So You Think You Know Cow Nutrition

Cow Bodyweight  Calving Date  Milk Production
Gestation  Breed Comp.  Cow Age
Distribution of Cows
Supplement Intake
Forage-Supplement Interaction
Forage Intake Level
Forage Quality
Forage Allowance
Forage Utilization Rate
Importance of the 7 P’s

- Prior
- Proper
- Preparation
- Prevents
- Poor
- Production
- Performance
The Beef Cow’s Assignment

• Our expectation of a productive cow
  – Maintain her body weight / condition
  – Deliver a live calf without difficulty
  – Come into heat promptly
  – Conceive early in the breeding season
  – Nourish a developing fetus
  – Adequately nurse the calf through to weaning
Understand what have you to work with

- Cattle
- Forages
- Feeds
Effect of Cow Bodyweight and Milk Production on Intake Requirement

3 months after calving
Effect of Cow Bodyweight and Milk Production on Energy Requirement

3 months after calving
Effect of Cow Bodyweight and Milk Production on Protein Requirement

3 months after calving
Requirement Cycles in Beef Cows

- TDN Req
- CP Req
- Pasture TDN
- Pasture CP

- Months Since Calving
- Lbs of TDN
- Lbs of CP

January
Basic Required Nutrients

- Water
- Energy
- Protein
- Minerals
- Vitamins
- Fats
Water

• Water is the most critical nutrient in ALL livestock production:
  – Clean
  – Fresh
  – Consider semi-routine analysis:
    • Microorganisms
    • Chemicals

• To ensure availability and control contamination of waterways, it is best to provide cattle with water derived from a well or control access to surface water.
Energy

• Total Digestible Nutrients
• Major “nutrient” required by cattle
• Main driver for production
  – Maintenance
  – Growth
  – Reproduction
  – Lactation
• Direct relationship between TDN and quality of feedstuff
• Low quality feed = low energy and low intake
Energy Use by the Cow

• Hierarchal process to energy use:
  1. Maintenance
  2. Lactation / Growth
  3. Gestation

• Utilize body tissues as energy source
  – Finite source of energy in light of continued production
  – Ultimately will require replacement

• Supplementation
  – Provide energy to meet deficiency
  – Multiple sources and interactions
## Feedstuff Options

<table>
<thead>
<tr>
<th>Feed</th>
<th>TDN, %</th>
<th>Pounds to provide 5 lbs TDN</th>
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<tr>
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<tr>
<td>Hominy</td>
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<td>Bahiagrass hay</td>
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<tr>
<td>Urea</td>
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Supplemental Energy

• Begin feeding before it is too late
• Response improves with long term low level supplementation
• Feeding energy (w/out natural protein) decreases overall energy intake of low quality forage
• Usually contain < 20% CP
Supplemental Energy Considerations

• Do not feed when high CP supp. will improve performance
• Grain is a substitute for forage
• High starch supp. decreases fiber digestibility (Negative Associative Effects)
• High starch supp. work best with moderate to high quality forage
By-products Feeds as Energy Supplements

• Use by-products with low starch, moderate fiber concentrations
• Less impact on fiber digestion
• Energy supplied via digestible fiber and fat
• 15-30% increase in performance / unit of TDN
• Use up to 0.5% of BW
Nutritional Assessment

• Energy is limiting nutrient if:
  – Cows are thin
  – Forage availability is limited

• Solving Energy limitation:
  – Forage availability is problem then substitute with harvested forage
  – Forage availability is adequate (selection) then supplement with high energy/low protein

• Supplement selection based on $/lb of TDN
• Supply sufficient supplement to meet crude protein deficiencies
Protein

• Ruminant protein requirements are met by:
  – Diet
  – Rumen microbes
  – Recycling of urea

• Ruminants use microbial-protein as a primary protein source

• Inverse relationship between CP and maturity of forage

• Low quality feed = low CP and low intake
Protein Supplementation

• Increases forage dry matter intake and digestibility

• Critical level:
  • forage CP < 7% or
  • TDN:CP is >7 (51% TDN: 5% CP)

• Correct protein type is essential
  – Non-protein nitrogen
  – Natural protein
    – Ruminal Degradable Protein (RDP)
    – Ruminal Undegradable Protein (RUP)
Natural Protein

- Oilseed meal, feather meal, DDGS, CGF, other forages: ryegrass, perennial peanut
- Animal performance: natural>NPN
- Fed as dry or additive in liquid feeds
- Supplies RDP, RUP, energy, and other nutrients
- Proportions of RDP and RUP vary and can affect use and performance in given situation
Non-Protein Nitrogen

