RELATIONSHIP BETWEEN THE BODY CONDITION AND THE MAIN JUDGEMENT CHARACTERISTICS OF HOLSTEIN-FRIESIAN COWS

EDIT MIKÓ, ÁKOS SZABÓ, MYRTILL GRÁFF

University of Szeged, Faculty of Agriculture
H-6800 Hódmezővásárhely, Andrássy u. 15., Hungary
mikone@mgk.u-szeged.hu

ABSTRACT

The objectives of this study were to estimate correlation between body condition score (BCS) and 5 main conformation parameters in Holstein cattle. The dataset consisted of 861 first-, 964 second-, and 634 third lactation cows. During the analysis of final class the details of the cows were grouped according to the BCS at classification (2-3 point, 4 point, 5 point, 6-8 point). The results of these groups were compared to the results within the number of lactations. The correlation examinations were also analysed within the lactation groups. The data were analyzed by the method of variance. The relationship between variables was examined with correlation analysis tests (Pearson's correlation coefficient).

The values of the body score changed between 77.58 and 84.23., correlation ranged from 0.06 (third lactation) to 0.20 (first lactation). The correlation analysis confirmed a positive, medium tightness in the relationship between the body condition and the legs, (between r=0.19 and r=0.31) within the lactation groups. When investigating the relationship between the body condition and the dairy strength. We found a negative correlation between these two characteristics. The correlation analysis confirmed only a loose correlation (r=0.03 and r=0.13 between the udder score and the body condition. When examining the final class it was again the scores of the cows with the weakest condition that were the lowest.

These results show that classification should be made later, probably in the 5th or 6th month of the lactation.

Keywords: body condition scoring system, conformation traits, type-classification, energy reserve, nutritional management, reproduction management

INTRODUCTION

Body condition score is a management tool used routinely to assess the body fat reserves and energy status in cattle (EDMONSON ET AL., 1989). Body traits in dairy cattle can be of interest as indicators of growth, maturity, and functionality. Conformation traits are recorded in many dairy cattle breeds.

Many countries have been recording BCS as part of a linear-type classification scheme for several years, and genetic parameters have been estimated (DOMECQ ET AL., 1997; VEERKAMP AND BROTHERSTONE, 1997). In Hungary the body condition scoring became part of the classification system in 2007, in accordance with recommendations by ICAR.

Some studies (DECHOW ET AL, 2003; BATTAGIN ET AL, 2012) have reported correlation between the body condition score and the main conformation traits.

In KADARMIDEEN AND WEGMANN (2003) study body condition score was favourably genetically related to some conformation traits, such as body capacity (0.19), stature (0.28), heart girth (0.21), strength (0.17), and overall scores for feet and legs (0.15) and final class (0.13). DECHOW ET AL. (2003) analysed a −0.73 genetic correlation between BCS and dairy form, whereas the genetic correlation between BCS and strength was 0.72. The genetic correlation between body condition score and the final score was rather low (0.08). The correlation between sharpness and body condition was -0.40 given by PRYCE ET AL. (2000). BASTIN ET AL. (2007) also reported a negative relationship between sharpness and body condition (r = -0.35 r = -0.73.) The contrast between the two parameters can be the result of the improved condition masked the sharpness.

KADARMIDEEN AND WEGMANN (2003) searched for significant association between the linear type traits, the main judgement characteristics and the body condition. They analysed the correlation between the body condition and chest width (r=0.17) and between BCS and body capacity (0.19) Body condition score had a negative correlation with dairy strength (-0.35) and udder quality (-0.42). Estimates of correlations between the BCS and final class (0.13) were not significant.

MATERIAL AND METHOD

During the analysis of estimated body condition scores at type-classification we tried to find the correlation between the BCS and the most important conformation characteristics. During the analysis of final class the details of the cows were grouped according to the BCS at classification (2-3 point, 4 point, 5 point, 6-8 point). The results of these groups were compared to the results within the number of lactations. The correlation examinations were also analysed within the lactation groups. The data were analyzed by the method of variance. The relationship between variables was examined with correlation analysis tests (Pearson's correlation coefficient).

