Body condition score, an extra service from hedbook organisation for farmers and cattle improvement

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Introduction

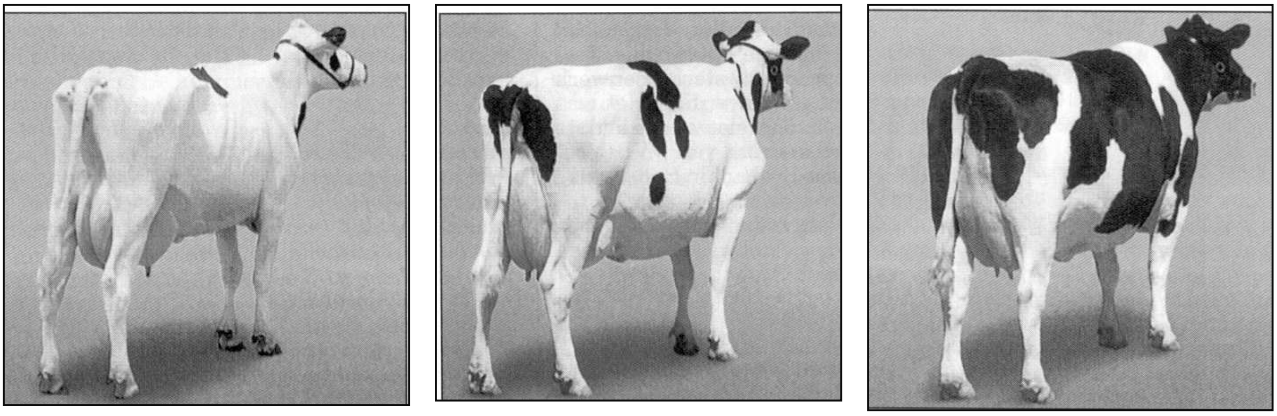
In dairy herds like in Europe, United States and New Zealand body condition scoring of dairy cows is used as a management tool. Body condition score is an indicator for how well the feed ration fits with the milk production of the cow or herd. But nowadays there is also more interest in body condition score (BCS) from the breeding side. This as BCS could be an indicator for robust cows.
The breeding goal for dairy cows is actually selecting for a cow, which produces a lot of milk in an efficient way during a long time without problems. The actual direct selection for the past 20-25 years has been on milk production traits and conformation. Later on, longevity was added but a little attention was given to traits like fertility. This has changed the last couple of years. Now world wide, traits like fertility get more attention.
One of the major disturbance for good fertility in dairy cows is the negative energy balance during the first part of the lactation: the energy output, in production, is higher than the energy input, via feed intake, causing mobilisation of fat reserves. Solution for this disturbance is, or better attention for feeding during dry period and the beginning of the lactation, or genetic selection.
BCS is a good indicator for cow's fat reserves during the lactation and could be a good measure for cow's which are able to balance in a good way between milkproduction and feed intake. Animals, which stay in good condition during the first part of the lactation, show shorter calving intervals.
To get data for genetic selection herdbook organisations in several countries started to score cows for BCS. But to get extra value out of this data herdbook organisation could also think about scoring of BCS as an extra support or service for the farmer his management.

Scoring body condition

The body condition score is an estimate of filling of cavity around tailhead with fat and fat covering of pelvic bones and rib bones. For management purposes BCS is scored on a scale of 1 to 5 with 9 classes. European herdbook organisations have transformed this to the 1-9 scale, with the same 9 classes. The advantage of the 1-9 scale is that this scale is in line with the other linear scores. Pictures of cows scoring 1, 5 or 9 are presented in figure 1.

