I J T A
© Serials Publications
National Academy of Agricultural Science (NAAS) Rating : 3.03

Studies on Repeatability of Production Traits in Holstein Friesian X Deoni Interse Crossbred Cattle

Thorat B. N.*, Chauhan D. S and Bhopale J. J.

ABSTRACT: *India has a pride possession of a large livestock wealth, both in terms of number as well as diversity. This is endeavored, with the complexity, to sustain under hard conditions with scares resources. Livestock production is more impressive than that of food grain production. The activity of livestock production is largely confined to the rural sector. In the present study systematic record in respect to LMY, PMY, DAPMY, LP and DP was taken from the pedigree sheets and daily milk yield record maintained at CCBP farm. In all records of 71 Holstein Friesian x Deoni interse crossbred dams with 185 lactations over a period of 16 years (1992 to 2007) were utilized for study. The data were classified in to the four period and season. For the statistical analysis of data the Statistical Analysis System (SAS, 2002) software programme is utilized. The repeatability of LMY in Holstein Friesian x Deoni Interse crossbred cows was observed as 0.39 ± 0.06 which was medium and PMY, LP and DP has low. The medium and low R values have indicated that higher amount of within individual variance.*

Key word: *DAPMY, DP, LMY, LP, PMY, Repeatability, Holstein Friesain X Deoni cattle*

INTRODUCTION

Indian climate confirms for the development of high yielding varieties and high yielding animals. Development of high yielding animals is a continuous process and it requires a good amount of patience. In the world, India possesses largest bovine population in 2013-2014 with the tune of 190.9 million cattle (NDDB statistics. com, 2012) and accounts a significant share of world's livestock resources with nearly 16.50% for cattle. Although India has large cattle population, the productivity per animal is low. The dairy breeds recognized all over the world for milk yield are Holstein Friesian, Jersey, Brown Swiss, Ayreshire and Gurnsey. In our country there are 37 breeds of cattle out of them Sahiwal, Red Sindhi and Gir are milch purpose breeds. These breeds in comparison with exotic milch purpose breeds produce meager quantities of milk. The reasons for low productivity of milk by indigenous cows are due to low genetic potentiality, unorganized breeding, inadequate nutrition and more incidence of disease. The total milk production of India during 2012-13 is 132.43 million metric tones and in Maharashtra milk production is 87.69 lakh metric tones. The India ranks first in the world for milk production and accounting for 17% of world production. The per capita availability of milk in India and Maharashtra is 312 gms per day and 223 gms per day. (NDDB statistics. com, 2012).

MATERIALS AND METHODS

Selection of Animals

Crossbreeding programme was initiated in 1972 and thereafter it was continued on farm. Deoni female formed the maternal line and the semen from proven Friesian bulls was used to produce F_1 generation. Further the programme was taken up to the second phase to take up interse mating between halfbred male and female on the farm. In addition to this induction of high potential germplasm from Friesian has also been taken up. However, the interse progeny was aimed at and they formed the material for investigation in this study.

The Sources and Collection of Data

Earlier the CCBP and ACDF farms use to maintain Deoni, Friesian x Deoni and Jersey x Deoni cattle. The data accumulated on production characters of Holstein Friesian x Deoni interse crossbred was considered in the present study. The information on

* Department of Animal Husbandry and Dairy Science, College of Agriculture, Parbhani (MS), India, *E-mail: badam.thorat2010@gmail.com*

characters namely LMY, PMY, DAPMY, LP and DP were taken from the pedigree sheets and daily milk yield record maintained at the farm. In all records of 71 Holstein Friesian x Deoni interse crossbred dams with 185 lactations over a period of 16 years (1992 to 2007) were included in the study.

Compilation of Data

The data accumulated on selected parameter namely LMY, PMY, DAPMY, LP and DP in respects of Holstein Friesian x Deoni interse crossbred cows during the period from 1992 to 2007 were compiled from the pedigree and daily milk yield record maintained at CCBP farm.

Classification of Data

The raw data collected on the characters under study were classified in suitable sub-class frequency and were subjected for correction. The data were classified in to,

1. Season
   - S_1- Cold Season (December to February) (33)
   - S_2- Hot Season (March to May) (46)
   - S_3- South West Monsoon Season (June to September) (80)
   - S_4- Post Monsoon Season (October to November) (26)
2. Period
   - P_1- (1992-1995) (42)
   - P_2- (1996-1999) (38)
   - P_3- (2000-2003) (61)
   - P_4- (2004-2007) (44)

Estimation of Repeatability

The estimation of R was done by the formula outlined by the following expression.

$$R = \frac{A - B}{A + B(\lambda - 1)}$$

Where,

A = Mean sum of squares of between animals.
B = Mean sum of squares of within animals.

$$\lambda = \frac{1}{m-1}\left(\Sigma_i n_1 - \frac{\Sigma_i n_1}{\Sigma_i n_1}\right)$$

Where,

m = Number of animals

n_1 = Number of records available for i^{th} animal.

$$SE\ of\ R = \sqrt{V(R)}$$

$$V(R) = \frac{\lambda}{2(\lambda - 1)(m - 2)}$$

$$R = \frac{1}{2}\log \quad \frac{1 + (\lambda - 1)R}{1 - R}$$

RESULTS AND DISCUSSION

Repeatability

Multiple measurements made on the same individuals in respect of a metric character are of special interest. The ratio between components to the total phenotypic variance is the repeatability. The R sets up the upper limit of heritability and guides in prediction of future performance. The estimates of R of the characters are presented in following Table 1.

