Winter Nutrition

Feed and Pasture Costs/Cow

Item	2017 - 2021	2022	% Change
Pasture	$178	$191	7%
Feed	$307	$428	39%
Total	$485	$619	28%

Source: Kansas Farm Management Association

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Beef Cow Nutrition

- Matching cattle to forage
- Body condition
- Diet evaluation
  - Forage nutritive value
  - Animal requirements
- Observation and Common Sense

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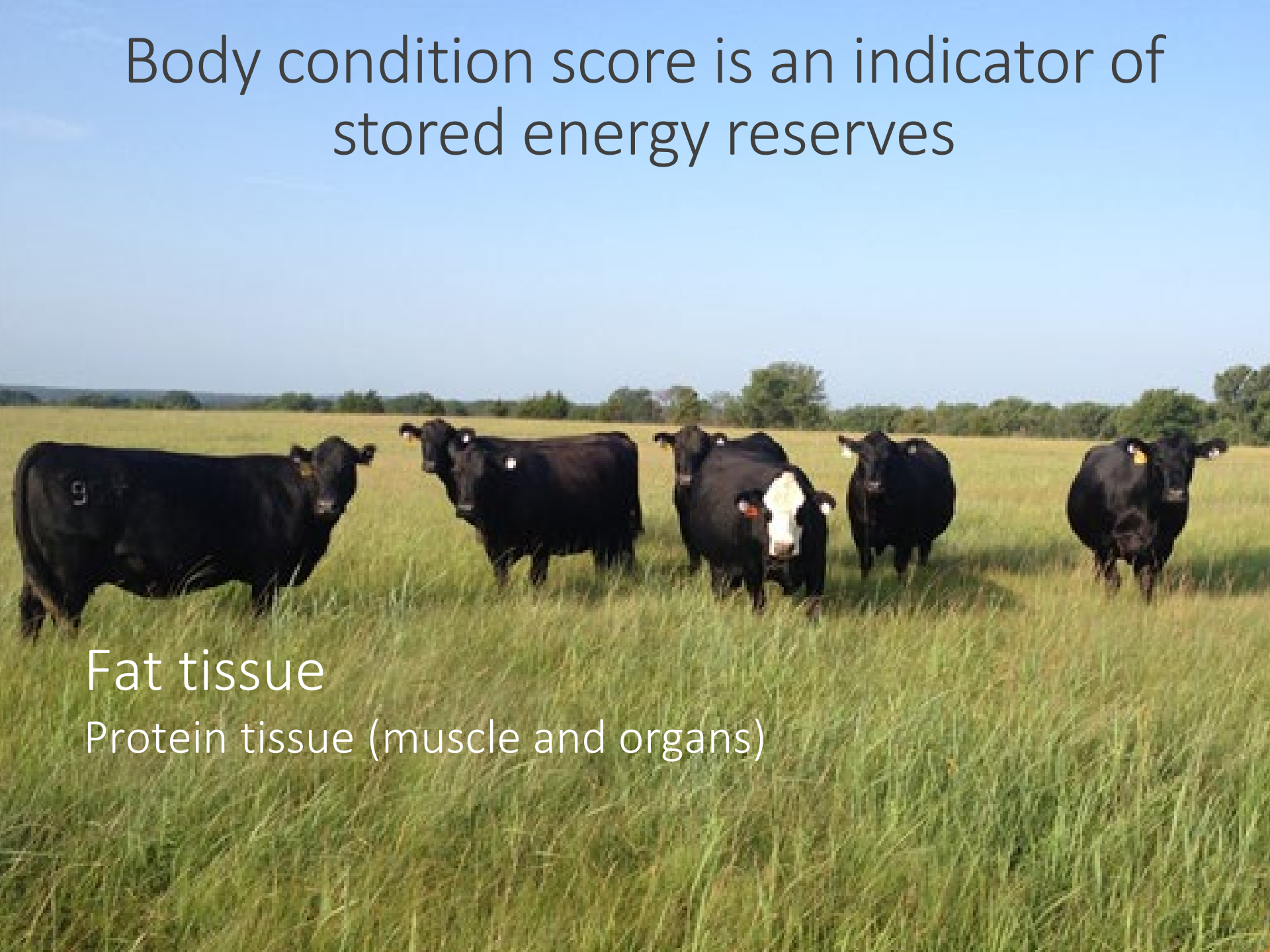
Body condition score is an indicator of stored energy reserves



Fat tissue

Protein tissue (muscle and organs)

Body Condition

Relationship between body condition score (BCS) at calving and first 90 days after calving to

- Reproductive success
- Calf immune system

Current BCS is a result of

- Balance between recent nutrient supply and recent nutrient requirements
  - Management (grazing management, supplementation program, herd health program, timing of calving, etc.)
  - Match or mismatch of cows' genetic potential to the forage and management system

