

Heritabilities of and genetic correlations between the dairy traits in goats estimated in first vs later lactations

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Abstract :

The purpose of the study was to evaluate the multiple-trait model, as opposite to repeatability model approach, at an early stage of developing the breeding value estimation system for dairy goats in Poland. Milk, fat, and protein yields and fat and protein contents in first (4,443 records) and following parities (9,115 records of 5,244 goats) were analysed as two separate traits within a trait. Variance components were estimated with REML method. Classification of dairy traits in lactation I contained random effects of animal's additive genetic background, herd-sire interaction, and fixed effects of herd-year-season, breed, year of birth, litter size, and linear regression on days-in-milk. Traits recorded in later lactations were considered to be the same within a trait, yet of repeated measurements. Hence, statistical model additionally accounted for fixed effect of parity and random effect of permanent environment. Heritability of milk yield ranged from 0.214 to 0.247 in later lactations, and from 0.190 to 0.324 in lactation I depending on set of traits which were estimated simultaneously. For lactation I the h^2 for fat yield ranged from 0.208 to 0.224 and for later lactations from 0.204 to 0.216. Heritability for protein yield ranged from 0.130 to 0.208 for lactation I, and from 0.180 to 0.201 for later lactations. Heritabilities for fat content ranged from 0.278 to 0.318 in lactation I and from 0.214 to 0.243 in later lactations. Those for protein content were between 0.397 to 0.448 and 0.276 to 0.310 for lactation I and later lactations, respectively. Repeatability coefficients for all the dairy traits in the later lactations were between 0.247 to 0.355. Phenotypic correlations between lactations for each trait exceeded 0.50 while genetic correlations ranged from 0.880 to 0.996. Correlations between yields within lactation were high and positive while those between milk yield and milk constituents contents were moderate and negative. Presented correlations follow the general pattern found in other dairy goat as well as in dairy cattle populations. It is concluded that repeatability model should better suit Polish conditions.

Key Word :

correlations / dairy goats / heritability / multiple-trait model / single-trait mode

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