2013 Agronomic Impacts
Iowa Water Conference
March 5

John Holmes
Extension Field Agronomist
Current situation

- Very little subsoil moisture
- Surface soils have started to re-charge
  - Good moisture down to 2 ½ - 3 feet in some areas
- Will take 8 – 8 ½ to re-charge top five feet.
  (6 inches needed / 70% infiltration rate)
- Will vary by area.
Current situation

• Farmers harvested an average of 137 bu./acre of corn and 44.5 bu./acre of soybeans.
• Hay crop yield was about half of normal.
• Nitrogen was applied at a normal rate.
• Fall dry fertilizer was applied at normal rates.
Current questions/thoughts:

• Should I plant corn at normal populations?
• Planting depth?
• Select a drought tolerant hybrid?
• How much fertilizer should be applied?
• Does soybean seed need to be inoculated with *rhizobium* due to 2012 drought?
• What insects pose the greatest threat?
• What diseases should be expected?
# U.S. Drought Monitor

## Midwest

### Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th>Current</th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.47</td>
<td>59.53</td>
<td>46.62</td>
<td>23.07</td>
<td>7.85</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Last Week (02/19/2013)</td>
<td>39.78</td>
<td>60.22</td>
<td>47.60</td>
<td>23.88</td>
<td>7.85</td>
<td>0.14</td>
</tr>
<tr>
<td>3 Months Ago (11/27/2012)</td>
<td>23.13</td>
<td>7.87</td>
<td>55.50</td>
<td>30.34</td>
<td>8.98</td>
<td>0.14</td>
</tr>
<tr>
<td>Start of Calendar Year (01/01/2013)</td>
<td>28.14</td>
<td>71.86</td>
<td>54.93</td>
<td>30.11</td>
<td>7.88</td>
<td>0.14</td>
</tr>
<tr>
<td>Start of Water Year (09/25/2012)</td>
<td>8.75</td>
<td>91.25</td>
<td>67.48</td>
<td>41.58</td>
<td>14.88</td>
<td>0.28</td>
</tr>
<tr>
<td>One Year Ago (02/21/2012)</td>
<td>71.82</td>
<td>28.18</td>
<td>20.04</td>
<td>6.80</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Map

- **Intensity:**
  - D0: Abnormally Dry
  - D1: Drought - Moderate
  - D2: Drought - Severe
  - D3: Drought - Extreme
  - D4: Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

[http://droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

Released Thursday, February 28, 2013
Brian Fuchs, National Drought Mitigation Center
Recommended strategies for corn:

- Plant early to hopefully avoid hot temps during pollination in July.
- Seeding depth should be 2 inches to avoid rootless corn.
- Plant at the low end of the recommended planting population.
- Expect normal seed germination and good early season growth.
Recommended strategies for corn:

- Continuous corn fields will look good early unless we get heavy rains.
- Protect roots from rootworm feeding
  - Use a good Bt corn rootworm hybrid
  - Use an insecticide if resistance has been a problem OR you had lots of western corn rootworms in fields last year.
Recommended strategies for corn:

- Control weeds early to conserve moisture.
- Watch for silk clipping.
  - Corn rootworms
  - Japanese beetles
- Aflatoxin could be a risk late if conditions are droughty.
Nitrogen for corn:

- Remember there is a lot of organic N available from last year.
- Use low end of recommended rates.
  - Nitrogen rate calculator
- This is the year for the late spring soil nitrate test.
Hardin County, 1987

Grain Yield (bu/a) vs. N Rate (lb/a)

- Preplant
- Side-dress
<table>
<thead>
<tr>
<th>Nitrogen Rate (lb/acre)</th>
<th>Time of Application</th>
<th>Cooperator’s Yield: 195 bu/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preplant</td>
<td>Sidedress</td>
</tr>
<tr>
<td>0</td>
<td>- - -</td>
<td>171</td>
</tr>
<tr>
<td>40</td>
<td>180</td>
<td>194</td>
</tr>
<tr>
<td>80</td>
<td>182</td>
<td>182</td>
</tr>
<tr>
<td>100</td>
<td>190</td>
<td>185</td>
</tr>
<tr>
<td>120</td>
<td>205</td>
<td>184</td>
</tr>
<tr>
<td>180</td>
<td>194</td>
<td>177</td>
</tr>
<tr>
<td>Ave.</td>
<td>189</td>
<td>182</td>
</tr>
</tbody>
</table>
## Kossuth County (Site 28)
1988 Nitrogen Management Demonstration

