

Udder health status of cows in early lactation – a comparison between a dairy and a dual purpose breed

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Abstract

The aim of organic farming to produce forage-based milk and to lower the amount of concentrate fed leads to an increased risk of metabolic disorders, especially in early lactation when the demand for energy often oversteps the energy provided. The use of breeds with a lower genetic merit for milk yield might offer a solution. Our study compared a dual-purpose and a dairy breed kept under the same management conditions and two herds consisting of the same dairy breed, but managed differently, to test the effect of the breed or the management on the metabolic status and on udder health of the cows during the first five weeks of lactation. The analyses of the udder health status revealed that the German Holstein (GH) cows at both farms had a better udder health than the German Red Pied (GRP) cows: Nearly 50% of the GH cows did not show any sign of an udder infection while only 27% of the GRP cows were not infected. This is reflected in the number of cows which showed symptoms of clinical mastitis: 15% and 25% of GH and GRP cows, respectively. Thus, our study showed that a local dual purpose breed not necessarily shows a better udder health due to a lower metabolic load, and maybe in this case the breed is more important than the management.

Key words: mastitis, dual purpose breed, early lactation

Introduction

During the transition period cows are subject to increased risks of developing production diseases, such as mastitis or metabolic disorders, due to a more or less physiologically normal negative energy balance. Organic dairy farming aims to reduce the amount of concentrates fed to cows and produce forage-based milk. Especially at the beginning of lactation, this might exacerbate the situation. Knaus et al. (2001) calculated a milk yield in organic farming up to 7,000 kg per year without exceeding the tolerable restrictions for suboptimal energy supply. However, the genetic potential of the breeds used in organic dairy farming is much higher and using breeds with a lower genetic merit for milk yield to solve the problem is still under discussion. After an initial study investigating the effect of breed and management on the metabolic status of a dairy and a dual-purpose breed (Barth et al. 2011) the present study addresses the udder health status in early lactation.

Material and methodology

The study was carried out on two research farms working according to the standards of organic farming. On Farm1 84 German Holstein black and white cows (Farm1-GH, 21 primipar, 63 pluripar) were analyzed. On Farm2, two breeds (German Holstein black and white and the local dual-purpose German Red Pied – GRP) are kept under the same management conditions (barn design, milking technique and routine, feedstuff, bedding material as well as farm staff). 49 GRP (18 primipar, 31 pluripar) and 46 GH (19 primipar, 27 pluripar) were analyzed on Farm2. Feeding management at Farm1 and Farm2 differed, resulting in better fulfillment the energy needs of the cows on Farm1 than on Farm2 (for details see Barth et al. 2011). Animals were sampled weekly during the first five weeks of lactation, gaining fore-milk samples according to the standards of the DVG (2000). Cyto-bacteriological analyses were carried out by the Department of Safety and Quality of Milk and Fish Products (MRI, Kiel, Germany) following the recommendations of DVG (2000). Cows were classified as shown in Table 1.

Table 1. Classification of cows according to their results of cyto-bacteriological analyses of fore-milk samples gained during the first five weeks of lactation

Class	Description
Healthy	no pathogen isolated during the five sampling weeks
Newly infected	the first sample/s <i>p.p.</i> was/were negative but pathogens were isolated later
Self-healed	the first sample/s <i>p.p.</i> contained pathogens but the following samples were negative
Changing results	results were not consistent
Clinical/ treated	cow showed clinical symptoms and was treated if necessary

Statistical analyses used R 2.15.0 (The R Foundation for Statistical Computing, 2012), especially the package “vcd” (Meyer et al. 2010).

Results

Due to missing results caused by contaminated samples, 20 cows (Farm1: 13 GH, farm2: 2 GH, 5 GRP) had to be excluded from analyses.

The analyses of the udder health status revealed that the German Holstein cows at both farms had a better udder health than the German Red Pied cows: Nearly 50% of the GH cows did not show any sign of an udder infection while only 27% of the GRP cows were not infected (Figure 1). This is reflected in the number of cows which showed symptoms of clinical mastitis: 15% and 25% of GH and GRP cows, respectively.

