



Short Communication

Interrelationships of Body Condition Score with Rumen Fill in Anatolian Buffalo Herds

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ABSTRACT

The objective of this study was to reveal the associations between body condition score (BCS) and rumen fill scores (RFS) in buffaloes. In total, 66 Anatolian buffaloes reared in four farms of the Middle Black Sea region of Turkey were scored subjectively by two parameters. BCS and RFS data were obtained using a 1 to 5 scale and a 1 to 4 scale, respectively, where lower points indicate thin body condition or relatively empty rumen. Animals were examined in two subgroups by parity (1= lactation number 1 and 2; and 2= lactation number ≥ 3) and stage of lactation (1= ≤ 121 d, and 2= ≥ 122 d). While both BCS and RFS were not affected by non-genetic factors (farm, parity and stage of lactation), moderate correlation coefficient ($r=0.536$) was calculated between two traits. Routinely recording productive traits and rechecking feeding management for elevating RFS in the farms may be suggested in the investigated farms.

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Authors' Contribution

SA and HE designed and performed the experiments. ICO analyzed the data. SA, HE and ICO wrote the manuscript.

Key words

Body condition score, Feeding, Management, Rumen fill score, Water buffalo

Both genetic and environmental factors are equally effective on productivity of livestock. While genetic improvement studies take long time, these have generally permanent influence. However, removing the effects of non-genetic factors is ensured more easily and needed relatively less time. At this point, improving herd conditions is mainly controlled by herd owners. For instance, revisions on the feeding applications in the farms may play the main role to boost production levels (Nalubwama *et al.*, 2016). In dairy enterprises, failures in reproduction and also diseases evoke the largest financial losses and cow welfare is substantially affected (von Keyserlingk *et al.*, 2009). Therefore, controlling herd productivity and health carries high importance to detect the disorders in an early time in the herds. Body condition score (BCS) has been used the common data to decide adequacy of the feeding regime that applied in any cattle herds (Stadnik *et al.*, 2017). In other words, BCS indicates energy reserves of animals and feeding management of herds (Stádník *et al.*, 2002) and thus highly used as a marker to detect whether feeding management is suitable or not for milk production (Roche *et al.*, 2009).

Another parameter that termed as rumen fill score (RFS) may be recorded to be useful marker for assessment. While the percentage of feed digestion and passage is related to ingredients of the diets, scoring cows by rumen

fill degree, scorer can be decide whether the composition and amount of the feeds should be changed or not according to the estimated values. In scoring, external parts of cow's body termed the paralumbar fossa is subjectively pointed (Burfeind *et al.*, 2010). However, sufficient studies especially on the buffaloes have not been reported yet. At this time, revealing the association of both parameters will add a substantial information to the literature.

The objective of the present study was to determine the correlations of BCS and RFS in Anatolian buffalo cows.

Materials and methods

The study was carried out in the buffalo farms of enrolled to Buffalo Breeders Association of Bafra County of Samsun province, Turkey. A total of four farms were visited in January 2019 to obtain data on BCS and the RFS of the animals. Buffalo cows were milked twice in a day automatically and kept in similar conditions. The animals were loose housed in a cubicle straw-bedded barn and fed similar rations during the scoring times. BCS data were recorded by a 1-5-point scale (Stadnik and Atasver, 2015) and evaluation was applied by emaciated, thin, average, fatty and obese cows. Half or quarter points were utilized if it was needed (e.g., 2.75 or 3.50). RFS records were also obtained by visually on the left hind side of the animals. To evaluate, a 1 to 4 chart was applied: 1 (paralumbar fossa sinks in more than a handwidth deep): poor (empty); 2 (paralumbar fossa visible): moderate; 3 (no paralumbar fossa visible): good and 4 (no visible transition from the

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flank to the rib): excellent (full). Animals were examined in two subgroups by parity (1= cows with 1th and 2nd lactation; 2= cows with \geq 3rd lactation). To examine effect of stage of lactation (SL) on the RFS and BCS, two subgroups were designed (SL1=up to 121 d, and SL2= \geq 122 d). To determine the effects of environmental factors on the traits, independent samples t-test was applied. In the statistical evaluation, SPSS 17.0 for windows program was used.

Results and discussions

In the present study, means of evaluated parameters by non-genetic factor groups are given in Table 1.

