Agenda

Furrow Environment Sensing
- Mechanical Issue Detection
- High Definition Zone Mapping

Taking Control
- Spatial Zone Management
- Seed Placement
- Multi-Genetic Planting

Nitrogen Management Trials
- Project Conceal

Starter Fertilizer Trials
- FurrowJet
The Ability to “Sense”

1. Furrow Environment Sensing
2. Mechanical Issue Detection
3. High Definition Zone Mapping
4. Controlling Seeding Rate
5. Controlling Genetics
The Ability to “Sense”

1. Furrow Environment Sensing
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Spatial Variability

Are farmers interested in defining it?
We know it’s been difficult in the past...
Can it be easier in the future?
Precision Planting: Do you have soil variability on your farms?

Yes: 91%
No: 9%
Have you created spatial management zones on your farm?

Yes: 25%
No: 75%
What datasets are you using to create spatial management zones on your farms?

- Soil Type: 10%
- Yield Data: 33%
- Veris EC Data: 5%
- Combination of the above: 48%
- Other: 5%
What about using Organic Matter to predict yield?
<table>
<thead>
<tr>
<th>% OM</th>
<th>2012 Corn</th>
<th>2013 Beans</th>
<th>2014 Corn</th>
<th>2015 Beans</th>
<th>2016 Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8-2.2</td>
<td>86%</td>
<td>93%</td>
<td>95%</td>
<td>97%</td>
<td>97%</td>
</tr>
<tr>
<td>2.3-2.7</td>
<td>97%</td>
<td>100%</td>
<td>98%</td>
<td>99%</td>
<td>94%</td>
</tr>
<tr>
<td>2.8-3.2</td>
<td>106%</td>
<td>103%</td>
<td>103%</td>
<td>100%</td>
<td>103%</td>
</tr>
<tr>
<td>3.3-4.5</td>
<td>115%</td>
<td>105%</td>
<td>105%</td>
<td>104%</td>
<td>109%</td>
</tr>
</tbody>
</table>
160,000 acres in IL and IN
2017 SmartFirmer Beta
Yield by Organic Matter

58 Fields
7 States:
- Minnesota
- Indiana
- Illinois
- Missouri
- Wisconsin
- North Dakota

100bu increase
16bu per 1% OM

$R^2 = 0.8101$
OM Is The Sponge Between Soil Minerals

Increase:
- Porosity
- Infiltration Rate
- Water use Efficiency
- Nutrient Use Efficiency
- Nutrient Retention
- Aggregation

Decrease:
- Compaction
- Crusting
- Runoff
- Erosion
## Water Supply Power of OM

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM</td>
<td>1.3%</td>
<td>2.4%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Rain Fall (30yr, April-Sept)</td>
<td>24.28in</td>
<td>24.28in</td>
<td>24.28in</td>
</tr>
<tr>
<td>Infiltration</td>
<td>1.5in/hr</td>
<td>3in/hr</td>
<td>5in/hr</td>
</tr>
<tr>
<td>Absorption (Rain rate &lt;= Infiltration)</td>
<td>47%</td>
<td>75%</td>
<td>90%</td>
</tr>
<tr>
<td>Useable Rain</td>
<td>11.41in</td>
<td>18.21in</td>
<td>21.85in</td>
</tr>
<tr>
<td>Total Water (Useable Rain + Soil)</td>
<td>19.41in</td>
<td>28.21in</td>
<td>31.85in</td>
</tr>
<tr>
<td>Yield Potential (3,000 gal per bushel)</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>
OM Has Amazing Water Retention Capacity

Every 1% Increase in OM
25,000 gal/A
More Available Water

Water Lost to Runoff
OM Has Amazing Water Retention Capacity

Every 1% increase in OM
25,000 gal/A
More Available Water

Water Lost to Runoff

10% OM Loam

1.5% OM Sandy Loam
OM is the Fingerprint of a Field
And SmartFirmer is the scanner.
**Definition:** Estimated Soil Organic Matter

