Impact of stockpiling initiation method on the biomass and nutritional quality of winter forage from cool-season grass pastures in the Midwest

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Introduction

- Sustainability of cow-calf enterprises in the Midwest can be viewed as a function of:
  1. Maximizing use of the natural resources available
  2. Minimizing off-farm inputs,
  3. Reducing overall environmental footprint
  4. Providing a manageable livelihood to the operators

- Stored feed costs are a substantial portion of operational expenses in the Midwest

- Winter confinement feeding requires significant increases in nutrient management practices to mitigate the potential environmental implications

- Stockpiled forages for winter grazing can:
  1. Minimize amount of harvested forages required
  2. Eliminate the need for confinement feeding
  3. Reduce winter feed costs

Objectives

- Evaluate the effects of three different methods of initiating the stockpiling of cool-season grasses:
  1. Spring strip-grazing (SPG)
  2. Summer strip-grazing (SMR)
  3. Hay Harvest (HAY)

- Assess the impact different winter feeding strategies have on feed intake and operational carrying capacity

- Compare costs of stockpiling systems to traditional winter hay feeding systems (DRY) using partial budgeting analysis

- Determine if mechanical harvest, stored feeds, and winter confinement feeding could potentially be replaced with grazing management strategies

Materials and Methods

- Nine, 0.405 ha paddocks blocked in replicate

- Treatments:
  1. Spring strip-grazing (SPG)
  2. Summer strip-grazing (SMR)
  3. Hay harvest (HAY)

- Forage allowance of 2.4% of BW/d

- Samples hand-clipped October - January from six, random, 0.25-sq.m locations

- Analyzed for CP, NDF, ADF, ADL, IVDMD

- Data analyzed with MIXED procedure in SAS

- Intakes derived from the Cornell Net Carbohydrate and Protein System

- Budget assumptions derived from the Iowa State University Extension Ag Decision Maker

Results

Biomass

- Greater biomass stockpiled after SPG than SMR (P < 0.05) or HAY

- Greater forage biomass (P < 0.05) available in October than January

Crude Protein

- No effect of treatment (P > 0.10) nor treatment by sample month interaction (P > 0.10)

- CP was greater (P < 0.05) in October than January

IVDMD

- SPG had lower IVDMD than SMR (P < 0.05) or HAY (P < 0.05)

- IVDMD was greater in October than November (P < 0.05). December (P < 0.05) or January (P < 0.05)

Carrying Capacity and Costs

- CC of DRY was greater (P < 0.05) than other models

- CC did not differ (P > 0.10) between SPG, SMR, and HAY

- No difference (P > 0.10) in gross or net costs

- DRY incurred greater (P < 0.05) total costs than SPG, SMR, or HAY

Conclusions

- Lower yields of SMR and HAY is compensated for by higher nutritional value compared to SPG

- SMR and HAY allows for greater use of late spring and summer grazing than SPG

- Cattle winter grazing on tall fescue could be at risk for fescue toxicosis

- Strip-grazing of stockpiled forage is economically comparable to mechanical harvest

- SMR is a viable method for generating quality stockpiled winter forage when compared to HAY

- Strip-grazing can reduce the amount of stored feeds required to winter cattle

- Strip-grazing could provide young producers an opportunity to bypass barriers to entry in the beef industry by minimizing the capital investment required to maintain a beef, cow-calf herd in the Midwest

- Strip-grazing can minimize the need to confinement feed cattle over the winter, reducing the need for intensive nutrient management and minimize environmental repercussions of cow-calf systems

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Table 1. Cost Assessments

<table>
<thead>
<tr>
<th>Treatment</th>
<th>SPG</th>
<th>SMR</th>
<th>HAY</th>
<th>DRY</th>
<th>SEM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Estimate</td>
<td>2.10</td>
<td>1.22</td>
<td>1.11</td>
<td>1.36</td>
<td>0.085</td>
<td>0.1471</td>
</tr>
<tr>
<td>Carrying Capacity, hd·ha⁻¹</td>
<td>0.78</td>
<td>1.18</td>
<td>1.35</td>
<td>1.80</td>
<td>0.097</td>
<td>0.0488</td>
</tr>
<tr>
<td>Gross Cost, $·hd⁻¹·d⁻¹</td>
<td>4.41</td>
<td>0.67</td>
<td>1.51</td>
<td>1.80</td>
<td>0.143</td>
<td>0.0519</td>
</tr>
<tr>
<td>Total Cost, $·ha⁻¹</td>
<td>212.76</td>
<td>119.67</td>
<td>248.02</td>
<td>366.72</td>
<td>5.349</td>
<td>0.0165</td>
</tr>
</tbody>
</table>

1Mean standard error of least square means; n=3.
2Least square means without a common letter differ (P < 0.05).