The direct comparison between the GH and GRP at Farm1 showed an increased risk for the GRP to be infected by a pathogen (OR= 2.4, Odds-Ratio-Test: $z=1.929$, $p=0.027$) whereas the risk of GH at Farm1 and Farm2 did not differ significantly (OR=1.07, Odds-Ratio-Test: $z=0.184$, $p=0.427$).

Discussion

Compared to the results concerning the metabolic status of the two breeds respectively the herds at the two differently managed farms, the breed was more important than the management for the udder health status of the cows. Although all animals at Farm2 are kept under the same management conditions, a clear difference between the GH and GRP cows could be observed indicating a higher susceptibility to udder infections of the GRP. The intensive breeding activities aiming to improve the milkability and udder characteristics of dairy breeds might be an explanation for the advantages of GH cows in this study.

In addition, the study revealed – when considered at farm level - that a higher metabolic load does not necessarily lead to an increase of udder infections. High quality standards in milking and hous-

ing may protect cows with high genetic merits for milk yield to be affected by other production diseases while they are subject to negative energy balance in early lactation.

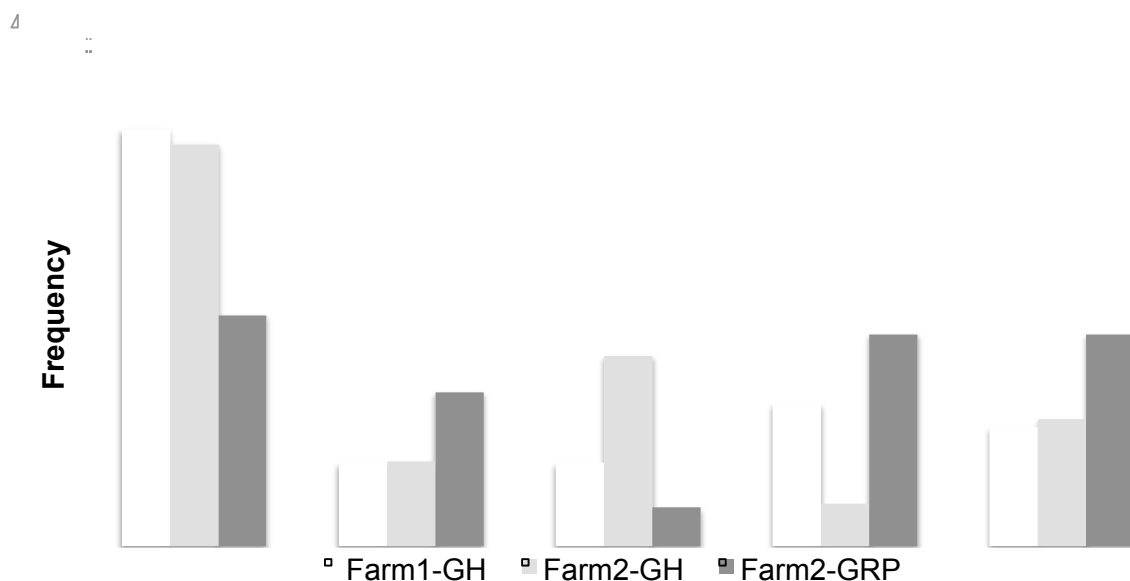


Figure 1. Frequencies of cows in classes of udder health status depending on farm and breed (GH = German Holstein black and white, GRP = German Red Pied)

Suggestions to tackle the future challenges of organic animal husbandry

Organic animal husbandry should focus on improving farm management and animal welfare on the farms. The origin of a breed does not guarantee its appropriateness for an organic farm in the same region. Thus, the selection of a breed should be based on the conditions and the management of the farm instead of rules such as “local breeds are to be preferred”. Nevertheless, the biodiversity of farm animals has to be conserved but under conditions of intensive agriculture as in Europe, special programs might be required.

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