**Range:** 0% - 60%
(Best at 1% - 5%)
Uniform Moisture  95%
Furrow Moisture

Definition: 3 day seed weight gain in that moisture
Range: 0 - 60%
Goal: Above 20%
Uniform Furrow (Formerly Uniform Moisture)

**Definition:** Any variation in furrow (e.g., light, cloddiness, moisture changes)

**Range:** 0 - 100%

**Goal:** Above 95%
Clean Furrow 98%
Clean Furrow

**Definition:** Absence of crop residue

**Range:** 0 - 100%

**Goal:** Above 95%
CleanSweep™
Definition: Real-time soil temperature during planting

Range: 32F - 100F.
Fast response.

Goal: Above 50F
The Ability to “Sense”

1. Furrow Environment Sensing
2. Mechanical Issue Detection
3. High Definition Zone Mapping
4. Controlling Seeding Rate
5. Controlling Genetics
Mechanical Issue Detection
Gauge Wheels Plugged (Uniform Furrow)
Significant Yield Loss
Mechanical Issue Detection
Mechanical Issue Detection
The Ability to “Sense”

1. Mechanical Issue Detection

May be most valuable aspect of SmartFirmer for a considerable amount of farmers
Tomorrow: vDrive® + vSet Select® + vApplyHD™ + SmartFirmer™
The Ability to “Sense”

1. Furrow Environment Sensing
2. Mechanical Issue Detection
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4. Controlling Seeding Rate
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Multi-Genetic Planting

Precision Placement of Seed
• Position the correct genetics on each acre
• Give the best opportunity to maximize yield across farm

Management Zone Creation
• Allowing offensive hybrids to flourish in HP soils
• Enabling defensive hybrids to “hold” yield in LP soils
3 Major Components of Multi-Genetic Planting

- Appropriate Genetics
- Spatial Management Zones
- Equipment
One of the most important decisions we can control........
Give the Best Opportunity to Maximize Yield

1. Create spatial management zones to define soil variability

- What is the variability?
- How much variability is it?
- Where is it in the field?
The Ability to “Sense”

High Definition Zone Mapping
The Ability to “Sense and Control”

1. High Definition Zone Mapping
2. Controlling Seeding Rate
3. Controlling Genetics
<table>
<thead>
<tr>
<th>OM%</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1.0%</td>
<td>28,000</td>
</tr>
<tr>
<td>1.0 %</td>
<td>30,000</td>
</tr>
<tr>
<td>1.8 %</td>
<td>32,000</td>
</tr>
<tr>
<td>2.7 %</td>
<td>34,000</td>
</tr>
<tr>
<td>4.0 %</td>
<td>36,000</td>
</tr>
<tr>
<td>&gt; 4.0%</td>
<td></td>
</tr>
</tbody>
</table>

Average Organic Matter: 2.30 %
Give the Best Opportunity to Maximize Yield

Position the correct genetics in each created zone
- Allow “offensive” hybrids to flourish in “High Yield” soils
- Enable “defensive” hybrids to hold yield in “Low Yield” soils
BIN - BUSTERS
DKC60-06
DKC62-78
DKC63-21
DKC64-35
DKC65-75
DKC70-27
AG 33X8
AG 36X6
AG 38X8
AG 39X7
AG 40X6

GO ANYWHERE
DKC60-53
DKC64-89
AG 34X8
AG 37X8
AG 40X6
AG 42X8
AG 44X6
AG 47X6

LIGHT GROUND LEADERS
DKC60-69
DKC62-98
DKC63-25
DKC65-95
DKC67-58
AG 38X6
AG 41X8
AG 43X8
AG 43X7
AG 45X8
Don't care if growers know names exactly, just remember where they fit for the most success @DKAS_SIL @Asgrow_DEKALB #PlacementisKey
Hybrid Potential Productivity

