

## Supplementation Basics for Cow-Calf Operations

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## Hay Feeding Scenarios

- ~~cheap and easy~~
- easiest and least expensive
- frequent labor when needed, less expensive
- less consistent labor, more expensive

What 3 primary things affect supplementation of energy & protein?

BCS  
forage & hay quality  
nutrient requirements

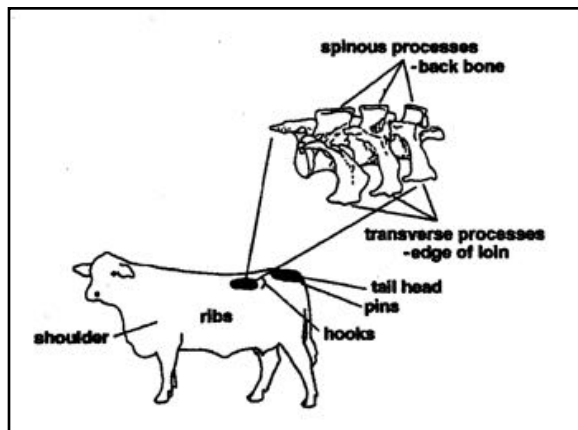
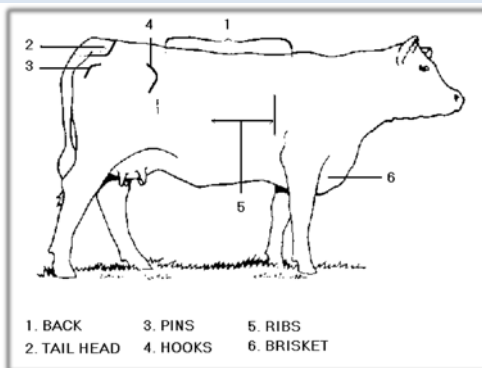
## Performance Terminology

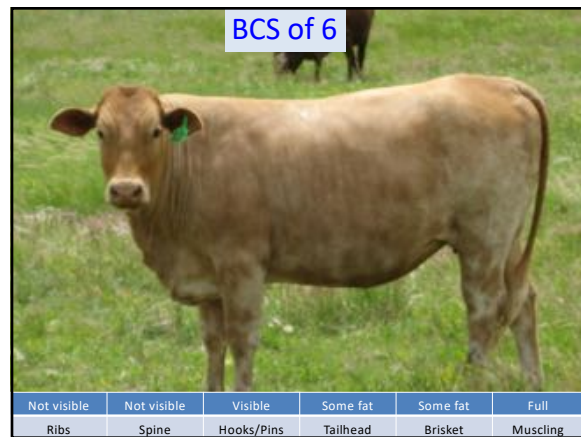
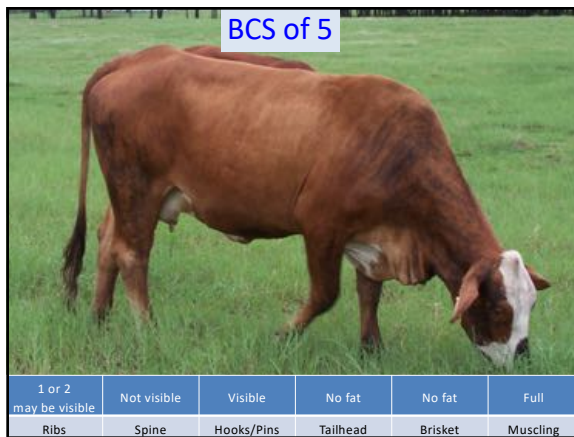
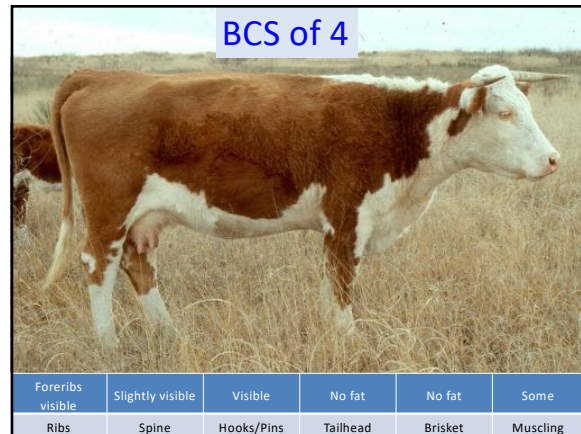
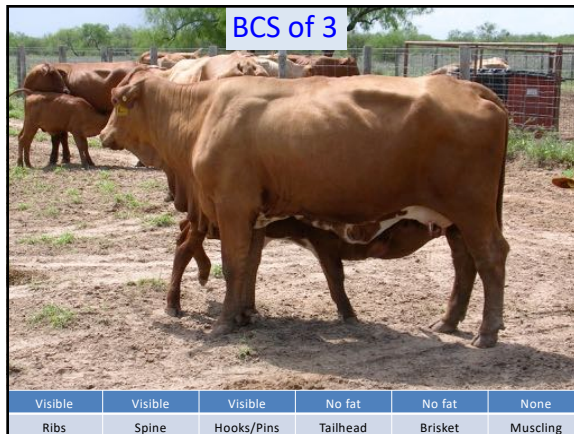
Growing Cattle: ADG