RESULTS

The relationship between the body condition and the main judgement characteristics (with regard to this examination) was illustrated in Figure 1-5.
The values of the body score (*Figure 1*) change between 77.58 and 84.23. It can be observed that the increasing number of lactation as well as the improving body condition has a positive effect on the body score.
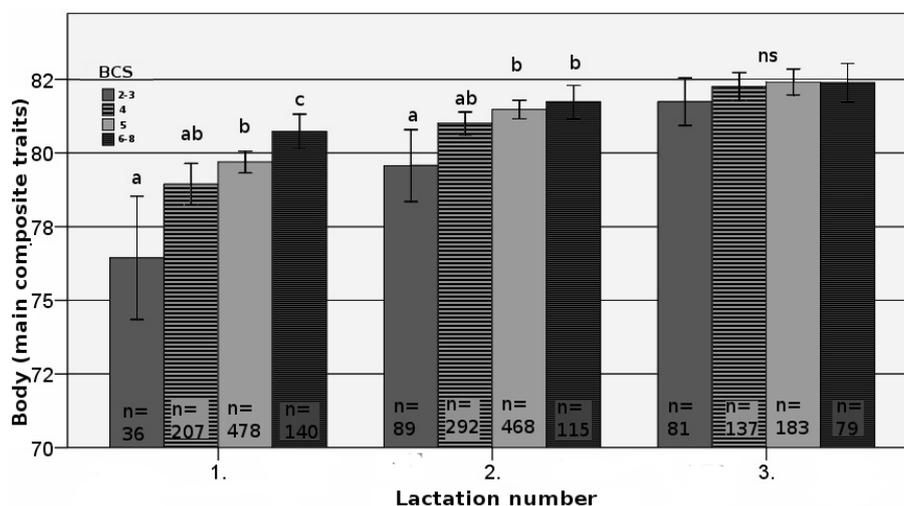

Figure 1. Body score of cows with different BCS in each lactation

In the figure it is visible that the strongest correlation is between the body condition and the body score of the first lactation cows. Significant difference was found in case of the second-lactation cows. There is a loose correlation between the body condition and body score in the first (r=0.20) and in the second (r=0.14) lactation. In the third lactation there is no correlation (r=0.06) between the two characteristics.
When analysing the relationship between the legs (*Figure 2*) and the body condition we

also concluded that the improving body condition has a positive effect on the legs. The legs of the cows with 2-3 BCS significantly (P <5%) falls behind the groups with a higher body condition. With the changes in the number of lactations no considerable difference can be detected in the legs. The correlation analysis confirms a positive, medium tightness in the relationship between the body condition and the legs, (between r=0.19 and r=0.31) within the lactation groups. The results suggest that the food uptake of the cows with better-structured, normal feet is higher than that of the animals with a worse foot-structure.
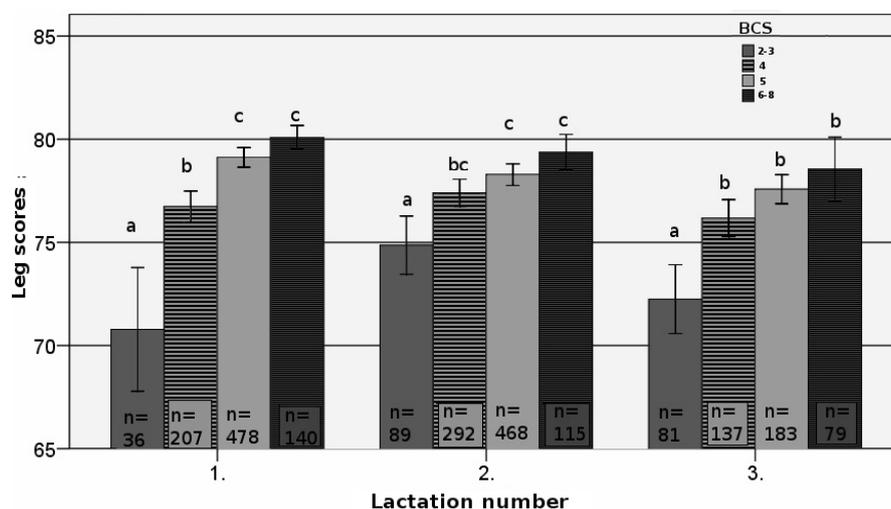

