eFields
Using On-Farm Research to Improve Management

Amanda Douridas and Elizabeth M. Hawkins
Ohio State University Extension
OARDC: Ag Research

- 11 research centers across Ohio
- 3 focused on row-crop production

“The nearest OSU research station is 180 miles from my farm. There’s a lot of variation in 180 miles.”
– Les Seiler, Fulton Co. farmer
OSU Extension: On-Farm Research Needs

• Faster publishing
• Projects represented more broadly across Ohio
• Better information to customize management recommendations
What is eFields?
MISSION

• Uniting the private and public sectors to drive innovation for the benefit of farmers.

• Partnering with farmers to translate innovation into long-term profitability for production agriculture.

• Delivering timely and relevant information for the advancement of digital agriculture technologies.
Partnering with Farmers

- Trial protocols developed through cooperation of Extension researchers and farmers
- Work with farmers to identify local needs and interests
### Standardized Protocols

- Current protocols are available at [go.osu.edu/eFields](go.osu.edu/eFields)
  - Corn and Soybean Seeding Rate
  - Nitrogen Rate

- On-Farm Research Manual is currently being developed to aid participants in understanding design and execution of trials.
Deliver Timely and Relevant Information

- Highlights research projects taking place around the state
- Local information
- Confidence in results
2018 eFields Report
2018 eFields Program

- 95+ trials
- 25 counties
- 5,624 acres
- Economic analysis for select trials
- Videos featuring partner farmers and researchers!
go.osu.edu/eFields
Return above analysis allows farmers to consider not only yield increase, but also economic return, which ultimately impacts the farm’s bottom line. For the studies, economics were calculated, as return above is labeled in the right-most column of the results table. To standardize return above calculation, state-wide, the OSU Extension budget values were used to perform a partial profitability analysis. farmoffice.osu.edu

Seed Costs:
For the seeding rate studies, a corn seed cost of $3.50/1,000 seeds. Soybean seed cost was $0.428/1,000 seeds. These are based on budget developed by Barry Ward, OSU Extension.

Nitrogen Application Costs

<table>
<thead>
<tr>
<th>Application Method</th>
<th>Rate $/ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Bulk</td>
<td>8.3</td>
</tr>
<tr>
<td>Liquid Knife</td>
<td>9.5</td>
</tr>
<tr>
<td>Liquid Spray</td>
<td>7.2</td>
</tr>
<tr>
<td>Anhydrous</td>
<td>13.7</td>
</tr>
<tr>
<td>Late Season Coulters</td>
<td>13.2</td>
</tr>
<tr>
<td>Late Season Drips</td>
<td>11.3</td>
</tr>
</tbody>
</table>

Nitrogen Costs:
A nitrogen cost of $0.305/lb used in this report is from the 2018 Corn Production Budget. For the nitrogen timing studies, application costs were also considered. The average cost of application the report uses is from the 2018 Ohio Custom Farm Rates.

Commodity Prices:
Price received was determined by the October WASDE (World Agricultural Supply and Demand Estimates) report with a corn price of $3.66/bu and a soybean price of $8.60/bu. We then calculated a 10% price increase and decrease to reflect price variability.

Example economic calculator for corn seeding rate studies:

<table>
<thead>
<tr>
<th>Average Price</th>
<th>25,000</th>
<th>20,000</th>
<th>15,000</th>
<th>10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeding rate (lbs/acre)</td>
<td>20.000</td>
<td>20.000</td>
<td>20.000</td>
<td>20.000</td>
</tr>
<tr>
<td>Cost of seed/1000</td>
<td>3.50</td>
<td>3.50</td>
<td>3.50</td>
<td>3.50</td>
</tr>
<tr>
<td>Total seed cost ($)</td>
<td>91</td>
<td>105</td>
<td>119</td>
<td>133</td>
</tr>
<tr>
<td>Yield (bu/ac)</td>
<td>120</td>
<td>130</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>Bushel Price ($/bu)</td>
<td>3.50</td>
<td>3.50</td>
<td>3.50</td>
<td>3.50</td>
</tr>
<tr>
<td>Gross Income ($)</td>
<td>420</td>
<td>455</td>
<td>500</td>
<td>700</td>
</tr>
<tr>
<td>Return above seed ($/ac)</td>
<td>329</td>
<td>350</td>
<td>441</td>
<td>557</td>
</tr>
</tbody>
</table>

