Genetic Parameters Estimation For Some Fertility Traits In Iranian Holstein Cows

H. Ghiasi, A. Nejati-Javaremi, A. Pakdel, H. Mehrabani-Yeganeh and M. Honarvar

Introduction

Profitability of dairy herd strongly depends on reproductive performance De Vries (2006). In past decades more attention on milk production in selection programs caused declines in female fertility; because antagonistic genetic relationship exists between milk production and fertility therefore including fertility traits in selection programs for improving or abate downward genetic trend in fertility is necessary liu et al. (2007). The objective of this study was to estimate genetic (co)variances between some female fertility traits using linear animal models.

Material and methods

Data and Traits. A total of 72124 fertility records in parities 1 to 6 on 27113 cows that collected from 1981 to 2007 in 15 herds were use to estimate genetic (co)variances between female reproductive traits. Fertility traits included: number of insemination per service (INS), calving interval (CI), days open (DO), interval between first and last insemination (IFL).

Table 1: Descriptive statistics for data used to estimate (co)variance components

Traits	No.of.records	Mean	SD	Maximum	minimum
INS	72124	2.13	1.39	9	1
CI	72124	393.85	62.70	600	300
DO	72124	117.67	63.60	330	30
IFL	72124	44.76	57.22	289	0

Statistical analyses. Heritabilities and genetic correlations of all traits were estimated by REML method using ASREML (Gilmour et al., 2002). For genetic parameter estimation bivariate analyses were used base on linear animal model. The pedigree file consisted of 32447 animals. The following statistical models were applied:

$$Y = HYS + PAC + MFI + PAR + A + PE + e$$

Where Y was the trait of interest, HYS was fixed of herd-year-season, PAC was fixed effect of age at previous calving, MFI was fixed effect of month of first insemination, PAR was fixed effect of parity, A was random additive genetic effect of animal, PE was random permanent effect and e was random residual term.

Results and discussion

Heritabilites for all traits and, phenotypic and genetic correlation among fertility traits are shown in table 2. Heritabilities for all fertility traits were low, ranging from 0.044 for IFL to 0.076 for DO. Heritabilities estimated for fertility traits were 0.046 for INS, 0.074 for CI, 0.044 for IFL. These estimates were in good agreement with result obtained by Gonzalez-Recio and Alenda (2005) and Gredler et al. (2007). Heritability obtain for interval traits (DO, CI, and IFL) were higher than obtained for categorical trait (INS). Genetic correlation of INS with IFL, DO, CI were higher than 0.69. High quality requires for recording INS but these interval traits easily can be recorded in milk recording scheme. So when INS is not available for genetic evaluation these correlated traits can be used. Higher genetic correlation between INS and IFL, DO and CI were reported by Gonzalez-Recio and Alenda (2005). High genetic correlation (>0.9) estimated between DO, IFL and CI. Indicating these traits measure same aspects of reproductive performance in cows so recording only one of them would be sufficient.

Table 2: Estimates of genetic parameters for fertility trats[α]

Traits	INS	CI	IFL	DO
INS	0.046 ±0.004	0.69 ±0.032	0.78 ±0.030	0.72 ±0.030
CI	0.70 ±0.002	0.074 ±0.005	0.92 ±0.018	0.99 ±0.002
IFL	0.79 ±0.001	0.80 ±0.001	0.044±0.004	0.94 ±0.013
DO	0.73 ±0.001	0.95 ±0.004	0.87 ±0.001	0.076 ±0.005

[α]Heritabilities (s.e.) on the diagonal, phenotypic and genetic correlations below and above the diagonal, respectively.

Conclusion

Different reproductive traits were studied in this study. Each of these traits is measured different aspect of reproductive performance, and Considerable genetic correlations were found between reproductive traits. So for giving better and faster improvement of reproductive performance it is necessary to use combination of these traits in terms of reproductive index.

References

De Vries, A. (2006). J. Dairy Sci. 89: 3876-3885.

Gilmour, A. R., B. J. Gogel, B. R. Cullis, S. J. Welham, and R. Thompson. (2002). ASReml User Guide Release 1.0. VSN

González-Recio, O. and R. Alenda . (2005). J. Dairy Sci. 88: 3282-3289.

Gredler, B., C. Fürst and J. Sölkner. (2007). Interbull Bull. 37:152-155.

Jorjani, H. (2007). Interbull Bull. 37: 148 -151. 134 -139.

Liu, Z., J. Jaitner, E. Pasman, S. Rensing, F. Reinhardt, and Reent. interbull Bull. 37:134 -139.