<table>
<thead>
<tr>
<th>Nitrogen Rate lb/a</th>
<th>Time of Application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preplant</td>
</tr>
<tr>
<td>0</td>
<td>166</td>
</tr>
<tr>
<td>40</td>
<td>172</td>
</tr>
<tr>
<td>80</td>
<td>180</td>
</tr>
<tr>
<td>100</td>
<td>186</td>
</tr>
<tr>
<td>120</td>
<td>170</td>
</tr>
<tr>
<td>140</td>
<td>165</td>
</tr>
<tr>
<td>180</td>
<td>169</td>
</tr>
<tr>
<td>Mean</td>
<td>174</td>
</tr>
<tr>
<td>Cooperator yield:</td>
<td>172 bu/a</td>
</tr>
</tbody>
</table>
**Denitrification**

- N\textsubscript{2} gas
- LEACHING

**Crop removal**

- NO\textsubscript{2}\textsuperscript{-}
- **Nitrosonomas**
- **Nitrobacter**

**Nitrate**

- NO\textsubscript{3}\textsuperscript{-}

**Ammonium**

- NH\textsubscript{4}\textsuperscript{+}

**Soil Organic Matter**

**Soil erosion**

**NH\textsubscript{3} gas**
Ammonium $\text{NH}_4^+$

Nitrosomonas

Nitrobacter

NO$\text{O}_3^-$

NO$\text{O}_2^-$

N$\text{O}_2$ gas

NH$\text{O}_3$ gas

Leaching

2012 Season

Crop removal --

Lower

Soil Organic Matter

Soil erosion

Ammonium $\text{NH}_4^+$

2012 Season

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Crop removal --

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NH$\text{O}_3$ gas

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Nitrosomonas

Nitrobacter

NO$\text{O}_3^-$

NO$\text{O}_2^-$

N$\text{O}_2$ gas

NH$\text{O}_3$ gas

Leaching

2012 Season

Denitrification
Current level of NO$_3$-N in our soils:

<table>
<thead>
<tr>
<th>Location</th>
<th>0 - 1 FEET</th>
<th>1 – 2 FEET</th>
<th>2 – 3 FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLARION</td>
<td>16 PPM</td>
<td>18 PPM</td>
<td>9 PPM</td>
</tr>
<tr>
<td>DUNCOMBE</td>
<td>17 PPM</td>
<td>19 PPM</td>
<td>17 PPM</td>
</tr>
<tr>
<td>MASON CITY</td>
<td>27 PPM</td>
<td>12 PPM</td>
<td>NO TEST TAKEN</td>
</tr>
</tbody>
</table>

Seasonal rainfall:
Clarion – 17.4 “
Duncombe: 17.6”
Mason City: 14.1”

Rainfall since harvest: roughly 3” at all three locations.
### Current level of NO₃-N in our soils:

<table>
<thead>
<tr>
<th>Location</th>
<th>0 - 1 FEET</th>
<th>1 – 2 FEET</th>
<th>2 – 3 FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLARION</td>
<td>64 lb./acre</td>
<td>72 lb./acre</td>
<td>36 lb./acre</td>
</tr>
<tr>
<td>DUNCOMBE</td>
<td>68 lb./acre</td>
<td>76 lb./acre</td>
<td>68 lb./acre</td>
</tr>
<tr>
<td>MASON CITY</td>
<td>108 lb./acre</td>
<td>48 lb./acre</td>
<td>NO TEST TAKEN</td>
</tr>
</tbody>
</table>

