Pakistan
Journal of Biological Sciences

A Comparative Study on the Performance of Crossbred and Indigenous (Zebu) Cows Under the Small Holder Dairy Farming Condition in Gaibandha District

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Abstract: A comparative study on productive and reproductive performance of crossbred and indigenous cows under the small holder dairying condition was conducted in Gaibandha district of Bangladesh. A sample of 96 dairy cows were selected randomly; of which 49 were crossbred cows and the other 47 were indigenous dairy cows from 50 small dairy farms. The productive performance (milk yield and lactation period) of crossbred cows were significantly ($p < 0.01$) higher than the indigenous dairy cows. Post partum heat period, calving to first service and dry period of the indigenous cows were lower (but not significantly) than crossbred cows. But service per conception and calving interval of indigenous cows were significantly ($p < 0.01$) lower than the crossbred cows. The cost benefit ratio of raising crossbred and indigenous dairy cows were 1:1.13 and 1:1.02, respectively. Although, reproductive performance of crossbred cows were better than indigenous cows but considering the other traits it may be concluded that the raising of crossbred cows were more economic than the raising of indigenous dairy cows.

Key words: Indigenous, crossbred, performance

Introduction

There are 23.14 million cattle in Bangladesh. Most of them are indigenous (Zebu) type with few crossbreds along with some pure breeds such as Holstein-friesian, Sindhi, Sahiwal and Jersey. The majority of indigenous cattle in Bangladesh have lower fertility, lower milk production than any modem developed breed, but these indigenous cattle and their crosses are highly adopted to the harsh tropical environment, resistant to maximum diseases and thrive well in fluctuating nutrient supply (Khan and Ahmed, 1995). There are many commercial dairy farms in the country and the rural households produce maximum milk. The majority of the households have one or two cows, which are used for both dairy and draught purpose. Moreover, in the milk pocket areas particularly in Pabna, Slrajgonj, Manikgonj, Faridpur and Gaibandha districts dairy farming has been traditionally an important and major component of the farming system. The high demand for fresh milk made dairying profitable enterprise for small holder dairy farmers in the Gaibandha district areas to take it as a profession. Low-income groups of people in the rural level and urban areas have very much interested for small-scale dairying than other professions. The performances of crossbred and Indigenous cattle so far have been studied in scientific articles in our context are very few and sporadic.

Most of the general people think that the performance of crossbred cattle in better than indigenous, but particularly, the performance of crossbred cattle has been deteriorating in many instances. So, the present study was under taken to determine and compare to the performance of crossbred and indigenous dairy cows and to identify the problems of small holder dairying and to make recommendations for better performance of dairy cows.

Materials and Methods

Firstly, a questionnaire was developed to collect the data on productive and reproductive performance of crossbred and indigenous (Zebu) cows, cost and returns of raising dairy cows and also the problems associated with small holder dairying. Five than as of Gaibandha district namely Sadar, Polashbari, Saadullahpur, Gobindhagonj and Shaghata were selected for the study; considering the higher number of crossbred and indigenous cows were raised and such type of study was not conducted previously in these areas. Then small dairy farms from each thane were randomly surveyed and the data of 49 cross bred and 47 indigenous cows were collected. The collected data on productive and reproductive performance and also cost and returns of raising were analyzed in a completely randomized design following model described by Steel and Torrie (1980).

$$Y_{ii} = m + F_i + e_{ij}$$

Where,

Y_{ij} = Individual observation
m = General mean
F_i = Effect of breed (local and crossbred)
e_{ij} = Random error associated with Y_{ij}

Results and Discussion

Total 50 farms in the selected area of Gaibandha district were interviewed. The highest percentage of farmers was occupied with agriculture (40%) as their principle occupation. There were 94% mixed (crossbred + indigenous), 4% crossbred and 2% indigenous dairy farm in the study area. Although maximum cattle in Bangladesh are indigenous but in the study area, maximum cows were crossbred (7.79%) and 28.03% were indigenous cows. The results and discussion of productive and reproductive performance of crossbred and indigenous dairy cows and costs and returns of dairying are described below.

Milk yield: Average milk yield per day of crossbred and indigenous cows was 4.10 ± 1.57 and 2.28 ± 0.85 litter respectively . The average milk yield of crossbred cows was significantly higher ($p < 0.01$) than the indigenous cows (Table 1). Halim (1992) also found in another district (Dhaka), the average milk yield per day 3.09 and 1.30 liter from crossbred and local (indigenous) cows respectively. But, Miah (1998) found average milk yield of local cows was only 1.34 liter per day.

