FIELD EVALUATION OF PRODUCTIVE PERFORMANCE OF GRADED AND CROSSBRED CATTLE IN CHHATTISGARH

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Abstract: The present study was undertaken to assess the performance of graded and crossbred cattle in Chhattisgarh. A total of 200 cows taking 50 cows from each group were analysed from three blocks i.e. Dhamtari and kurud block of Dhamtari district and Gurur block of Durg district. The animals were divided into four groups: (1) Holstein Friesian/Jersey × Local (Crossbred, (CB)); (2) Gir × Local (G × L); (3) Sahiwal × Local (Sw × L) and (4) Red Sindhi × Local (RS × L). The productive traits considered for the study include daily milk yield (DMY), total lactation milk yield (TLMY), peak yield (PY) and lactation length (LL). All the information was collected from farmer's interview. Result of this study revealed that all the productive traits showed comparatively higher values for CB cows than graded animals. In case of graded animals G × L and Sw × L showed better performance than RS × L. In case of other non-genetic factors parity and feeding system had significant effect whereas period of calving and season of calving had non-significant effect on all the productive traits under study. From the present investigation it may be concluded that, CB animal showed marginally superior over graded animals in terms of productive performance.

Keywords: Crossbred and graded cattle, Milk yield and Peak milk yield.

INTRODUCTION

Chhattisgarh region is full of livestock resources. Livestock sector play an important role in socio economic development and the national economy of the country. The contribution of this sector to the national economy in terms of Gross Domestic Product is 4.1% at current prices for livestock sector. India has the highest number of cattle (210.2 Million) and also the total Milk production was 146.3 million tonnes. The analysis shows nearly 24% and 21% production is contributed by Cow Exotic/Crossbred and Non-Descript respectively. The per capita availability of milk in country and state is 299 and 127gm/day respectively. As per the livestock census, 2012, C.G. has total cattle population 9.8 Million and total milk production 0.737 Million tonnes. Milk production by cross bred and indigenous cows is 0.086 and 0.65 million tonnes respectively (BAHS 2014). Earlier cattle breeding policy emphasized on cross

breeding with exotic cattle. Performance of crossbreds in field conditions is not encouraging and their population is decreasing gradually. Grading up of non-descript cattle is more suitable in field conditions in Chhattisgarh. In Chhattisgarh, places like Dhamtari, Mahasamund and Durg districts are some of those areas, where grading up with Sahiwal, Red Sindhi, Gir, Ongole, Hariana etc. was initiated. The current research was initiated with the objectives of assessing the productive performance and factors that influence performance of graded and CB cows owned by rural smallholder dairy farmers in Chhattisgarh.

MATERIAL AND METHODS

A total of 200 cows taking 50 cows from each group were analysed from three blocks i.e. Dhamtari and kurud block of Dhamtari district and Gurur block of Durg district of chhattisgarh**.** Field data recording collected from the state Government through hospitals, dispensaries, key village block, A.I. centers and A. I. sub centers and some data were taken through direct interviewing of farmers of selected areas.

Parameters studied-

The following economic traits were recorded on the basis of information provided by the animal owners as well as records from State Livestock Development Department:-

a)   **Daily milk yield and total lactation milk yield**- In this study, average daily milk yield information was taken by farmer questionnaire basis. Since farmers do not keep the records the total lactation milk yield was calculated by simply multiplying the average daily milk yield with lactation length as reported by the farmers.

b)   **Peak yield-** The above information was taken by farmer questionnaire basis.

c)   **Lactation length**- The above information was taken by farmer questionnaire basis.

Classification of data

1) Breed/Genetic Group-Four genetic groups of animals were taken for the study i.e. Holstein Friesian/Jersey × Local (CB); Gir × Local; Sahiwal × Local and Red Sindhi × Local. The level of exotic/improved indigenous was 50% and animals of F_1 generation were taken.

2) Period of calving –Calving year was divided into two periods i.e. period-I ranging from 2004-2008 and period II ranging from 2009-2011.

3) Season of calving-Year of calving was divided into three main seasons i.e. Summer (March – June), Rainy (July – October) and Winter (November – February)

4) Parity- Parity wise distribution of cows for each genetic group has been given in table 1.

