



EFFECT OF PRE PARTUM BODY CONDITION SCORE ON PRODUCTIVE, REPRODUCTIVE AND CALF BIRTH WEIGHT PERFORMANCE IN THARPARKAR CATTLE

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ABSTRACT

The present study of body condition scoring of 18 Tharparkar cows were carried out at Cattle & Buffalo Farm (Livestock Production and Management Section) Indian Veterinary Research Institute, Izatnagar to know the change in Body Condition Score (BCS) in different stages as Stage- I: 15 days before expected date of calving; Stage-II: Within 3 days of calving; Stage-III, IV, V, VI, VII, VIII: 15, 30, 45, 60, 75 and 90 days after calving, respectively to know the effect on production, reproduction and calf birth weight performance. To study the effect of BCS at stage I on calf birth weight, post partum interval to estrus, peak yield, day to attain peak yield and 90 day lactation yield, animals were divided into three BCS groups as Group 1: BCS ≤ 3.5 ; Group 2: (BCS $> 3.5 - 4.0$); Group 3: BCS > 4.0 . Overall mean values for BCS during stages I to VIII were 4.17 ± 0.11 , 4.00 ± 0.11 , 3.90 ± 0.07 , 3.73 ± 0.08 , 3.57 ± 0.06 , 3.57 ± 0.07 , 3.70 ± 0.06 and 3.85 ± 0.06 respectively. The 90 days milk yield was non-significant among three groups. There is significant difference between groups for peak yield. The cows with BCS values ≤ 4 expressed highest peak yields (6.06 ± 0.90 kg). Significant differences ($p < 0.01$) between group 1, 2 and 3 were also found for days to attain peak yield and postpartum interval to estrus. Cows with 3.5 to 4.0 BCS had lowest postpartum interval to estrus (43.83 ± 14.24 d). Significant differences ($p < 0.05$) also existed among calf birth weights for these groups. This shows that BCS 3.5 to 4.0 is better for fetus growth.

KEY WORDS: Body Condition Score, Tharparkar cattle, Productive and reproductive performance, birth weight.

INTRODUCTION

Body condition scoring has been widely accepted as the most practical method for assessing changes in energy reserves in many species, including dairy cattle. Both absolute BCS, particularly at calving and changes in BCS during early lactation influence animal health and reproduction. The high genetic merit dairy cattle have a higher predisposition for mobilization of body fat reserves to cover milk production demands (Veerkamp, 1998; Pryce *et al.*, 2002). High producer cows had lower BCS during lactation and their BCS changes after calving were higher than in cows with lower genetic merit (Buckley *et al.*, 2000; Horan *et al.*, 2005). Gallo *et al.* (1999), who observed a higher and more prolonged BCS loss in cows with higher milk yield. Therefore, BCS and milk yield are in a negative correlation (Veerkamp and Brotherstone, 1997), and high-yielding dairy cows generally have a lower BCS (Pryce *et al.*, 2001). A decrease in BCS post partum depends not only on the milk yield level but also on the BCS level at calving. Rhodes *et al.* (2003) and Roche *et al.* (2007) examined the relationships between BCS at the time of calving and mating, negative energy balance duration and reproduction.

A higher BCS level before calving, at calving and during early lactation was associated with a higher probability of being detected in estrus before the planned start of mating and higher probability of being mated after the first insemination. Roche *et al.* (2007) in their study found that reproductive performance was significantly affected by BCS and it changes during lactation. Suriyasathaporn *et al.* (1998) found that cows with BCS < 3 required more time for conception than cows with higher BCS at calving. Markusfeld *et al.* (1997) showed that primiparous cows with high BCS at calving experienced fewer days open. It is necessary to verify these observations in order to recommend body condition scoring as a method of evaluating nutritional and reproduction management of dairy cows in dual purpose indigenous cattle. The objective of this study was to determine the relationship between body condition score at the time around parturition and milk yield in subsequent lactation – whether higher BCS before calving is associated with higher BCS loss during lactation, whether high-yielding cows lose more BCS and whether BCS around the time of parturition influences reproductive efficiency and birth weight of calf.