The “Return above” line includes only the expense of what was being studied (i.e., seed cost) to provide a clear indication of economic return. To calculate your own economic return, you can access the e-wraps Economic Calculators at farmoffice.osu.edu/economics.
## Example economic calculator for corn seeding rate studies:

<table>
<thead>
<tr>
<th>Average Price</th>
<th>26,000</th>
<th>30,000</th>
<th>34,000</th>
<th>38,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeding rate (sds/ac)</td>
<td>3.50</td>
<td>3.50</td>
<td>3.50</td>
<td>3.50</td>
</tr>
<tr>
<td>Cost of seed/1000</td>
<td>91</td>
<td>105</td>
<td>119</td>
<td>133</td>
</tr>
<tr>
<td>Total seed cost ($)</td>
<td>120</td>
<td>130</td>
<td>160</td>
<td>200</td>
</tr>
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<td>3.50</td>
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<tr>
<td>Gross Income ($)</td>
<td>420</td>
<td>455</td>
<td>560</td>
<td>700</td>
</tr>
<tr>
<td>Return above seed ($/ac)</td>
<td>329</td>
<td>350</td>
<td>441</td>
<td>567</td>
</tr>
</tbody>
</table>

The "Return above" line includes only the expense of what was being studied (i.e., seed cost) to provide a clear indication of economic return. To calculate your own economic return, you can access the e-holds Economic Calculators at go.osu.edu/econcalculator
Seeding Rate Trials

STUDY INFORMATION
- Planting Date: 5/8/2018
- Harvest Date: 9/19/2018
- Variety: SC9288R
- Population: 19
- Treatments: 4
- Reps: 3
- Treatment Width: 40 ft.
- Tillage: Vertical
- Herbicide: 2.4-D, Gramoxone, Prefix, Select, Durango
- Previous Crop: Corn
- Row Width: 15 in.
- Soil Type: Ochre silt loam, 66% Cherokee silt loam, 17% Fox gravelly loam, 14% Wooded silt loam, 3%

Weather Summary
Use this QR code to access the corresponding eFields On-Farm Research video to this study.
gp.osu.edu/einternational/short

PROJECT CONTACT
For inquiries about this project, contact John Barker, Extension Educator Agriculture/Amos Program - Knox County (barker.41@osu.edu).

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STUDY INFORMATION
- Planting Date: 5/17/2018
- Harvest Date: 10/2/2018
- Variety: P25A70R
- Population: 54
- Treatments: 4
- Reps: 3
- Treatment Width: 40 ft.
- Tillage: Vertical
- Herbicide: 2.4-D, Gramoxone, Prefix, Select, Durango
- Previous Crop: Corn
- Row Width: 15 in.
- Soil Type: Ochre silt loam, 48% Fox gravelly loam, 23% Bennington silt loam, 8% Centerburg silt loam, 4%

Weather Summary
Use this QR code to access the corresponding eFields On-Farm Research video to this study.
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<table>
<thead>
<tr>
<th>Treatments (eds/ac)</th>
<th>Avg. Emergence (plants/ac)</th>
<th>Moisture (%)</th>
<th>Yield (bu/ac)</th>
<th>Return Above Seed ($/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>125,000</td>
<td>107,667</td>
<td>13.4</td>
<td>79 a</td>
<td>626</td>
</tr>
<tr>
<td>145,000</td>
<td>115,697</td>
<td>13.5</td>
<td>78 a</td>
<td>609</td>
</tr>
<tr>
<td>185,000</td>
<td>124,000</td>
<td>13.5</td>
<td>79 a</td>
<td>609</td>
</tr>
<tr>
<td>185,000</td>
<td>125,167</td>
<td>13.4</td>
<td>79 a</td>
<td>600</td>
</tr>
</tbody>
</table>

Treatment means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1. LSD: Not significant CV: 2.25%

<table>
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<tr>
<th>Treatments (eds/ac)</th>
<th>Avg. Emergence (plants/ac)</th>
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<tbody>
<tr>
<td>125,000</td>
<td>109,833</td>
<td>14.6</td>
<td>67 b</td>
<td>523</td>
</tr>
<tr>
<td>145,000</td>
<td>125,333</td>
<td>14.7</td>
<td>70 a</td>
<td>540</td>
</tr>
<tr>
<td>165,000</td>
<td>141,500</td>
<td>14.8</td>
<td>68 ab</td>
<td>514</td>
</tr>
<tr>
<td>185,000</td>
<td>159,000</td>
<td>14.8</td>
<td>69 a</td>
<td>514</td>
</tr>
</tbody>
</table>

