0 To 1 Percent Slopes</td>
<td>90</td>
<td>0.8</td>
<td>0.9</td>
<td>259.9</td>
</tr>
</tbody>
</table>

*Yield differences calculated for Soil Map Units that have relatively small areas might not be representative of the treatments.
## Yield By Treatment and Soil Map Unit

<table>
<thead>
<tr>
<th>Soil Map Unit</th>
<th>Map Symbol</th>
<th>Percent of Trial (%)</th>
<th>Yield (bu/acre)</th>
<th>Yield* Difference (bu/acre)</th>
</tr>
</thead>
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<tr>
<td>Clarion Loam, 5 To 9 Percent Slopes, Moderately Eroded</td>
<td>138C2</td>
<td>13.8</td>
<td>197.6</td>
<td>0.3</td>
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<tr>
<td>Nicollet Loam, 1 To 3 Percent Slopes</td>
<td>55</td>
<td>12.2</td>
<td>192.9</td>
<td>-5.4</td>
</tr>
<tr>
<td>Webster Silty Clay Loam, 0 To 2 Percent Slopes</td>
<td>107</td>
<td>6.8</td>
<td>218.6</td>
<td>5.6</td>
</tr>
<tr>
<td>Okoboji Mucky Silt Loam, 0 To 1 Percent Slopes</td>
<td>90</td>
<td>5.9</td>
<td>248.0</td>
<td>8.3</td>
</tr>
<tr>
<td>Harps Loam, 0 To 2 Percent Slopes</td>
<td>95</td>
<td>5.7</td>
<td>200.9</td>
<td>-2.0</td>
</tr>
<tr>
<td>Clarion Loam, 2 To 5 Percent Slopes</td>
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<td>4.6</td>
<td>200.7</td>
<td>8.6</td>
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<td>511</td>
<td>0.9</td>
<td>243.7</td>
<td>-2.1</td>
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</tbody>
</table>

*Yield differences calculated for Soil Map Units that have relatively small areas might not be representative of the treatments.*
Dakota REV on corn

- Dakota REV is a proprietary peat-based humic product for corn or soybeans
- Crossover product from the turfgrass industry
- Applied in-furrow at planting or foliar at V3-V5
- Pulverized organic humic compounds in a water carrier are the sole ingredients
Dakota REV on corn

Outcome

- Unconvincing results applied both in-furrow (2016) and over the top (2017)
- Results suggest that the best placement may be in stressed environments and fields with lower productivity
Tryptophan co-product in corn

- Derived from Tryptophan production at Iowa corn milling campus
- Acts as growth stimulant similar to auxins
- Experimental stage - Formulation & Rate under development
2017 Tryptophan co-product trials

- Half of all trials were in or around Mahaska County
- All applications were during the month of June
- Dry conditions intensified during June through the end of the season
Outcome

• Trials clustered near distribution
• Area highly stressed
• Results variable
• Trials in ’18 with next generation formula
2017 Corn Rootworm Beetle Survey

199 fields
  • 98 COC
  • 97 corn after soybeans
  • 4 other
  • Generated 797 field/weeks of CRW counts
94 of the 199 fields monitored by ISA interns & staff
CRW Trapping - Field Layout

Clearly mark edge of field and record GPS point for each sampling point so you can get back to where the sticky traps are.

- 4 points in a line
- 100 – 200 ft apart
2017 Corn Rootworm Beetle Survey

Highlights

797 field/weeks of data
- 10.4% near or over threshold*
- 2.4% NCRW (usually rotated)
- 6.8% WCRW (COC)
- Difference is N+W, migrated

*Weekly threshold = 56 [(2 beetles x 4 traps) x 7 days]
2017 Corn Rootworm Beetle Survey

Highlights

• 120 times we got 0 beetles (15%)
• 42% of the time there was ≤ 1/trap
• Field 009 (Washington Co., COC) – 1081* beetles over 6 weeks
• Field 010 (Boone Co., COC) – 1072 beetles over 5 weeks
• Both fields had insecticide @planting and full trait stacks

*Weekly threshold = 56
What Happened From 2016 to 2017?

