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Genetic Evaluation of HF X Gir Halfbreed Sirs on the Basis of First Calving Interval

Kankal S. V. and Deokar D. K.
Department of Animal Husbandry and Dairy Science
Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri
sachin.kankal123@gmail.com

Abstract: *The investigation entitled, "Genetic evaluation of HF x Gir halfbred sires on the basis of age of first calving" was undertaken at Research-cum-Development Project (RCDP) on Cattle, MPKV Rahuri. The data on first calving interval were collected from history sheet for the period from 1977 to 2011. The least square analysis was used to assess the influence of sire group, and season and period of birth. Corrected data were used for ranking of sires. The overall least squares mean of first calving interval was 426.29±9.23 days. observer in HF x Gir halfbred. Ranking of sires done according to the estimated breeding values by using first calving interval. In case of HF x Gir sire, the results revealed that sire 6HG-409, 5HG-451, HG-45, 7HG-464 these rank records high.*

I. INTRODUCTION

Livestock's have been playing on important role in Indian economy. Being an agriculture country India possess 1/5th world population of cattle and half of world buffalo. The cow and bullocks are backbone of agriculture and play major role in rural economy. Systematic evaluation of bull need complete recording of their daughters at least for first lactation. The complete records generally are not available due to economic constraints, transfer of animal, selling and death of the animal. Large expense involved in recording milk production data is also limiting factor in rural area. An economic milk production and best reproductive efficiency is an indication of having optimum calving interval. Longer calving interval lowers the lifetime milk production of animal. For economic milk production, the cow should calve regularly at an optimal interval. From reproductive performance point of view this is an important economic trait to animal breeder. A breeder will always welcome animal having shorter calving interval for better economic gain. Therefore, the objectives of this study is to estimate the breeding value of sire by Best Linear Unbiased Prediction (BLUP) procedure (Henderson 1973) and to find out product moment and rank correlation between estimates of breeding values based on first calving interval.

II. MATERIALS AND METHODS

The data for present study were collected from records maintained at RCDP on Cattle, MPKV, Rahuri, Dist-Ahmednagar. The data on first calving interval was recorded; Sire with less than five dauthers will not be included in this study. The data will be classified according to sire group, period of calving and season of calving. Genetic Evaluation of sire for first calving interval was estimated by BLUP procedure (Henderson 1973) using following model

$$Yijklm = \mu + P_i + S_j + G_k + H_{kl} + eijklm$$

Where,

Yijklm	=	Observation on mth progeny of 1th sire belonging to kth sire group born in and ith period and jth season of calving
μ	=	Overall mean.
Pi	=	Fixed effect of ith period calving.
Sj	=	Fixed effect of jth season of calving.
Gk	=	Fixed effect of kth sire group
Hkl	=	Random effect of lth sire within kth sire group
eijklm		Random error associated with mth progeny of kth sir

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Sire and residual variance components needed for BLUP were obtained from the data using Henderson method III (1953) using above model. The estimated breeding value (EBV) of sire for trait was taken as twice the sire group solution plus sire within sire group for that trait. The products moments and rank correlation among sire's EBV's of different traits was calculated according to Steel and Torrie (1980). All sires were ranked on the basis of EBV's for first calving interval traits.

III. Results and Discussion

The analysis of variance for first calving interval as affected by various non-genetic factors is depicted in Table1. While the least squares means for FCI are depicted in Table2. The overall least squares mean for first calving interval of HF x Gir halfbred obtained in present investigation was 426.29 ± 9.53 days. The present result resembled with Bhagat *et al.* (2006) in FG (443.93 + 9.99 days). The longer calving interval than obtained result were reported by Narula *et al*. (2005) in FH (450.73 ± 9.47 days). However, shorter calving interval was reported by Dahiya *et al*. (2003) in FH (432.42 + 8.19 days).