Table 1: Frequency Distribution of Breed × Parity

Name of Grades	Parity-1	Parity-2	Parity-3	Parity-4	Total
Crossbred	14	17	12	7	50
Gir grade	19	11	10	10	50
Sahiwal grade	14	15	16	5	50
Red Sindhi grade	16	10	16	8	50
Total	**63**	**54**	**55**	**28**	**200**

5) Feeding System- Three type of feeding system were followed by farmers i.e. dry fodder (FS-1), dry fodder + concentrate (FS-2) and dry fodder + concentrate + green forage (FS-3)

Table 2: Frequency Distribution of Breed × Feeding System

Name of Grades	F. S. -1	F.S. -2	F. S. -3	Total
Crossbred	16	17	17	**50**
Gir grade	20	14	16	**50**
Sahiwal grade	20	12	18	**50**
Red Sindhi grade	18	20	12	**50**
Total	**74**	**63**	**63**	**200**

Statistical analysis of data- To study effect of genetic and non genetic factors, Analysis of Variance was carried out as per the method given by Snedecor and Cochran (1989) utilizing SPSS statistical programme. The following statistical model was utilized:

$$Y_{ijklmn} = \mu + G_i + P_j + F_k + X_l + S_m + e_{ijklmn}$$

Where,

$Y_{ijkmn} =$ n^{th} observation under the effect of ith genetic group, j^{th} parity, k^{th} feeding system, l^{th} period & m^{th} season

μ = Over all mean

G_i = Effect of ith genetic group

P_j = Effect of jth parity

F_k = Effect of kth feeding system

X_l = Effect of lth period of calving

S_m = Effect of mth season of calving

e_{ijklmn} = Random error $(0,\sigma^2 e)$

RESULTS AND DISCUSSION

Productive parameters included were daily milk yield, total lactation milk yield, peak yield and lactation length:-

1. Daily milk yield (DMY)

The overall daily milk yield in the present field study was found as 5.23 ± 0.24 liter/cow/day. The analysis of variance (ANOVA) showed that there was highly significant (P<0.01) effect of genetic group on daily milk yield. Among the different graded animals RS × L showed less production whereas Duncan Multiple Range Test (DMRT) analysis is showed that differences between Gir × L and Sw × L were non- significant. Crossbred cows showed significantly (P<0.05) higher production than graded animals. Parity and feeding system had highly significant effect on daily milk yield whereas season of calving and period of calving did not show any significant deviation. Miazi *et al.* (2007) and Rokonuzzaman *et al.* (2009) who found average daily milk yield in crossbred (HF/Jy × L) and Sw × L as 6.0 ± 1.0 and 4.9 ± 0.9 liter, respectively, under field condition in Bangladesh.

2 Total lactation milk yield

The average total lactation milk yield was found as 1250.50 ± 80.82 liter. Genetic group wise values were given in table 3 with highly significant (P<0.01) effect of genetic group. Result showed that higher production obtained from crossbred cows than graded animals. DMRT showed that RS × L cows produced significantly (P<0.05)lower production than G × L and Sw × L. Total lactation milk yield was affected significantly by parity and feeding system while season of calving and period of calving did not show any significant differences. TLMY reported by Hossain *et al.* (2011) in crossbred (Jy × L) cattle (1629 Kg) under field condition in Bangladesh. Period of calving and season of calving also showed non-significant effect which is in agreement with the findings of Dongre *et al.* (2011) whereas Laxmi *et al.* (2009) and Dongre *et al.* (2011) found significant effect of period of calving on milk yield.

3 Peak yield

In these present study average peak yield was found as 7.53 ± 0.38 liter. The peak yield for crossbred, G × L, Sw × L and RS × L were given in table 3 with highly significant effect (P<0.01) of genetic groups. DMRT analysis showed that crossbred cattle showed significantly higher peak yield than graded animals. Effect of parity and feeding system

showed significant effect on peak yield whereas season and period of calving did not show any significant effect on peak yield. Significant effect of genetic group on lactation length reported by Kabir and Islam (2009) and Hossain *et al.* (2011) in field condition. Bhadoria *et al.* (2002) and Laxmi *et al.* (2009) found that parity showed significant effect on peak yield under farm condition. Laxmi *et al.* (2009) also reported non- significant effect of period on peak yield in crossbred whereas significant effect of season and period was also reported by Bhadoria *et al.* (2002) in Gir herd and Sharma *et al.* (2010) in Sahiwal herd.

