Managing cow nutrition

66th Annual Florida Beef Cattle Short Course

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Over the next 40 minutes or so...

- My goal is to...
  - Discuss why we actually care about nutrition
  - Utilize results of previous research and extension efforts to focus on how nutrition can be utilized to improve cowherd productivity
  - Leave you with at least one factor to consider when evaluating your nutritional management program
What production trait has the greatest impact on cow/calf productivity?
Why nutrition matters...

- Genotype x environment = phenotype
- Nutrition is the major contributing factor to “environment”

- Interaction between nutrients/nutritional status and genes affect...
  - Growth and development
  - Health
  - Beef composition and product quality
  - **Reproductive outcomes**
    - Reproduction is a lowly heritable trait
    - This means that the environment tends to impact reproduction more than an animal’s genetics
Major factors that limit reproduction

1) She becomes pregnant, but loses the calf
   - Prior to calving
   - Between calving and weaning

2) She doesn’t become pregnant in the first place
   - We’re going to focus on nutrition’s role
Why doesn’t she get bred?

- The bull, breeder, transfer tech., etc.
  - ~95 % or more of the time that a viable spermatocyte and oocyte meet, it results in the development of an embryo

- The cow
  - She wasn’t cycling to begin with
  - Something else happened that prevented her from becoming pregnant

Photo courtesy of Landon Smith
What causes her to cycle again?

- Her nutritional status
  - She has to receive certain hormonal cues
  - They tell her “you’re ready to support another calf”
  - When that happens, she starts cycling again

- What drives those signals?
  - Body condition
  - Plane of nutrition

Photos courtesy of Progressive Cattleman Magazine and Matt Hersom, respectively
Nutrient partitioning

1. Maintenance and lactation
2. Growth
3. Existing pregnancy
4. Estrous cycle and establishment of a new pregnancy
Protein vs. energy

- Protein often gets more credit than it deserves
  - “This feed is better ‘cause it’s higher in protein”
  - “Nutrition can’t be the problem, I feed 16 %”

- Energy drives growth and performance, not protein

- Protein supports an energy-dependent level of growth and performance
Focus on cow requirements: energy

Calculated for a 5-yr old cow with a mature body weight of 1300 lbs
Adapted from the NRC, 2000

NE\textsubscript{M} REQUIREMENT, MCAL PER DAY

MONTH SINCE CALVING

Maintenance  Lactation  Pregnancy  Total

Calculated for a 5-yr old cow with a mature body weight of 1300 lbs
Adapted from the NRC, 2000
Focus on cow requirements: protein

Assumes enough energy present to support crude to metabolizable protein conversion efficiency of ~60%
Calculated for a 5-yr old cow with a mature body weight of 1300 lbs
Adapted from the NRC, 2000
The importance of body condition

- Insurance for reproduction
  - When we aren’t meeting her energy and protein requirements
  - “Excess” body condition at calving will fill the void

- Helps to ensure that:
  - She starts cycling within enough time to become pregnant during the breeding season
  - She doesn’t sacrifice the pregnancy
What is the ideal BCS at calving?

Effect of BCS at calving on the postpartum interval to return to estrus

<table>
<thead>
<tr>
<th>BCS</th>
<th>Postpartum interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>89 d</td>
</tr>
<tr>
<td>4</td>
<td>70 d</td>
</tr>
<tr>
<td>5</td>
<td>59 d</td>
</tr>
<tr>
<td>6</td>
<td>52 d</td>
</tr>
<tr>
<td>7</td>
<td>31 d</td>
</tr>
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</table>

Adapted from Houghton et al., 1990
What is the ideal BCS at calving?

Effect of BCS at **pregnancy diagnosis** on overall pregnancy rate

<table>
<thead>
<tr>
<th>BCS</th>
<th>Overall pregnancy rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>13 %</td>
</tr>
<tr>
<td>3</td>
<td>43 %</td>
</tr>
<tr>
<td>4</td>
<td>66 %</td>
</tr>
<tr>
<td>5</td>
<td>94 %</td>
</tr>
<tr>
<td>6</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Adapted from Kunkle et al., 1994
What is the ideal BCS at calving?

Adapted from Spitzer et al., 1995
General rule of thumb for BCS

- "Ideal" BCS at calving and breeding for mature cows is ≥ 5
- This should be a target, but isn't always possible
- So when it isn't, what's the next best option?
  - Managing cattle on an increasing plane of nutrition
  - Moving them toward that "ideal" state of body condition
Plane of nutrition can be the saving grace

Adapted from Spitzer et al., 1995
The first-calf heifer conundrum

- Why are those three-year olds so dang hard to get bred back?
  - Because they’re different
  - They’re still growing until after they’ve weaned their second calf

- Their energy and protein requirements are ~10 to 15 % greater than mature cows
  - They need to be managed accordingly
    - Need ~10 to 15 % more of it
    - “It” needs to be ~10 to 15 % higher in energy and protein
Can they eat enough?

