



Study on Body Condition Score and its Relationship with Solid Not Fat and Weekly Fat Corrected Milk Yield in Frieswal Cows

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ABSTRACT

The study was carried out at Military Dairy Farm on Eighty milch Frieswal cows. The cows were divided in five parities and three stages of lactation. The study was done for Body Condition Score and its relation with production parameters namely solid not fat percent and weekly fat corrected milk yield (3.5%) along with the effect of parities and stages of lactation on Body Condition Score, production parameters. The Body Condition Score (BCS) system is a subjective scoring method of evaluating the energy reserve of dairy animal to provide better understanding of biological relationships between body fat, milk production parameters. The overall least square mean of body condition score related to parity as well as stage of lactation was 3.35 ± 0.04 . The effect of parity was found significant on body condition score and solid not fat percent and weekly fat corrected milk yield while stage of lactation showed significant effect on body condition score and solid not fat percent. The stage of lactation did not showed significant effect on weekly fat corrected milk yield. The significant correlation and regression of body condition score was not seen with solid not fat and weekly fat corrected milk yield. This can be concluded that parity and stage of lactation have positive and significant impact on milk production parameters.

Keywords: Frieswal cow, Body Condition Score, stages of lactation, SNF.

The Body Condition Score (BCS) system is a subjective scoring method of evaluating the energy reserve of dairy animal to provide better understanding of biological relationships between body fat, milk production and reproduction. This method helps in adopting the optimum health of livestock. Body condition scoring is also useful in dairy heifer feeding management (Heinrichs and O'Connor, 1991). Cows that are too thin are also more prone to metabolic problems and diseases with decreased milk yield. The genetic quality of animals is very important to assess the relationship of various productive parameters as well as body measurements. To make this effort a success, Ferguson *et al.* (1994) suggested body condition score method for establishing the accurate assessment of energy status of dairy cattle.

MATERIALS AND METHODS

Eighty Frieswal cows were included in the experiment. The observations were recorded at weekly intervals. The cows were divided into their respective parity and stages of lactation. The parities were designated as P1, P2, P3, P4 and P5 parity having 21, 23, 18, 11 and 7 animals respectively and for Stage of lactation (Post parturient days of milking) in S1 (0-90 days), S2 (91-180 days), S3 (181 & above) 13, 27, 40 animals respectively.

Body condition score

The technique of Body condition scoring used was given by Ferguson *et al.* (1994). It was applied to assess the body condition of the animal with fairly high accuracy.

The points were given to animal ranged from 1 to 5 scales. Study indicated that body condition could be differentiated into 0.25 units between 2.5 and 4.0, inclusively. Below 2.5 and above 4.0, body condition could only be separated by 0.5 units. Between scores of 2.5 to 4.0 the ilial and ischealtuberosties and coccygeal and sacral ligaments provide the primary information below 2.5 and above 4.0 the transverse process of lumbar vertebrae need to be used. The appearance of the thurl region is a major feature distinguishing cows below 3.25 and above 3.0 in BCS. Shape of rump in 'V' and 'U' shape indicated the BCS 3.0 and >3.0, respectively and above 4.0 BCS thurl region become flattened. Distinct changes in specific body regions were associated with change in absolute BCS.

Data recording and analysis of milk samples

The daily milk yields of all the animals under experiment were recorded and the data was used to generate the weekly milk yield of particular animal. Milk sample were collected randomly morning and evening time. After collection of milk solid not fat percent were analyzed with the help of electronic lactoscan machine (automated). The weekly fat corrected milk yield (3.5% fat) was calculated by using simple equation of Pearson's square method. The milk samples were collected weekly interval throughout the experiment. No preservative was used and sampling bottles were thoroughly cleaned with the help of lukewarm water.

Statistical analysis

The data were subjected to statistical analysis using least square analysis technique as outlined by Harvey (1976). The degree of association between two different variables was estimated by calculating the Pearson's correlation coefficient (Snedecor and Cochran 1994). After completion of analysis of variance the significant effect were further analyzed to make all pair wise comparisons by using DMRT as modified by Kramer (1957).

RESULTS AND DISCUSSION

The study revealed significant ($P<0.05$) effect of parities and stages of lactation on body condition score which ranged from 3.09 to 3.64. Present study showed the lowest body condition score in first parity and then it increases

with parity up to fourth parity with slight declination in fifth but almost similar to fourth parity. Increase in BCS in subsequent parities may be due to decline in milk fat percent. This fat (%) might have been deposited, and slight declination after fourth may be on account of an age factor. The Body Condition Scores in present study were in accordance with the findings of Bhakat, (2004) who reported BCS in the range of 2.82 to 3.43 in Murrah buffaloes.

The body condition score showed the increasing tendency with stage of lactation. It was significantly ($P<0.05$) higher in third stage of lactation in Frieswal cows, while first and second stage of lactation showed almost similar Body Condition Score. The higher Body Condition Score in third stage of lactation may be due to positive effect of possible pregnancy to enhance body reserve for next parity. (Drame *et al.*, 1999) supported the present findings.

