Precision Livestock Management on Western Rangelands: *Self-Fed Supplementation*

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Professor & Nancy Cameron Chair
Range Beef Cattle Nutrition & Management

2021 Rancher’s Thursday Luncheon Seminar Series
OSU Extension
Land & Forage Resources in the Western US
Beef Cattle Performance, Grazing Behavior, & Distribution
Environment and Nutrient Requirements

• Most of the models for environment are based on 1981 NRC Publication

• Most are focused on energy requirements
  • Protein, minerals & vitamins?

• Relate to temperature and hair coat
  • Limited in respect to precipitation and/or wind conditions
    • Wind Chill equivalent?
Current/Future Research

- Strategic Supplementation
  - Optimal nutrient delivery systems
  - Optimal use of Low-Quality Forages
  - Optimal use of Rangelands
Winter Grazing Research at Havre

- Winter of 2016/2017 and 2017/2018

- Influence of Supplement Intake and Cow Age on Grazing Behavior and Rangeland Use Patterns
  - Sam Wyffels, Jan Bowman, Lance McNew, Darrin Boss, Cory Parsons, Julia Dafoe, Alyson Hicks-Lynch, and Tim DelCurto
Feeding Bout Data

• 45 d (yr 1) & 60 d (yr 2):
  – 42,472 visits yr 1 & 65,873 yr 2
    • Cow EID read
    • Time of day
    • Entry and exit are recorded
    • Coupled with weather station and GPS collar data
  – Avg Supple Intake = 2.75 lbs (1.25 kg)
  – 264/272 (yr 1) and 302/306 (yr 2) cows were recorded
Figure 1. The influence of cow age on supplement intake and variation in intake. Age class 1 = yearling heifers, age class 2 = 2 & 3 yr cows, age class 3 = 4 & 5 yr cows, age class 4 = 6 & 7 yr cows, age class 5 = 8 & 9 yr cows, and age class 6 = 10 & older (Wyffels et al., 2020).
**Figure 2.** The influence of environment and cow age on supplement intake behavior. Best-Fit model involved mean daily temperature and cow age (Wyffels et al., 2020).
Winter Grazing Research at MSU
- Winter of 2018 to Present

- Influence of Supplementation Strategy, Protein/Mineral Status and Cow Age/Type on Grazing Behavior and Rangeland Use Patterns
  - Parsons et al., 2021 Animals
  - Davis, Wyffels & Kirkpatrick (in progress)
  - Marques - minerals

- Studies are unique with environmental interaction with the above treatments and grazing behavior/distribution on extensive landscapes and environment
The influence of RFI classification and cow age on body weight and body condition change, supplementation intake and grazing behavior of beef cattle winter grazing mixed-grass rangelands

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Animals 2021,11(6),1518. doi.org/10.3390/ani11061518
Materials & Methods

* MSU AACUC #2018-AA12

* n=205 yr-1 and n=203 yr-2
  - Pregnant Angus beef cows
  - 1 – 9 years of age
  - Performance trial 84 days
  - Supplement intake trial last 45 days
    - mid-October – early January
    - Winters of 2018-2019 and 2019-2020

* Cattle were categorized by RFI based on GrowSafe RFI tests when they were yearling heifers (9-11 months of age.)
  - low (< -0.50 SD from mean),
  - average (+\- 0.50 SD from mean) or
  - high (> +0.50 SD from the mean)
### Forage Conditions

Annual average grass quality and quantity, Northern Agricultural Research Center Thackeray Ranch, Havre, MT

<table>
<thead>
<tr>
<th></th>
<th>Production (kg · ha⁻¹)</th>
<th>CP (%)</th>
<th>NDF (%)</th>
<th>ADF (%)</th>
<th>TDN (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yr 1</strong></td>
<td>1790</td>
<td>5.4</td>
<td>63.2</td>
<td>41.9</td>
<td>56.0</td>
</tr>
<tr>
<td><strong>Yr 2</strong></td>
<td>1456</td>
<td>5.4</td>
<td>66.9</td>
<td>39.9</td>
<td>55.0</td>
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Results: Daily supplement intake

Age Classifications, yrs

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<th>Age Group</th>
<th>Linear</th>
<th>Quadratic</th>
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<tbody>
<tr>
<td>1</td>
<td>0.43</td>
<td>0.91</td>
</tr>
<tr>
<td>2</td>
<td>0.54</td>
<td>0.25</td>
</tr>
<tr>
<td>3</td>
<td>0.14</td>
<td>0.94</td>
</tr>
<tr>
<td>4</td>
<td>0.05</td>
<td>0.20</td>
</tr>
<tr>
<td>5–7</td>
<td>0.20</td>
<td>0.07</td>
</tr>
<tr>
<td>≥ 8</td>
<td>0.39</td>
<td>0.46</td>
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Average Daily Supplement Intake, g·kg of body weight⁻¹·d⁻¹

Year 1

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<thead>
<tr>
<th>Residual Feed Intake Classification</th>
<th>Low</th>
<th>Avg</th>
<th>High</th>
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Year 2

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<th>Residual Feed Intake Classification</th>
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<th>Avg</th>
<th>High</th>
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Influence of cow age on variation of supplement intake

Coefficient of Variation of Supplement Intake, %

Cow Age, yrs

Linear < 0.01
Quadratic < 0.01
Intake Behavior Study

Impacts of form of salt-limited supplement on supplement intake behavior and performance with yearling heifers grazing dryland pastures
- White et al., 2018

- Objectives:
  1. Evaluate the effects of salt as an intake-limiter on supplement intake behavior and animal performance.
  2. Evaluate the difference between loose form and pelleted form of a salt-limited supplement.
Materials and Methods

3 Treatment Groups:
1. Control (no supplement)
2. Pelleted form
3. Loose form

Heifers were weighed and body condition scored on days 0, 42, and 84. Individual dry matter supplement intake, and intake behavior were measured for each heifer.
Final Thoughts: Self-Fed Supplement Use

• Significant Variation within days, over the season, and among animals
• Weekly averages are encouraging
• Further research is needed
Thank You!

Questions?

"Yes... I believe there's a question in the back."
Research Support

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