

BODY CONDITION SCORING: DAIRY CATTLE



BASICS

OVERVIEW

- Body condition scoring is a useful tool for monitoring the nutritional management of dairy cows. It is based on the visual appraisal of key external anatomical points of the cow, evaluating fat deposition as energy reserves. Body condition scoring is a simple, quick and cheap methodology that help maximizing milk production and reproductive efficiency while reducing the incidence of metabolic disorders and other peripartum diseases.
- Several scales and charts have been developed to assess the nutritional status of dairy cattle. The simplest and most practical methodology that is used routinely is based on a scale 1 to 5 with a $\frac{1}{4}$ point increment, being 1 a very thin cow and 5 a very obese cow.
- Body condition score should be evaluated strategically at different points of the production cycle of dairy cows. This assessment should consider an evaluation at dry-off, calving, early lactation (30 to 45 days in milk), and mid to late lactation (180 to 250 days in milk).

SCORING SYSTEM

- Body condition scoring is best done when the animal is standing squarely, observing from the side and the rear. Scoring is subjective and therefore it is best to designate one person to routinely conduct body condition scoring within a herd to decrease interobserver error. A score is determined by observation and palpation of the transverse processes of the lumbar vertebrae and the tail head ligaments to assess fat cover. A score of 1 will have well defined tail head ligaments with hollows on either side of the tail head and the transverse processes are sharp and create a shelf-like appearance. A score of 5 will have no visible tail head ligaments with fatty tissue wraps around either side of the tail head and the transverse processes are not visible or palpable. The angle between the tubercosae and ischium is also observed (1= sharp “V-shaped” angle, 5= appears flat due to fat cover).
- Visit the following PDF from Elanco Animal Health for a complete visual guide to BCS in dairy cattle: <https://www.elanco.us/pdfs/ai10752-body-condition-score-insert.pdf>

DYNAMIC OF BCS

Dry matter intake in dairy cows starts to decrease a few weeks before parturition with the lowest level occurring at calving. Dry matter intake decreases about 32% during the final three weeks of gestation, and 89% of that decline occurs at five to seven days before calving. Most cows start to

gradually increase DMI for the first three weeks after calving. During early lactation dairy cows experience a typical negative energy balance characterized by mobilization of NEFA from adipose tissue. This is explained by the low DMI at parturition and slower increase in DMI than in milk production during the early postpartum period. Energy required for maintenance and milk production exceeds the amount of energy the cow can obtain from dietary sources. During this period, mobilization of body fat helps the cow meet the demands of high milk production. These changes in BCS can be visually observed over time while mobilization of subcutaneous adipose tissue is taking place. Loss in BCS during this period should not exceed 0.75 points in BCS. As the cow passes peak of lactation and feed intake recovers to normal levels, the cow returns to positive energy balance. At this point, the cow starts to deposit energy in the way of subcutaneous and intra-abdominal fat, recovering BCS. As the cow enters late lactation the score should approach at levels close to what was observed at calving. Entering the dry period, the cow should be within 0.25 points of the desired calving BCS.

SYSTEMS AFFECTED

Musculoskeletal

GENETICS

Body condition score has a genetic component. Heritability estimates for BCS have been low to moderate, ranging from 0.20 to 0.51, with the majority of studies estimating heritability between 0.20 and 0.30. Body condition score has sufficient genetic variation and is strongly genetically correlated with health and fertility that allows for successful selection.

GEOGRAPHIC DISTRIBUTION

Worldwide, depending on production management. Scoring systems vary between some countries.

MANAGEMENT ON BCS

- If many cows are over-conditioned, a fat cow group for late lactation should be established and a diet containing 1.54 Mcal/Kg NEI/DM or less should be fed. If many cows are underconditioned, a thin cow group should be established and a diet with proper NEI content to target the desired weight gain should be fed (one unit BCS $\approx$ 57 kg BW).
- Cows should have a total dry period length of at least 6 to 8 weeks. A dry period of less than 6 weeks results in lower milk yields in the next lactation.
- Two groups of dry cows are recommended; the early dry group (8 to 4 weeks before expected calving) and a close-up group (4 weeks to calving). If early dry cows are in proper condition and eating more than predicted to meet their requirements, it may be necessary to lower the energy and nutrient density of the ration by re-formulating the diet. Never try to reduce BCS or body weight of dry cows during any stage of the dry period. If BCS is correct at dry-off (3.0-3.25) then cows should gain about 0.3-0.45 kg/d to increase BCS by 0.25 to 0.35 units during the dry period.
- In the close-up period (prepartum cows, 28 days to calving), if DMI is around 11.3 kg or higher, a diet containing 1.52 Mcal/kg NEI but no higher, and 14-15% of Crude Protein should be fed. A separate close-up group for pregnant heifers might be a beneficial management strategy in farms if adequate facilities are available.

