COMPARARTIVE PERFORMANCE OF *Bos indicus, Bos taurus* AND THEIR HALFBREDS IN TARAI REGION OF TROPICS

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SUMMARY

Analysis of data on first lactation of *Bos indicus, Bos taurus* and their halfbreds indicated that Holstein x Tharparkar halfbreds calved earliest in first and second calvings (825.32±85.43 and 1245.37±91.46 days, respectively). These halfbreds were best for 305 days first lactation milk yield (2960.75±241.87 kg); first dry period (99.09±29.19 days); milk yield per day of - first lactation length (9.58±0.71 kg), first calving interval (7.61±0.72 kg); age at second calving (2.38±0.26 kg); lactation efficiency (79.86±4.80 percent) and breeding efficiency (99.56±5.65 percent). Purebred Holstein cattle were on the second place with respect to almost all the traits considered for Holstein x Tharparkar halfbreds, except first dry period for which Hariana halfbreds with Jersey/Holstein were on the second place. Total first lactation milk yield and peak yield in first lactation were highest in Holstein cattle (3194.71±124.12 kg and 15.10±0.45 kg, respectively). Genetic group effect was highly significant ($P<0.01$) on all the traits. Season of calving influenced ($P<0.05$) age at first calving, only. Effect of period of calving was highly significant ($P<0.01$) on ages at first/second calving and breeding efficiency, whereas it significantly ($P<0.05$) affected first lactation 305 days milk yield and peak yield.

Keywords : *Bos taurus, Bos indicus*, Milk production, Reproduction, Tropics.

INTRODUCTION

All India Coordinated Research Project on Cattle established the superiority of halfbreds of Holstein cattle (with Hariana cattle) over halfbreds with other exotic breeds like Brown Swiss, Jersey etc. National Dairy Research Institute (NDRI), Karnal (India) had evolved Karan-Fries cattle by crossing Tharparkar/Sahiwal with Holstein cattle, which is well known for its high production potential. Therefore, in the present study an attempt has been made to evaluate and compare *Bos indicus, Bos taurus* and their halfbreds with various indigenous cattle on the basis of their production, reproduction and milk production efficiency traits.

MATERIALS AND METHODS

Data on first lactation records of 745 animals of 7 genetic groups of *Bos indicus, Bos taurus* and their halfbreds i.e. Holstein-Friesian, Sahiwal, Tharparkar, Holstein x Tharparkar, Holstein x Sahiwal, Holstein x Hariana, Jersey x Hariana, were used for estimating the least squares means (Harvey, 1990) for age at first calving (AFC), first lactation - total milk yield (TMY) and 305 days milk yield (305MY); first lactation length (LL), peak yield in first lactation (PY), first calving interval (CI), age at second calving (ASC), first dry period (DP), milk yield per day of - first lactation length (MYPL), first calving interval (MYPC), age and at second calving (MYPS); breeding efficiency (BE) and lactation efficiency (LE). The animals were

reared in or aroud the tarai region of Uttar Pradesh (India). Each year was divided into three seasons viz. rainy, winter and summer. Years of calving extended from 1970 to 1992 (22 years) and were grouped into five periods (P_1:1970-74, P_2:1975-79, P_3:1980-84, P_4:1985-89 and P_5:1990-92).

RESULTS AND DISCUSSION

Least Squres Means. Performance comparison of all the 7 genetic groups indicated that Holstein x Tharparkar (HF x Th) halfbreds were best with respect to almost all the reproductive traits viz. AFC (825.32±85.43 days), ASC (1245.37±91.46 days), DP

