Precision Seed and Fertilizer

PRESENTED BY
Aaron Herrmann
Research Agronomist
How do WE manage crop nutrients for the grower’s peak profitability?
Managing Phosphorous for Grower Profitability

Right Time
Right Place
Right Amount

Starter Fertilizer on the Planter
Starter Adopters

- No Starter on Planter: 43.0%
- In-Furrow: 43.0%
- 2x2: 14.0%

Farm Journal - Text Survey - May 2015
Where?
Meet the Starter Skeptic

Starter Skeptic’s top reasons for not using starter?

“I’ve tried it and it didn’t work”

“Starter costs too much”

“I’ve tried it and it didn’t pay for itself”

“My soils test High/Very High in P & K so I don’t need starter”

“I am not going to slow down planting”

“Too much hassle”
"I tried starter and it didn’t work"

The Fine Print: He has put starter on at a in-furrow rate of 2-6 gallon and can’t see it on the yield monitor.
2017 Starter Rate Study

Yield (bu/ac) vs. Zone for Ipava

No starter: 279.7
FJ 6: 281.1
FJ 8: 282.8
FJ 10: 285.2
FJ 12: 285.4
FJ 14: 284.9

1.5 bu. increase

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Starter Rate Comparison
7-23-5+1Zn, Avg all attachments

2015 Starter Plot, Roth 60
10 Acre Ipava Soil Zone

Bu/A

<table>
<thead>
<tr>
<th>0 gal</th>
<th>3 gal</th>
<th>5 gal</th>
<th>10 gal</th>
<th>15 gal</th>
</tr>
</thead>
<tbody>
<tr>
<td>194.7</td>
<td>202.5</td>
<td>210.9</td>
<td>219.0</td>
<td>207.9</td>
</tr>
</tbody>
</table>

+7.8 bu.
+24.3 bu.
40% of Starter Yield Response Captured
FurrowJet

100% of Starter Yield Response Captured
Starter Skeptic

“Starter costs too much”

“I tried it and it didn’t pay for itself”

The Fine Print: He is admitting he gets extra bushels but <10 bu. Can’t pay for a $30 starter cost.
## Fertilizer Program ROI

### Program Scenario

- 250 Bu. Corn
- 0.35 lbs of P205 per bu removed
- 88 lbs of P205 for Maintenance
- DAP: $480 per ton
- 10-34-0: $450 per ton

### Gross $/ac

<table>
<thead>
<tr>
<th>Starter Response</th>
<th>Gross $/ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 bu/ac</td>
<td>$18 /ac</td>
</tr>
<tr>
<td>10 bu/ac</td>
<td>$35 /ac</td>
</tr>
<tr>
<td>15 bu/ac</td>
<td>$53 /ac</td>
</tr>
</tbody>
</table>
### Fertilizer Program Assessment

<table>
<thead>
<tr>
<th>Traditional Dry Program</th>
<th>P2O5</th>
<th>Fertilizer Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Broadcast</td>
<td>190lbs of Dry DAP (18-46-0)</td>
<td>88 lbs</td>
</tr>
</tbody>
</table>

#### No Reallocation

<table>
<thead>
<tr>
<th></th>
<th>P2O5</th>
<th>Fertilizer Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter</td>
<td>8GPA of Liquid (10-34-0)</td>
<td>32 lbs</td>
</tr>
<tr>
<td>Fall Broadcast</td>
<td>190lbs of Dry DAP (18-46-0)</td>
<td>88 lbs</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>= $67 /acre</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ <strong>$14/ac</strong></td>
</tr>
</tbody>
</table>

#### Reallocation: Starter Credit

<table>
<thead>
<tr>
<th></th>
<th>P2O5</th>
<th>Fertilizer Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter</td>
<td>8GPA of Liquid (10-34-0)</td>
<td>32 lbs</td>
</tr>
<tr>
<td>Fall Broadcast</td>
<td>120lbs of Dry DAP (18-46-0)</td>
<td>56 lbs</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>= $50 /acre</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ <strong>$31/ac</strong></td>
</tr>
</tbody>
</table>

#### Reallocation w/ Efficiency Factor (1.5x)

<table>
<thead>
<tr>
<th></th>
<th>P2O5</th>
<th>Fertilizer Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter</td>
<td>8GPA of Liquid (10-34-0)</td>
<td>32 lbs</td>
</tr>
<tr>
<td>Fall Broadcast</td>
<td>87lbs of Dry DAP (18-46-0)</td>
<td>40 lbs</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>= $42 /acre</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>$4 Cost</strong></td>
</tr>
</tbody>
</table>

- **No Opportunity for Starter Response**
“My soils test High/Very High in P & K so I don’t need starter”

The Fine Print: He believes high soil test values equals high amount of phosphorous into the plant.
How does fertilizer interact with the soil?