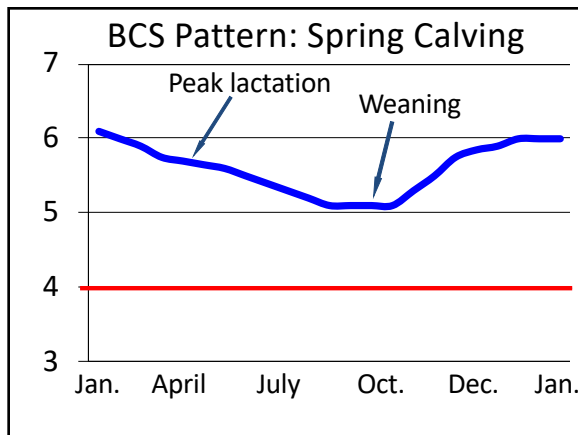
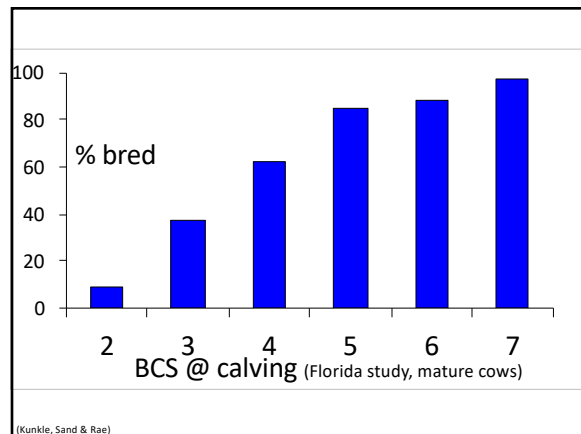
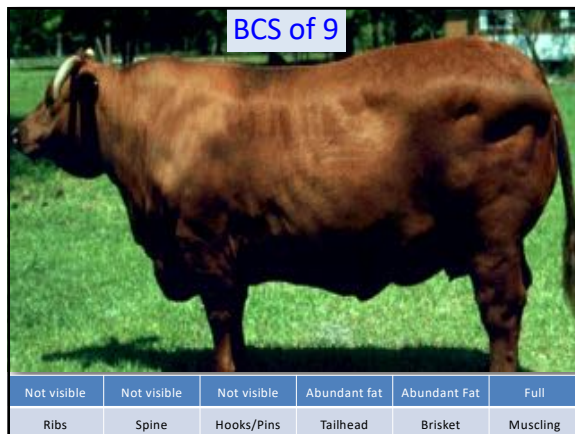
Cows: BCS



## Areas to evaluate Body Condition







## Forage Quality and Forage Intake

as forage quality declines forage intake decreases

- low quality forage = low intake
- high quality forage = higher intake

### Factors Affecting Forage Quality

- maturity
- species
- temperature
- rained on hay

## Maturity

| Interval between cuttings | % TDN | Yield, tons/acre |
|---------------------------|-------|------------------|
| 3 weeks                   | 65.2  | 7.9              |
| 4 weeks                   | 61.9  | 8.4              |
| 5 weeks                   | 59.3  | 9.2              |
| 6 weeks                   | 58.0  | 10.3             |
| 8 weeks                   | 54.1  | 10.2             |
| 12 weeks                  | 51.0  | 10.4             |

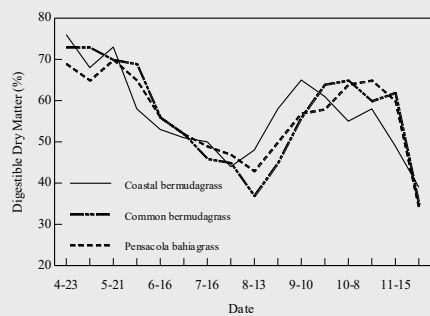
- Coastal bermudagrass study in Georgia
- Glen Burton

## Species

cool season > warm season

annuals > perennials

- winter annuals (i.e. ryegrass, rye, oats, etc.)
- crabgrass
- johnsongrass
- Tifton 85
- bahiagrass
- bermudagrass



Time of year influences the quality of warm-season perennial grasses.