Table 1. Genetic Groupwise least squares means of the traits

Traits	Overall Means	Genetics Groupwise means						
		HF	Th	S	HFxS	HFxTh	HFxH	JxH
AFC (d)	1108.55	915.50	1261.04	1456.19	1127.97	825.32	1114.55	1059.28
	±20.08	±30.63	±53.59	±108.18	±50.28	±85.43	±33.70	±41.16
TMY (Kg)	2154.71	3194.71	1429.94	1526.80	2944.78	3097.44	1705.85	1183.43
	±0.33	±124.12	±213.65	±426.81	±204.61	±343.27	±134.57	±166.20
305MY(Kg)	2271.94	2876.37	1977.21	2294.01	2808.67	2960.75	1633.25	1353.29
	±56.71	±87.15	±151.05	±303.08	±143.42	±241.87	±95.16	±116.87
LL (d)	290.32	344.84	236.50	208.97	322.03	322.10	314.08	283.74
	±4.94	±8.46	±12.73	±22.74	±14.35	±21.95	±7.98	±11.05
PY (Kg)	11.23	15.10	9.14	8.73	13.98	12.27	10.82	8.56
	±0.28	±0.45	±0.76	±1.51	±0.74	±1.24	±0.48	±0.60
CI (d)	431.55	475.60	457.72	403.93	438.33	416.42	433.93	394.90
	±6.91	±12.00	±17.68	±30.83	±20.45	±30.86	±11.08	±15.62
ASC (d)	1538.38	1393.90	1720.06	1854.57	1563.18	1245.37	1541.79	1449.80
	±21.45	±32.92	±57.18	±114.88	±54.15	±91.46	±36.02	±44.16
DP (d)	143.06	138.08	220.43	192.54	121.94	99.09	114.70	114.68
	±6.59	±11.21	±16.99	±30.56	±19.00	±29.19	±10.65	±14.66
MYPL (Kg)	7.11	9.22	5.40	6.93	8.91	9.58	5.44	4.31
	±0.16	±0.26	±0.44	±0.87	±0.43	±0.71	±0.27	±0.34
MYPC (Kg)	5.09	6.98	3.11	4.01	6.71	7.61	4.07	3.17
	±0.16	±0.26	±0.44	±0.87	±0.43	±0.72	±0.27	±0.35
MYPS (Kg)	1.45	2.32	0.86	0.82	1.83	2.38	1.13	0.83
	±0.06	±0.09	±0.16	±0.33	±0.15	±0.26	±0.10	±0.12
LE (%)	69.06	75.38	52.74	53.67	64.25	79.86	74.48	73.17
	±1.07	±1.88	±2.72	±4.67	±3.20	±4.80	±1.70	±2.44
BE (%)	90.77	99.31	81.41	74.42	90.21	99.56	92.40	98.13
	±1.32	±2.03	±3.53	±7.09	±3.35	±5.65	±2.22	±2.73

(d) - days

(99.09±29.19 days) and BE (99.56±5.65 percent), except CI which was lowest in Jersey x Hariana (J x H) halfbreds (394.90±15.62 days). The Holsteins were best with respect to almost all the milk production traits like TMY (3194.71±124.12 kg), LL (344.84±8.46 days) and PY (15.10±0.45 kg), except 305MY which was highest in Holstein x Tharparkar (HF x Th) halfbreds (2960.75±241.87 kg). Regarding milk production efficiency traits HF x Th halfbreds were best and the values for MYPL, MYPC, MYPS and LE were 9.58±0.71 kg/day, 7.61±0.72 kg/day, 2.38±0.26 kg/day and 79.86±4.80 percent, respectively. The HF x S halfbreds were on the third place with respect to all the milk production/efficiency traits.

Table 2. Periodwise and seasonwise least squares means during different periods and seasons

Traits	Periodwise means					Seasonwise means		
	P_1	P_2	P_3	P_4	P_5	Rainy	Winter	Summer
AFC (d)	822.38 ±47.99	911.87 ±36.60	1192.66 ±33.44	1187.84 ±40.71	1427.99 ±49.54	1115.09 ±25.07	1125.53 ±22.12	1085.02 ±21.82
TMY (Kg)	2044.02 ±212.58	2297.19 ±159.86	2485.89 ±145.04	2053.23 ±178.97	1893.21 ±219.72	2080.93 ±105.13	2231.87 ±90.62	2151.33 ±89.10
305MY(Kg)	2179.73 ±144.10	2307.37 ±108.95	2510.73 ±99.10	2261.07 ±121.67	2100.77 ±148.87	2226.45 ±72.80	2325.44 ±63.34	2263.92 ±62.36
LL (d)	288.01 ±21.30	303.72 ±15.37	301.89 ±13.64	278.98 ±17.55	279.02 ±22.09	286.78 ±8.68	293.28 ±6.63	290.90 ±6.40
PY (Kg)	11.73 ±0.82	11.83 ±0.61	12.70 ±0.55	10.34 ±0.69	9.54 ±0.85	11.07 ±0.39	11.48 ±0.33	11.14 ±0.32
CI (d)	437.89 ±31.34	468.50 ±22.55	434.56 ±19.99	421.79 ±25.78	394.99 ±32.51	418.23 ±12.60	428.33 ±9.49	448.08 ±9.14
ASC (d)	1280.51 ±53.82	1400.31 ±40.76	1635.93 ±37.11	1580.60 ±45.48	1794.56 ±55.59	1531.68 ±27.38	1553.10 ±23.89	1530.36 ±23.53
DP (d)	155.16 ±27.92	165.46 ±20.16	142.03 ±17.90	140.91 ±23.01	111.76 ±28.95	137.12 ±11.43	142.05 ±8.76	150.03 ±8.46
MYPL (Kg)	6.70 ±0.48	7.31 ±0.35	7.90 ±0.32	7.05 ±0.40	6.62 ±0.49	6.91 ±0.22	7.30 ±0.19	7.13 ±0.18
MYPC (Kg)	4.78 ±0.50	5.29 ±0.37	5.95 ±0.33	4.79 ±0.41	4.65 ±0.51	5.09 ±0.23	5.24 ±0.19	4.95 ±0.19
MYPS (Kg)	1.56 ±0.14	1.68 ±0.11	1.63 ±0.10	1.31 ±0.12	1.09 ±0.15	1.42 ±0.07	1.49 ±0.06	1.45 ±0.06
LE (%)	68.29 ±5.01	67.58 ±3.60	72.28 ±3.19	66.96 ±4.12	70.19 ±5.20	70.39 ±1.99	69.80 ±1.49	66.99 ±1.43
BE (%)	98.00 ±3.36	98.00 ±2.54	87.84 ±2.31	88.07 ±2.84	82.00 ±3.47	90.85 ±1.70	90.02 ±1.48	91.39 ±1.45

