Study ID: 0817081201801
County: Hamilton
Soil Type: Hastings silt loam 0-1% slope; Crete silt loam 0-1% slope; Fillmore silt loam 0-1% slope
Planting Date: 4/27/18
Harvest Date: 11/1/18
Population: 34,000
Row Spacing (in): 30
Hybrid: Pioneer® P1306 WHR
Reps: 21
Previous Crop: Soybean
Tillage: Ridge-Till

Introduction: This project is part of the Data Intensive Farm Management project, a multi-university collaboration led by the University of Illinois at Urbana Champaign. The goal of these research studies is to utilize precision agriculture technology for conducting on-farm research. This study tested four nitrogen rates. Treatments were randomized and replicated in 60’ wide by 280’ long blocks across the entire field. Variable-rate prescription maps for the nitrogen study were developed and uploaded to the in-cab monitor. Geospatial yield monitor data were collected at the end of the growing season and post-processed to remove errors with Yield Editor Software from the USDA.

A total of 33 lb N/ac was applied to the whole field (250 lb/ac of 11-52-0 and 5 gal/ac of 10-34-0 at planting). The N treatments were established with an anhydrous ammonia application on March 30. Rates of 0, 110, 150, 190, and 220 lb N/ac were applied to equal the total treatment rates of 33, 143, 183, 223, and 253 lb N/ac respectively.

Figure 1. Nitrogen prescription map (total lb N/ac).
Results:

<table>
<thead>
<tr>
<th></th>
<th>Moisture (%)</th>
<th>Yield† (bu/ac)</th>
<th>Marginal Net Return‡ ($/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33 lb N/ac</td>
<td>14.7 B*</td>
<td>240 D</td>
<td>763.01 C</td>
</tr>
<tr>
<td>143 lb N/ac</td>
<td>15.1 A</td>
<td>279 C</td>
<td>850.90 A</td>
</tr>
<tr>
<td>183 lb N/ac</td>
<td>15.1 A</td>
<td>282 BC</td>
<td>845.66 A</td>
</tr>
<tr>
<td>223 lb N/ac</td>
<td>15.2 A</td>
<td>285 A</td>
<td>843.11 A</td>
</tr>
<tr>
<td>253 lb N/ac</td>
<td>15.2 A</td>
<td>284 AB</td>
<td>828.50 B</td>
</tr>
<tr>
<td>P-Value</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield values are from cleaned yield monitor data. Bushels per acre adjusted to 15.5% moisture.
‡Marginal net return based on $3.23/bu corn and $0.35/lb N.

Figure 2. Yield versus nitrogen rate with economic optimum nitrogen rates (EONR) indicated.

Summary: At a corn price of $3.23/bu and N price of $0.35/lb (prices used in this year’s report) the EONR was 177 lb/ac. This resulted in a yield of 283 bu/ac.