(Duble, 1970; pasture samples taken at Overton)



## Determining Forage Quality

sample each cutting

TDN (i.e. energy)

- summative equations
- NDF
- NDF digestibility
- ash

Crude Protein



| Components                | As Fed | DM   |
|---------------------------|--------|------|
| % Moisture                | 9.1    |      |
| % Dry Matter              | 90.9   |      |
| % Crude Protein           | 6.2    | 6.8  |
| % Adjusted Crude Protein  | 6.2    | 6.8  |
| % Acid Detergent Fiber    | 45.3   | 49.8 |
| % Neutral Detergent Fiber | 56.1   | 61.8 |
| % NFC                     | 22.3   | 24.5 |
| % TDN                     | 52     | 57   |
| NEL, Mcal/Lb              | .46    | .51  |
| NEM, Mcal/Lb              | .46    | .51  |
| NEG, Mcal/Lb              | .2     | .26  |
| IVTD 48hr, % of DM        |        | 69   |
| NDFD 48hr, % of NDF       |        | 50   |

57% TDN



| Components                | As Fed | DM    |
|---------------------------|--------|-------|
| % Moisture                |        |       |
| % Dry Matter              |        |       |
| % Crude Protein           | 6.2    | 6.8   |
| % Adjusted Crude Protein  | 6.2    | 6.8   |
| % Acid Detergent Fiber    | 45.3   | 49.8  |
| % Neutral Detergent Fiber | 56.1   | 61.8  |
| % NFC                     | 11.8   | 13.0  |
| % Ash                     | 16.55  | 18.21 |
| % TDN                     | 42     | 46    |
| NEL, Mcal/Lb              | .37    | .41   |
| NEM, Mcal/Lb              | .31    | .34   |
| NEG, Mcal/Lb              | .0     | .09   |
| IVTD 48hr, % of DM        |        | 69    |
| NDFD 48hr, % of NDF       |        | 50    |

18.21% Ash

46% TDN

## Forage Testing Laboratories

### Dairy One Forage Lab

Ithaca, NY; 800-344-2697

<http://www.dairyone.com>

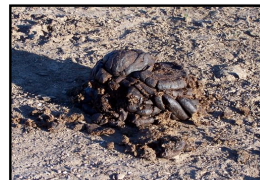
- > NIR can be used if lab has appropriate database
- > wet chemistry will always work

| Components                | As Fed | DM   |
|---------------------------|--------|------|
| % Moisture                | 8.0    |      |
| % Dry Matter              | 92.0   |      |
| % Crude Protein           | 11.3   | 12.2 |
| % Adjusted Crude Protein  | 11.3   | 12.2 |
| % Acid Detergent Fiber    | 37.3   | 40.6 |
| % Neutral Detergent Fiber | 64.8   | 70.5 |
| % NFC                     | 11.6   | 12.6 |
| % TDN                     | 50     | 54   |
| NEL, Mcal/Lb              | .38    | .41  |
| NEM, Mcal/Lb              | .42    | .46  |
| NEG, Mcal/Lb              | .19    | .21  |

## Determining Forage Quality

### Pasture:

forage species  
growing conditions  
fecal consistency



## Nutrient Requirements

| Description                             | % CP | % TDN | % Ca | % P  |
|-----------------------------------------|------|-------|------|------|
| 2-yr-old lactating cow, peak lactation  | 11.5 | 60    | 0.28 | 0.18 |
| 3-yr-old lactating cow, peak lactation  | 12.5 | 61    | 0.30 | 0.19 |
| mature lactating cow, peak lactation    | 12.5 | 61    | 0.30 | 0.19 |
| coming 3-yr-old dry cow, 270 d pregnant | 9.0  | 58    | 0.26 | 0.17 |
| mature dry cow, 270 d pregnant          | 8.5  | 55    | 0.26 | 0.17 |

\*Estimated dietary requirements for high marbling Angus cows with no weather stress. Assumes 1,300 lb mature weight and 25 lb milk potential at maturity (NRC, 2016)



but....what if the cows  
look like this?