MATERIALS & METHODS

The experiment was performed in 2013-2014 in herd of Tharparkar cattle maintained at Cattle and Buffalo Farm, Indian Veterinary Research Institute, Izatnagar, U.P. (India). 18 cows were included in the study. During the experiment, the body condition score was measured (by the same assessor) according to a five-point scale (1 = thin cow, 5 = over-conditioned cow) as per Endmonson *et al.* (1989). The scales have been combined into a BCS card provided by the Elanco Animal Health (1997) which was used as support during the scoring. Body condition score of the animals were recorded at eight stages as described: Stage- I: 15 days before expected date of calving; Stage-II: Within 3 days of calving; Stage- III, IV, V, VI, VII, VIII: 15, 30, 45, 60, 75 and 90 days after calving, respectively. Further, data from the milk and reproduction performance of herd available in farm record were used.

To study the effect of BCS at stage I (15 days before expected date of calving) on 90 day lactation yield, peak yield, day to attain peak yield, post partum interval to estrus (PPIE) and calf birth weight, animals were divided into three BCS groups. Groups of cows according to BCS at 15 days before expected calving: Group 1: BCS 3.5; Group 2: (BCS > 3.5 - 4.0); Group 3: BCS > 4.0. The data obtained

from experiment were subjected to statistical analysis (Snedecor and Cochran, 1994) for one way analysis of variance and Duncan's multiple range test (DMRT) to compare the means. Means and standard error were calculated following the standard statistical procedures.

RESULTS & DISCUSSION

Overall body condition score and body weights at different stages and their losses in early lactation

Overall mean values for BCS and mean live body weights during stages I to VIII has been depicted in Table 1. Highest BCS was 4.17 ± 0.11 (stage I) and lowest was 3.57 ± 0.06 (stage V). The BCS started declining from stage I to V and loss up to stage II was 0.17 BCS and it was 0.10 BCS between stage II and III while 0.33 BCS points between stage III and V (Table 1 and Figure 1) which was consistent with the reports of Hady *et al.* (1994), who reported that normal cows lose the greater portion of BCS during first 30 days of lactation. The BCS remains constant until 60 days in milk, thereafter cows may begin to increase body condition. The mean body weight (kg) was highest at stage I (396.11 ± 11.51) and lowest at stage V (356.11 ± 11.71). However, from stage VI onwards it increased (Table 1).

TABLE 1: Overall BCS and body weight at different stages

Stages	BCS	Body weight (kg)
I	4.17 ± 0.11	396.11 ± 11.51
II	4.00 ± 0.11	373.89 ± 11.59
III	3.90 ± 0.07	371.38 ± 12.01
IV	3.73 ± 0.08	359.17 ± 12.16
V	3.57 ± 0.06	356.11 ± 11.71
VI	3.57 ± 0.07	364.17 ± 11.57
VII	3.70 ± 0.06	370.55 ± 12.83
VIII	3.85 ± 0.06	374.72 ± 13.11

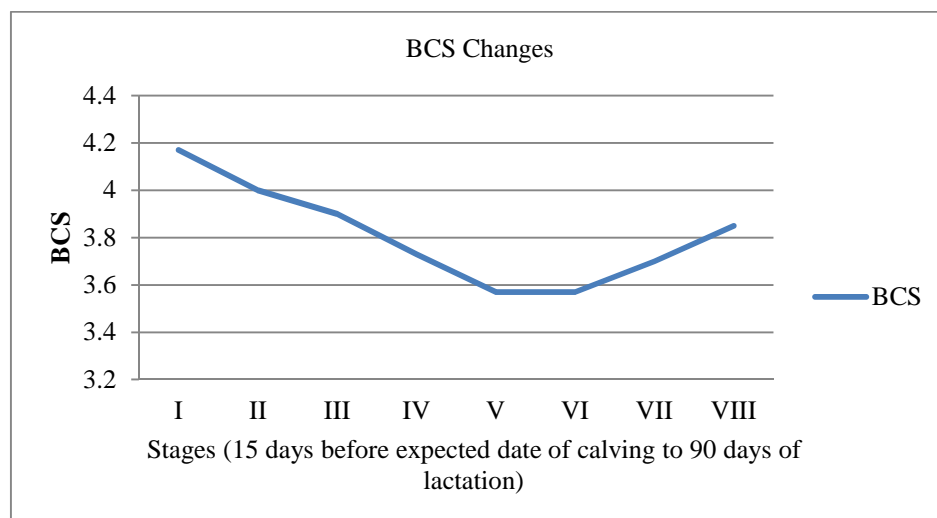


FIGURE 1. Overall BCS at different stages (15 days before expected date of calving to 90 days of lactation) in Tharparkar cow.