- Diet formulation should be based on 10 to 11 kg of DM intake. If cows are overeating it is not a big problem because this is a short period of time. Cows should be in a positive energy status and not losing weight. Feed should always be available in the bunk (24 h a day) in a form of TMR to ensure adequate control of nutrient composition and consumption. Fermentable grains (coarsely ground dry corn, hominy, or high moisture corn) to enhance development of the ruminal epithelia should be fed. Cows should calve with a BCS of 3.25-3.75 and heifers 3.25-3.5 to minimize obstetrical trauma.
- The primary goal for early fresh cows is to maximize carbohydrate, protein and nutrient intake and provide adequate fiber to meet requirements for increasing milk production. Cows should reach maximum daily DMI no later than 10 weeks postpartum. Cows milked three times a day should eat about 5 to 6% more DM per day. For every 1 kg of expected milk production, cows should eat at least 0.45 kg of DM. Eating less than this causes excessive body condition loss. Forage DM intake should be near 2% of the cow's BW. Acid detergent fiber should be at least 19-21% and NDF at least 28-30% or 0.9% of BW. Particle size should be long enough to stimulate 30 minutes of cud chewing time per kg of DM. Total mixed ration DM content should be between 45 to 50%. Clean water should be provided expecting cows to drink 2 liters for each 0.45 kg of milk. Enough feed bunk space should also be provided.
- Cows should peak in milk production 8 to 10 weeks after calving. First-calf heifers should peak within 75% the production of older cows. For each extra 1 kg of milk at peak production the average cow will produce 200 to 220 kg more milk for the entire lactation period. Milk protein:fat ratio should be near 0.85-0.88 for Holstein cows. Forage intake using a good quality roughage should be maximized. Energy density of the top cows should be 1.76 Mcal/kg of NEL. Non-fiber carbohydrate levels should be between 35 and 42% with 25 and 29% starch in the total ration.
- Cows should not lose more than 1 point of BCS during early lactation, a good amount is 0.75 points, and ideally 0.5 points. Last third of lactation should be used to replace lost body condition.

Target Body Condition Scores (BCS) Scale 1-5 with a ¼ point increments

STAGE	IDEAL BCS	RANGE
Dry-off	3.0	3.0-3.25
Calving	3.5	3.25-3.75
Early lactation	2.75	2.5-3.0
Mid-lactation	3.0	2.75-3.0
Late lactation	3.0	3.0-3.25

Growing Heifers	3	2.75-3.25
Heifers at calving	3.25	3.0-3.5



MISCELLANEOUS

SEE ALSO

- Dairy Nutrition: Ration Guidelines for Milking and Dry Cows (www.fiveminutevet.com/ruminant)
- Milk Cow Nutrition Monitoring (www.fiveminutevet.com/ruminant)
- Transition Cow Management (www.fiveminutevet.com/ruminant)
- Ketosis: Dairy Cattle
- Fatty Liver

ABBREVIATIONS

- BCS = body condition score
- BW = body weight
- NEFA = non esterified fatty acids
- TMR = total mixed ration
- DMI = dry matter intake
- NEL = net energy for lactation

SUGGESTED READING

- Edmonson, A. J., I. J. Lean, L. D. Weaver, T. Farver, and G. Webster. 1989. A body condition scoring chart for Holstein dairy cows. *J Dairy Sci* 72:68-78.
- Esposito G., Irons P., Webb E., Chapwanya A. 2014. Interactions between negative energy balance, metabolic diseases, uterine health and immune response in transition dairy cows. *Anim Reprod Sci* 144:60-71
- Ferguson, J. M., D. T. Galligan, and N. Thomsen. 1994. Principal descriptors of body condition score in Holstein cows. *J Dairy Sci* 77:2695-2703.
- Goff JP. Major advances in our understanding of nutritional influences on bovine health. *J Dairy Sci*. 2006; 89:1292–1301.
- LeBlanc SJ, Lissemore KD, Kelton DF, Duffield TF, Leslie KE. Major advances in disease prevention in dairy cattle. *J Dairy Sci*. 2006; 89:1267–79.
- Risco, C.; Melendez, P. 2011. Editors of book: Dairy Production Medicine. 800 pp. Wiley-Blackwell. First edition, October, 2011.

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