Multi-Hybrid Prescription
Give the Best Opportunity to Maximize Yield

3. Use proper planting equipment to automatically switch chosen genetics on-the-fly while planting.
vSet® Select

Introduced in 2014
vSet Select

Single Row, Dual Meter Technology
- 2 Meters
- 2 Crop Kits
- 2 vDrives

Hybrid Switching Occurs Based on which meter is spinning
“Perfect” Transitions
Today’s Planter Market

SpeedTube

vSet Select

Precision Planting
Multi-Genetic Planting

What is the next chapter?
Introducing...

mSet

Single Row, Single Meter Multi-Genetic Technology

vSet2 + vDrive + mSet
Today's Planter Market

SpeedTube

Multi-Genetic Planting
mSet Removes Speed vs. Multi-Genetic Decision
Divided Hopper

Seed Selector

Meter with Integrated Seed Level Sensor
Planter Nutrient Application

PRESENTED BY

Jason Webster
Lead Commercial Agronomist, CCA
Project Conceal
Nitrogen Management Trials

• Can we position Conceal as a nitrogen placement tool?

• How does it compare to current programs today?
2017 Nitrogen Management Study

- 25% PRE WNF + 25% Conceal + 50% V3 Sidedress
- 75% Conceal Dual Band + 50% V3 SideDress
- 75% Conceal Dual Band + 25% V3 SideDress
- 50% Conceal Dual Band + 50% V3 SideDress
- 25% Conceal Dual Band + 50% V3 SideDress
- 100% Conceal Dual Band
2017 Nitrogen Management Study

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- 50% Conceal Dual Band + 50% V3 SideDress
- 25% Conceal Dual Band + 50% V3 SideDress
- 100% Conceal Dual Band
- 50% PRE WNF + 50% V3 SideDress
2017 Nitrogen Management Study

Return / Acre

- 25% PRE WNF + 25% Conceal + 50% V3 Sidedress
- 75% Conceal Dual Band + 50% V3 SideDress
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- 50% Conceal Dual Band + 50% V3 SideDress
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- 100% Conceal Dual Band
- 50% PRE WNF + 50% V3 SideDress
2017 Nitrogen Management Study

- 25% PRE WNF + 25% Conceal + 50% V3 Sidedress
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- 50% Conceal Dual Band + 50% V3 SideDress
- 25% Conceal Dual Band + 50% V3 SideDress
- 100% Conceal Dual Band
- 50% PRE WNF + 50% V3 SideDress

Return / Acre

- $940.00
- $920.00
- $900.00
- $880.00
- $860.00
- $840.00
- $820.00
2017 Nitrogen Management Study

- 25% PRE WNF + 25% Conceal + 50% V3 Sidedress
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- 100% Conceal Dual Band
- 50% PRE WNF + 50% V3 SideDress
2017 Nitrogen Management Study

- 25% PRE WNF + 25% Conceal + 50% V3 Sidedress
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2017 Nitrogen Management Study

Return / Acre

25% N Reduction

- 25% PRE WNF + 25% Conceal + 50% V3 Sidedress
- 75% Conceal Dual Band + 50% V3 SideDress
- 75% Conceal Dual Band + 25% V3 SideDress
- 50% Conceal Dual Band + 50% V3 SideDress
- 25% Conceal Dual Band + 50% V3 SideDress
- 100% Conceal Dual Band
- 50% PRE WNF + 50% V3 SideDress
Top Split N Applications

- 25% PRE WNF + 25% Conceal + 50% V3 Sidedress
- 75% Conceal Dual Band + 25% V3 SideDress
- 50% Conceal Dual Band + 50% V3 SideDress
- 50% PRE WNF + 50% V3 SideDress
Top Split N Applications

- 25% PRE WNF + 25% Conceal + 50% V3 Sidedress
  - Yield: $69.10/A

- 75% Conceal Dual Band + 25% V3 SideDress
  - Yield: $60.45/A

- 50% Conceal Dual Band + 50% V3 SideDress
  - Yield: $56.10/A

- Trad. 50-50
  - Yield: $50.10/A
FurrowJet
Thank You

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