BODYWEIGHT CHANGES IN WINTER AND SUMMER CALVING BUFFALO DURING PERIPARTUM PERIOD

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Received : 29.03.2011 Accepted : 08.10.2012

ABSTRACT

The present study was conducted on 29 healthy, lactating pleuriparous Murrah buffaloes, in their third to fifth parity and calved during December 2007 to May 2008. The animals were selected at 2 organized dairy farms (Mattewara and Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana). On the basis of season of calving they were divided into two group's viz. Winter Calving Buffaloes (WCB) and Summer Calving Buffaloes (SCB). All the calvings were unassisted and the animals had shed their placental membranes. Changes in bodyweight and body condition score (BCS) were recorded at weekly intervals and related to the onset of the ovarian activity from calving till 9 weeks (day 63) postpartum. WCB were significantly ($P < 0.05$) heavier than SCB. Bodyweight loss occurred continuously postpartum throughout the study period. Similarly, BCS was significantly ($P < 0.05$) higher in WCB than in SCB during the period of study. Body condition also declined continuously in both the groups during first 63 days postpartum. While WCB lost their body condition by 0.82 points, SCB lost by 0.64 points by the end of study period. Loss of BCS after parturition was positively correlated to the onset of ovarian activity. It can thus be concluded that both the winter and summer calving buffalo lose their bodyweight and BCS continuously during first 63 days postpartum. Therefore, proper strategy with respect to nutrition should be adopted to minimize body losses for optimum reproduction and production.

Key words: Body Condition Score, Bodyweight, Buffalo, Reproduction

Bodyweight is commonly used for monitoring nutritional status and growth of animals (Chimonyo *et al.*, 2000). However, the bodyweight of an animal *per se* does not reflect its nutritional status (Oulun 2005). Animals with large frames may have higher bodyweights with low level of body reserves and *vice versa*. Variations in bodyweight occur as a result of changes in gut-fill and bladder-fill, pregnancy and parturition (National Research Council 1996). Moreover, weight changes may reflect tissue hydration rather than significant alterations in body protein or fat content. To minimize the effect of frame size of the animal, bodyweight measurements are collected regularly, often on a monthly basis. Body condition scoring (BCS) describes the systematic process of assessing the degree of fatness of an animal (Nicholson and Sayers 1987). The score reflects the plane of nutrition on which an animal has been exposed over a reasonable length of time (Stuth *et al.*, 1998). The loin, ribs, tail head, brisket, flank, vulva and/or rectum and udder are the important parts of the body used in determining the score. Physiologically, the proportion of protein and water of the animal's bodyweight decreased as it gains body condition (National Research Council 1996). Prakash *et al.* (1990)

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found that bodyweight at calving and parity order affected the degree of bodyweight loss during early postpartum. In buffalo, bodyweight changes during postpartum period have been inadequately studied. Therefore, the present study was planned to evaluate the changes in bodyweight and BCS during prepartum, calving and postpartum periods during the two main seasons and correlate them with the onset of ovarian activity.

Healthy, lactating pleuriparous Murrah buffaloes (n = 29), in their third to fifth parity and calved during December 2007 to May 2008 were selected at 2 organized dairy farms (Government Buffalo Breeding Farm, Mattewara and Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana). Based on the season of calving, the animals were classified into two groups. The ones expected to calve during the period from December 2007 to February 2008 were categorized as winter calving buffaloes (WCB; n = 19) and those during April through May 2008 as summer calving buffaloes (SCB; n = 10). All the animals were maintained under standard managemental and hygienic feeding conditions. They were fed *adlib* with seasonal green fodder, wheat straw and concentrate mixture. Late pregnant animals were kept separate until calving. They were milked twice a day, morning (4.00 am) and evening (4.00 pm).

Weekly bodyweight measurements of buffaloes in both groups were taken 1-2 weeks prior to expected calving until 9 weeks postpartum using a standard bodyweight measuring tape.

The method described by Edmonson *et al.* (1989) for body condition scoring in dairy cows (scale 1 to 5), was pretested with a herd of buffalo prior to the commencement of the experimental study with intermediate values for animals whose condition falls between these numbers, functioning as a 10 point scale. This system used palpation of the backbone and lumbar processes feeling for the sharpness and covering of the bones along with palpation of the tail-head region. After confirmation, using that method, weekly body condition scoring was recorded 1-2 weeks before expected calving until week 9 postpartum in the two groups.

Various parameters viz. [1]weekly changes in bodyweight, [2]percentage of total bodyweight change, [3]mean daily bodyweight change, [4]mean BCS of first 9 weeks postpartum and [5]total change in BCS were calculated by the following formulas:

[1]Weekly changes in bodyweight = Difference between two consecutive weekly bodyweights

[2]Percentage of total bodyweight change =

$$\frac{\text{Bodyweight at calving} - \text{Bodyweight at day 63 postpartum}}{\text{Bodyweight at calving}} \times 100$$

[3]Daily bodyweight change =

$$\frac{\text{Bodyweight at calving} - \text{Bodyweight at day 63 postpartum}}{63}$$

[4]Mean BCS of first 9 weeks postpartum =

$$\frac{\text{Sum of weekly BCS during first 9 weeks postpartum}}{9}$$

[5]Total change in BCS = BCS at calving – BCS at day 63 postpartum

The ovarian activity was recorded ultrasonographically with the help of a real time B-mode diagnostic ultrasound scanner equipped with a 7.5 MH linear array transducer upto 9 weeks postpartum.

The differences in mean ($\overline{X}$ ± SEM) body weight and BCS in the two groups with significant interactions at 5% level were subjected (Students 't' test) to the methods described previously (Zar 2008).

