

New approaches for organic dairy cow breeding

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Phd-Thesis: University of Kassel / Witzenhausen

January 2011

(Original title: Neue Ansätze für die ökologische Milchrinderzucht)

Summary

A convincing profile for organic dairy cow breeding does not exist so far. Usually conventional breeds and lines are used on organic farms. Most of them have been bred for high milk production. On organic farms it is not always possible to feed high yielding cows adequately, because farm own feed must preferably be used and only small amounts of concentrates are allowed. This can lead to energy deficiencies and animal health problems. Therefore new concepts for organic dairy cow breeding are required. During the last 100 years conventional dairy cow breeding had been focussing more and more on single production traits. The animals' relation to the environment and their health and constitution had continuously been neglected. Therefore the conventional breeding concepts do not exactly agree with the ideas of organic agriculture. The whole animal as well as the whole farm should be considered in organic breeding concepts rather than focussing on single production traits. Nowadays a few approaches for organic dairy cow breeding exist, like "breeding for life production" and "kinship breeding with cow families". They take account of the animal-environment-relationship and they promote a holistic animal understanding. But these approaches are still not widespread and they are associated with demands for further research and / or advisory service.

To select for functional or fitness traits (partly instead of production traits) is getting more and more attractive and common in conventional breeding. This approach fits well to organic agriculture. Since it is difficult to measure health directly there are often health related traits used for selection schemes. The aim of the present study was to find new health related traits. Emphasis was on behaviour traits, which partly reflect ways of the individual animal to cope with the environment. Most of them have not been explored for this purpose, yet. Traits which are connected to digestion and metabolism were preferably included in this explorative study, because those processes are central in a cows' life (this view is drawn from the anthroposophic understanding of the animals). The goal was to find individual differences in all observed traits and their possible relations to animal health; so new selection traits for animal health could be developed in future.

All observations were conducted in a herd of 60 dairy cows on a biodynamic farm in Switzerland during a period of 13 months. Two projects with 27 and 34 animals respectively were carried out. Ruminating behaviour, lying behaviour, temperament, body condition (BCS) and manure consistency were observed. All observations were conducted on farm under normal conditions, which were the same for all observed

animals. Animal health was analysed using data from the farm's treatment journal, from veterinarians' invoices and from milk recording- and calving data. All data from one year were summarised in a health index and in a separate udder health index. Individual consistency of behaviour was analysed by calculating reproducibility of repeated measurements. Correlations between animal health and observed parameters and linear regressions with animal health as the dependent variable were calculated.

Individual differences and consistency were found for all behaviour and manure traits. The variation of ruminating speed, the number of acts of lying down, and BCS (1st quartile) were positively correlated to animal health whereas BCS-range was negatively correlated to animal health. Another positive correlation was found between a calm temperament and udder health. Multivariate regression analyses showed that the variation of animal health could be explained by these factors to an extent of 23% (health in project 1), 32% (health in project 2), and 24% (udder health in project 2) respectively.

The results presented, especially the ones on temperament and BCS, show interesting selection traits for organic farms. Those traits can quite easily be observed and in other studies quite high heritability estimates were found. It can be recommended to use both traits as future selection traits on organic farms (especially BCS-range), since they reflect how animals cope with their environment. Those features are most important on organic farms which usually don't have standardized environments. However more advisory services for organic breeding which include these traits are urgently needed.

It is also possible to integrate these traits into breeding programmes on population level, but further research is needed to find the best methods for collecting data on BCS and on temperament. In this regard several projects on BCS are already being conducted.