EVALUATION OF DATA LAYERS TO OPTIMIZE CORN AND SOYBEAN PLACEMENT WITHIN THE SOIL LANDSCAPE

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Food, Agricultural and Biological Engineering
Now what?

Hybrid prescriptions

Population prescriptions

Fertilizer prescriptions

Insecticide prescriptions

Others?
Objectives

1. Evaluate challenges of multi-hybrid/variety seeding.
2. Determine the effectiveness of the technology.
3. Consider operational issues, logistics, and benefits to different platforms.
4. Evaluate prescription creation techniques.
5. Consider remote sensing for evaluation of field performance.
6. Evaluate technology with cooperating growers in Ohio.
2015
Magnum 240 and 1255 16-row planter

2016
Magnum 380 and 1245 16/31-row planter

2017
Magnum 380 and 1245 16/31-row planter

2018
Magnum 340 and 1245 16/31-row planter
2015 Test Blocks

- Corn
- 0.25 to 0.5 acre blocks
- Treatments
  - Defensive hybrid: Low, medium, high population
  - Offensive hybrid: Low, medium, high population
- No replications
2016 Test Strips

- Corn and Soybeans
- Treatments
  - Solid seed defensive hybrid at low population
  - Solid seed defensive hybrid at high population
  - Solid seed offensive hybrid at low population
  - Solid seed offensive hybrid at high population
  - Inverse of prescription
- Replicated 3 times
2017 Protocol

- Corn and soybeans
- 0.25 to 0.5 acre blocks
- Treatments
  - Defensive and offensive hybrid
  - One mid population for comparison
  - Rest of comparisons are already in Rx
- Minimum of 3 replications
Comparing Corn Yield Maps

2015

2017
NCCPI vs. MH Corn Advantage -2017

R² = 0.1016
Elevation vs MH Corn Advantage - 2017

\[ R^2 = 0.1648 \]
### 2017 Corn Conclusions

#### Prescription vs MH Corn Advantage - 2017

![Graph showing yield advantage with R² = 0.0031](image)

<table>
<thead>
<tr>
<th>Field</th>
<th>Zone</th>
<th>Zone Yield</th>
<th>Defensive</th>
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NCCPI vs Soybean Yield - 2017

R² = 0.0002
NCCPI vs. MH Soybean Advantage - 2017

\[ R^2 = 0.0304 \]
Elevation vs MH Soybean Advantage - 2017

Elevation vs MH Soybean Advantage - 2017

R² = 0.2456
Remote Sensed Imagery vs MH Soybean Advantage - 2017

Yield Advantage (bu/acre)

Vegetative Index

$R^2 = 0.2637$
## 2017 Soybean Conclusions

### Table: Soybean Yield Advantages - 2017

<table>
<thead>
<tr>
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### Chart: Prescription vs MH Soybean Advantage - 2017

*Regression equation: $Y = 10.0 - 0.1X, R^2 = 0.0873$*
Multi-hybrid Cost
16 row: $31,200 or $1950/Row

Beck’s Multi-Year Data

<table>
<thead>
<tr>
<th></th>
<th>Corn (7/17/2018, $3.46 per bushel)</th>
<th>Soybeans (7/17/2018, $8.35 per bushel)</th>
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<tbody>
<tr>
<td>Return</td>
<td>+6.1 bu/ac $21.11/acre</td>
<td>+1.9 bu/ac $15.87/acre</td>
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Break-Even Acreage

Corn ~ 1477 acres
or
Soybeans ~1965 acres
Grower Conclusions

• Numerous challenges using multi-hybrid technology not just plug and play
• If grower has not ever used variable rate seeding do not use multi hybrid
• Growers must be ready for seed logistics more than ever before
• Switching hybrids could be yield swings of 50 plus bushels per acre
• Planter calibration and setup is critical or will cause gaps and offsets in field critical transition areas
• Mechanically meters have little to no issues
• Growers do not understand their data or the quality of their data
• Growers do not know which data to use and when to use it
• Agronomists do not have all the tools to make sound decisions for seed placement
• Be prepared to make more planter adjustments
• ROI is going to change with introduction of mSet
• ALWAYS DIG BEHIND PLANTER!
Research Conclusions

• Must have test block/strips replicated to double check placement but **which method?**
• Remote sensed imagery will be key for creating prescriptions for growers with little yield history
• **Need a standard protocol for testing zones in fields** (Harvest, Planting, Rx generation, Reporting, etc.)
• Average duration of marketing a hybrid is 18 months
• No true defensive hybrids on market, current we are overloaded with hybrids that are both and stay in the middle of genetics
• With correct data and grower management multi-hybrid will show benefit
• Seed companies are behind the learning curve compared to the equipment companies
• Be ready to fail and get hybrid placement wrong
• Water and growing season affects results considerably
Acknowledgments

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Craig Rodgers - Beck’s Hybrids
Radcliff Farms
Digital Agriculture
Providing solutions to meet world demand

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