Figure 2. Leg score of cows with different BCS in each lactation

When investigating the relationship between the body condition and the dairy strength. We found a negative correlation between these two characteristics (*Figure 3*).
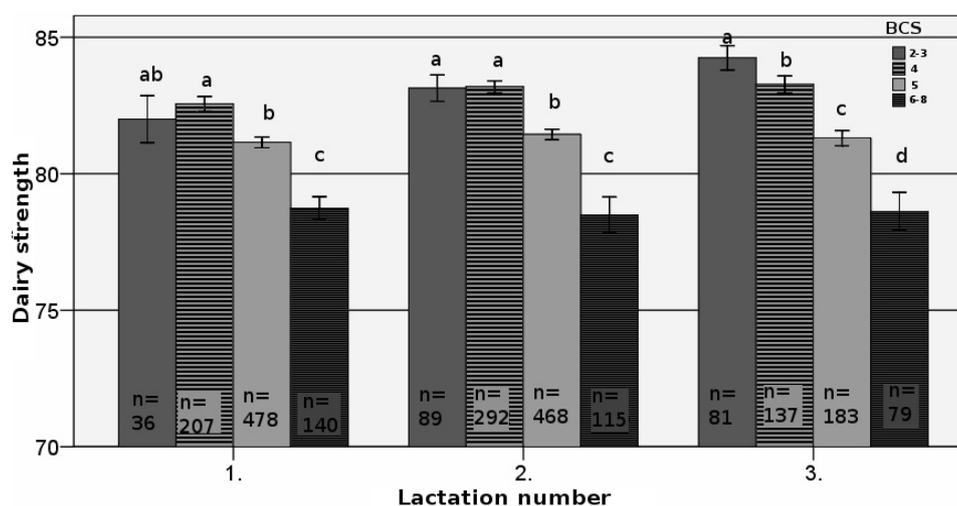

Figure 3. Dairy strength values of cows with different BCS in each lactation

The results of *Figure 3* demonstrate the unselfish character of the animal. The most scores for dairy strength were given to the cows that obtained only two, three or perhaps four linear score at the body condition scoring. Concerning the tightness of the relationships there are medium correlations in each lactation; a negative correlation (with extremes of r=-0.51 and r=-0.57) was confirmed between the dairy strength and the body condition. The strongest relationship is in the third lactation (r=-0.57). These results are identical to

those of DECHOW ET AL. (2003)(r= -0,73) and KADARMIDEEN AND WEGMANN (2003) (r=-0,35).

Considering the udder scores (*Figure 4*) there is no significant difference between the results of the first and second lactation cows. Following the third lactation the udder scores are significantly behind that of the previous lactations. Even the highest value is below the value of the 'good' class that is below 75 scores. When comparing the udder scores of the cows from BCS point of view there is a tendency of the low body condition associated with a low udder score. The correlation analysis confirmed only a loose correlation (r=0.03 and r=0.13 between the udder score and the body condition.
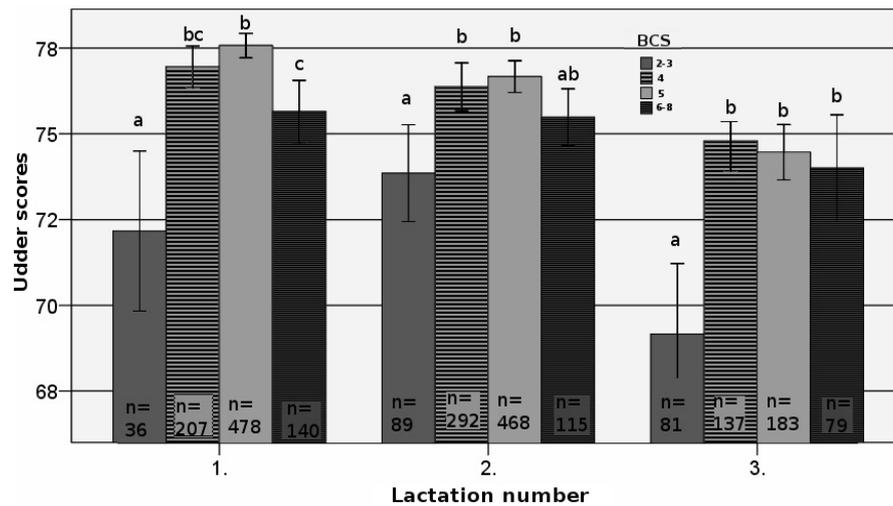