- Synthetic (Urea, Biuret) chemical compounds that contain a nitrogen source not associated with protein.
- Improvement in performance compared with no supplementation
- Utilization rate may be reduced because of decreased forage digestibility potential
  - 50% utilization rate on low-quality forage
- Lacks energy, vitamins, and minerals
- Urea is a common NPN source used in cattle supplements.
- Rumen microbes are able to use NPN to synthesis microbial protein. Requires a carrier that supplies energy
- Success of utilization depends on adequate ruminal energy for microbes
## Feedstuff Options

<table>
<thead>
<tr>
<th>Feed</th>
<th>Crude Protein, %</th>
<th>Degradable Protein</th>
<th>Undegradable Protein</th>
<th>Pounds to provide 2 lbs CP</th>
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<tr>
<td>Dried Distillers Grains</td>
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<tr>
<td>Wet Brewers Grains</td>
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<tr>
<td>Corn Gluten Feed</td>
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<td>8.33</td>
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<tr>
<td>Whole Cottonseed</td>
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<td>Peanut Hulls</td>
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<tr>
<td>Molasses</td>
<td>5</td>
<td>100</td>
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<td>40.0</td>
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</table>
Nutritional Assessment

• Protein is limiting nutrient if:
  – Energy is satisfactory
  – Cows in adequate BCS for energy mobilization
  – Forage availability is not limited

• Solving Protein limitation:
  – Forage availability is adequate then supplement with high crude protein
    • Natural protein (RDP) improves forage utilization
    • NPN in molasses 50% utilization
    • RUP source improvements animal performance after RDP is met

• Supplement selection based on $/lb of CP
• Supply sufficient supplement to meet CP deficiencies and monitor energy status
Vitamin-Mineral Supplementation

• Vitamin-Mineral deficiencies cause problems regardless of protein/energy
• Deficiencies in forage
  – especially low quality
  – fast-growing and/or winter annuals
• Other supplements may alter mineral availability in forage
• Efficacy of all other supplementation depends on vitamin/mineral adequacy
Feeding the Beef Cow

• If you feed costs are extremely high:
  – May indicate that cow nutrient needs and forage nutrient supply do not match
    • Does the cow match the nutritional environment
    • Consider altering production calendar
Nominal groups in the herd

- Dry, mature pregnant cows in good condition
- Lactating mature cows
- Lactating young cows
- Pregnant replacement heifers
- Weaned replacement heifers
- Growing market steers and heifers
- Herd bulls

All have different nutritional requirements. How can you feed them together?
Assessing Effectiveness of Nutrition
Cow BCS is most often influenced by the lack of available forage.
How to tell if cattle are getting adequate nutrition

• Body Condition Score
• Estimation of body fat
• Gauge effectiveness of feeding program
• Decision tool to determine future feeding needs
• Scale of 1 to 9

• Most Florida cows score from 3 to 7
  – BCS 3 = 7 to 9% fat.
  – BCS 5 = 15 to 18% fat.
  – BCS 7 = 25 to 27% fat.
Cow Body Condition Score

• Body condition score is the best measure of past nutritional status and a good indicator of future reproductive performance.

• **5 is the magic number!**
Body Condition Score (BCS)

- A medium frame cow weighs about 1100 lb at BCS 5.
- A similar cow weighs approximately 950 lb at BCS 3.
- Each condition score changes weight approximately 75 lb.
Energy required for cows with different BW to increase BCS

![Graph showing energy requirements for cows with different BW to increase BCS. The x-axis represents Body Condition Score (3 to 4, 4 to 5, 5 to 6), and the y-axis represents Mcal of Net Energy. The graph includes data for 1,000 lb, 1,100 lb, and 1,200 lb BW.]
Young Cow Nutritional Issues

Forage intake in yearling heifers is limited by gut capacity.
Comparison of Cow vs Heifer Energy Requirement

<table>
<thead>
<tr>
<th></th>
<th>Lbs, Intake</th>
<th>TDN, % required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow DMI</td>
<td>24</td>
<td>60</td>
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<tr>
<td>Heifer DM</td>
<td>20</td>
<td>58</td>
</tr>
</tbody>
</table>

Cow TDN req: 56
Heifer TDN req: 61
Conclusion

- Ability to meet requirement is constrained by forage and cattle characteristics
- Grazing forage alone often does not meet energy and/or protein demands of cattle
- Cow herd nutrition can be complicated
  - Forage quality
  - Forage availability
  - Cattle requirements change
  - Supplement characteristics
- Evaluate feedstuff on a price / unit of nutrient
- Nutritional decision making process should be economical and biological
Final Remarks

• Underfeeding the cow herd before or after calving really affects 2 calf crops, this year’s and next year’s.

• THE MOST IMPORTANT NUTRIENT IS THE ONE THAT IS MISSING!
Questions

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