**Seasonal rainfall:**  Clarion – 20.4 “,  Duncombe: 20.6”,  Mason City: 16.4”
Late spring soil nitrate test

• Sample 6 – 12 inch corn (V3 – V6)
• Take sample to full 12 inches
• Take 16 – 24 cores/sample
• Keep samples cool and submit to laboratory immediately or freeze sample
Set of eight:

175 – 200 feet

12 – 16 rows
Move across the row during sampling
Common mistakes:

- Sample isn’t 12 inches deep
- Too few cores
- Failure to follow the pattern
- Improper handling
- Samples taken on different soil types
Interpretation of LSNT’s

• Results are ppm NO$_3$ – N
• More than 25 ppm = enough N
• 10 – 25 ppm
  (25 – result) x 8 lb. N
• Less than 10 ppm = full rate required

Drs. Randy Killorn & Regis Voss
Extension Fertility Specialists

Joyce Hornstein, Project Coordinator
& ISU Extension Crop Crop Specialists
Optimum nitrogen rates:

<table>
<thead>
<tr>
<th>YEAR</th>
<th>LINEAR PLATEAU --- LB/ACRE ---</th>
<th>QUADRATIC --- LB/ACRE ---</th>
<th>COOPERATOR RATE --- LB/ACRE ---</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>48</td>
<td>61</td>
<td>152</td>
</tr>
<tr>
<td>1988</td>
<td>14</td>
<td>16</td>
<td>142</td>
</tr>
<tr>
<td>1989</td>
<td>12</td>
<td>10</td>
<td>136</td>
</tr>
<tr>
<td>1990</td>
<td>98</td>
<td>100</td>
<td>145</td>
</tr>
<tr>
<td>1991</td>
<td>42</td>
<td>49</td>
<td>144</td>
</tr>
<tr>
<td>5 YR AVERAGE</td>
<td>42</td>
<td>49</td>
<td>144</td>
</tr>
<tr>
<td>AVER EXCLUDING 1988</td>
<td>47</td>
<td>57</td>
<td>144</td>
</tr>
</tbody>
</table>
# Responsive sites by year

<table>
<thead>
<tr>
<th>YEAR</th>
<th>NUMBER OF SITES</th>
<th>RESPONSIVE SITES</th>
<th>NONRESPONSIVE SITES</th>
<th>RESPONSE TO TIMING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>13</td>
<td>8</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>1988</td>
<td>20</td>
<td>3</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>1989</td>
<td>11</td>
<td>2</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>1990</td>
<td>11</td>
<td>8</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1991</td>
<td>10</td>
<td>4</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>65</strong></td>
<td><strong>40</strong></td>
<td><strong>25</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td><strong>TOTAL EXCL. 1988</strong></td>
<td><strong>45</strong></td>
<td><strong>28</strong></td>
<td><strong>17</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>
The 2012 drought created some unique nitrogen issues:

- Fall 2011 – very dry/ tiles weren’t running; no nitrogen was leaching from soil
- Spring 2012 – tiles ran briefly
- Lots of residual N from organic matter, dry fertilizer, 28 or 32%, and NH$_3$.
- Little nitrogen has left the soil profile except through the crop
Recommended strategies for soybeans

- Select an SCN resistant variety if needed
- Plant early and plant at normal seeding rate.
- Planting depth should be normal.
- Inoculation with *rhizobium* isn’t recommended unless beans were planted in the field for the past five years.
Recommended strategies for soybeans

- Control weeds early. Use a preplant herbicide as a foundation.
- Watch for BLB and thistle caterpillar early.
- Watch for green cloverworm, spider mites, aphids, or grasshoppers mid- to late season.
- Charcoal rot may be a problem late.
Forage crop strategies:

- 2013 may not be the year to seed fields.
- Cut a little higher to aid in cutting recovery.
- Watch for potato leafhoppers and grasshoppers.
Closing thoughts:

• The weather pattern seems to be improving.
• We’ll just have to watch weather and manage accordingly.
• It’s possible that we’ll have a near normal growing season if rain continues.
Contact information:

John Holmes
ISU Extension Office
210 1st St. SW, Clarion, IA

Email: jdholmes@iastate.edu
Phone: (515) 532-3453