Nutrition 101

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6 major nutrients groups
- proteins
- carbohydrates
- lipids
- vitamins
- minerals
- water

Nutrients Cattle Require
- protein
- energy
- carbohydrates
- lipids
- short or long chain
- excess protein
- vitamins
- A, D, E, K
- B-vitamins
- minerals
- macro
  - Ca, P, K, Mg, Na, S
- micro
  - Cu, Zn, Mn, Se, I, Co, Fe,
- water
- other nutrients
- linoleic acid
- linolenic acid
- etc.

*nutrients in red are not essential in the diet (i.e. they can be supplied by rumen microbes)

Nutrient Usage
- maintenance
- pregnancy
- lactation
- gain
- energy
- protein
- minerals
- vitamins
- water
- all other nutrients

maintenance energy – the amount of energy it takes to maintain an animal (i.e. the animal is not gaining or losing weight or condition)

total digestible nutrients (TDN)
- TDN = energy
crude protein (CP)

highest nutrient needs as % of diet DM
calves
stocker cattle
lactating cows
replacement heifers
dry cows

lowest nutrient needs
7

<table>
<thead>
<tr>
<th>Description</th>
<th>% CP</th>
<th>% TDN</th>
<th>% Ca</th>
<th>% P</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-yr-old lactating cow, peak lactation</td>
<td>11.5</td>
<td>60</td>
<td>0.28</td>
<td>0.18</td>
</tr>
<tr>
<td>3-yr-old lactating cow, peak lactation</td>
<td>12.5</td>
<td>61</td>
<td>0.30</td>
<td>0.19</td>
</tr>
<tr>
<td>Mature lactating cow, peak lactation</td>
<td>12.5</td>
<td>61</td>
<td>0.30</td>
<td>0.19</td>
</tr>
<tr>
<td>Coming 3-yr-old dry cow, 270 d pregnant</td>
<td>9.0</td>
<td>58</td>
<td>0.26</td>
<td>0.17</td>
</tr>
<tr>
<td>Mature dry cow, 270 d pregnant</td>
<td>8.5</td>
<td>55</td>
<td>0.26</td>
<td>0.17</td>
</tr>
</tbody>
</table>

*Estimated dietary requirements for high marbling cows with no weather stress. Assumes 1,200 lb mature weight and 25 lb milk potential at maturity (NRC, 2016)

8

<table>
<thead>
<tr>
<th>Nutrient Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>700 lb yearling steer</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADG</th>
<th>% TDN</th>
<th>% CP</th>
<th>% Ca (gm)</th>
<th>DMI (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>53</td>
<td>8</td>
<td>0.26</td>
<td>21.3</td>
</tr>
<tr>
<td>1.5</td>
<td>57</td>
<td>9</td>
<td>0.32</td>
<td>26.5</td>
</tr>
<tr>
<td>2.0</td>
<td>61</td>
<td>10</td>
<td>0.38</td>
<td>31.6</td>
</tr>
<tr>
<td>2.5</td>
<td>65</td>
<td>11</td>
<td>0.43</td>
<td>36.1</td>
</tr>
<tr>
<td>3.0</td>
<td>70</td>
<td>12</td>
<td>0.50</td>
<td>41.7</td>
</tr>
</tbody>
</table>

*Estimated dietary requirements for Brangus type steer under typical production conditions (Beef Cattle NRC, 1996). These requirements will vary depending on numerous factors including body condition, health, breed, environmental factors, use of growth promotants, and others.

9

<table>
<thead>
<tr>
<th>Nutrient Requirements comparison at 2.0 lb/d</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>weight</th>
<th>% TDN</th>
<th>% CP</th>
<th>% Ca</th>
<th>Ca, gm</th>
<th>DMI, lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>65</td>
<td>12.7</td>
<td>0.55</td>
<td>32.2</td>
<td>13.0</td>
</tr>
<tr>
<td>600</td>
<td>63</td>
<td>11</td>
<td>0.45</td>
<td>32.3</td>
<td>15.9</td>
</tr>
<tr>
<td>700</td>
<td>61</td>
<td>10</td>
<td>0.38</td>
<td>31.6</td>
<td>18.7</td>
</tr>
<tr>
<td>800</td>
<td>61</td>
<td>9.5</td>
<td>0.34</td>
<td>31.4</td>
<td>20.6</td>
</tr>
</tbody>
</table>

*Estimated dietary requirements for Brangus type steer under typical production conditions (Beef Cattle NRC, 1996). These requirements will vary depending on numerous factors including body condition, health, breed, environmental factors, use of growth promotants, and others.