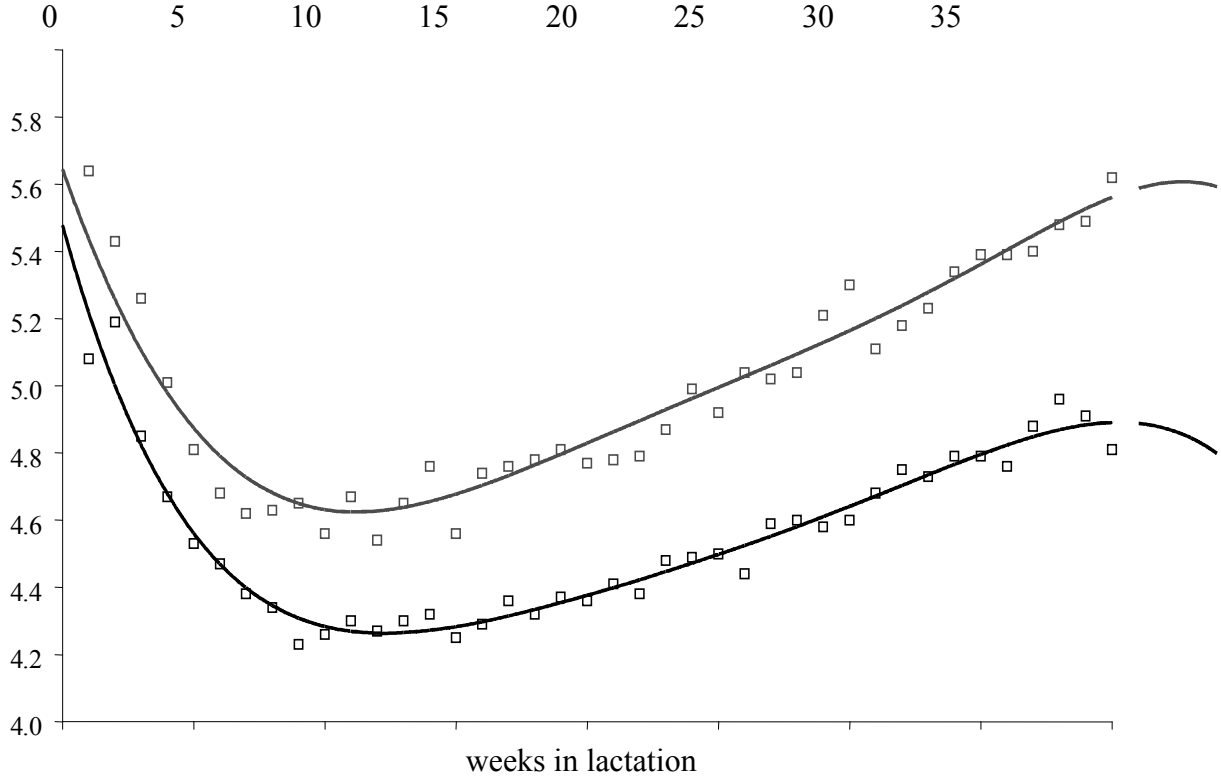
Figure 1: **Three pictures of cows scoring 1, 5 of 9 for body condition.**

score 1 score 5 score 9



Body condition changes during the lactation. A cow starts in the beginning of the lactation with above average condition score and reaches on average the lowest point during the third month, after which the fat reserves increase again (see figure 2).

Figure 2 **Body condition during the lactation for Black and White Holstein (black line or owest line) and Red and White Holstein (red line or highest line) in the Netherlands.**



Body condition score has the strongest relationship with linear conformation traits angularity and chest width. The phenotypic correlations of BCS with angularity and chest width are –0.51 and 0.55 respectively. The genetic correlations of BCS with angularity and chest width are –0.75 and 0.71 respectively (based on Dutch data).

BCS and management

BCS has relationship with many traits, which are important to a dairy farmer. Cows, which score in the extreme classes, so too fat or too thin, are culled earlier during her life. Further cows, which produce 1000 kg milk more, the BCS is 0.5 point lower. The relation with fertility is one of the most interesting. Cows with one point higher BCS have a 5-day shorter interval calving to first insemination and a 5-day shorter calving interval.