4. Lactation length

The overall average lactation length in the present study was found as 233.38 ± 3.63 days. Lactation length for crossbred, G × L, Sw × L and RS × L were given in table 3 with significant (P<0.01)differences among genetic groups. Parity and feeding system showed highly significant effect on lactation length whereas season and period of calving had not significant effect on lactation length. Similar to our investigation reported by Miazi *et al.* (2007) in Sw × L (234 days) by Kabir and Islam (2009) in HF × L (259 days). In contrast to our present findings Thakur and Singh (2000) found non significant effect of parity and significant effect of period in Jy × Sw cattle and Bharti *et al.* (1996) found significant effect of season of calving on lactation length in Jy × Sw under field conditions.

Table 3: Mean and Standard error of different productive traits

Effect	N	Daily Milk Yield (liter)	Total Lactation Milk Yield (liter)	Peak Yield (liter)	Lactation Length (days)
Overall Mean	**200**	**5.23±0.24**	**1250.50±80.82**	**7.53±0.38**	**233.38±3.63**
A. Genetic group:					
CB(**HF/J × L**)	50	6.06±0.27[a]	1516.6±82.60[a]	9.21±0.43[a]	245.7±3.57[a]
G × L	50	5.26±0.30[b]	1265.75±85.51[b]	6.91±0.37[b]	236.4±3.43[b]
Sw × L	50	5.11±0.23[b]	1194.28±102.71[b]	7.4±0.41[b]	228.1±3.61[bc]
RS × L	50	4.48±0.17[c]	1025.4±52.46[c]	6.61±0.22[b]	223.8±3.90[c]
B. Period of calving:					
P-1	63	5.01±0.20	1184.36±60.51	7.3±2.57	230.95±3.15
P-2	137	5.32±0.16	1280.92±49.07	7.53±2.86	234.67±2.36
C. Season of calving:					
Summer	59	5.52±0.27	1331.05±78.21	7.89±0.38	236.1±3.69

Rainy	54	5.26±0.26	1263.08±79.40	7.41±0.38	232.96±3.56
Winter	87	5.00±0.17	1188.07±51.52	7.35±0.28	232.06±2.83
D. Parity:					
Parity -1	63	4.16±0.14^c	929.58±37.33^b	5.94±0.20^c	221.11±3.08^c
Parity -2	54	5.28±0.24^b	1249.35±73.19^b	7.56±0.35$_b$	231.75±3.44^b
Parity -3	55	5.91±0.23^a	1471.22±74.77^a	8.56±0.37^a	244.45±3.18^a
Parity -4	28	4.6±0.07^a	1541.25±118.75^a	9.01±3.48^a	243.21±4.83^a
E. Feeding system:					
FS -1	74	4.31±0.15^c	961.64±42.52^c	9.69±0.33^c	219.52±2.64^c
FS -2	63	5.01±0.18^b	1195.63±54.08^b	7.06±0.27$_b$	234.2±3.22^b
FS -3	63	6.51±0.25^a	1664.68±75.44^a	6.09±1.90^a	249.2±3.00^a

a,b,c: Means with different superscript in the same column differ significantly (P<0.05)

CONCLUSION

The average DMY per cow as 5.23 ± 0.24 liters under field condition. Genetic group wise distribution, Parity and feeding system showed that CB cows had significantly higher daily milk yield than graded animals. The average TLMY estimated found as 1250.50 ± 80.82 liter. Genetic group, parity and feeding system showed highly significant effect on TLMY. The overall mean for PY was estimated as 7.53 ± 0.38 liter with highly significant effect of genetic groups, parity and feeding system. The overall lactation length (LL) was found as 233.38 days with highly significant effect of genetic group, parity and feeding system. Period of calving and season of calving did not show any significant effect on DMY, TLMY, PY and LL.

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