### Hay Feeding Scenarios

~~cheap and easy~~

- easiest and least expensive
- less consistent labor, more expensive
- frequent labor when needed, less expensive

Easiest,  
Least Expensive



Frequent Labor When Needed,  
Less Expensive

### When do we supplement?

for most beef cow-calf operations protein  
and/or energy supplementation is  
generally needed

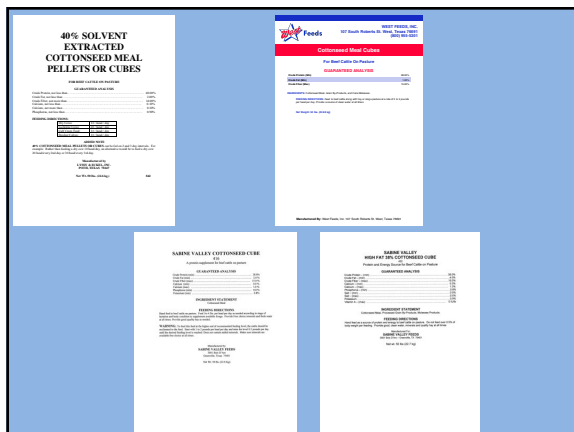
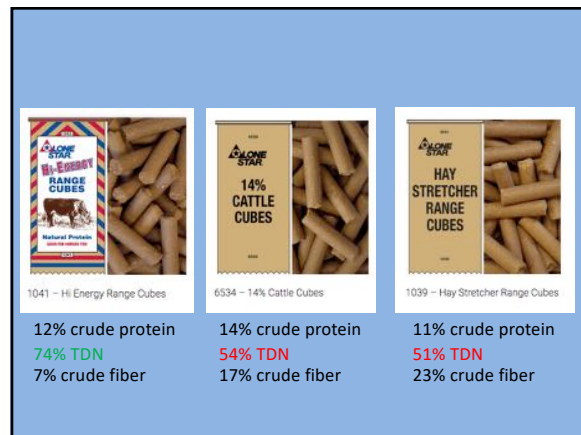
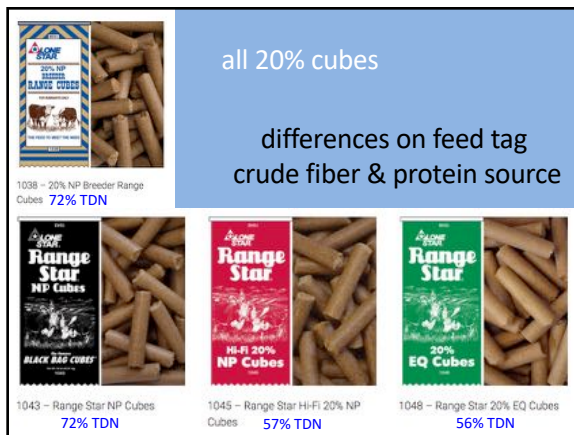
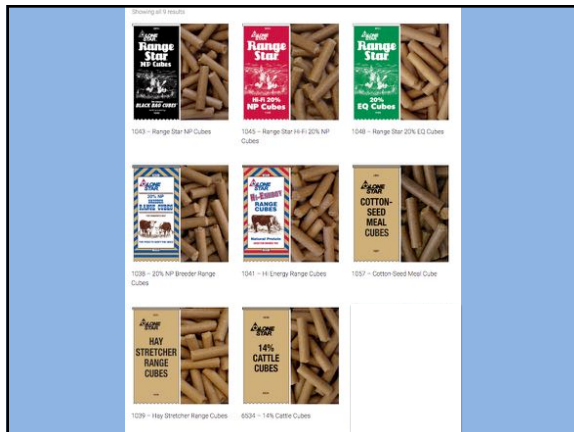
- late summer when forage quality declines
- during the winter

### What type of supplement is needed?

protein                      energy  
a combination of energy and protein



| Ingredient | \$/50 lb | \$/ton | % TDN,<br>DMB | % CP,<br>DMB |
|------------|----------|--------|---------------|--------------|
| 12% cube   | \$7.10   | \$284  | 81            | 13.6         |
| 20% cube   | \$8.60   | \$344  | 77            | 22.7         |
| 38% cube   | \$10.60  | \$424  | 75            | 43.2         |