But when classifying animals as a herdbook is there extra service to be delivered to the farmer?
First of all when the herdbook classifier visits the herd and scores the cows for body condition, the farmer, when he is also regularly scoring his herd for body condition, can check his way of scoring with the herdbook way. In this way the classifier can be used by the farmer as a reference. Over time the farmer will score more consistent.
Second way to give the farmer extra information is to show the long term trend for BCS in his herd. This can be done by showing the average BCS of the cows scored during a visit. Even a better way is to show him and adjusted average (herd standard condition score), taking into account difference in stage of lactation and age when the animals were classified. The ideal BCS level is in this case 5. The difference in time can be used to analyse the feed ration quality during a longer period. The farmer can use this in retrospect.
Examples of four different real herds are shown in Appendix 1. The average and adjusted herd condition score (HCS) are compared with the target level of 5 points.
Showing the farmers these kind of trend figures may help him in better analysing the management of the herd.

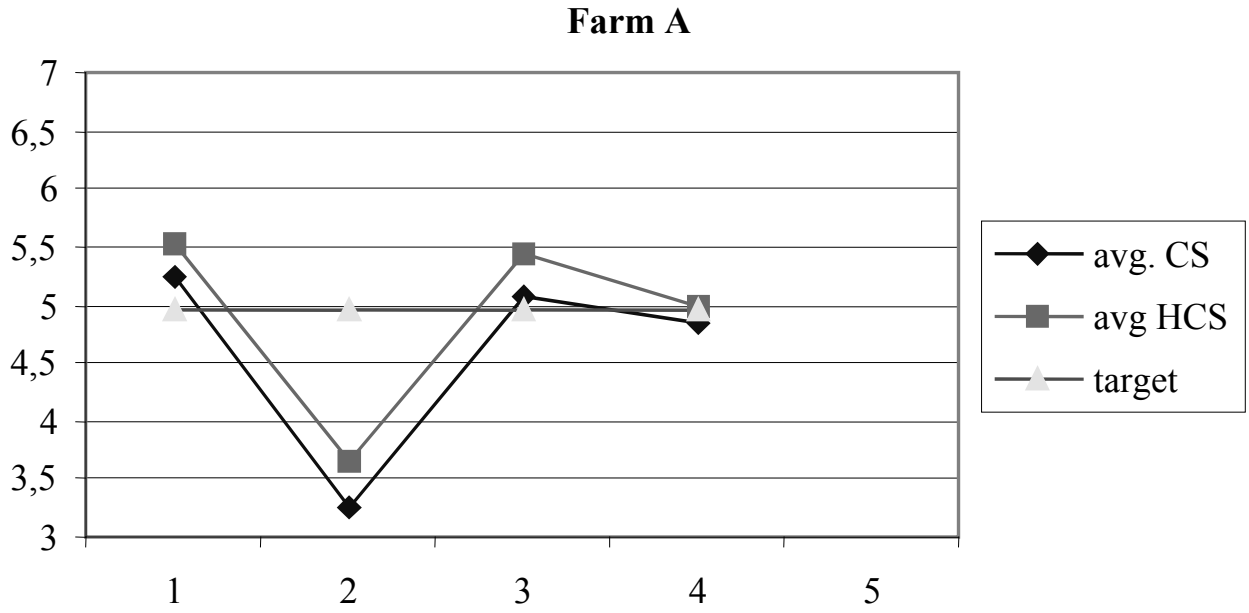
BCS and genetics

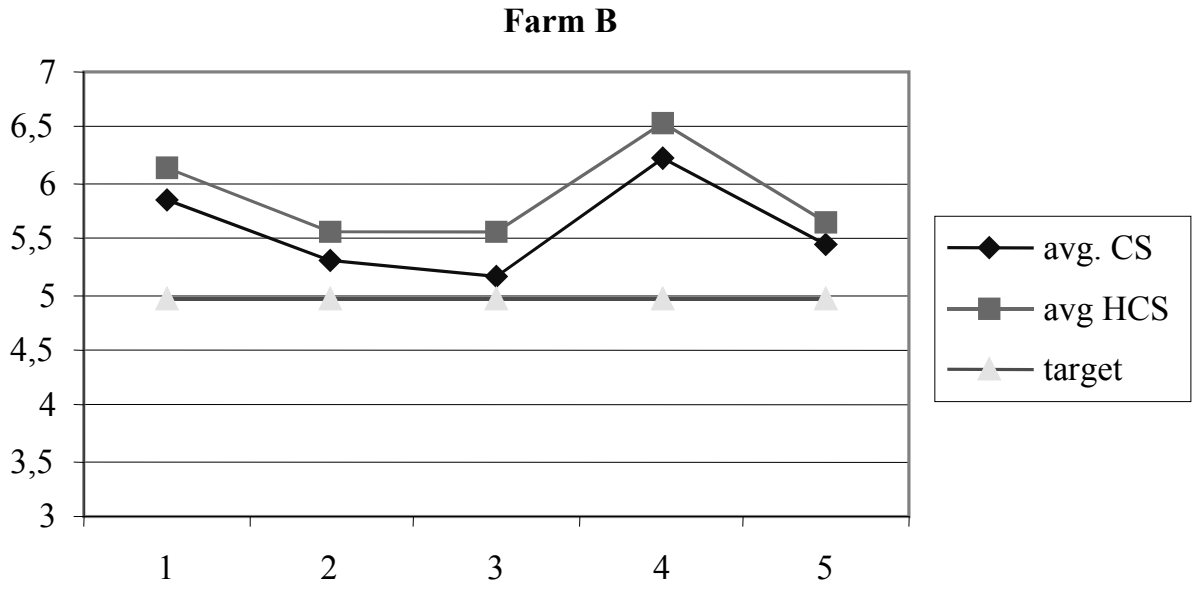
BCS is for sure a heritable trait. Heritability estimates for BCS range from 0.30 to 0.40. The genetic standard deviation on a scale of 1-9 is in the range of 0.8 to 0.9 points. So using a bull which is one standard deviation in his breeding value above population average can increase the body condition with 0.4 to 0.45 points in a herd.
Up to now countries like Great Britain, the Netherlands, Germany, USA, Ireland, New Zealand and Denmark score cows during the type classification of herds. The Netherlands, Ireland and New Zealand have breeding values available on bulls. In near future more countries will follow.
Breeding values for BCS are valuable in breeding as it can be a help to breed more robust cows. The genetic correlation with fertility traits is considerable: -.53 and –0.45 with respectively interval calving to first insemination and calving interval. The genetic correlation between BCS and non-return after 56 days is close to zero. Therefore the breeding value for BCS can be used as an early predictor for fertility, which helps to increase the reliability for fertility traits.