Table I. Means (\pm SD) of BCS and RFS by environmental factors.

| Factor | n | BCS | n | RFS |
|---------------|----|-----------------|----|-----------------|
| Farms | | | | |
| 1 | 12 | 2.66 \pm 0.12 | 12 | 2.08 \pm 0.17 |
| 2 | 14 | 2.75 \pm 0.17 | 12 | 2.25 \pm 0.19 |
| 3 | 12 | 2.95 \pm 0.11 | 28 | 2.25 \pm 0.14 |
| 4 | 28 | 3.05 \pm 0.09 | 14 | 2.28 \pm 0.11 |
| Parity | | | | |
| 1 | 33 | 2.80 \pm 0.08 | 16 | 2.21 \pm 0.10 |
| 2 | 33 | 3.00 \pm 0.09 | 26 | 2.24 \pm 0.10 |
| SL | | | | |
| 1 | 44 | 2.96 \pm 0.08 | 44 | 2.22 \pm 0.08 |
| 2 | 22 | 2.77 \pm 0.10 | 22 | 2.22 \pm 0.14 |
| General | 66 | 2.90 \pm 0.06 | 66 | 2.22 \pm 0.07 |

BCS, body condition score; RFS, rumen fill score; SL, stage of lactation

Accordingly, no statistically difference was found by the subgroups. By farms, relatively higher BCS and RFS were attractive in the latest operation. Actually, changeable results in BCS or RFS could be an expected case among the different farms because of different management techniques especially on the feeding regime. Really, a change in two parameters about 0.4 and 0.2 points, respectively, were highly attractive. However, wide variations among the valued might be assumed the main reason of insignificant result that was obtained here.

Similar findings might be mentioned for parity groups (Table 1). While animals with higher parity had higher BCS and RFS, no statistically significant difference was determined in the study. In normal, buffaloes those had more age or parity might be expected to have higher BCS and RFS. Experience for calving stress or enhanced body structure might be assumed to be the possible causes

of this condition. But, wide variations in S_x of the means might be seen as the main reason of insignificant values.

In normal, buffalo cows those at the beginning of lactation are expected poor body condition due to negative energy balance in this period (Delfino *et al.*, 2018; Patel *et al.*, 2018). But statistically similar findings were obtained by SL groups in our study (Table 1). However, overall BCS and RFS values of the study pointed out a moderate class of the animals. In this context, elevating calculated values to more suitable levels might be advised to the stockmans of the farms.

In a general assessment, the means for both BCS and RFS were calculated as relatively low. Therefore, additional feeding application including balanced rations within the farms should be seen to be the crucial practice by the herd owners.

As shown in Figure 1, a positive correlation ($r=0.536$) was found between BCS and RFS. Really, RFS of an animal can be accepted as an origin of feeding management of the farm. Thus, a positive relationship of this parameter with BCS was not found as a surprise. Bramley *et al.* (2013) informed important associations among BCS, RFS, diarrhea, lameness and ruminal acidosis in Australian dairy herds.

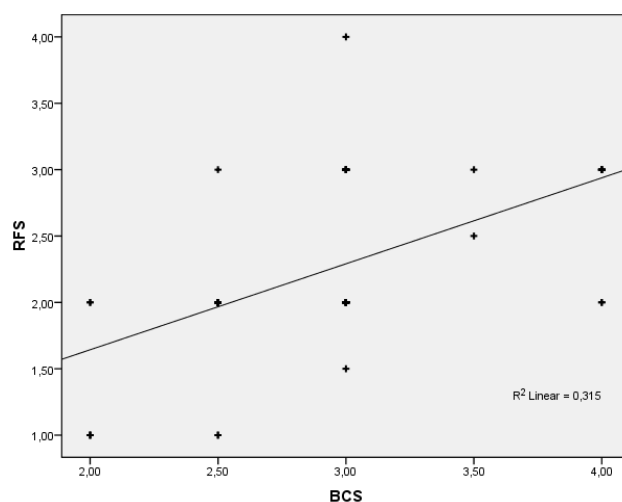


Fig. 1. Correlations of BCS with RFS of buffalo cows. For abbreviations, see Table I.

In this connection, exactly recording BCS and RFS as important management indicators of the herds may be seen to be beneficial acts for the future of the farms.

Conclusions

The findings of the present research indicated that non-genetic factors were not effective on both BCS and

RFS. Estimated correlation ($r = 0.536$) of BCS with RFS might be considered to be an attractive case. This result indicates that two traits should be considered together during the deciding time on the feeding regime applied in the farms are suitable or not. Also, the overall means for two parameters point out to low/moderate thresholds. That's why, additional feeding program should be applied to boost the levels of these parameters for Anatolian buffalo herds investigated here.

Statement of conflict of interest

The authors have no conflict of interest to declare.

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