Using RTN and Field Forecasting Tool in N Management

Rick Behrens
Digital Technology Manager
Southern Iowa
Winfield United
WinField United Approach to Nitrogen Management

- A two tiered approach
  - Use of RTN (Response to Nitrogen)
    - Hybrids tested in the Answer Plot System
    - Broken into Characterizing Groups by Maturity
    - Tested at different levels of nitrogen
      - Limited N – only enough N is applied to make sure to have an ear
      - Unlimited N
  - Field Forecasting Tool
    - Modeling Tool developed with ITK.
Answer Plot System – Approximately 200 sites
Answer Plot Testing

- CHT Group
  - Break hybrids into 5 day groups
    - Example 110 CHT – hybrids from 108 to 112 day maturity
    - Each plot will have 3 different CHT groups
  - Products from
    - Croplan
    - Dekalb
    - Mycogen
    - NK
    - Pioneer
  - Tested for
    - RTN – Response to Nitrogen
    - RTP – Response to Population
    - RTCC – Response to Continuous Corn
    - RTF – Response to Fungicide
Answer Plot Testing - Continued

- Plots also identified by
  - Soil Texture
  - Yield Environment
- Things are replicated 12 times
- Gives approximately 2 million data points a year
Data is used in CHT Tool in the R7 Tool

©2016. WinField is a registered trademark and WinField United is a trademark of Winfield Solutions.
Field Forecasting Tool

- Develop in partnership with ITK
- First large scale testing 2015
- Launched commercially 2018
- Is only available through the Winfield United System.
Field Forecasting Tool

• Data used
  • Soil Survey Data with soil test data
Field Forecasting Tool

• Previous Crop and Tillage
# Field Forecasting Tool

**Current Season**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Hybrid type</th>
<th>Maturity</th>
<th>Planting date</th>
<th>Planting depth</th>
<th>Average population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>Croplan</td>
<td>113 days</td>
<td>04/23/2019</td>
<td>2 in</td>
<td>36000 seeds/ac</td>
</tr>
</tbody>
</table>

©2016. WinField is a registered trademark and WinField United is a trademark of Winfield Solutions.
Field Forecasting Tool

- In Season Adjustments
  - Rainfall
  - Stand Adjustments
    - Model automatically adjust for population
      - Corn and wheat – 10%
      - Soybeans – 15%
    - Should adjust stand at tissue sampling and harvestable ears at brown silk
- Growth Stage
  - VE
  - V1-10 – At first tissue sample
  - VT
- Tissue Samples
  - V5
  - V10
  - VT/R1
Field Forecasting Tool

- Irrigation and Fertilizing Practices

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Product</th>
<th>Stabilizer</th>
<th>%N</th>
<th>%K</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/10/2019</td>
<td>Commercial</td>
<td>MAP 11-52-0</td>
<td>None</td>
<td>11</td>
<td>%N</td>
<td>0 %K</td>
<td>154 lbs/acre</td>
</tr>
<tr>
<td>04/10/2019</td>
<td>Commercial</td>
<td>Potash 0-0-80</td>
<td></td>
<td>0</td>
<td>%N</td>
<td>60 %K</td>
<td>130 lbs/acre</td>
</tr>
<tr>
<td>04/25/2019</td>
<td>Commercial</td>
<td>AMS 24-0-0</td>
<td>None</td>
<td>21</td>
<td>%N</td>
<td>0 %K</td>
<td>100 lbs/acre</td>
</tr>
<tr>
<td>04/25/2019</td>
<td>Commercial</td>
<td>Urea 46-0-0</td>
<td>Urease Inhibitor</td>
<td>46</td>
<td>%N</td>
<td>0 %K</td>
<td>196 lbs/acre</td>
</tr>
<tr>
<td>07/02/2019</td>
<td>Commercial</td>
<td>Urea 46-0-0</td>
<td>Urease Inhibitor</td>
<td>46</td>
<td>%N</td>
<td>0 %K</td>
<td>75 N/acre</td>
</tr>
</tbody>
</table>
Field Forecasting Tool

• What is modeled
  • Weather
    • Rainfall
    • GDD accumulation
    • Solar Radiation
  • Biomass Accumulation
  • Soil Moisture
  • Nitrogen
  • Potassium
Field Forecasting Tool
Field Forecasting Tool
Field Forecasting Tool
### Field Forecasting Tool

**R7 Field Forecasting**

<table>
<thead>
<tr>
<th>Corn: 537055/RIB</th>
<th>RTP: High</th>
<th>Stress in</th>
<th>29 days</th>
<th>Stress in</th>
<th>29 days</th>
<th>No Forecasted Stress</th>
<th>38 Gap</th>
<th>0 Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planted on 04/25/2019</td>
<td>RTP: High</td>
<td>Growth stage V4</td>
<td>Average pop 36000 seeds/ac</td>
<td>GDD 467</td>
<td>Predicted maturity 09/06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### V5 Side Dress 06-06-2019

**Urea 46-0-0**

<table>
<thead>
<tr>
<th>Product Cost</th>
<th>Application Cost</th>
<th>Selling Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4 $/bu</td>
<td>10 $/ac</td>
<td>3.5 $/bu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50 N/acre</th>
<th>60 N/acre</th>
<th>70 N/acre</th>
<th>80 N/acre</th>
<th>90 N/acre</th>
<th>100 N/acre</th>
<th>110 N/acre</th>
<th>120 N/acre</th>
<th>130 N/acre</th>
<th>140 N/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
</tr>
<tr>
<td>+22</td>
<td>+26</td>
<td>+30</td>
<td>+33</td>
<td>+36</td>
<td>+37</td>
<td>+38</td>
<td>+39</td>
<td>+38</td>
<td>+38</td>
</tr>
<tr>
<td>+22</td>
<td>+17</td>
<td>+20</td>
<td>+22</td>
<td>+23</td>
<td>+24</td>
<td>+24</td>
<td>+25</td>
<td>+26</td>
<td>+26</td>
</tr>
<tr>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/bu</td>
</tr>
</tbody>
</table>

**10 dates** every 1 day from 06/06/2019

**10 quantities** every 10 N/acre from 50 N/acre

©2016. WinField is a registered trademark and WinField United is a trademark of Winfield Solutions.
Field Forecasting Tool
Field Forecasting Tool 2018 Yield Analysis

Corn Yield Comparison Observed vs. Predicted

Predicted Yield

Observed Yield

Green Snap
Field Forecasting Tool 2018 Yield Analysis
Field Forecasting Tool new for this year Wheat
Thank You!