

Genetic analysis of somatic cell count of Iranian Holsteins

Abstract:

A total of 101147 monthly test day somatic cell counts were used to estimate genetic parameters as well as genetic trend using random and fixed test day models. The data belonged to 13977 Iranian Holsteins calving from 2002 to 2006 and distributed in 183 herds in three provinces (Tehran, Esfahan and Khorasan). Total number of sires, dams and animals in the pedigree were 871, 12882 and 27101 respectively. Somatic cell count was transformed to somatic cell score using a natural logarithmic. Random and fixed test day models were utilized in this study. In both models, fixed environmental factors of herd – year – season of production – province, stage of lactation, age of cow at recording (linear and quadratic covariates) and Holstein gene percentage (linear and quadratic covariates) were included. In the fixed test day model, random effects of additive genetic and permanent environment were also included. In the random test day model, orthogonal Legendre polynomials of order four was used for both additive genetic and permanent environmental effects. Furthermore, a constant residual error was fit for both test day models. Derivative free restricted maximum likelihood approach was applied to estimate genetic and environment variance and covariance components. DFREML along with DXMRR sub-programme was used in this study. The results obtained from the present research showed that the heritability of somatic cell score was generally lower than 10 percent over the course of the lactation indicating that there is a very low genetic variation for this trait in Iranian Holstein cattle to be improved by genetic selection. The lowest (0.030) and highest (0.068) heritability estimates were found at month 2 and 10 respectively. Additive genetic correlations among the monthly test days decreased as the interval between them increased. The results revealed that no statistically significant annual genetic trends were found for somatic cell score using fixed and random test day models.

Keywords: Genetic parameters, Somatic cell count, test day model .