

Estimation of direct and maternal genetic variances for calving ease in Croatian Holstein breed

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Abstract

The objective of this study was to estimate genetic parameters for calving ease in Croatian Holstein breed. Data for 134,949 first and later calvings were taken from the database of the Croatian Agricultural Agency. Calving ease was scored from 1 to 4 (1 =no problem, 2 =slight problem, 3 =cow needed assistance, 4 =veterinary assistance). Scores were harmonized by region and period of recording. The number of animals in pedigree was 204,990. Calving ease in the first and later parities was treated as two traits using a bivariate model. Fixed effects in the model were: calving season, interaction of sex, calving age, and parity, and interaction of region and calving year. Herd and calving year interaction, direct and maternal genetic effect were included as random effects for first and later parities, while permanent effect was also included for later parities. Residual variance was assumed heterogeneous by sex and parity (first and later calvings) to partly account for relationship of mean and variance in discrete traits. Variance components were estimated from Gaussian model using REML method as implemented in the VCE-6 program. The estimated variances (\pm standard error) for the first, second and later parities (correlations) were: 0.107 \pm 0.005, 0.085 \pm 0.004 (0.845) for herd-year, 0.017 \pm 0.004, 0.034 \pm 0.006 (0,548) for direct genetic, 0.014 \pm 0.004, 0.014 \pm 0.004 (0.743) for maternal genetic, and 0.018 \pm 0.003 for permanent effect. Correlation between direct and maternal genetic effect was -0.490 for the first and -0.730 for the later parities. Estimates for residual variance followed biological expectations: 0.295 and 0.228 for males and 0.204 and 0.162 for females in the first and later parities, respectively – all standard errors were about 0.005. Results provide genetic parameters for the application of genetic evaluation for calving ease in Croatian Holstein breed.