Precision Agriculture Systems

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Sustainability

What are the 4Rs

- **RIGHT SOURCE**: Matches fertilizer type to crop needs.
- **RIGHT RATE**: Matches amount of fertilizer type crop needs.
- **RIGHT TIME**: Makes nutrients available when crops need them.
- **RIGHT PLACE**: Keep nutrients where crops can use them.
Sustainability

- **4Rs of nutrient management**
  - Nutrient Protection
    - Nutrient stabilizers
      - Exploiting microorganisms
  - Nutrient Delivery
    - Safe products
      - Products safe for tissue application
    - VRT delivery systems
      - Prescription delivery of nutrients
- **Data**
  - GPS sampling
    - Soil type and yield zone
  - Evidence based recommendations
    - Test plots
Nutrient Uptake: lbs/acre/day

• Possibly the biggest change in the Tri-State Fertilizer Recommendations
• Timing is Everything
• Needs to be Exploited
Nutrient Timing

- Current corn hybrids use nitrogen later in the season

<table>
<thead>
<tr>
<th>Era Of Hybrid Release</th>
<th>N at R1</th>
<th>N at R6</th>
<th>Post-flowering N Uptake</th>
<th>Increase in post-flowering N Uptake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old (1940 to 1990)</td>
<td>102</td>
<td>145</td>
<td>43</td>
<td>28%</td>
</tr>
<tr>
<td>New (1991 to 2011)</td>
<td>97</td>
<td>152</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Old (1970)</td>
<td>125</td>
<td>162</td>
<td>37</td>
<td>40%</td>
</tr>
<tr>
<td>New (2000)</td>
<td>125</td>
<td>177</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>

\(^{a}\) Ciampitti and Vyn, 2012  \(^{b}\) Haegele et al., 2013

Dr. Ciampitti - Kansas State University, Dr. Tony Vyn – Purdue University
Jason Haegele – University of Illinois
## Nutrient Timing

### Effect Of Late UAN Application On Corn Yield

*Dupont/Pioneer, 2010*

<table>
<thead>
<tr>
<th>All N Applied Before Tassel</th>
<th>Portion Of N Applied At Brown Silk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>19 Plots</strong></td>
<td><strong>21 plots</strong></td>
</tr>
<tr>
<td>Avg Yield 217 bu/acre</td>
<td>Avg Yield 248 bu/acre</td>
</tr>
<tr>
<td>Low yield: 170 bu/acre</td>
<td>Low yield: 183 bu/acre</td>
</tr>
<tr>
<td>High yield: 269 bu/acre</td>
<td>High yield: 302 bu/acre</td>
</tr>
<tr>
<td>3 plots over 240+ bu/acre</td>
<td>14 plots over 240+ bu/acre</td>
</tr>
</tbody>
</table>

Presented by Dr. Dale Leikam, Leikam AgroMax
Nutrient Timing

- Bio-stimulants
  - Humic Acid
  - Fulvic Acid
  - Microorganisms

- Low-salt starter
  - Custom Liquid Blends
  - Low Salt, High Quality
  - Unique Placement Can Lower Use Rate

- Foliar fertilizer
  - Custom Prescription
  - VRT application
Vertex

- Soil sampling
- VRT dry/lime application
- Custom starter blends
- VRT nitrogen
- Prescription post products
- Yield maps
- Stalk degradation
Soil Samples

• Control the information
  • Junk in, junk out

• Combine similar soils
  • Cation exchange capacity (CEC), organic matter

• Stay consistent on your formula
  • Tri-State Nutrient Recommendations

• Find a reliable program
  • SST, SSI, ...
VRT Application

• 4Rs of Nutrient Stewardship
  • Applying the Right Product
  • At the Right Rate
  • At the Right Place
  • At the Right Time
Custom Starter Blends

- Individual needs
  - NPK
  - Micronutrients
  - Microorganisms
  - Bio-stimulants
  - Branded names
VRT Nitrogen

- Organic matter
- CEC
- VRT MAP/DAP
- Irrigation
- Yield potential
- 4R concerns
Prescription Post Products

- Tissue testing
- Pre Sidedress Nitrate Tests (PSNT)
- Large portfolio of specialty products
- Don’t have it? Make it!
Yield Maps

- Finding trends
- Develop fertility equations
- Removal rates
- Finding problem areas
Residue Management

• Stalk degradation
  • Fall into food
  • Easier on equipment
  • Consistent planting area
Precision Ag Triangle

- Talent
- Satisfied Customer
- Equipment
- Knowledge
New Thoughts

• “Systems approach”
  • Everything works together

• Be open to new ideas/products
  • Think for yourself – interpret data
  • Find multiple sources

• “Recalibrate thinking”
  • Rapid change
Final Thoughts

THINKING OUTSIDE THE BOX
Questions?

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Additional Resources

AndersonsPlantNutrient.com

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