PATH COEFFICIENT ANALYSIS OF FIRST LACTATION MILK YIELD IN FRIESWAL COWS OF ASSAM

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ABSTRACT

Records of 729 Frieswal cows of Assam were utilized for the present study. The correlations of the FLMY with AFC, FLL, FDP and FCI were partitioned into direct and indirect effects. The numerical values of the coefficients assigned to each of the path showed maximum direct effect of FLL (0.645) on FLMY followed by that of FCI (0.548). The direct effects of AFC and FDP were found to be low (0.034 and – 0.132 respectively). The FLL had maximum total effects (0.662) on FLMY followed by FCI (0.238).

The overall economic merit of an individual depends upon several traits. The relative importance of a particular trait for determining the aggregate genetic worth of the individual also differs. Therefore, it is important to assess the real nature of association existing between first lactation milk yield and some other traits. In the present study an attempt has been made to establish the causal association of factors affecting first lactation milk yield in Frieswal cows by

adopting path coefficient analysis method. The path coefficient analyses have been extensively used in plant breeding. However, its use for analysing quantitative data in animal breeding is very scanty.

First lactation milk yield (FLMY) record of 729 Frieswal cows maintained at the Military Farm, Basistha, Guwahati, Assam, covering a period from 1990 to 2009 were utilized to find out the direct and indirect effects of different components, viz age at first calving (AFC), first lactation length (FLL), first dry period (FDP) and first calving interval (FCI) on first lactation milk yield (FLMY). The data were adjusted for the effects of various genetic and non-genetic factors utilizing least-squares technique of fitting constants[2]. The correlation coefficients among the traits were estimated[1]. The path coefficients of direct and indirect effects were obtained[5]. The contribution of each independent factor was derived by determining the coefficient of determination which is square of the path coefficient value of corresponding factors[5].

The correlations of the FLMY with AFC, FLL, FDP and FCI were partitioned into direct and indirect effects and the numerical values are presented in the Table-1.

The direct effect of AFC towards FLMY was negligible. The indirect effects via FLL, FDP and FCI were also negligible. This suggests that both AFC and FLMY are independent and therefore the AFC is not an important factor for affecting FLMY. The result agreed with the observation of earlier workers[4].

Table-1: Direct (diagonal) and indirect effects of components influencing FLMY.

TRAITS	AFC	FLL	FDP	FCI	TOTAL EFFECTS
AFC	0.034	0.074	- 0.004	- 0.092	0.011
FLL	- 0.403	0.645	- 0.417	0.837	0.662
FDP	0.001	0.082	- 0.132	0.029	- 0.020
FCI	- 0.483	0.637	- 0.464	0.548	0.238
Residual effect	-	-	-	-	0.978

When the correlation between FLMY and FLL was partitioned, it was observed that the direct effect of FLL was high and positive and was almost equal to the correlation coefficient between the two traits. The indirect effect of FLL through AFC and FDP were negligible. The results suggested that improvement in FLMY could be made efficiently through FLL. Similar observation was also reported[4&3].

The direct effect of FDP towards FLMY was low and negative. All the indirect effects of this trait were also negligible. The direct effect of FCI towards FLMY was high and the indirect effects were negligible for AFC and FDP but high for FLL. The residual effect was also high.

The correlations of the FLMY with AFC, FLL, FDP and FCI were partitioned into direct and indirect effects. The numerical values of the coefficients assigned to each of the path showed maximum direct effect of FLL (0.645) on FLMY followed by that of FCI (0.548). The direct effect of AFC and FDP was found to be low (0.034 and – 0.132 respectively). The FLL had maximum total effects (0.662) on FLMY followed by FCI (0.238). The indirect effect was the highest for FLL through FCI (0.837), followed by FCI through FLL (0.637). Thus, the present findings suggested that improvement in FLMY could be made efficiently through FLL.

REFERENCES

1. Becker, W.A. 1984. Manual of quantitative genetics. 4th edn., Academic Enterprises, Washington State University, Washington.

2. Harvey, W. 1990. Guide for mixed model least-squares analysis of data and maximum likelihood computer programmes (PC-2version), Ohio State University, USA.

3. Laskar, S. and Roy, T.C. 2007. Path – coefficient analysis of first lactation milk yield in Jersey cows. *Indian Vet. J.*, **84**: 482-483.

4. Sharma, A.P.; Khan, F.H. and Jadhav, S.K. 1987. Genetic study of first lactation yield in Sahiwal cows. *Indian Vet. J.*, **64**: 770-774.

5. Singh, R.K. and Chaudhary, B.D. 2004. Biometrical methods in quantitative genetic analysis. Revised Edn. Kalyani Publishers, Ludhiana.

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