The overall Least Square Mean of Solid Not Fat percentage related to parity as well as stage of lactation was 8.69 ± 0.01 . The Least Square Means and standard error of Frieswal cows during P1, P2, P3, P4 and P5 parities were 8.81 ± 0.01 , 8.75 ± 0.02 , 8.63 ± 0.01 , 8.69 ± 0.03 and 8.55 ± 0.02 , respectively. The Least Square Means and standard error in Frieswal cows during S1, S2 and S3 stage were 8.55 ± 0.02 , 8.63 ± 0.01 and 8.89 ± 0.01 , respectively. The Solid Not Fat decreases significantly ($P<0.01$) from first parity to fifth parity with marginal non significant increase in fourth parity. The underlying reason may be due to increasing trend of milk production with parities advancement and also close correlation of Solid Not Fat with fat percent of milk. The result of the study simulated with the findings of Kausik and Tandon (1979).

The analysis of Variance and DMRT showed significant ($P<0.01$) difference in third stage of lactation for Solid Not Fat with first and second stage of lactation in Frieswal cow. The third stage of lactation showed maximum Solid Not Fat (8.89%), as compared to first (8.55%) and second (8.63%). The results of the study were in accordance with the finding of Abd-El-Razek *et al.* (1982), Mathapati and Bhat (1988), Nigam and Bector (1991) and Padekar and Bhoite (2002).

The lowest WFCMY was observed in first parity and then afterwards an increasing trend in weekly fat corrected milk yield was observed with the advancement of parities. The Frieswal cows reported significantly ($P<0.01$) highest

Table 1: Least Square Means and standard error of Body Condition Score, SNF percent and Fat corrected weekly milk yield under different parity and stage of lactation in Frieswal cow

Effect	Mean±SE (BCS)	Mean±SE (SNF Percent)	Mean ± SE (Weekly Fat Corrected Milk Yield)
P1	3.09 ^a ±0.07	8.81 ^d ±0.01	75.61 ^a ±4.36
P2	3.14 ^a ±0.07	8.75 ^{cd} ±0.02	99.45 ^{ab} ±4.19
P3	3.31 ^{ab} ±0.08	8.63 ^{ab} ±0.01	100.52 ^b ±4.97
P4	3.64 ^b ±0.10	8.69 ^{bc} ±0.03	118.08 ^b ±7.44
P5	3.56 ^b ±0.12	8.55 ^a ±0.02	100.01 ^b ±6.06
ANOVA	Significant at P<0.05	Significant at P<0.01	Significant at P<0.01
Stage of lactation			
S1	3.25 ^a ±0.09	8.55 ^a ±0.02	96.88±5.57
S2	3.31 ^{ab} ±0.07	8.63 ^a ±0.01	101.77±4.08
S3	3.48 ^b ±0.05	8.89 ^b ±0.01	97.53±3.24
ANOVA	Significant at P<0.05	Significant at P<0.01	Non significant
Overall mean (μ)	3.35±0.04	8.69±0.01	98.73±2.62

Means linked by similar superscripts do not differ significantly.

WFCMY in fourth parity (118.08 kg). This might be due to the fact that being the crossbred inheritance; the Frieswal cows attain the optimum production maturity with the advancement of parity. The parity showed the significant (P<0.01) effect on weekly fat corrected milk yield of Frieswal cows. The weekly fat corrected milk yield was similar to that of weekly milk yield. This might be due to lesser amounts of fat percent in the milk of crossbred cow and hence no much difference was observed between weekly milk yield and 3.5 percent fat corrected weekly milk yield.

The second stage of lactation showed maximum weekly fat corrected milk yield (101.77 kg) followed by first and third stages of lactation. The weekly fat corrected milk yield dropped down sharply from second stage of lactation to third stage.

Table 2: Correlation Coefficient between BCS and SNF percent and weekly fat corrected milk yield in Frieswal cows

	BCS	SNF
BCS		
SNF	0.102	
WFCMY	0.116	-0.187

The stages of lactation did not show any significant difference in milk yield. Initial increment in fat corrected

milk yield during second stage of lactation followed by decrease in third, is in close agreement with findings of Puranik *et al.* (2000).

Table 3 : Coefficient of Regression of Body Condition Score with SNF percent and Weekly Fat Corrected Milk Yield in Frieswal cow

	SNF %	Standard error	t-value
BCS	0.0878	0.0555	1.726
WFCMY			
BCS	0.2864	0.7035	1.0356

In the study, it was observed that Body Condition Score of Frieswal cow had positive correlation with Solid Not Fat percent (0.102). The positive correlation with no significant finding is suggestive of that both parameters are positively bounded with each other. Although due to non-significant correlation it can be stated that increase in body condition score leads not so much changes in SNF percent of milk in frieswal cow. The body condition score is also positively correlated with WFCMY (0.116) with no significance. This indicated animals must be in good body condition score for high milk production. But good body condition score have no significant impact on SNF% of milk as well as weekly fat corrected milk yield.



The correlation of SNF percent with weekly fat corrected milk yield was found negative (-0.187) non-significant. It means when the WFCMY (of 3.5%) increases the solid not fat percent of the animal will be negatively affected.

The regression coefficient of Body Condition Score of Frieswal with weekly fat corrected milk yield was found positively (0.2864) related. And regression of Body condition score over fat percent observed positive with non-significance (0.0878).

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