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Comparison of native and commercial dairy cattle breeds on organic farms in five European countries

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Local/ native breeds are indirectly or explicitly recommended in organic standards. They may be better adapted to local, and especially organic, conditions characterized by a stronger dependency on local feed resources, higher amounts of pasture-based feeding systems and/or lower amounts of concentrate feeding, as well as stronger restrictions regarding medicine use. Nevertheless, little knowledge is available regarding health status, medicine use and phenotypic functional characteristics of local/native breeds in organic dairy production in Europe. Therefore, local and commercial dairy breeds from organic farms were compared regarding direct health traits, health associated functional and conformation traits as well as production traits with the aim to map the suitability of local breeds for organic farms in the respective countries. The study included data from organic herds from Austria, Germany, Poland, Sweden and Switzerland for the period 01.07.2011 to 30.06.2014. Preliminary results reveal lower milk yield for local breeds, but in many cases better fertility (shorter calving intervals, lower number of inseminations). Limited data on useful lifetime indicates a superiority of local breeds for this trait, whereas commercial breeds showed a higher lifetime production (kg ECM).

Genetic relationships and trait comparison between and within lines of local dual purpose cattle

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The aims of the present study were: (1) to analyse the genetic structure of the local black and white cattle breed (DSN); (2) to compare different lines of DSN and Holstein (HF) cows for production and functional traits; and (3) to analyse genotype by environment interactions based on defined clusters. Clusters were created according to geographic, environmental and phenotypic descriptors (e.g. longitudes, altitudes, breeding organisation, average herd production level). The study considered 4,251 DSN and 4,187 HF cows from 38 herds keeping both breeds. Farms mostly reflected pasture based low input production systems. The average generation interval considering the years 1950 to 2010 was 5.8 years for the DSN population. Based on the average increase of inbreeding per generation, the effective population size comprised 125 animals, and the current average inbreeding coefficient in 2013 was 2.13%. The most influential DSN sires with more than 100 daughters were identified. Genetic relationships between those sires with the active cow population ranged between 6 and 9%. The genetic relationship between the current DSN and HF populations was quite small (0.06%), but reflecting identical genealogies. Due to artificial insemination, genetic relationships among different cluster combinations were on a similar level. Linear and generalized linear mixed models were applied for breed and line comparisons. The energy efficiency indicator fat-to-protein ratio (FPR) was higher for HF early in lactation in the first parity ($P < 0.0001$), but opposite results were found with increasing day in milk. Interestingly, least square means for somatic cell scores were slightly higher for DSN compared to HF. A multiple trait approach, i.e. defining same traits in different clusters as two different traits, was applied to prove genotype by environment interactions based on genetic correlation estimates. Genetic correlations between low heritability functional traits were lower than for production traits, and partly below the threshold of $rg = 0.80$.