Effects of Continuous and Strip Grazing of Corn Residues on Cow Performance, Soil Properties, & Crop Yield

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Why Graze Corn Residue?

- Extend the Grazing Season
  - REDUCE Dry Lot Days!
- Utilize cheap feed resource
  - Cows at their lowest nutritional requirements
- Cow/calf profitability
  - Feed accounts for over 60% of inputs (Miller et al., 2001)
Grazing Corn Residue

• Stover yield equal to grain yield
• Cattle selectively graze stover
  – Leftover grain, husks, leaves, cobs, stalk
  – Order of both palatability and nutritional value

• Stocking rate and grazing management important by year
  – Continuous vs. strip

• Weather the most limiting factor!!!

Continuous vs. Strip Grazing

• Continuous
  – one-pasture/paddock system, livestock have unrestricted access to the entire area throughout the grazing season

• Strip
  – involves giving livestock a fresh allocation of forage after a given amount of time (2 weeks), controlled by the use of an electric fence
DSI Fall Grazing Study

- Cow Performance
- Grazing Behavior
  - GPS
- Forage selectivity
- Grazing Impacts on:
  - Soil
  - Crop Growth & Yield

Objective

- Cattle producer incentives well documented
- How is the integrated system affected?
  - Soil properties, crop growth, development, & yield
Materials & Methods

- 36 mature Angus Cows
- 3 treatments
  - (Continuous Grazed, Strip Grazed, Ungrazed)
- 1.2 cows/acre

Cow Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Treatment</th>
<th>SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial BW, lbs.</td>
<td>Continuous Grazed</td>
<td>2.1</td>
<td>0.65</td>
</tr>
<tr>
<td>Initial BCS</td>
<td>Continuous Grazed</td>
<td>0.1</td>
<td>0.56</td>
</tr>
<tr>
<td>Final BW, lbs.</td>
<td>Strip Grazed</td>
<td>9.6</td>
<td>0.05</td>
</tr>
<tr>
<td>Final BCS</td>
<td>Strip Grazed</td>
<td>0.1</td>
<td>0.65</td>
</tr>
<tr>
<td>BW Change, lbs.</td>
<td>Strip Grazed</td>
<td>8.5</td>
<td>0.04</td>
</tr>
</tbody>
</table>

2013 and 2014 combined performance
All cows supplemented 4 lbs/hd/d corn gluten feed and soybean hulls
Weather

• 2012
  – Graze from Sept. 29\textsuperscript{th} – Nov. 15\textsuperscript{th}
  – 49°F Av. Temp. (80 – 24°F)
  – 3.60 in. precipitation

• 2013
  – Graze from Nov. 2\textsuperscript{nd} – Dec. 19\textsuperscript{th}
  – 34°F (69 – 3°F)
  – 1.72 in. precipitation
Soil Analysis

• Samples before and after grazing period
  – 0-50 cm (20 inches)
• Analyzed for:
  – Penetration Resistance (compaction)
  – Bulk Density
  – Nitrogen (NO3 & NH4)
  – Available Phosphorous
  – Moisture Content
  – Organic Matter
  – Maximal Compaction
  – Water Aggregate Stability

Compaction
Preliminary Findings

• Significant main effect of grazing found after grazing
  – BD – Strip & continuous had greater bulk densities than control
  – PR – CG & SG had increased PR in top 10 cm

Conclusions

• Increase in BD and PR are not yet of agronomic importance
  – Ranges within optimal values on silt loam soils
  – No differences in crop growth & populations

• More years of research needed to evaluate permanency of soil effects
## 2013 Corn Yield

### Treatment

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>CG</th>
<th>SG</th>
<th>SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. Yield, bu/acre</td>
<td>196.2</td>
<td>195.8</td>
<td>198.4</td>
<td>3.35</td>
<td>0.84</td>
</tr>
</tbody>
</table>

### Grazing Order

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>SE</th>
<th>1 vs. 2</th>
<th>1 vs. 3</th>
<th>2 vs. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. Yield, bu/acre</td>
<td>188.1</td>
<td>203.3</td>
<td>199.9</td>
<td>3.76</td>
<td>0.01</td>
<td>0.05</td>
<td>0.54</td>
</tr>
</tbody>
</table>

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![Map of 2013 Corn Yield](image.png)
2013 Corn Yield

- No differences were found for average corn yield between ungrazed, continuously grazed, and strip grazed paddocks.

- Within grazed paddocks, however, the first 1/3 of the paddock had lower corn yields.
  - Location of water and/or feed & mineral.