Inspite of, better reproductive status of J x H halfbreds, their productive performance was inferior as compared to HF x H halfbreds. The Harina halfbreds with J and HF exotic cattle were poorest among all with respect to milk production/efficiency traits. It ultimately indicated that HF breed of cattle is better than Jersey cattle, to be crossed with indigenous Hariana cattle for getting an improvement in milk production/efficiency traits. All other genetic groups were having intermediate production performance (Table-1).

Effect of genetic and non-genetic factors. The effect of genetic group was highly significant ($P<0.01$) on all the traits considered. Similar significant effect of genetic group were reported by (Dalal *et al.*, 1990; Jadhav *et al.*, 1991 and Singh *et al.* 1993). The effect of season was found non-significant on almost all the traits, except AFC which showed its significant ($P<0.05$) effect. Summer calvers exhibited lowest AFC (1085.02±21.82 days), whereas winter calvers took maximum time for first calving (1125.53±22.12 days). It might be due to the availablility of different types of feeds/fodders to the animals in different seasons before their first calving, which in turn, influenced the AFC of the animals. Similar results were reported by various workers (Pyne *et al.*, 1989 and Singh *et al.* 1989). Highly significant effect of period ($P<0.01$) was observed on AFC, ASC & BE, which ultimately indicated that overall managemental conditions were different during different periods, atleast upto the age of first calving. This, in turn, affected the other two traits (ASC & BE), which were the functions of AFC. Significant effect of period ($P<0.05$) was observed on 305MY and PY. Period P_1 was best for AFC (822.38±47.99 days), ASC (1280.51±53.82 days) and BE (98.00±3.36 per cent), whereas P_3 was best for 305MY and PY, respectively. Period P_5 was poorest for all the traits considered (Table-2). Reports reviewed also confirmed the significant effect of period on AFC, lactation milk yield and peak yield (Singh *et al.* 1989 and Yadav *et al.* 1992).

REFERENCES

Dalal, D.S., Arora, K.C. and Rathi, S.S. (1990) *International J. Tropi. Agri.* **8**: 89-92.

Harvey, W.R. (1990).LSMLW computer programme, PC-2 version, Ohio State Univ., USA.

Jadhav, K.L., Tripathi, V.N., Taneja, V.K. and Kale, M.M. (1991) *Ind. J. Dairy Sci.* **44**(3):209-216.

Pyne, A.K., Dattagupta, R., Roy, S.P., Mitra, D.M. and Das, P.K. (1989) *Ind. Vety. J.* **66**(11):1084-1085.

Singh, R.V., Tewari, N., Singh, C.V. and Singh, Y.P. (1989) *Livestock Advisor,* **14**(12):13-18.

Singh, V.P., Singh, R.V. and Singh, C.V. (1993) *Ind. J. Dairy Sci.* **46**(1):5-8.

Yadav, A.S.,Rathi, S.S.,Dahiya, S.P. and Arora, D.N.(1992) *Ind. J. Dairy Sci.,* **45**(10):522-527