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Matching Cow Size to Ranch Resources

Jane Parish, MSU Extension Beef Cattle Specialist

Cow size varies tremendously across and even within beef cattle operations. Size is routinely described in terms of both weight and frame. Frame size describes the skeletal size of cattle. Terms like large frame, moderate frame, and small frame are frequently used to indicate cattle size. While frame size is often a useful selection consideration and is sometimes used in predicting expected mature body weight, it should be noted that cattle that are similar in frame size are not always similar in body weight. Body weight takes into account muscling, condition (fat cover), and gut fill in addition to skeletal and organ mass. Cow body weight and body condition score are useful records for nutritional program planning.

Body Weight and Nutritional Requirements

In a practical forage-based nutritional system, as is common in the Southeastern U.S., cattle nutrient intake depends on forage availability and quality and does not exactly match cattle nutrient requirements at every given point in time. In addition, environmental conditions such as temperature and humidity continually change, and cattle progress through a production cycle (gestation, calving, lactation, weaning, rebreeding) that continually shifts nutrient needs. Thus, cattle both gain and lose weight and body condition throughout the year as nutrient intakes and demands change. Body energy reserves are stored during periods when energy intake exceeds body energy demands. In other words, cows put on body condition when intake of nutrients from forage and feed is higher than what they are using for body functions and performance.

Differences in body size impact maintenance nutrient requirements. Maintenance nutrient requirements are defined as the amount of nutrient intake that will result in no net loss or gain of that nutrient from body tissues. Body functions comprising maintenance energy requirements, for instance, include body temperature regulation, physical activity, and metabolic processes (chemical processes by which cells produce the substances and energy needed to sustain life). Maintenance energy requirements vary with body weight, breed or genotype, sex, age, season, temperature, physiological state, and previous nutrition.

With increasing research emphasis on cattle efficiency and particularly feed efficiency, differences in predicted feed intake (based on factors including body weight) and actual feed intake are worthy of consideration. Identification of and selection for efficient cattle has tremendous economic implications for beef cattle operations, many of which expend a significant and often majority of operational funds on herd nutrition. Stay tuned for research findings and applications in this area in the coming years.

Body Weight Impacts on Herd Nutritional Program

Because body weight is one of many factors impacting cattle nutritional requirements, dry matter intake and nutrient requirements should be determined for the specific animal or herd taking performance level, environmental conditions, and other factors into consideration. Even so, the effects of body weight on cattle nutrient requirements can still be illustrated assuming the other factors impacting these nutrient needs are similar across a given set of cattle. For example, the current Beef Cattle NRC publication lists daily dry matter intake requirements of mature lactating cows with 20 pounds of peak milk production per day at 2 months after calving at 25.0 pounds (with 15.2 pounds TDN and 2.79 pounds of crude protein) for a 1000-pound cow and 30.5 pounds (with 18.0 pounds TDN and 3.14 pounds of crude protein) for a 1400-pound cow. This 400-pound difference in cow body weight results in a 5.5-pound difference in daily dry matter intake needs. At 6 months after calving the same two 1000-pound and 1400-pound cows require 22.7 pounds and 28.6 pounds of dry matter intake per day, respectively (a 5.9-pound difference).

Accurately determining the supply of forage and feed needed to winter a cow herd depends on accurately determining cattle nutrient requirements. If cow body weight is grossly underestimated and winter forage and feed supplies are planned based on these estimates, then winter feeding deficits can result. Running out of hay when it is needed is not an ideal scenario for a cattle operation. Therefore, it is worthwhile to monitor cow body weights in the herd and use them to plan nutritional programs accordingly. Weaning is a logical time to record cow weights and body condition scores. Any regular herd work event such as vaccination time or pregnancy checking is a good time for checking cow condition score and body weight.

Cow Body Weight Changes

Cows with the same genetic potential will reach different mature weights if environmental restrictions exist, preventing cows managed under these restrictive conditions from reaching their genetic potential for mature size. High environmental temperature, nutrient restriction, parasite loads, and other health problems can result in lower mature weight and to a smaller extent lower heifer weight at puberty. Monitoring cattle body weights can be a useful tool in quickly identifying and troubleshooting herd health or nutritional program problems.

Body condition score changes affect cow body weight. A change of one condition score on a 9-point body condition scoring scale is roughly an 80- to 120-pound change in body weight depending on genetics and stage of production. Pregnancy, calving, and body condition changes cause weight variation in mature cows. According to the most recent Beef Cattle NRC, weight gain during pregnancy and loss at calving is approximately 1.7 times calf birth weight. This weight gain or loss is due to the fetus, fetal fluids, placenta, and uterus.

The animal body weight difference between two successive body condition scores shifts depending on the particular condition score change evaluated. Moving from a body condition score of 3 to 4 represents different proportions of fat and lean deposited

compared to moving from a body condition score of 7 to 8, for example. To get a feel for body weight changes as body condition scores change, cow weights and condition scores should be monitored throughout the production cycle. This will help in fine tuning the nutritional program or redirecting the program based on current cow condition and stage of production.

Fitting Cow Size to Resources

Given the role of cow body weight in cattle nutrient requirements, herd selection and culling and nutritional program planning could benefit from assessing cow size. Forage and feed resources must be adequate to meet herd nutritional demands or production may be sacrificed. Key indicators of mismatching cow size or production level to ranch resources include low body condition scores and a high percentage of non-pregnant cattle. Lighter calf weaning weights than genetics would indicate could also reveal the inability of the forage and feeding system to support current cow milk levels. When culling the herd, extremes in cow size may be candidates for culling, particularly when nutrition costs are high and/or herd performance is suffering.

For more information on beef cattle production, contact your local Extension office.