Estimates of Genetic Parameters for Non-return rate and open Days in Iranian Holsteins

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ABSTRACT

Present study was designed to estimate Genetic parameters for Non return-rate and open days in herds of Holstein in Iran. 72135 records of different parity that collected from 15 large dairy farms during 1981-2006 used for analyzing. Data were statistically analyzed by using SAS software and GLM procedure. Features like herd, year, season of birth and age of cattle when they give birth were the fixed effects considered in the model. Genetic parameters were obtained using the restricted maximum likelihood (REML) and ASREML software. Heritability values are 0.044 for Non return-rate and 0.0737 for open days.

Key words: Non return-rate, Open days, Holstein cattle.

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INTRODUCTION

In recent years, selection of dairy cows for Functional traits is one of the most important parts of Reform objectives. Conception of Functional traits of dairy cattle is production of milk with high efficiency, In other words, by increasing in field of production of milk, Production costs per cows in the herd would be reduced. Among the associated factors with Functional traits, Fertility problems can cause increase in production costs per cows [3].

One of the success factors of farmer is reproductive efficiency that Inefficiency in that case causes cost of farmer are increased. One of the most important difficulties of this part is infertility in early pregnancy. In terms of management, farmers try to have new born calves with higher productivity by comparison with previous generations. Farmers for meeting this target use

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high productivity mothers and sperms with the value of high correction in terms of production. So when pregnancy is lost, It's not losing a calf, but It's losing a Genetic composition that has existed through a specific corrective goal. Another consequence of pregnancy loss is reducing in Milk production. Given that production of milk and healthy calf are major sources of profits of farms, Failure in pregnancy will decrease these profits.

Part of these different that related to the productive traits has Genetic origin. This means that selection for these traits can be used[3].

Recent study was conducted for estimation of Genetic parameters of Non return-rate and open days as well as Genetic and phenotypic correlations between these traits.

MATERIALS AND METHODS

For Identifying effective factors on traits changes and Finally, extract the appropriate models for genetic evaluation GLM procedure in SAS9.1 software was used. In this study particular model was used for each group of traits.

1. Non return-rate trait:

$$Y_{ijkl} = \mu + HYS_i + S_j + A_k + e_{ijkl}$$

where:
Y_{ijkl} = Records relating to the Non return-rate
μ = Average effect
HYS_i = Fixed effect of herd-year-season
S_j = Fixed effect of age at calving as a classified variable
A_k = Effect of Additive genetic relating to effect of animal K m
e_{ijklm} = Residual effect

2. Open days trait:

$$Y_{ijkl} = \mu + HYS_i + S_j + A_k + e_{ijkl}$$

Where:
Y_{ijklm} = score of open days trait
HYS_i = Fixed effect of herd-year-season
S_j = Fixed effect of age at calving as a classified variable
A_k = Effect of Additive genetic relating to effect of animal K m
e_{ijklm} = Residual effect

In this investigation first, for estimating the genetic parameters associated with each trait, a separate analysis was performed on the data of each trait. Then, For calculating the correlation between traits because of limitations of computational, two trait models were used.

This analysis based on the most appropriate animal model of one-variable analysis and by using ASREML software was performed.

Table 1: Data Details

Traits	Average	Standard deviation	Minimum	Maximum	Record number
Non return-rate	0.744	0.002	0	1	32447
Open days	117.7	29.23	30	330	32447

RESULTS AND DISCUSSION

In this study heritability of Non return-rate trait was estimated 0.044, generally that is in the range of values for this attribute.

Heritability of non return-rate for 158 herds in Australia that was reported by Haile-Mariam & et. Al was 0.01[2]. Kadarmideen, H.N by using REML method and repeatable univariate and multivariate animal model, heritability of this trait, 0.06 reported[5]. Biffani & et. Al by using REML method and multivariable animal model, estimated reproductive traits and reported that the heritability of non return-rate for 56 and 90 days were 0.016 and 0.014 respectively[3]. Liu & et. Al by using REML method and heritability of non return-rate for heifers and cattle respectively 0.012 and 0.015 reported[6].

In recent study, heritability of open days trait, estimated 0.0737, generally that is in the range of values for this attribute but it is almost more than most studies.

Table 2: Genetic Variance(σ^2_g),Enviromental Variance(σ^2_e),Phenotypic Variance(σ^2_p),heritability(h^2)

Traits	Variance			
	σ^2_g	σ^2_e	σ^2_p	h^2(standard error)
Non-return rate	0.046	1.000	1.054	0.044 (0.010)
Open days	299.500	3578.000	4064.000	0.0737 (0.0057)

Abe et. Al by using Bayzyn method and univariable and multivariable animal model reported that heritability of open days in first and second births were 0.005 also Oseni et. Al reported heritability of open days for herds in different states of America was between 0.03 to 0.06[1,4]. Kadarmideen by using Multi-trait models repeatable reported that heritability of open days is 0.030 also González-Recio and Alenda by using animal method reported that heritability of this trait is 0.04[5,7].

Heritability of each trait in each community is unique to the community and Several factors may be effective on that. Generally, differences in estimating genetic parameters can cause by diversity of data, volume of data and Perform various editing, methods and models that are used. In addition, The number of animals examined, Level of livestock production, Pedigree's size and family relationships as intended, Can be factors that are involved in making a difference.

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One of the reasons for the low heritability of these two traits and related traits with Fertility is Environmental factors that influence these traits is large. Also management of various herds is different that has very important effect on the characteristics. Another factor that can influence low heritability of related traits with fertility is the role of Non-additive effects of genes on the incidence of these traits.

In recent study Genetic correlation of non return-rate and open days was estimated 0.55. This correlation was reported -0.21 by Van raden [8].

Table 3: Correlations (Standard Error)

Traits	Correlation		
	Genetic	Environmental	Phenotypic
Non-return rate and open days	0.5508 (0.066)	0.1223 (0.0017)	0.146 (0.0036)

CONCLUSION

Fertility is a complex set of traits related through genetic and environmental factors. The result of this studies similar to previous findings. Heritabilities of reproductive characteristics were low, which indicates large environmental or managemental influences on these traits.

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