Figure 4. Udder score of cows with different BCS in each lactation

When examining the final class (*Figure 5*) it was again the scores of the cows with the weakest condition that were the lowest. It is especially true for the first lactation cows. In the first lactation the most scores were given to the group with the ideal (5) body condition. The variance analysis confirmed a significant (P <5%) difference between the groups.
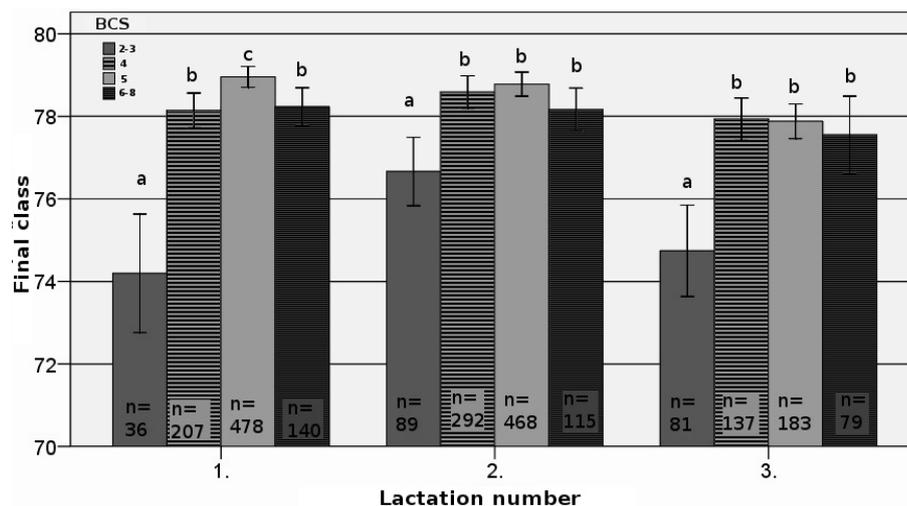

Figure 5. Final class of the cows with different BCS in each lactation

No significant difference was confirmed between the second-lactation groups made according to the body condition. Exceptions are the cows with 2-3 BCS, since their final classes are different from that of the other groups and this difference is statistically

confirmed. The Final class of the third-lactation cows follows a similar tendency as the second-lactations ones. When examining the tightness of the correlations we can claim that regardless of the number of lactation there is a weak positive (r=0.09 and r=0.16) correlation between the linear BCS and the final class. Also loose or very loose relationship has been reported between the condition and the final score in the work of DECHOW ET AL. (2003) (r = 0.08), KADARMIDEEN AND WEGMANN (2003) (r = 0.13), and VEERKAMP AND BROTHERSTONE (1997)(r =- 0.07).

CONCLUSIONS

The results of our study show that the increase in the number of lactations as well as the improving body condition had a positive effect on the body score. When investigating the relationship between the body condition and the dairy strength a negative correlation was found between these two attributes. Therefore we suggest that classification should be made later, probably in the 5th or 6th month of the lactation.

REFERENCES

BASTIN, C., LALOUX, L., GILLON, A., BERTOZZI, C., VANDERICK, S., GENGLER, N. (2007): First results of body condition score modeling for Walloon Holstein cows. http://www-interbull.slu.se /bulletins/bulletin37 /Bastin.pdf (2011.01.11.)

BATTAGIN, M., F. FORABOSCO, J.H. JAKOBSEN, M. PENASA, T.J. LAWLOR, M. CASSANDRO (2012): International genetic evaluation of Holstein bulls for overall type traits and body condition score, Journal of Dairy Science, 95, 8, 4721-4731,

DECHOW, C.D., ROGERS, G.W., KLEI, L., LAWLOR, T.J. (2003): Heritabilities and correlations among body condition score, dairy form and selected linear type traits. J. Dairy Sci. 86 6 2236-2242

DOMECQ, J.J., SKIDMORE, A.L., LLOYD, J.W., KANEENE, J.B. (1997): Relationship between body condition scores and milk yield in a large dairy herd of high yielding holstein cows. J. Dairy Sci. 80 1 101-112

EDMONSON, A.J., LEAN, I.J., WEAVER, L.D., FARVER, T., WEBSTER, G. (1989): A body condition scoring chart for holstein dairy cows. J. Dairy Sci. 72 1 68-78

KADARMIDEEN, H.N., WEGMANN, S. (2003): Genetic parameters for body condition score and its relationship with type and production traits in swiss holsteins. J. Dairy Sci. 86 11 3685-3693

PRYCE, J. E., COFFEY, M. P. BROTHERSTONE, S. (2000): The genetic relationship between calving interval, body condition score and linear type and management traits in registered holsteins. J. Dairy Sci. 83 11 2664-2671

VEERKAMP, R. F., BROTHERSTONE, S. (1997): Genetic correlations between linear type traits, food intake, live weight and condition score in Holstein Friesian dairy cattle. Animal Science. 64 03 385