10

(photos courtesy of Real Hog Farm)

11

12

(photos courtesy of Real Hog Farm)
Acidosis

(photo courtesy of vetnext.com)

(photo courtesy of FiveF)

(photo courtesy of vetnext.com)
When do we have confined feeding?
- feedlot
- dairy
- backgrounding yard
- drought
- winter in Northern states

TMR
3 components
- roughage
- energy source
- protein, mineral, vitamin premix

When do we supplement?
- forage doesn’t meet nutrient requirements
- BCS is too low
- improve forage utilization
- improve ADG of growing cattle

Energy and/or Protein Supplements
components
- not worried about roughage
- energy
- protein

separate mineral & vitamin supplement generally provided

Performance Terminology
Growing Cattle: ADG  Cows: BCS
Areas to evaluate Body Condition

1. BACK
2. TAIL HEAD
3. PINS
4. HOOKS
5. RIBS
6. BRISKET

Figure 1. Anatomic areas that are used for scoring body condition in beef cows.

BCS of 3

<table>
<thead>
<tr>
<th>Visible</th>
<th>Visible</th>
<th>Visible</th>
<th>No fat</th>
<th>No fat</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribs</td>
<td>Spine</td>
<td>Hooks/Pins</td>
<td>Tailhead</td>
<td>Brisket</td>
<td>Muscling</td>
</tr>
</tbody>
</table>

BCS of 4

<table>
<thead>
<tr>
<th>Visible</th>
<th>Slightly visible</th>
<th>Visible</th>
<th>No fat</th>
<th>No fat</th>
<th>Some</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribs</td>
<td>Spine</td>
<td>Hooks/Pins</td>
<td>Tailhead</td>
<td>Brisket</td>
<td>Muscling</td>
</tr>
</tbody>
</table>
When should you take BCS?

- at weaning  
  - most important time
- every few months

- score the same cows in the herd
- a digital camera can be a good tool

BCS and Pregnancy Rates

Effect of BCS on Pregnancy Rate of Mature Cows
EFFECT OF BODY CONDITION SCORE (BCS) ON % PREGNANT

% PREGNANT

BCS

TX, SW
BCS OKL
BCS FL90

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Forages the Key to Cow-Calf and Stocker Nutrition

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Beef Industry is a Grass Industry

What is the goal of a forage system?

Customized to Your Operation, Soil Type, and Resources
Cow-Calf Systems are based on Perennial Forages
Protein is often first limiting with Native Warm-Season Perennial Forages

Native Range Systems

Introduced Warm-Season Perennial Forages
Energy is often first limiting with Introduced Warm-Season Perennial Forages.
Bahia and Bermudagrass Systems

How long does bahia and bermudagrass grow?

How do we fill in the gaps?
What about winter annuals?

3rd trimester heifers & cows: limit grazing only

Utilizing Cool-Season Annual Grasses (ryegrass, small grain-rye)

Utilizing Warm-Season Perennial Grasses (bermudagrass, kahigraass, etc.)
What about summer annuals?

Management Factors Affecting Forage Production
Grazing Pressure and Stocking Rate
introduced

natives

Rotation Considerations
Stocking Strategies and Factors

Stocking Rate is a Moving Target

How many acres do you need per cow?

General intake guidelines
- Dry gestating cow: 1.8 to 2.0% of BW
- Lactating cow: 2.3 to 2.5% of BW

Estimated Annual Intake
Assume cow consumes 2.25% of BW on DM basis

$1,000 \text{ lb} \times 2.25\% = 22.5 \text{ lbs/d}$

$22.5 \times 365 = 8,213 \text{ lbs/year}$
Estimated Forage Allowance

Should you let the cows consume everything that is produced?

let cow consume 70%

\[ 8,213 \div 0.70 = 11,733 \text{ lbs} \]

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<tr>
<th>Cow Weight</th>
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<th>1,200</th>
<th>1,400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow intake, (2.25% of BW)</td>
<td>8,213</td>
<td>9,855</td>
<td>11,498</td>
</tr>
<tr>
<td>Calf Intake</td>
<td>1,508</td>
<td>1,810</td>
<td>2,111</td>
</tr>
<tr>
<td>Pair Intake</td>
<td>9,721</td>
<td>11,665</td>
<td>13,609</td>
</tr>
<tr>
<td>Forage Allowance, let cow consume (70%)</td>
<td>13,887</td>
<td>16,664</td>
<td>19,441</td>
</tr>
<tr>
<td>Forage Production, lbs/ac</td>
<td>4,500</td>
<td>4,500</td>
<td>4,500</td>
</tr>
<tr>
<td>Stocking Rate, ac/pair</td>
<td>3.09</td>
<td>3.70</td>
<td>4.32</td>
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<td>13,609</td>
</tr>
<tr>
<td>Forage Allowance, let cow consume (25%)</td>
<td>38,884</td>
<td>46,660</td>
<td>54,436</td>
</tr>
<tr>
<td>Forage Production, lbs/ac/yr</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Stocking Rate, ac/pair</td>
<td>12.96</td>
<td>15.55</td>
<td>18.15</td>
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80%
Using Excess Forage

skip an application of nitrogen
be mindful of biosecurity

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