

Nutritional Management of Cows by Body Condition



The principle factors affecting the profitability of a beef cattle operation include calf weaning weights, percent of exposed cows weaning calves, annual cost of maintaining cows, and the sale price of calves. One of the primary expenditures of a cow/calf enterprise is annual feed cost. Balancing feed cost with reproduction is critical to the cattle operation's success. Inadequate nutrition may extend calving intervals or result in failure to conceive. At some point, more feed will not improve production enough to offset the additional cost.

Body condition scoring (BCS) is a system many producers, veterinarians, and beef cattle specialists use to monitor effectiveness of nutrition programs. The concept is not new, but BCS is underutilized as a tool for evaluating how well the feed provided matches cattle nutrient requirements.

Cow nutrient requirements

Cow nutrient requirements change with stage of pregnancy, level of milk production, age, weight, and body condition, as well as breed and estimated calf size. The publication, *Nutrient Requirements of Beef Cattle: Eighth Revised Edition*, released in 2016, establishes nutrient requirements of beef cows that account for the factors listed above. This bulletin addresses key questions that pertain to body condition scoring and its importance in nutritional management.

What are body condition scores?

Body condition scores are a numerical method to determine the relative body reserves of a cow. U.S. beef producers use a scale that ranges from 1 to 9, where 1 is a severely thin cow and 9 is an extremely obese cow. Primary areas evaluated for fat deposition or reserves include the spine (vertebrae), ribs, hooks and pins, tail head, and brisket. Any atrophy of muscling is also noted. To learn how to evaluate body condition of beef cows and bulls, see *Guide to Body Condition Scoring Beef Cows and Bulls* (MF3274).

Why is scoring important?

Body condition scoring cattle is an easy way for cattle producers to assess the nutrient reserves of their cattle. Finding the optimal balance between feed expenditures and reproduction level achieved for a given environment and genetics within your herd is key to a profitable cow/calf operation. Analyzing BCS can provide insight into current nutrition management practices. If cows are thin on grass, this indicates a need for supplementation or removal from a pasture because of low forage availability. Sorting cows into feeding groups based on body condition score allows you to allocate feed resources more appropriately. It saves money by minimizing overfeeding of low-maintenance, higher BCS cows.

How to use body condition scores in your operation

There are three steps in developing a nutritional management program using body condition scoring: assessment, allocation, and evaluation.

1. Assess current body condition and needed dietary changes.

Producers should evaluate BCS throughout the year, most importantly 60 to 90 days before calving, at calving, and at weaning. These assessments allow sufficient time to make nutritional changes to help cows reach optimal body condition for reproductive success and calf health. Because cows are fed and managed as a group, use a group average body condition score. Use the *Body Condition Record Book* (MF3277) to collect and summarize group body condition or record individual scores as cows come through the chute, and then average.

Strive for a BCS at calving that promotes success the following breeding season. Mature cows should have a minimum score of BCS of 5 at calving and heifers a BCS of 6. Heifers have additional growth requirements compared to mature cows. They are more likely to lose body condition during their first lactation, so it takes longer for heifers to resume normal estrous cycles and rebreed.

The amount of weight gain associated with each unit of BCS is a function of cow body weight (7.105% change in bodyweight/BCS). A one unit change in body condition score would reflect a live weight change of approximately 85 lbs for a 1200 lb cow, 92 lbs for a 1300 lb cow and 99 lbs for a 1400 lb cow. To achieve a BCS of 5 at calving, a thin cow at weaning would need to regain her body weight plus the weight of the growing fetus.

This is shown in Table 1, where cow body condition at weaning and that targeted for calving is used to estimate needed weight gains in 1400 lb, pregnant cows. All cows will have a weight gain of the fetus, membranes, and fluids (approximately 100-150 pounds or 1.7 times calf birth weight) in addition to the amount of weight gain needed to improve BCS. In the example, cows that are thin at weaning (BCS = 3), would need to gain 2 BCS units, which is equal to

198 pounds (92 pounds per BCS unit x 2 BCS unit change = 198 pounds). Cows that wean at a BCS of 4 only need to move one BCS unit, which is 99 pounds. Once you identify the number of unit changes needed, add the weight of the conceptus (calf, fluids, and membranes), and this gives you the total amount of weight your cow needs to gain.

Based on the length of time between weaning and calving, you then take the pounds of gain needed divided by days to calving, to determine the average daily gain required. Once you have identified the average daily gain, your nutritionist can help develop feeding regimens that will provide adequate gain. Avoid waiting too long to make this calculation. This can be costly if you have to buy expensive nutrient dense feeds or needed weight gain is not achieved and calf health and rebreeding suffer.

The net energy system is the primary method the nutritionist uses to estimate weight gain in cattle. In this system, the energy units are expressed in megacalories (Mcal). The energy units are usually expressed as either Mcal of net energy required for maintenance (NE_m) or as Mcal of net energy required for gain or production (NE_g).

