Five Factors To Improve The Odds For High Yield Corn

Missy Bauer
The Andersons – Consulting Agronomist
B&M Crop Consulting, Inc.
Coldwater, MI
Five Factors To Improve The Odds For High Yield Corn

• Fertility Program
• Nitrogen Management
• Stand Establishment & Ear Count
• Root Growth & Soil Density
• Pest Management
Soil Fertility Program

- Soil Sampling is the foundation of a good fertility program
- Soil pH & Lime
- Phosphorus
- Potassium
- Micronutrients
- VRA
Management Zones

Zones Created by:
- Soil Type
- Elevation
- Aerial Photos
- Yield Maps
- Getting the right soil in the right bag
Variable Rate Population

- Maximizing the profit potential of each management zone
- Based on
  - Water Holding Capacity
    - CEC
    - Organic Matter
  - Yield Potential
- Proper plant spacing is critical to the success
Variable Rate Application Nitrogen

Establishing Nitrogen Rate Studies to help Evaluate Proper VRA Nitrogen Rates.
2009 Nitrogen Rate
High, Medium, & Low Yield Zones
Bach Farms - Elmore, OH

Corn Yield (Bu/ac)

80 lb N  115 lb N  155 lb N  195 lb N  235 lb N

N Rate (lb N/ac)

131.2  131.7  135.4  175.9  193.3
196.6  196.1  196.0

+$20

High  Medium  Low

125  135  145  155  165  175  185  195  205

2.8  11.6  11.8

High
Medium
Low
2009 Nitrogen Rate
MfA & RfA Soil Type Zones
Fostoria, OH

Corn Yield (Bu/ac)

174.5
174.2
170
160
150
140

N Rate (lb N/ac)

100 lb N
150 lb N
190 lb N
220 lb N
250 lb N

+ $15

Prepared by Missy Bauer
## Green Springs VRA Nitrogen Plot

<table>
<thead>
<tr>
<th>Zone</th>
<th>Responsive</th>
<th>Best Rate</th>
<th>Bu Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>51</td>
<td>47.0</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>51</td>
<td>59.6</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>51</td>
<td>11.5</td>
</tr>
<tr>
<td>7 W</td>
<td>No</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>7 E</td>
<td>Yes</td>
<td>51</td>
<td>28.6</td>
</tr>
<tr>
<td>8 W</td>
<td>Yes</td>
<td>36</td>
<td>9.2</td>
</tr>
<tr>
<td>8 E</td>
<td>Yes</td>
<td>36</td>
<td>3.3</td>
</tr>
<tr>
<td>9 W</td>
<td>Yes</td>
<td>51</td>
<td>35.4</td>
</tr>
<tr>
<td>9 E</td>
<td>Yes</td>
<td>36</td>
<td>33.8</td>
</tr>
</tbody>
</table>

**Average** 43.1

Responsiveness Based on $4.50 Corn and $0.40 lb N.
Yield Maps Can Help Create or Fine Tune Management Zones
Yield Monitor Calibration Good vs. Poor

- **Good Calibration = high accuracy**
  - Within 3% of the scale
  - Maps are clear and well defined
  - Handle wide yield swings
- **Poor Calibration = fuzzy data**
  - Exaggerate high yields
  - Underestimate low yields
  - Maps are a blur of random colors
NDVI Imagery

• NDVI – Normalized Difference Vegetation Index
  – Measurement of vegetative health

• Remotely Sensed Imagery
  – Airplane
  – Satellite
  – Ground

• Timing
  – Just prior to tasseling
  – Just prior to dry down
  – Anytime trouble shooting is required
Nitrogen

- Losses
  - Volatilization
  - Denitrification
  - Leaching
- Immobilization
- Mineralization
The Nitrogen Cycle

Atmospheric nitrogen fixation and deposition

Animal manures and biosolids

Industrial fixation (commercial fertilizers)

Crop harvest

Volatilization

Plant residues

Runoff and erosion

Denitrification

Plant uptake

Organic nitrogen

Ammonium (NH$_4^+$)

Nitrate (NO$_3^-$)

Leaching

Input to soil

Loss from soil

Source: IPNI
Picket Fence Stands & Photo Copied Plants & Ears
Stand Establishment

- Seeds/acre planted
- Plants/acre @ harvest
- Ears/acre @ harvest

<table>
<thead>
<tr>
<th>Farmer</th>
<th>Seeds/acre</th>
<th>Plants/acre</th>
<th>Ears/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe</td>
<td>32,000</td>
<td>31,000</td>
<td>27,000</td>
</tr>
<tr>
<td>Bob</td>
<td>36,000</td>
<td>35,000</td>
<td>34,000</td>
</tr>
<tr>
<td>John</td>
<td>31,000</td>
<td>30,000</td>
<td>30,000</td>
</tr>
</tbody>
</table>

- Measure off 1/1000th acre
  - Ex. 30” Rows = 17’ 5” = 1/1000th acre

- Count the number of harvestable ears
  
  Ex. 30 ears counted in 1/1000th acre, 30 * 1000 = 30,000 ears/acre
Economics of Ear Count Loss:

- **Potential grain yield losses:**
  - Loss of 1000 ears/acre = 5 to 7 Bu/ac
  - Loss of 2000 ears/acre = 10 to 14 Bu/ac
  - Average Loss
    - $6 * $5.00/Bu = $30.00/ac
    - $12 * $5.00/Bu = $60.00/ac
    - 500 ac * $30.00/ac = $15,000 Loss
    - 500 ac * $60.00/ac = $30,000 Loss
Picket Fence Stand

- Plants are spaced an even distance from one another within the row
- Uniform
- Little Variability
- Low Standard Deviation
Photo Copied Plants & Ears

• **Uniform Plants**
  - Stalk Diameter
  - Height

• **Uniform Ears**
  - Length
  - Rows Around
  - Placement (node)
Uneven Emergence:

- Delayed plants:
  - Cannot compete with older, more established plants
  - Don’t contribute much to yield
  - Still compete for water, light, and nutrients
The Bottom Line:

• Uneven stand establishment in corn can reduce a field's yield potential from the first day you place the seed in the ground.

• Yield loss can easily be as much as 7 to 15 bu/acre due to poor plant spacing and uneven emergence.

• 10 bu/ac loss * $5.00/bu = $50.00/ac Loss
Density Layer

Roots Turning on a Density Layer
Create an Optimum Environment for Roots

- Roots are the Road to Top Yields
- Healthy Roots
  - White
  - Round
  - Grow Downward 35° Angle
- Unrestricted Root Growth
- First Three Sets of Crown Roots are Key
Crown Roots

Ground Line

Crown

1st Set Crown Roots

Seed

Seed Roots

3/4”
Soil density layer, turning roots
Shallow Chiseling
Pest Management

BE Proactive Not Reactive

PEST

HOST

CONDITIONS
Thank You

Missy Bauer