WCB were heavier ($P < 0.05$) than SCB throughout the study period. The nadir bodyweight loss occurred at calving in both winter and summer calving buffalo and thereafter the bodyweight loss got compensated. From calving to 9 weeks postpartum, loss of bodyweight was 14.7 percent in WCB and 14.5 percent in SCB. The rate of bodyweight loss was dependent upon the bodyweight at calving and large (> 550 kg) and medium (475 – 550 kg) sized buffalo lost bodyweight at the highest rate as compared to small (< 475 kg) sized

buffalo during first five months of lactation (Bhalaru *et al.,* 1987). Apparently, from calving to 9 weeks postpartum, buffaloes in both the groups lost nearly 15 percent of their total bodyweight in the present study. Excessive body condition at calving caused by over consumption of energy during prepartum increased loss in bodyweight in dairy cattle (Boisclair *et al.,* 1986). Buffalo in the first parity gained bodyweight while older buffalo lost bodyweight during first three months of lactation (Prakash *et al.,* 1990).

In both winter and summer calving buffalo, the average bodyweight loss was negatively correlated with size of large follicles. It appeared that bodyweight loss impaired follicle growth. Lucy *et al.* (1991) concluded that energy balance during first 25 days postpartum and diet after day 25 postpartum affected the number and size of ovarian follicles in dairy cows. Severe bodyweight loss associated with severe negative energy balance during early postpartum period reduced the total and peak concentrations of circulating progesterone through reduced luteal development and decreased secretory activity per luteal cell (Peter *et al.,* 2009).

Average weekly body condition scores of winter and summer calving buffalo during the study period revealed that there was a continuous decrease in BCS from calving to week 9 postpartum in the two groups as recorded by Pryce *et al.* (2001). Increasing pre-calving body condition by increased energy supplementation apparently enhanced body condition loss during the early postpartum period in dairy cows (Boisclair *et al.,* 1986). Contrarily, Prakash *et al.* (1990) reported that buffalo in the first parity gained bodyweight while older buffalo lost bodyweight during first three months of lactation.

While BCS had a positive correlation with size of large follicles in both the groups, total loss in BCS had a negative correlation. Reduction in the concentrations of insulin, insulin-like growth factor-I and glucose in circulation due to negative energy balance caused by loss in body condition may adversely affect the follicular growth during early postpartum period in dairy cattle (Peter *et al.,* 2009). BCS had positive correlation with onset of reproductive activity in WCB. Reverse was true for SCB. Eventually, in both the groups, total loss in BCS was negatively correlated with ovarian activity.

It can thus be concluded that both winter and summer calving buffalo lost their bodyweight and BCS continuously during first 9 weeks postpartum, which forms the future basis of reproduction. Therefore, proper nutrition for optimum reproduction is essential during early postpartum period.

REFERENCES

Bhalaru, S.S., Tiwana, M.S. and Singh, N. (1987). Effect of body condition at calving on subsequent reproductive performance in buffaloes. *Indian J. Anim. Sci.,* **57:** 33-36.

Boisclair, Y., Grieve, D.G., Stone, J.B., Allen, O.B. and Macleod, G.K. (1986). Effect of prepartum energy, body condition and sodium bicarbonate on production of cows in early lactation. *J. Dairy Sci.,* **69:** 2636-47.

Chimonyo, M., Kusina, N.T., Hamudikuwanda, H. and Nyoni, O. (2000). Reproductive performance and body weight changes in draught cows in a smallholder semi-arid farming area of Zimbabwe. *Trop. Anim. Hlt. Prod.,* **32:** 405-15.

Edmonson, A.J., Lean, I.J., Weaver, L.D. and Webster, G. (1989). A body condition scoring chart for Holstein dairy cows. *J. Dairy Sci.,* **72:** 68-78.

Lucy, M.C., Beck, J., Staples, C.R., Head, H.H., De La Sota, R.L. and Thatcher, W.W. (1991). Follicular dynamics, plasma metabolites and growth factors in lactating cows with positive or negative energy balance during the periestrual period. *Reprod. Nutr. Develop.,* **32:** 331-41.

National Research Council (1996). *Nutrient Requirements of Beef Cattle.* 7th revised (Ed.). Update 2000. National Academic, Press, Washington, DC, USA.

Nicholson, M.J. and Sayers, A.R. (1987). Reliability, reproducibility, and sequential use of condition scoring of *Bos indicus* cattle. *Trop. Anim. Hlt. Prod.,* **19:** 127-35.

Oulun, Y. (2005). Variation in the blood chemical constituents of reindeer, significance of season, nutrition and other extrinsic and intrinsic factors. *Acta Uni. Oul. Sci. Rerum Natura.,* **440:** 210-16.

Peter, A.T., Vos, P.L.A.M. and Ambrose, D.J. (2009). Review: Postpartum anestrus in dairy cattle. *Theriogenology,* **71:** 1333-42.

Prakash, A., Tripathi, V.N. and Tomar, S.S. (1990). Changes in body weight during lactation in Murrah buffaloes. *Indian Vet. J.,* **67:** 852-55.

Pryce, J.E., Coffey, M.P. and Simm, G. (2001). The relationship between body condition score and reproductive performance. *J. Dairy Sci.,* **84:** 1508-15.

Stuth, W., Dyke, P., Jama, A. and Corbett, J. (1998). The use of Nir/Nubtal, Phygrow and Apex in a meta-modeling environment for an early warning system to monitor livestock nutrition and health. National Workshop on Early Warning System for Monitoring Livestock Nutrition and Health, Addis Ababa, Ethiopia.

Zar, J.H. (2008). *Biostatistical analysis.* 4th Edn. Dorling Kindersley (India) Pvt. Ltd. Pearson Education. Delhi, India.

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