CRW activity - 2016

Peak Beetle Count—Beetles / Trap / Day

- 5
- 2
- 1.3
- 0.3
- 0
What Happened From 2016 to 2017?
What Happened From 2016 to 2017?

2016

2017

7/4/17

ISA '17
Corn Nematode Survey

Methods
• Timing of sampling: 4-6 weeks after planting (V3-V6)
• Soil Probes: 6-8” deep at angle through the root zone
• 20 cores per 40 acres
• Sample locations chosen to represent loam, clay and sandy soils
• 82 usable locations
## Nematodes that Feed on Corn

* damage thresholds

(per g root for lance and lesion, all others per 100 cc soil)

- dagger nematode: 300–400
- lance nematode: 300–400
- lesion nematode: 1,000
- needle nematode: 1
- ring nematode: 100
- spiral nematode: 500–1,000
- sting nematode: 1
- stunt nematode: 100

Courtesy: Greg Tylka
Spiral Nematode Populations in Iowa, 2017

Experts disagree on economic threshold for spiral nematode.
Root Lesion Nematode Populations in Iowa, 2017

1.000 is assumed threshold

Nematode Population per 100 cc of soil

Root_lesion

- 0 - 250 Not economic
- 251 - 479 Potentially economic
Corn Nematode Survey - Conclusions

- 9 fields had Spiral nematodes at economic levels (>500), 10 fields just below at 250-500
- 2 fields had Root Lesion nematodes near economic levels (>300)
- Other nematode species below economic levels.
- Cluster of higher counts in SE Iowa. Sampling also more concentrated there.
- Corn nematicide seed treatment trials in 2018?
Prospects for variable rate nitrogen in corn

In 2017, the On-Farm Network began a series of long-term trials to understand the best practices for creating variable rate nitrogen prescriptions.
Year 1 Lessons

Can we use *elevation* as a criteria to create management zones?

A: Optimum N Rate on the shoulder slopes were significantly greater than the responses on in the low spots and summits.
Year 1 Lessons

Is soil organic matter a good criteria for creating management zones for variable rate nitrogen?

A: Management zones with lower organic matter were more responsive to nitrogen rate.
Year 1 Lessons

Is soil EC a good criteria for creating management zones for variable rate nitrogen?

A: Soil EC did not do a good job creating zones for VRN in this field.
Further Data Collection and Honing in ‘18

Economical Proxy N Rates (lb/acre) by Soil Types, Topography and SOM

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Npnt Proxy lb N/acre</th>
<th>Area (%)</th>
<th>Landform</th>
<th>Npnt Proxy lb N/acre</th>
<th>Area (%)</th>
<th>Soil Organic Matter</th>
<th>Npnt Proxy lb N/acre</th>
<th>Area (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarion</td>
<td>162</td>
<td>36</td>
<td>Footslope</td>
<td>156</td>
<td>68</td>
<td>&lt; 3.0%</td>
<td>175</td>
<td>32</td>
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<tr>
<td>Cannisteo</td>
<td>177</td>
<td>23</td>
<td>Lowspot</td>
<td>142</td>
<td>9</td>
<td>3.0% &lt; 3.5%</td>
<td>147</td>
<td>17</td>
</tr>
<tr>
<td>Harps</td>
<td>147</td>
<td>19</td>
<td>Shoulder</td>
<td>182</td>
<td>8</td>
<td>3.5% &lt; 4.0%</td>
<td>156</td>
<td>19</td>
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<tr>
<td>Niccollet</td>
<td>159</td>
<td>13</td>
<td>Sideslope</td>
<td>177</td>
<td>15</td>
<td>4.0% &lt; 4.5%</td>
<td>156</td>
<td>23</td>
</tr>
<tr>
<td>Webster</td>
<td>163</td>
<td>9</td>
<td>Summit</td>
<td>N/A</td>
<td>0</td>
<td>4.5% &lt; 5.0%</td>
<td>146</td>
<td>9</td>
</tr>
</tbody>
</table>

Slightly higher N Rates for shoulder, sideslope and low Soil Organic Matter areas.
Thank you for your attention.