Nutrients are allocated for maintenance and pregnancy first. Remaining calories go to support additional body-weight gain and/or lactation. Nutrient requirements for maintenance are based on cow body weight, maturity, and stage of production (pregnancy and or lactation). Cows that are heavier and have a higher peak energy requirement during lactation have higher maintenance energy (NE_m) requirements.

2. Allocate feed resources to individuals that need more or less.

Use body condition scores to allocate feed resources to cows and/or heifers that would benefit from different feeding management. Sorting cows by BCS reduces waste from overfeeding fat cows, and underfeeding thin cows. One potential management system is to place thin, older cows with 2-year-old cows. Usually, young cows are being fed a higher quality diet. Placing older, thin cows on the same diet may improve reproductive efficiency in the total cowherd. Additionally, body condition scoring helps identify cows that consistently need more feed to maintain body condition as possible culls if they fail to conceive in a timely fashion. These animals might not fit your available resources and can be a drain on the system.

3. Measure relative success of recent feeding program.

Monitor BCS over time to gauge the success of a feeding regimen. This is true for short-term goals (i.e., during the third trimester) or differences across years that reflect rainfall, stocking rate, or weaning time decisions. Remember, you can't manage what you don't measure.

Another way to measure the success of your feeding program is to evaluate the number of cows that calved within successive 21-day cycles of the calving season. You can assume nutrient requirements are met for cows that can resume normal estrous cycles and

conceive early in the breeding season. Ideally, 65% of cows would be expected to conceive in the first 21 days of the breeding season if they were all healthy, in adequate body condition, and cycling before breeding exposure. Realistically, this ideal is seldom achieved.

In a large study of Kansas herds, 64 percent of mature cows were cycling before the start of the breeding season, compared to 55 percent of first calf heifers, despite calving 2 to 3 weeks ahead of the mature cows. Table 2, page 4, shows the impact of calving distribution on herd average weaning weight. A lower percentage of cows in Herd A were cycling at the beginning of the breeding season than in Herd B.

Formulating diets to improve BCS

By using the following information, you can formulate diets to improve BCS:

- Current and desired BCS
- Days to achieve desired BCS change
- Body weight of cow
- Stage of production
- Quality of feedstuffs
- Forage intake

You can develop diets using hand calculations or work with your local livestock extension agent or ruminant nutritionist to use the Beef Ration and Decision software (BRaNDs). This tool allows you to quickly formulate diets to meet your operation's goals and is customized for Kansas producers. It is strongly

Table 1. Estimated weight gain in 1400 lb pregnant cows between weaning and calving to achieve target body condition at calving¹

Body Condition Score		Weight Gain Need to Calving, lbs				
Weaning	Calving	Calf ²	BodyWt ³	Total ⁴	Days to Calving	ADG ⁵ lbs/d
3	5	136	198	334	100	3.34
3	5	136	198	334	120	2.78
3	5	136	198	334	200	1.67
4	5	136	99	235	120	1.96
5	5	136	0	136	120	1.13

¹ *Nutrient Requirements of Beef Cattle, Eighth Revised Edition, 2016*

² Fetal calf weight gain is based on equations from *Nutrient Requirements of Beef Cattle (2016)* where weight of calf plus fetal fluids is 1.7 x calf birth weight. In this example calf birth weight is 80 lbs.

³ Body weight gain for the cow based on change in BCS (7.105% of body weight).

⁴ Total weight gain is calculated by taking calf and fetal fluids plus cow body weight gains.

⁵ ADG: average daily gain requirements to meet BCS goals. Calculated by taking total gain needed and dividing by days.

recommended that you submit properly collected forage and feed samples to a laboratory for nutrient analysis. Quality of feedstuffs varies widely, so the use of average values may result in failure to meet performance goals. Commercial laboratories estimate NEm and NEg based on acid detergent fiber (ADF) for the specific feedstuff submitted. Labs use different equations based on the type of forage — legume versus grass hays, for example — so make sure to identify the sample accurately when submitting.

Summary

Body condition scoring is an important management practice for all producers and should be conducted before critical events in the cow-calf production cycle. The most important times to assign a BCS are 60 to 90 days before calving, at calving, and at weaning. Evaluating your cows and the pastures they graze allows you to determine the supplements or management changes that are needed. Work with your local extension professional to make decisions based on cow BCS and to use the ration-development software known as BRaNDs.

Table 2. Effect of calving distribution on weaning weight in two hypothetical herds

Time period	Percentage of calves born		Weaning weight	
	Herd A	Herd B	Herd A	Herd B
21 d post calving	37.6	64.1	639	639
42 d post calving	66.8	89	571	571
63 d post calving	82.17	95.6	526	526
> 63 d	17.3	4.4	402	402
Average weaning weight			560	604

Jaymelynn K. Farney, Beef Systems Specialist, Southeast

Dale A. Blasi, Stocker Specialist

Sandy Johnson, Livestock Specialist, Northwest

A.J. Tarpoff, Extension Livestock Veterinarian

Justin Waggoner, Beef Systems Specialist, Southwest

Robert Weaber, Cow/Calf Genetics Specialist



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