

Analysis of genetic correlations between multivariate measures of lactation persistency and somatic cell score in Italian Simmental cattle

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ABSTRACT

Genetic relationships between lactation curve traits and Somatic Cell Count are of great interest for dairy cattle breeding. Factor Analysis (MFA) and Principal Component Analysis (PCA) can be used to extract from the correlation matrix of milk test day records new unobservable (latent) variables that can be related to lactation curve shape. Previous researches report that MFA is particularly able to extract two latent variables related with level of production in early lactation (PEL) and lactation persistency (PERS), respectively, whereas PCA yields a leading component related to the average level of production (AVY) for the whole lactation and a second component negatively related with tests of early lactation and positively with tests of the second part of lactation (SLOPE). Aim of this work was to estimate genetic correlations between lactation curve shape traits and Somatic Cell Score (SCS). MFA and PCA were carried out on a data set of 16,020 lactations of Italian Simmental cows, each with six TD records for milk yield recorded with the A4 scheme. Genetic parameters were estimated with a bivariate animal model that included fixed effects of herd-test date, parity*age*lactation stage (only parity*age for lactation curve traits), calving season, and random effects of additive genetic and permanent environment. Heritability estimates were moderate for lactation curve traits (0.15, 0.15, 0.21 and 0.09 for PEL, PERS, AVY and SLOPE, respectively) and low for SCS (0.09). Correlations between lactation curve traits and SCS were favourable, i.e. negative, except for the level of production in early lactation. In particular, the genetic improvement of lactation persistency result in a contemporary reduction of SCS (rg -0.55 and -0.51 with PERS and SLOPE, respectively) whereas the increase of level of production in early lactation can lead to a moderate increase of SCS (rg 0.13). Finally, the two measures of persistency could be used for different selection strategies: the use of PERS may allow for the increase of persistency together with the total lactation yield whereas the use of SLOPE may result in an improvement of the lactation curve shape without modifying total lactation yield.