Genetic parameters for milk traits using fixed regression models for Pag sheep in Croatia

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Abstract

The objective of this study was to estimate genetic parameters for daily milk, fat and protein yields, and somatic cell score (SCS) using test-day records of the Pag sheep in Croatia. Data included 38,068 test-day yields for 4,449 ewes recorded from 2003 to 2010. Pedigree file included 5,260 animals. Test-day records were modelled using a single-trait fixed regression repeatability test-day model. Fixed class effects in the model were: parity, litter size as a number of born lambs, season of lambing, and flock. Days in milk and age at lambing were treated as covariates. For yield traits, the effect of days in milk was nested within parity and number of lambs born and fitted using the Ali-Schaeffer lactation curve. Given the seasonal production regime in this breed, linear regression nested within parity was sufficient to model the age at lambing. This effect was not included in the model for SCS, while the effect of days in milk was nested within parity. Direct additive genetic effect, flock-test-day, and permanent environment effect over lactations were included in the model as random effects. Variance components were estimated using Residual Maximum Likelihood as implemented in the VCE-6 program. Comparison was also done with Markov chain Monte Carlo and Integrated Laplace methods. The estimated standard deviations for daily milk, fat and protein yields (kg), and SCS were: 0.15, 0.01, 0.008, and 0.54 for additive genetic, 0.15, 0.008, 0.009, and 0.83 for flock-test-day, and 0.14, 0.01, 0.008, and 0.24 for permanent environment effect over lactations. Fitting permanent environment effect within lactations lead to the underestimation of additive genetic variance due to the small number of test-day records per lactation and shallow pedigree. Results indicate the possibility of using test-day records for genetic evaluation of the Pag sheep in Croatia.