## Energy Sources

- 11-14% cubes
- corn
- soybean hulls
- wheat midds
- rice bran



gradually increase levels in the diet

## Energy and Protein Sources

- 20% cubes
- corn gluten feed
- distillers grains
- winter pasture
- whole cottonseed (max. 25% of diet)



gradually increase levels in the diet

## Protein Sources

- 38 or 40% cubes
- cottonseed meal
- soybean meal
- sunflower meal
- alfalfa hay
- winter pasture



Less Consistent Labor,  
More Expensive



20% cubes



\$10.60/50 lb sack  
\$424/ton

20% tub



\$98.95/225 lb tub  
\$880/ton

VS



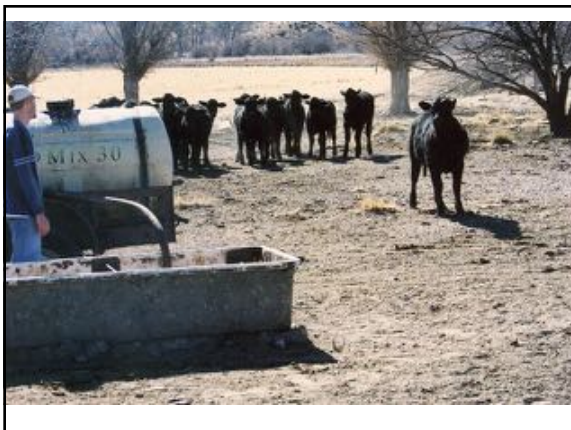
Generally, on all FS protein supplements one tub to 25 head will achieve a .5 to .75 of a pound per-head per-day consumption, which is all that cattle need.

???

Common floor stock formulations: 1 – 3 lbs of intake



Can Provide More Energy



Custom formulations





## Starting Point

Hay: 45% TDN, 5.0% CP

### Dry cow

goal: maintain BCS

8 lbs of 20% cubes

### Wet Cow

goal: control weight loss

11 lbs of 20 % cubes

Hay: 50% TDN, 6.5% CP

### Dry cow

goal: maintain BCS

4 lbs of 20% cubes

### Wet Cow

goal: control weight loss

6 lbs of 40 % cubes

Hay: 55% TDN, 9.0% CP

### Dry cow

goal: maintain BCS

hay only

### Wet Cow

goal: control weight loss

2 lbs of 40 % cubes

Monitor and adjust your supplementation program as performance dictates



# Pricing Supplements



# Need Protein

20% CP cube (no NPN)

- \$10.30 per 50 lb sack
- 10 lb CP per sack ( $50 \times 0.20 = 10$  lb of CP)
- **\$1.03/lb of CP** ( $\$10.30 \div 10 = \$1.03/\text{lb}$ )

38 % CP cube

- \$13.55 per 50 lb sack
- 19 lb CP per sack ( $50 \times 0.38 = 19$  lb of CP)
- **\$0.71/lb of CP** ( $\$13.55 \div 19 = \$0.71/\text{lb}$ )

## Need Energy

- 20% CP cube (high energy, 70% TDN, <sub>AFB</sub>)
  - \$10.30 per sack
  - 35 lb of TDN per sack ( $50 \times 0.70 = 35$  lb)
  - \$0.29/lb of TDN ( $\$10.30 \div 35 = \$0.294/\text{lb}$ )
- 38% CP cube (67 % TDN, <sub>AFB</sub>)
  - \$13.55 per 50 lb sack
  - 33.5 lb TDN per sack ( $50 \times 0.67 = 33.5$  lb)
  - \$0.40/lb of TDN ( $\$13.55 \div 33.5 = \$0.404/\text{lb}$ )

# Supplementation Frequency

# Frequency of Supplementation

protein supplements  
(no NPN or antibiotics)

- everyday
  - 2 lbs
- 3 times/wk
  - 4.7 lbs
- 2 times/wk
  - 7 lbs
- 1 time/wk ??
  - 14 lbs



## Frequency of Supplementation

### energy supplements

- best to feed everyday
- if feeding small amounts, can feed every other day
- feeding at less frequent intervals can lead to big problems

feeding 3 times a week reduced ADG by 10% compared with daily feeding (Loy et al., 2008)

- 3 supplements, 2 supplementation levels

## Additional Considerations

- Subacute ruminal acidosis reduces sperm quality in beef bulls (Callaghan et al., 2016)
- Bulls were on free choice hay and 0.5% of BW concentrate for 125 days prior to challenge
- Challenged 1 day with rapidly fermentable CHO source
- Percent normal sperm reduced
- Percent normal sperm still lower at 88 days after challenge

<http://beef.tamu.edu>