University of Zabol
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**Dissertation for M.Sc Degree in
Genetic and Animal Science**

Estimation of Genetic Parameters for Test Day Records in Holstein Cows of Khorasan Razavi Whit a Random Regression Spline Model

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Abstract:

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In the current study, a total of 56978 monthly test day milk yield, fat and protein percent records from 8028 first lactation Holstein cows calving between 2004 and 2006 in Khorasan Razavi province were used. Estimation of variance components and heritabilities were obtained using animal model random regression test day model. Model fitting was carried out using Restricted Maximum Likelihood with WOMBAT. In the model age at calving and herd-year-month of recording were included as fixed effects. Additive genetic and permanent environmental random effects for the milk yield, fat and protein percent curves were taken to account by applying B-Spline and Legendre polynomials of order three in the model. There was no difference between B-Spline and Legendre polynomials in results.

The results showed that the lowest and the highest additive genetic variances for milk yield and protein percent were at the beginning and the ending of the lactation period, respectively. For fat percent this value was at 206-day and end of lactation period the lowest and highest respectively.

For milk yield and protein percent the heritabilities at 6 d in milk were 0.0968 and 0.066 which increased to the midlactation-maximum value of 0.28 and 0.18 and then a little decrease and finally an increase to the maximum value of 0.55 and 0.4 at the end of the lactation. Heritability for fat percent at the beginning of the lactation period was 0.0938 and had no considerable changes up to the end of lactation that reached to 0.193. On average milk yield, fat and protein percent heritabilities were 0.27, 0.11 and 0.179, respectively.

Genetic, permanent and phenotypic correlations among test days decreased as the interval between consecutive test days increased. For milk yield, correlations ranged from -0.5 to 0.99 for the genetic component. For fat and protein percent correlations ranged from -0.38 to 0.99 and -0.47 to 0.99, respectively.

Keywords: Genetic Parameter, Holstein Cow, Random Regression model, Spline