- Energy content is the primary indicator of voluntary forage intake.
- If forage has a low energy content, they may not be able to eat enough to meet their requirements.
  - Voluntary intake decreases as energy content decreases.

Relationship between forage energy content and DM intake

Calculated for a 1300 lb cow
Adapted from the NRC, 2000
Meeting requirements in a forage-based setting

- Forages are generally the most economical means of meeting energy and protein requirements of the cowherd
  - The reality is that they won’t always do it

- Need to utilize complementary supplemental feedstuffs that will fill the nutrient void that remains
  - Feed something that will provide enough supplemental nutrient(s)
  - Feed it at a level that will actually fill the void
The issue with supplemental feeds...

- Not all feeds are created equally
- Retail price doesn’t always reflect those differences
- Moving forward, we need to consider basing supplementation decisions on nutrient needs and supplement value
Nutrient cost

- Retail price does not paint the entire picture
  - Differences in nutrient content bias the comparison

- Evaluating nutrient cost “levels the playing field”
  - Accounts for differences in nutrient content
  - Allows for an un-biased comparison

\[
\text{Nutrient cost} = \frac{\text{final cost per lb of feed}}{\text{amount of nutrient per lb of feed}}
\]
## Retail price comparison

<table>
<thead>
<tr>
<th>Option</th>
<th>CP content (% as-fed)</th>
<th>Unit of purchase (lbs)</th>
<th>Retail price ($/unit)</th>
<th>Retail price ($/lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>28</td>
<td>200 lbs</td>
<td>$80.00</td>
<td>$0.40</td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>2,000 lbs</td>
<td>$160.00</td>
<td>$0.08</td>
</tr>
<tr>
<td>C</td>
<td>28</td>
<td>2,000 lbs</td>
<td>$180.00</td>
<td>$0.09</td>
</tr>
<tr>
<td>D</td>
<td>16</td>
<td>2,000 lbs</td>
<td>$240.00</td>
<td>$0.12</td>
</tr>
</tbody>
</table>

CP = crude protein
## Value and total cost comparison

<table>
<thead>
<tr>
<th>Option</th>
<th>Lb of CP per lb of feed</th>
<th>Lbs required per day(^1)</th>
<th>Cost per lb of CP ($/lb)</th>
<th>Total cost (^1) ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.28 lbs</td>
<td>1.79 lbs</td>
<td>$1.43</td>
<td>$3,571</td>
</tr>
<tr>
<td>B</td>
<td>0.16 lbs</td>
<td>3.13 lbs</td>
<td>$0.50</td>
<td>$1,250</td>
</tr>
<tr>
<td>C</td>
<td>0.28 lbs</td>
<td>1.79 lbs</td>
<td>$0.32</td>
<td>$804</td>
</tr>
<tr>
<td>D</td>
<td>0.16 lbs</td>
<td>3.13 lbs</td>
<td>$0.75</td>
<td>$1,875</td>
</tr>
</tbody>
</table>

\(^1\)To provide 0.5 lb of supplemental CP per cow to 50 cows for 100 days
Sorting through the options

Four major factors to consider:

- What options are available to you?
- Do any of those options act as a vehicle for something else that adds value?
- Do they require additional expense or lead to savings in terms of time, labor, or storage?
- Which option is the most economical means of filling the nutrient void?
Mineral supplementation

- Mineral supplementation is crucial

  - Forages + trace mineralized salt will not meet mineral requirements most of the time

  - Provide constant year-round access to a good quality free-choice mineral supplement that complements your forage base

  - There is no “silver-bullet”
Mineral supplementation

- Plays an important role in pretty much anything that impacts cow/calf productivity
- Find a formulation that your cattle will consume
- Choose the form that fits your management style
- Don’t blend it with salt to reduce consumption
- Ask yourself, is saving a couple bucks per bag for a lower quality product a responsible decision?
Is a couple bucks per bag worth sacrificing product quality?

<table>
<thead>
<tr>
<th>Option</th>
<th>Price, $ per 50-lb bag</th>
<th>Annual cost(^1), $ per cow</th>
<th>Annual savings, $ per cow</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$23.00</td>
<td>$41.98</td>
<td>--</td>
</tr>
<tr>
<td>B</td>
<td>$20.00</td>
<td>$36.50</td>
<td>$5.48 @ $3.00/bag</td>
</tr>
<tr>
<td>C</td>
<td>$17.00</td>
<td>$31.03</td>
<td>$10.95 @ $6.00/bag</td>
</tr>
</tbody>
</table>

\(^1\)Assumes a mineral supplement consumption of 4 oz. per head per day
Take-home points

- Focus on managing body condition and meeting nutrient requirements to improve cow/herd productivity
- Do so in the most economical way possible
- If you’re looking to cut costs, make sure the benefit outweighs the risk
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“If you feed them, they will come”