Table 1
The repeatability estimates in Holstein Friesian x Deoni Interse crossbred Cows

Characters	*Mean ± SE*
LMY	0.39 ± 0.06
PMY	0.33 ± 0.06
DAPMY	0.30 ± 0.05
LP	0.30 ± 0.05
DP	0.34 ± 0.06

It was observed from Table 1 that the estimates of R for characters LMY, PMY, DAPMY, LP and DP in Holstein Friesian x Deoni Interse crossbred cows were 0.39 ± 0.06, 0.33 ± 0.06, 0.30 ± 0.05, 0.30 ± 0.05 and 0.34 ± 0.06 respectively.

Repeatability for LMY in Holstein Friesian x Deoni Interse Crossbred cows

The R of LMY in Holstein Friesian x Deoni Interse crossbred cows was observed as 0.39 ± 0.06 which was medium (Table 1). Medium R values have indicated that higher amount of within individual variance. Similarly Deshpande and Bonde (1975) reported R as 0.32 ± 0.02 in Deoni cows. Lohiya (1980) reported R as 0.36 ± 0.03 in Deoni cow. Thombre (1996) reported R for LMY as 0.32 ± 0.05 in Deoni cow. Higher R has been reported by different authors in indigenous breed. Latpate (1995) reported R for LMY as 0.43 in Red Kandhari cow. Salunke (2007) reported R for LMY as 0.34 ± 0.04 in Deoni cows. Reddy and Basu (1986) reported R as 0.57 ± 0.08 in Holstein Friesian x Sahiwal, Shelke *et al.* (1992) reported R as 0.43 in Jersey x Red Kandhari, Thombre (1996) reported R as 0.416

± 0.064 in Holstein Friesian x Deoni crossbred. These values were comparable to those observed in present study.

Repeatability for PMY in Holstein Friesian x Deoni Interse Crossbred Cows

It was observed from Table 1 that the estimates of R for PMY as 0.33 ± 0.06, which was low. Low R values have indicated that higher amount of within individual variance. Higher R reported by Latpate (1995) as 0.47 in Red Kandhari cow. Whereas, lower R was reported by Salunke (2007) as 0.30 ± 0.06 in Deoni cows.

Repeatability for LP in Holstein Friesian x Deoni Interse Crossbred Cows

R of LP in Holstein Friesian x Deoni interse crossbred was observed as 0.30 ± 0.05 which was low (Table 1). Low R values has indicated that higher amount of within individual variance. Lower R was reported by Latpate (1995) as 0.09 for LP in Red Kandhari cows and Salunke (2007) as 0.28 ± 0.05 in Deoni cows.

Repeatability for DP in Holstein Friesian x Deoni Interse Crossbred cows

The R of DP in Holstein Friesian x Deoni Interse crossbred was observed as 0.34 ± 0.06, which was low (Table 1). Low R values has indicated that higher amount of within individual variance. The low R values were reported in indigenous Red Kandhari cattle by Latpate (1995) as 0.15 and in Deoni cattle by Salunke (2007) as 0.29 ± 0.05.

CONCLUSIONS

The R for LMY, PMY, DAPMY, LP and DP in Holstein Friesian x Deoni interse crossbred were recorded as 0.39 ± 0.06, 0.33 ± 0.06, 0.30 ± 0.05, 0.30 ± 0.05 and 0.34 ± 0.06. The R estimates in respect of the characters in Holstein Friesian x Deoni interse crossbred were higher to that of the R estimates of characters in pure Deoni cows. The management factor had indirectly affected the DP and also it affects the LMY and LP though not to a significant level, its sensitivity remains unchanged. The period effect which is basically of non-genetic origin contributed to certain extent in the manifestation of the production and reproduction characteristics. Thus management is the major component while Holstein Friesian x Deoni interse crossbred genotype as major respondent. There is trend of lowering down the DP with non-significant influence by non-genetic factors thereby by positive scope for selection of individuals in early age.

REFERENCE

Deshpande, K. S. and Bonde, H. S. (1975), Average AFC and Breeding Efficiency in Deoni. College of Agriculture, Magazine, MAU, Parbhani XV: 132-135.

Latpate, N. S. (1995), Studies on Factors Affecting Production Efficiency of Red Kandhari Cows and Its Crosses. M.V.Sc. *thesis* submitted to Marathwada Agricultural University, Parbhani (M.S.) India.

Lohiya, M. L. (1980), Optimization of Production and Reproduction Traits in Deoni Cattle at ACDF Parbhani. M. Sc. Thesis Submitted to Marathwada Agricultural University, Parbhani (M.S.).

NDDB Statistics, (2012), Livestock Population in India. *www. nddb*. statistics. com

Reddy, C. O. and Basu, S. B. (1986), Genetic Parameters of Profit Function of First Lactation and Life time Traits in Crossbred Cattle. *Indian J. Anim. Sci.* **56** (11): 1156-1160.

Salunkhe, M. S. (2007), Productive and Reproductive Performance of Deoni Cattle. M.Sc. Thesis submitted to Marathwada Agriculture University, Parbhani (M. S.).

Shelke, B. S., Sakhare, P. G. and Deshpande, K. S. (1992), Breeding Efficiency and Milk Producing Ability of Red Khandhari and Jersey x Red Kandhari Halfbred Cows. *Indian J. Anim. Sci.* **62** (1): 79-80.

Thombre, B. M. (1996), Study on Genetic Architecture of Few Economic Characters in HF x Deoni Halfbreds. Ph. D. Thesis Marathwada Agriculture University, Parbhani (M. S.).