Effect of pre-calving (stage I) BCS on 90 days milk yield, peak yield, day to attain peak yield, post partum interval to estrus and calf birth weight

The 90 days milk yield was 329.83 ± 65.30 , 272.45 ± 31.77 and 332.67 ± 65.30 kg for group 1, 2 and 3, respectively, which showed that it was lowest for group 2 and highest for group 3 (Table 2). The 90 days milk yield for three groups were within normal range of days a healthy cow takes to reach the peak. So the range of BCS studied were either normal or above normal. Peak yields for BCS (I) group 1, 2 and 3 were 4.33 ± 0.93 , 5.16 ± 0.54 and 6.06 ± 0.90 kg, respectively (Table 2). The group 1 differed significantly ($p < 0.01$) from group 3. This indicated that the animals with BCS values < 4 expressed highest peak yields. The mean values for days to attain peak yield were 19.67 ± 11.98 , 29.33 ± 3.43 and 34.67 ± 9.21 days for group 1, 2 and 3,

respectively, which showed that days to attain peak yield was earlier for group 1 and longer for group 3 (Table 2). Significant differences ($p < 0.01$) between group 1, 2 and 3 were there.

Post partum interval to estrus for group 1, 2 and 3 (BCS I) were 66.00 ± 19.43 , 43.83 ± 14.24 and 49.33 ± 10.42 days, respectively. Significant differences existed among postpartum interval to estrus (Table 2). However, these results were inconsistent with finding of Buckley *et al.* (2003) who suggested that precalving BCS was not significantly associated with reproductive performance. Hegazy *et al.* (1997) reported that cows with high BCS at calving had a significantly shorter interval to first detected estrus. They reported that at BCS of 1.5 or more the interval was 59.13 ± 4.35 days which decreased to 18.27 ± 0.46 days at BCS of 3.5 to 4.0 in Holstein cows.

TABLE 2: Effect of BCS (at stage I) on 90 days milk yield, peak yield, days to attain peak, post partum interval to estrus and calf birth weight

Particulars	90 days milk yield (kg)	Peak yield (kg)	Days to attain peak (d)	PPIE (d)	Calf birth weight (kg)
Overall mean	312.11 ± 35.24 (18)	5.47 ± 0.51 (18)	30.39 ± 5.05 (18)	50.28 ± 7.49 (18)	22.10 ± 0.62 (18)
Stage I BCS classes	NS	**	**	**	*
1 (BCS < 3.5)	329.83 ± 65.30 (3)	4.33 ± 0.93 (3)	19.67 ± 11.98 (3)	66.00 ± 19.43 (3)	21.33 ± 1.20 (3)
2 (BCS > 3.5 < 4.0)	272.45 ± 31.77 (6)	5.16 ± 0.54 (6)	29.33 ± 3.43 (6)	43.83 ± 14.24 (6)	22.67 ± 1.36 (6)
3 (BCS > 4.0)	332.67 ± 65.30 (9)	6.06 ± 0.90 (9)	34.67 ± 9.21 (9)	49.33 ± 10.42 (9)	21.89 ± 0.82 (9)

Where, **: $P < 0.01$; *: $P < 0.05$; PPIE: Post partum interval to estrus and NS: Non-Significant

Figures given in the parenthesis indicates number of animals

The mean values for calf birth weights were 21.33 ± 1.20 , 22.67 ± 1.36 and 21.89 ± 0.82 kg for group 1, 2 and 3, respectively. Significant differences ($p < 0.05$) existed among calf birth weights for these groups (Table 2). The significant difference in calf birth weights among the groups was possibly due to the reason that BCS 3.5 to 4.0 is better for fetus growth and fatty cows with more BCS (> 4.0) may have negative effect on birth weight of calf. Singh (2005) also reported similar findings in Vrindavani cattle.

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