Genetic parameters for a multiple-trait linear model conception rate evaluation

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Genetic evaluation for female fertility in Finnish, Danish, and Swedish dairy cows has been upgraded to multiple trait animal model evaluation, where heifer and cow fertility up to third parity are considered as four different traits. In next step, non-return rate will be replaced by conception rate (CR). The aim of this study was to estimate required variance components for the implementation of a CR model using outcomes of all available inseminations. A multiple trait multiple parity sire model with 11 traits was used to estimate simultaneously the variance components for CR, interval from first to last service (IFL) and interval from calving to the first service (ICF) in the different parities. Within each lactation the CR observations were treated as repeated observations. The data consisted of Nordic Red dairy cattle heifers and cows (n=101 315) from Swedish milk recording data. The heritabilities of CR were 0.02 in all parities and ranged from 0.02 to 0.05 for the interval traits in different parities. The within-trait genetic correlations between heifer and cow traits varied from 0.4 to 0.7 in CR and in IFL, and were 0.9 or higher among all the cow traits in the later parities. CR are binomial observations with a variance structure depending on the number of repeated trials service period. Proper modeling of CR observations was found to be crucial to avoid biased estimates for heritability and genetic correlations between traits. Female fertility traits are low-heritable and benefit from multiple trait analysis where all available information is used.

Genetic parameters of body weight and body measurements of Austrian dairy cattle

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During the last decades the breeding goal mainly focused on increased milk production. As a consequence dairy cows got larger. Concerning resource efficiency, body weight (BW) is of increasing interest, as maintenance costs do have an impact on efficiency. Changes in BW may also be used as predictors for health problems. Currently, the Austrian breeding organizations aim at improving efficiency of dairy cows. BW could be a trait to select for; however, weighing animals reliably is cost and time intensive. Therefore, some indirect traits have to be identified for routine genetic evaluation. The aim of this study was to estimated heritabilities, repeatability and genetic correlations between BW, waist circumference (WC), chest circumference (CC), muscularity (MU) and body condition score (BCS) of Austrian Fleckvieh (FV, dual purpose Simmental), Brown Swiss (BS) and Holstein Friesian (HF). In total, 33,347, 18,552 and 10,766 records of FV, BS and HF, respectively, were used to estimate genetic parameters. A bivariate animal model was fitted using VCE 6.0. Heritabilities were similar for all breeds and in the range of 0.22 for BCS (FV) to 0.49 for CC (BS). Traits showed a moderate repeatability (0.51 for MU (BS) to 0.80 for BW (FV)). Genetic correlations between BW and WC, CC, MU, and BCS were 0.76, 0.85, 0.32 and 0.37 for FV, 0.90, 0.81, 0.51 and 0.56 for BS and 0.84, 0.74, 0.59 and 0.52 for HF, respectively. Among body measurements significant and positive correlations were observed (ranging from 0.23 to 0.89). Especially WC and CC are genetically closely linked to BW and can therefore be used as indirect traits to select for an optimal BW.