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Czech Journal of Animal Science

Genetic and environmental parameters estimation for milk traits in Slovenian dairy sheep using random regression model

Komprej A., Malovrh Š., Gorjanc G., Kompan D., Kovač M.:

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(Co)variance components for daily milk yield, fat, and protein content in Slovenian dairy sheep were estimated with random regression model. Test-day records were collected by the ICAR A4 method.

Analysis was done for 58 985 test-day records of 3068 ewes in 36 flocks. Common flock environment, additive genetic effect, permanent environment effect over lactations, and permanent environment effect within lactation were included into the random part of the model and modelled with Legendre polynomials on the standardized time scale of days in lactation. Estimation of (co)variance components was done with REML. The eigenvalues of covariance functions for random regression coefficients were calculated to quantify the sufficient order of Legendre polynomial for the (co)variance component estimation of milk traits. The existing 13 to 24% of additive genetic variability for the individual lactation curve indicated that the use of random regression model is justified for selection on the level and shape of lactation curve in dairy sheep. Four eigenvalues sufficiently explained variability during lactation in all three milk traits. Heritability estimate for daily milk yield was the highest in mid lactation (0.17) and lower in the early (0.11) and late (0.08) lactation. In fat content, the heritability was increasing throughout lactation

(0.08–0.13). Values in protein content varied from the beginning toward mid lactation (0.15–0.19), while they rapidly increased at the end of lactation (0.28). Common flock environment explained the highest percentage of phenotypic variability: 27–41% in daily milk yield, 31–41% in fat content, and 41–49% in protein content. Variance ratios for the two permanent environment effects were the highest in daily milk yield (0.10–0.27), and lower in fat (0.04–0.08) and protein (0.01–0.10) contents. Additive genetic correlations during the selected test-days were high between the adjacent ones and they tended to decrease at the extremes of the lactation trajectory.

Keywords:

dairy ewes; test-day records; orthogonal Legendre polynomials; heritability; additive genetic correlations

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