Treatment means with the same letter are not significantly different according to Fisher's Protected Least Significant Differences (LSD) test at alpha = 0.1. LSD: 1.54 CV: 1.78%
Seeding Rate Trials

STUDY INFORMATION

- **Planting Date**: 5/8/2018
- **Harvest Date**: 9/19/2018
- **Variety**: SC9238R
- **Population**: Treatments
- **Acres**: 19
- **Treatments**: 4
- **Reps**: 3
- **Treatment Width**: 40 ft.
- **Tillage**: Vertical
- **Herbicide**: 2,4-D, Gramoxone, Prefix, Select, Durango
- **Previous Crop**: Corn
- **Row Width**: 15 in.
- **Soil Type**: Ockley silt loam, 66% 
  - Crane silt loam, 17%
  - Fox Gravelly loam, 14%
  - Wooster silt loam, 3%

Weather Summary

- **Precip (in)**: APR 6.49, MAY 3.93, JUN 3.38
- **Cumulative GDDs**: 133, 723, 1,363

Weather Contact

For inquiries about this project, contact John Barker, Extension Educator at 419-773-4148 (barker.41@osu.edu).

PROJECT INFORMATION

- **Average Emergence (plants/ac)**: 125,000, 107,667
- **Moisture (%)**: 13.4, 13.5, 13.5
- **Yield (bu/ac)**: 79 a, 78 a, 78 a

Treatment means with the same letter are not significantly different according to Fisher's Protected Least Significant Difference (LSD) test at alpha = 0.1.

LSD: Not significant
CV: 2.25%
### Seeding Rate Trials

<table>
<thead>
<tr>
<th>Treatments (sds/ac)</th>
<th>Avg. Emergence (plants/ac)</th>
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Treatment Means with the same letter are not significantly different according to Fisher’s Protected Least Significant Differences (LSD) test at alpha = 0.1.

LSD: Not significant
CV: 2.25%

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### PROJECT CONTACT

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branker.41@osu.edu
Seeding Rate Trials

STUDY INFORMATION
Planting Date: 5/9/2018
Harvest Date: 9/19/2018
Variety: SC9298R
Population: Treatments
Acres: 19
Treatments: 1
Reps: 3
Treatment Width: 40 ft.
Tillage: Vertical
Herbicide: 24, 20, Gramoxone, Preflax, Select, Durango
Previous Crop: Corn
Row Width: 15 in.
Soil Type: Ochre silt loam, 66%
Crane silt loam, 17%
Fox gravelly loam, 14%
Wooster silt loam, 3%

Weather Summary
Total Precip (in) Cumulative GDDs
APR: 6.49 133
MAY: 3.93 723
JUN: 3.38 1,363
JUL: 1.87 2,078
AUG: 2.38 2,802
Total: 18.05 2,802

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<td>107,867</td>
<td>13.4</td>
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<td>626</td>
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LSD: Not significant
CV: 2.25%

Soybean

STUDY INFORMATION
Planting Date: 5/17/2018
Harvest Date: 10/2/2018
Variety: P25A70R
Population: Treatments
Acres: 54
Treatments: 4
Reps: 3
Treatment Width: 40 ft.
Tillage: Vertical
Herbicide: 24, 20, Gramoxone, Preflax, Select, Durango
Previous Crop: Corn
Row Width: 15 in.
Soil Type: Ochre silt loam, 46%
Fox gravelly loam, 23%
Berending silt loam, 4%
Centerburg silt loam, 4%

Weather Summary
Total Precip (in) Cumulative GDDs
APR: 6.49 133
MAY: 3.93 723
JUN: 3.38 1,363
JUL: 1.87 2,078
AUG: 2.38 2,802
Total: 18.05 2,802

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LSD: 1.64
CV: 1.78%
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Ohio State Precision Ag Program

www.OhioStatePrecisionAg.com

@digitalag@osu.edu
@OhioStatePA
Ohio State Precision Ag
Questions?
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Douridas.9@osu.edu