6,000 lbs of Phosphorous
Table 2: Effects of Soil Temperature on the Relative Availability of Phosphorus*

<table>
<thead>
<tr>
<th>Soil Temperature</th>
<th>Relative Availability (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>70°F</td>
<td>100</td>
</tr>
<tr>
<td>64°F</td>
<td>70</td>
</tr>
<tr>
<td>61°F</td>
<td>50</td>
</tr>
<tr>
<td>55°F</td>
<td>30</td>
</tr>
</tbody>
</table>

* Soil Temperature Effects P Use: Using starter fertilizer for corn grain, sorghum, soybeans - Hergert and Wortmann - Extension Soils Specialists, University of Nebraska - Lincoln
Phosphorus Not Available

Temperature, 4” Bare Soil Central IL 2017

60°F
### Temperature, 4” Bare Soil Central IL 2017

<table>
<thead>
<tr>
<th></th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30.8%</td>
<td>58.5%</td>
<td>98.3%</td>
</tr>
<tr>
<td></td>
<td>69.2%</td>
<td>41.5%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

- Phos. Available: 60 F
- Phos. Not Available: 60 F

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Soil biology has the power to tie up readily available N, P, and K fertilizers.
P Cycle

- Animal manures and biosolids
- Plant residues
- Atmospheric deposition (dust)
- Mineral fertilizers
- Runoff and erosion

Organic Phosphorus:
- Microbial
- Plant residues
- Humus

Soluble P:
- $\text{H}_2\text{PO}_4^-$
- $\text{HPO}_4^{2-}$

- Immobilization
- Mineralization
- Weathering
- Desorption
- Adsorption
- Dissolution
- Precipitation
- Leaching (usually minor)

- Primary minerals (apatite)
- Mineral surfaces (clays, Fe and Al oxides, carbonates)
- Secondary compounds (CaP, FeP, MnP, AlP)
Starter Skeptic

“I am not going to slow down planting”

“Too much hassle”

The Fine Print: He understands most of the value of starter but doesn’t want the hassle.
Reducing Hassle

Trouble-Free Attachments
Reducing Hassle

System Installation and Setup
Reducing Hassle

Logistics and Delivery
Questions on Starter Fertilizer?
Pursuit of Nitrogen Efficiency

PRESENTED BY

Kyle Muhlbauer
Regional Manager
N15 Plots

Labeled $^{15}\text{N}$ Fertilizer

Unlabeled soil N

Lighter

Heavier

Dr. Mulvaney
Kelsey Griesheim
University of Illinois
N15 Plots

Broadcast

Banding

Cropsmith Inc.
Tim Smith - owner

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N15 Plots, Harvest

Cropsmith Inc.
Tim Smith - owner
N15 Plots, Lab Analysis

Mass Spectrometer

Dr. Mulvaney
Kelsey Griesheim
University of Illinois
### 15N Nitrogen Tracer Plots

**FNUE, Fertilizer Nitrogen Uptake Efficiency**

- **Double Uptake Efficiency**
  - **Broadcast**: 27.45%
  - **Conceal Single**: 43.70%
  - **Conceal Dual**: 51.58%

Dr. Mulvaney
Kelsey Griesheim
University of Illinois
Volatilization Study
Conceal vs Dribble

Week 1
Conceal: -10
Dribble: -20

Week 3
Conceal: -5
Dribble: -50

52% Loss
Planter Nitrogen ROI

R&D & PTI Multi-Year Plot Average

Conceal Nitrogen on the Planter

$40/A
Equipment Rebate Programs
### Winter Conference 20|20

Sessions to help you maximize your farm

https://precisionplanting.wistia.com/medias/fs1vp4c2xd
Precision Planting Opportunities

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