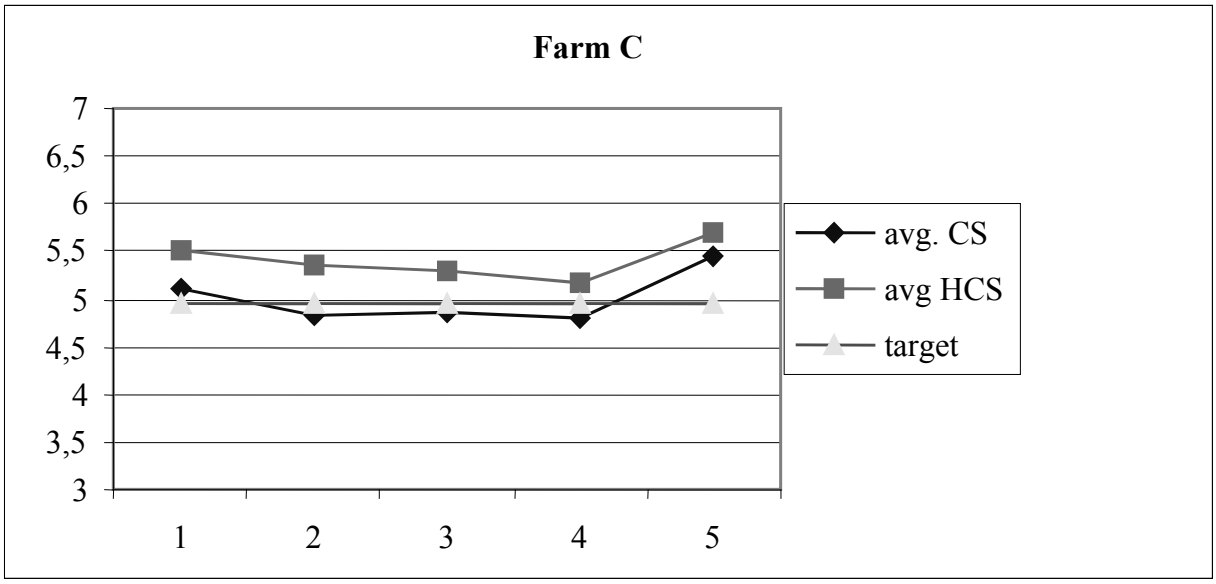
Summary

Body condition score by herdbook can give management information for the dairy farmer. First the farmer can use the score of the classifier as a reference for his body condition scores. Second, the herdbook could use the BCS to present trend in the herd in time, which can help the farmer to analyse his (feed)management.
Body condition scores is of interest for the farmer as it has a strong relation with milk production and fertility.
Body condition of a cow is a heritable trait with genetic variation. Selection is possible. Breeding values on BCS for bulls could help to breed a more robust cow which can produce a lot of milk, while keep enough body condition as sign for enough energy (feed) intake. Cows with enough body condition have fewer problems with fertility and health. Therefore BCS is a tool in selecting cows which balance production, fertility and health in the right way.

Appendix 1 **Four herds and their average for body condition score (CS) and average herds condition score (HCS) during 5 herd classification visits.**






Farm C
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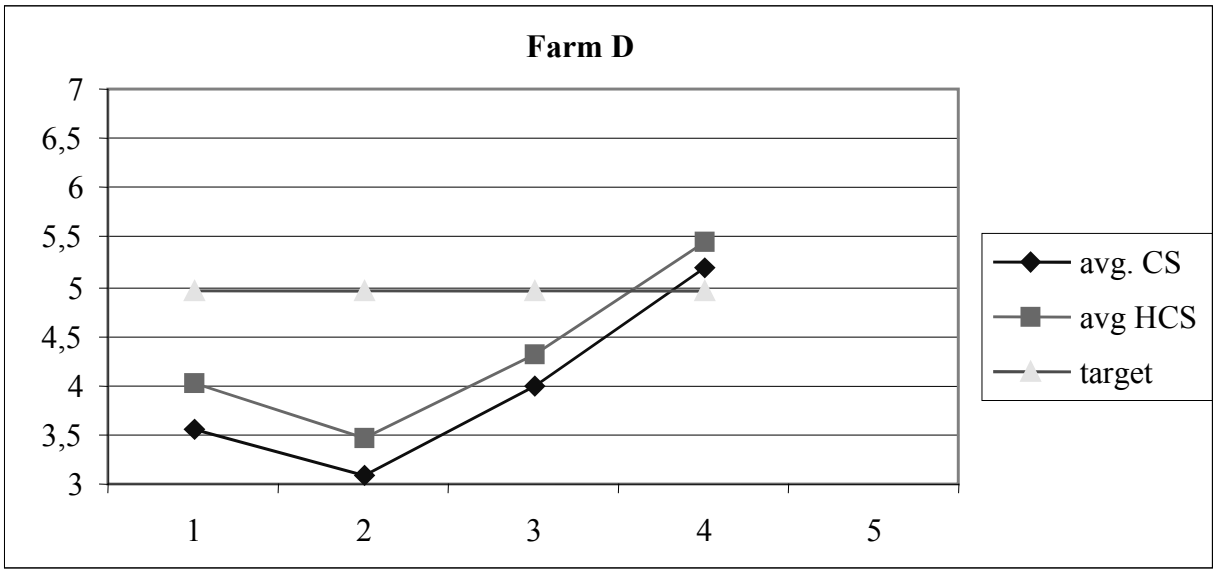
4
5
avg. CS
avg HCS
target


Farm D
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avg. CS
avg HCS
target