ESTIMATION OF GENETIC PARAMETERS FOR ELECTRICAL CONDUCTIVITY OF MILK FOR HOLSTEIN BREED USING RANDOM REGRESSION [1]

ESTIMATIVA DE PARÂMETROS GENÉTICOS PARA CONDUTIVIDADE ELÉTRICA DO LEITE PARA A RAÇA HOLANDESA UTILIZANDO REGRESSÃO ALEATÓRIA

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The electrical conductivity of milk is an indirect method of mastitis diagnosis and can be used as selection criterion in breeding programs to obtain resistant animals to infection. For the present study data from 9,302 milk electrical conductivity measurements in the morning (ECM), from 1,129 Holstein cows in first lactation, calving between 2001 and 2011, belonging to eight herds in the Southeast of Brazil, obtained from automated milking equipment WESTFALIA® with system management "Dairyplan" was utilized. Classes of ECM were formed at weekly intervals, representing a total of 42 classes. The model included direct additive genetic, permanent environmental and residual effects as random and the fixed effects of contemporary group (herd - year and season of the control), age at calving as a covariate (linear and quadratic). Mean trends were modeled by an orthogonal Legendre polynomial with three coefficients of days in milk. The residual variance was considered homogeneous throughout lactation. Variance components were estimated by restricted maximum likelihood method (REML), using the statistical package Wombat (Meyer, 2006). The mean and standard deviation of the electrical conductivity of milk were 4.799 ± 0.543 ms/cm. The heritability for ECM were increased from the beginning to the middle of lactation (154 days), when it reached the maximum value (0.44), decreasing thereafter and reaching its minimum value at 300 days (0.17). Genetic correlations between the ECM at different periods of lactation were high and positive across the course of lactation, ranging from 0.73 to 0.99. It was observed that the correlation estimates were considerably lower when compared to the ECM 300 days with those of other periods. The data suggest that significant gains can be obtained via selection when using the ECM as selection criterion aimed at resistance to mastitis. It was verified also, that the selection for this trait in the early period of lactation, to increase resistance to mastitis would be more efficient than in other periods Moreover, the heritabilities were higher in this period. The estimates of genetic correlations were high throughout lactation.

Key words: heritability, longitudinal data, mastitis, test-day model.