Usporedba modela sa fiksnom regresijom za svojstva mliječnosti HF krava u Hrvatskoj

Marija Špehar[1], Špela Malovrh[2], Vasco Cadavez[3], Zdenko Ivkić[1], Vesna Bulić[1], Milena Kovač[2]

[1]Hrvatski stočarski centar, Ilica 101, 10000 Zagreb, Hrvatska, (e-mail: govedarstvo@hssc.hr)
[2]Biotehniška fakulteta v Ljubljani, Groblje 3, 1230 Domžale, Slovenija
[3]Agrarian Superior School of Bragança, Polytechnic Institute of Bragança, Portugal

Sažetak

Cilj rada je bio usporediti tri modela sa fiksnom regresijom pri procjeni genetskih parametara za svojstva mliječnosti na kontroni dan, krava Holstein-Friesian (HF) pasmine u Hrvatskoj. U analizi su korišteni podaci 93412 dnevnih zapisa 11826 krava sa sedamnaest farmi. Uključujući pedigre ukupno je bilo 48562 životinje u analizi. Prosječna količina mlijeka na kontrolni dan je bila 24.7 kg sa standardnom devijacijom (SD) od 8.53 kg, prosječni sadržaj mliječne masti i proteina je iznosio 3.8 % (SD 0.97 %) i 3.3 % (SD 0.40 %). Korištena su tri modela sa fiksnom regresijom zbog usporedbe opisa stadija laktacije između Larry Schaeffer (LS) funkcije i Legendre polynomials reda 4 (LP4) i reda 5 (LP5). Komponente (ko)varijance su procjenjene koristeći REML metodu unutar VCE-5 programskog paketa. Statistički model jeuključivao slijedeće sistematske utjecaje: redni broj laktacije i interakciju između farme i sezone kontrole definirane kao godina-mjesec. Direktni genetski utjecaj životinje i utjecaj permanentnog okoliša predstavljao je slučajni dio modela. Za dnevnu količinu mlijeka, procjenjeni heritabiliteti su bili .21 ± 0.002, 0.17 ± 0.004 i 0.16 ± 0.004 za LP5, LP4 i LS. Procjenjeni heritabiliteti za sadržaj mliječne masti su bili 0.23 ± 0.002, 0.21 ± 0.002 i 0.23 ± 0.001 za LP4, LP5 i LS. Za sadržaj proteina, procjenjeni heritabiliteti su iznosili 0.25 ± 0.001, 0.23 ± 0.001 i 0.24 ± 0.002 za LP5, LP4 i LS. Dobiveni rezultati pokazuju da podatke najbolje opisuje model koji sadrži Legendre polynomials za opis stadija laktacije.

Ključne riječi: genetsko vrednovanje, govedo, heritabilitet, komponente (ko)varijance

Comparision of fixed regression models for estimation of genetic parameters for milk traits in Holstein-Friesian cattle in Croatia

Marija Špehar[1], Špela Malovrh[2], Vasco Cadavez[3], Zdenko Ivkić[1], Vesna Bulić[1], Milena Kovač[2]

[1]Croatian Livestock Centre, Ilica 101, 10000 Zagreb, Croatia, (e-mail: govedarstvo@hssc.hr)
[2]Biotechnical Faculty, University of Ljubljana, Groblje 3, 1230 Domžale, Slovenia
[3]Agrarian Superior School of Bragança, Polytechnic Institute of Bragança, Portugal

Abstract

The objective of this work was to compare three fixed regression models for estimation of genetic parameters of milk traits for test day records for Holstein-Friesian cattle in Croatia. Data consisted of 93412 test day records of 11826 cows from seventeen farms. Pedigree data included 48562 animals. The average daily milk yield was 24.7 kg with standard deviation (SD) of 8.53 kg and the average contents were 3.8 % (SD 0.97 %) for fat and 3.3 % (SD 0.40 %) for protein, respectively. Three fixed regression animal models were developed in order to compare Larry Schaeffer (LS) function with Legendre polynomials of order 4 (LP4) and 5 (LP5). The (co)variance components were estimated by REML as implemented in the VCE-5 program package. Statistical model was determined with parity and herd-year-month of production as fixed effects. Direct additive genetic effect and permanent environment were included in the model as random effects. For daily milk yield, the estimated heritabilities were 0.21 ± 0.002, 0.17 ± 0.004 and 0.16 ± 0.004 for LP5, LP4 and LS, respectively. The estimated heritabilities for fat content were 0.23 ± 0.002, 0.21 ± 0.002 and 0.23 ± 0.001 for LP4, LP5 and LS, respectively. For protein content the heritability estimates were 0.25 ± 0.001, 0.23 ± 0.001 and 0.24 ± 0.002 for LP5, LP4 and LS, respectively. The Legendre polynomials of order five best fitted the data.

Key words: cattle, covariance components, genetic evaluation, heritability