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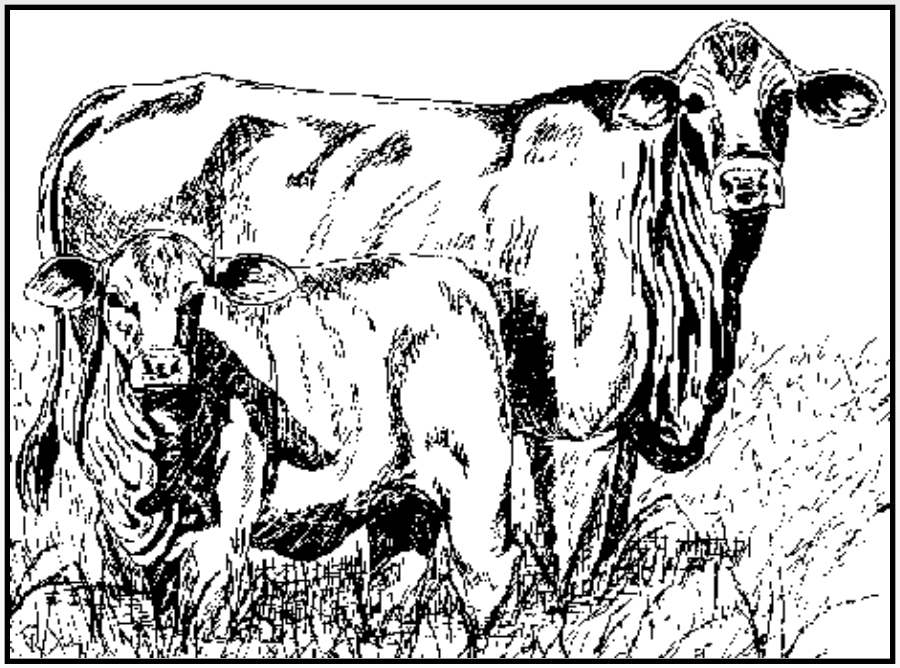
Body Condition Goals at Calving

Mature cows	**5**
2-year-olds	**6**




Requirements vary
with the production cycle
Grazed forage quality and availability
changes over time

Effective Supplementation

1. Determine nutrient requirements
2. Estimate nutrients available from forage
3. Determine supplemental needs
4. Evaluate supplement alternatives

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Cowculator

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Cattle | Balancer | Feed List | Summary

DEVELOPED AT OKLAHOMA STATE UNIVERSITY
BY M.A. GROSS, D.L. LALMAN, and P.A BECK

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Resources

- Nutrient requirements
  - Beef Cattle Manual, chapter 16
  - Extension bulletins: E-974, Nutrient Requirements of Beef Cattle

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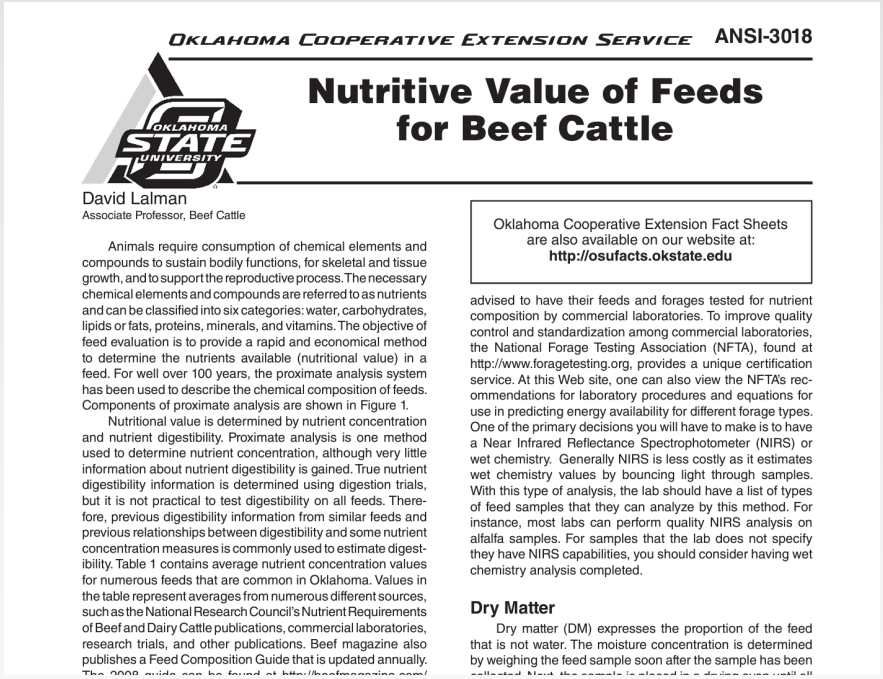
Resources

Nutrients available from forage

- Book values:
  - Beef Cattle Manual, chapter 17
  - Extension bulletins and other publications: ANSI-3018
- Build your own library
  - Harvested hay samples and quarterly (or more frequently) forage sampling using hand-plucking technique
  - Commercial laboratory analysis
  - Consistency and continuity over time is key



OKLAHOMA COOPERATIVE EXTENSION SERVICE ANSI-3018

Nutritive Value of Feeds for Beef Cattle

David Lalman
Associate Professor, Beef Cattle

Animals require consumption of chemical elements and compounds to sustain bodily functions, for skeletal and tissue growth, and to support the reproductive process. The necessary chemical elements and compounds are referred to as nutrients and can be classified into six categories: water, carbohydrates, lipids or fats, proteins, minerals, and vitamins. The objective of feed evaluation is to provide a rapid and economical method to determine the nutrients available (nutritional value) in a feed. For well over 100 years, the proximate analysis system has been used to describe the chemical composition of feeds. Components of proximate analysis are shown in Figure 1.