Source of variation	d.f.	MSS
Sires Group (SG)	4	30143.91*
Period of calving (PC)	4	24861.81
Season of calving (SC)	2	4702.42
Error	267	10751.76

Table 1: Analysis of variance for first calving interval (days) in HF x Gir halfbred

Effects	N	Mean	SE
Overall mean (ju)	278	426.29	9.53
Sires Group (SG)			
SG1	71	453.17[a]	23.85
SG2	54	405.80[b]	18.51
SG3	88	446.97[ab]	17.39
SG4	52	453.51[a]	24.64
SG5	13	371.99[c]	41.29
Period of calving (PC)			
P1	32	387.05	33.71
P2	64	422.82	25.23
P3	69	446.59	18.48
P4	73	409.43	17.96
P5	40	465.55	25.60
Season of calving (SC)			
S1	78	417.59	13.55
S2	90	429.79	13.99
S3	110	431.48	12.95

Table 2: Effect wise least squares means for first calving interval (days) in HF x Gir halfbred

A. Effect of Sires Group

The analysis of variance indicated that the sires group had significant (P<0.05) effect on FCI in HF x Gir hlfbred. DMRT revealed that the FCI of progeny of sires group 4 and 1 had significantly higher (453.51 ± 24.64 days) than rest of the sires groups. This might be due to the different genetic potential of various sires.

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B. Effect of Period of Calving

The analysis of variance revealed that period of calving had non significant effect on first calving interval in HF X Gir halfbreds. The non significant effect of period of calving on calving interval was supported by Bhoite et *al.* (1999), Deokar et *al.* (2005) in Gir crossbred cattle, Zol (2007) in Phule Triveni cows and Narula *et al.* (2005) in Hariana crossbreds. thought period of calving had non significant effect on first calving interval .

HF x Gir halfbreds calved during 2005-2011 had highest calving interval (465.55 ± 25.60 days) over the cows calved during 1977-1983 (387.05 ± 33.71 days), 1984-1990(422.82 ± 25.23 days), 1991-1997 (446.59 ± 18.48 days) and1998-2004 (409.43 ± 17.96 days).

C. Effect of Season of Calving

The influence of season of calving on first calving interval was non-significant in HF X Gir halfbreds. The significant results were reported by Reddy *et al.* (1987), Jadhav *et al.* (1992), Singh *et al.* (2002) and Jadhav (2009) in various crossbreds. The results revealed that the HF X Gir halfbred heifers calved during summer season (431.48 ± 12.95 days) had comparatively highest calving interval than halfbreds calved during winter (429.79 ± 13.99 days) and rainy season (417.59 ± 13.55days).

D. Breeding Values of Sires

In HF x Gir sires the result revealed that the breeding value of sire code No. 1 to 29 was ranked according to their mean value in Table3. However the sire No. 4HG-370, 4HG-329, HG-45, 7HG- 464 ranks first, second, third and fourth, respectively.

Sr. No.	Effects	N	Mean	SE	Rank
	Overall mean (μ)	278	434.19	7.9	
1	HG-214	7	433.19	39.52	15
2	HG-233	13	443.35	29.01	19
3	HG-242	3	404.11	60.37	8
4	HG-387	3	539.99	60.37	28
5	HG-599	35	447.05	17.93	20
6	2HG-191	8	403.99	36.97	7
7	3HG-183	14	451.91	27.94	22
8	3HG-217	40	447.79	16.53	21
9	3HG-272	10	455.19	33.07	23
10	3HG-321	5	420.80	46.76	12
11	4HG-285	4	465.49	52.28	25
12	4HG-297	16	432.36	26.14	14
13	4HG-321	3	431.74	60.37	13
14	4HG-322	17	419.63	25.36	11
15	4HG-329	5	466.55	46.76	26
16	4HG-370	3	438.99	60.37	18
17	4HG-377	7	547.62	39.52	29
18	5HG-412	6	500.01	42.69	27
19	5HG-451	5	374.11	46.76	2
20	6HG-409	3	359.16	60.37	1
21	7HG-369	11	437.32	31.53	17
22	7HG-464	4	381.85	52.28	4
23	HG-1	14	435.81	27.94	16

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24	HG-129	10	457.69	33.07	24
25	HG-15	5	415.81	46.76	9
26	HG-43	7	401.27	39.52	6
27	HG-45	6	376.43	42.69	3
28	HG-59	10	418.76	33.07	10
29	HG-6	4	383.46	52.26	5

Table 3: Sire wise least squares mean and ranking of sires for first calving interval

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