

Genetic parameters for milk traits using multi-trait fixed regression model for Alpine goat in Croatia

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Abstract

The objective of this study was to estimate (co)variance components for daily milk yield (DMY), fat (FC), and protein (PC) content for Alpine goat in Croatia. Data included 267,773 test-day records for 14,820 does recorded from 1998 to 2014. Pedigree file included 20,468 animals. Test-day records were modelled using multi-trait fixed regression repeatability test-day model. Fixed class effects in the model were: parity, litter size as a number of born lambs, year and month of kidding. Days in milk was treated as covariate. The effect was fitted using the Legendre polynomial of order 4 and nested within parity and number of lambs born. Direct additive genetic effect, flock-test-day, and permanent environment effect within lactations were included in the model as random effects. (Co)variance components were estimated using Residual Maximum Likelihood as implemented in the VCE-6 program. Heritability estimates were 0.33 ± 0.02 , 0.18 ± 0.01 , and 0.27 ± 0.01 , for DMY, FC, and PC, respectively. Genetic correlations were -0.26 ± 0.04 between DMY and FC, -0.27 ± 0.04 between DMY and PC, and 0.59 ± 0.04 between FC and PC. Random flock-test-day determined between 25% and 36% of phenotypic variance. Permanent environment effect obtained another 19% of phenotypic variation for DMY, while lower proportion (4% and 6%) was explained for FC and PC. Results indicate possibility of using multitrait test-day model for genetic evaluation of the Alpine goat instead of currently used single test-day model due to improved accuracy of evaluation by accounting genetic correlations among traits.