Nutritional value is determined by nutrient concentration and nutrient digestibility. Proximate analysis is one method used to determine nutrient concentration, although very little information about nutrient digestibility is gained. True nutrient digestibility information is determined using digestion trials, but it is not practical to test digestibility on all feeds. Therefore, previous digestibility information from similar feeds and previous relationships between digestibility and some nutrient concentration measures is commonly used to estimate digestibility. Table 1 contains average nutrient concentration values for numerous feeds that are common in Oklahoma. Values in the table represent averages from numerous different sources, such as the National Research Council's Nutrient Requirements of Beef and Dairy Cattle publications, commercial laboratories, research trials, and other publications. Beef magazine also publishes a Feed Composition Guide that is updated annually.

Oklahoma Cooperative Extension Fact Sheets are also available on our website at: **http://osufacts.okstate.edu**

advised to have their feeds and forages tested for nutrient composition by commercial laboratories. To improve quality control and standardization among commercial laboratories, the National Forage Testing Association (NFTA), found at http://www.foragetesting.org, provides a unique certification service. At this Web site, one can also view the NFTA's recommendations for laboratory procedures and equations for use in predicting energy availability for different forage types. One of the primary decisions you will have to make is to have a Near Infrared Reflectance Spectrophotometer (NIRS) or wet chemistry. Generally NIRS is less costly as it estimates wet chemistry values by bouncing light through samples. With this type of analysis, the lab should have a list of types of feed samples that they can analyze by this method. For instance, most labs can perform quality NIRS analysis on alfalfa samples. For samples that the lab does not specify they have NIRS capabilities, you should consider having wet chemistry analysis completed.

Dry Matter

Dry matter (DM) expresses the proportion of the feed that is not water. The moisture concentration is determined by weighing the feed sample soon after the sample has been

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Certified Laboratories
foragetesting.org
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Determine Supplemental Needs

Nutrients from forage

-

Nutrient requirements

Nutrient excess or deficiency

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Effective Nutrition Program

- Balance nutrient supply with nutrient requirements
  - Overfeeding any nutrient is unnecessary and expensive
  - Ignoring a substantial deficiency can be devastating
- Optimize cost, performance, convenience and ancillary benefits

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Supplement Decisions

1) Address protein balance first
2) Evaluate energy balance
3) Cost
4) Convenience

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Supplementation Priorities
Evaluate Protein First

	No Sup.	1.1 lbs Protein
Dry Matter Intake	**18 lbs.**	**21 lbs.**
Forage Digestibility	**49%**	**55%**
Total TDN Intake	**8.9 lbs.**	**12.8 lbs.**

Sanson, 1990

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Improved Intake and Digestibility Results in Better Performance

	2 lb. / d of 40%	No Sup
Cow wt. change	+23 lb	-153 lb
BCS change	-.3	-1.6
Weaning weight	484	448

Steele et al., 2002
Treatments applied for about 90 days during late gestation

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Don't Purchase Protein Supplement That is Not Needed

Rule of Thumb:

Forage with >= 8% CP and fed during mid-gestation will not require a protein supplement

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Protein Sources

“Natural” or Plant Proteins

- soybean meal
- cotton seed meal
- alfalfa hay
- dehydrated alfalfa
- wheat middlings
- whole cotton seed
- sunflower meal
- whole soybeans
- corn gluten feed
- barley malt sprout product

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Protein Sources

Non-protein nitrogen

- urea
- biuret
- uric acid (poultry litter)
- ammonium sulfate

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Effect of Urea or Natural Protein Supplements on Forage Intake

	Supplements	
Item	Urea	Natural
No. of Studies	19	17
Mean Forage CP %	3.7	4.5
Mean Intake Inc. %	34	45
Range in Response	8 – 104	14 - 77

Adapted from Minson, 1990

Non-protein nitrogen as a protein source

	Utilization, %	
Diet Type	Dry Supplement	Liquid or Block Supplement
Low quality hay, weathered grass	0 - 25	50
Medium quality hay, summer pasture	40 - 60	80
High Quality (Feedlot diet)	90 - 100	90 - 100

OSU, 1967

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Improving NPN utilization

NPN sources are better utilized when:

- More mature cattle: > 600 lbs.
- .5% or more of body weight concentrate is fed
- Dietary protein is marginally deficient (1 to 3% gap)
- Natural PTN and NPN are blended
- Animals allowed access > 1 time/day

Cost vs. Convenience

- Do your own math
- Only you can decide what the convenience factor is worth

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Interval Feeding

- Saves labor and equipment
- Every-other-day or 3 days per week (M, W, F) works well
- Effective with plant-based protein supplements
- Limited to less than 1% of body weight per feeding

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