Lactation period: Table 1 shows that the average lactation period (days) of crossbred cows was significantly ($p < 0.01$)

Table 1: Productive and reproductive performance of crossbred and indigenous (Zebu) cows

Parameter	Crossbred cows	Indigenous cows	Level of significance
Average milk yield (liter/day)	4.10±1.57	2.28±0.51	**
Lactation period (days)	266.42±30.87	220.21±21.69	**
Service per conception	3.33±1.40	1.98±0.58	**
Post partum heat period (days)	109.59±26.87	103.83±18.54	NS
Calving to first service (days)	124.13±27.89	113.98±20.75	NS
Dry period (days)	97.17±29.11	141.38±21.61	**
Calving interval (days)	653.10±84.90	539.40±128.10	**
Age at first calving (days)	37.41±3.21	36.85±2.87	NS

Table 2: Total costs, returns and net profit in raising a crossbred and an indigenous cows

Item	Crossbred cows		Indigenous cows	
	Taka	Percentage	Taka	Percentage
A. Items of cost				
I. Feed cost	21855.60	83.10	14439.60	82.29
a) Roughage cost	9147.60	34.78	6519.60	37.15
b) Concentrate cost	12708.00	48.32	7920.00	45.14
ii. Labor cost	2113.44	8.04	1516.56	8.64
iii. Housing cost	1077.60	4.10	1048.00	5.97
iv. Treatment cost	1111.80	8.04	496.56	2.83
v. AI charge	142.56	0.54	46.68	0.27
Total cost	26301.00	100.00	17547.48	
B. Items of income				
I. Value of milk	25151.04	84.27	14347.56	80.13
ii. Value of calf	2773.44	9.29	2021.28	11.29
iii. Value of cowdung	1800.00	6.03	1440.00	8.04
Value of empty gunny bag	120.00	0.40	96.00	0.54
Gross income	29844.48	100.00	17904.84	100.00
C. Net Profit	3454.48		357.36	
D. Cost benefit ratio	1:1.13		1:1.02	

Table 3: Problem faced by the dairy farms owners and their opinion for the improvement of dairy enterprises

Item	Crossbred cows		Indigenous cows	
	No. of respondents	Percentage	No. of respondents	Percentage
A. Nature of problem				
i. Scarcity of feeds and fodder	49	100.00	47	100.00
ii. Lack of veterinary care and services	42	85.71	30	63.83
iii. Milk marketing	25	51.02	25	53.19
iv. Financial	35	71.43	35	74.47
v. Nan availability of hybrid bull	15	30.61	15	31.91
vi. Grazing problem	22	44.90	18	38.3
vii. Distance of AI center	9	18.37	10	21.28
viii. Non conception	35	71.43	20	42.55
ix. Lake of training and extension	12	24.94	12	25.53
x. Calves mortality	7	14.29	5	10.64
B. Opinion of farm owners				
I. Breed improvement	32	65.31	40	85.11
ii. Availability of balance ration	36	73.47	32	68.08
iii. Proper marketing	22	44.90	12	25.53
iv. Availability of loan	20	40.82	15	31.91
v. Proper managemal training	12	24.49	7	14.89
vi. Proper breeding facilities	18	36.73	13	27.66
vii. Availability of veterinary services	27	55.10	17	36.17
viii. Increasing awareness	5	10.20	4	8.51

higher (266.42 *30.87) than indigenous cows (220.21±21.69). Halim (1992) also observed higher lactation period in crossbred cows (259 d) than indigenous cows (288 d).

Service per conception: Service per conception is the important measurement of fertility of a cow or a farm. The average service per conception of crossbred and indigenous cows were 3.33±140 and 1.98±0.58 respectively (Table 1). Service per conception was significantly (p<0.01) higher in crossbred than indigenous cows. Majid *et al.* (1995) observed that service per conception 1.76 and 2.20 in local (indigenous) and 50% local×50% Friesian cows respectively. Post pertum heat period (PHP): The number of days calving to first heat of an animal is called post pertum heat period. The average PHP of crossberd and indigenous cows were 109.59±18.54 days respectively (Table 1). This result did not differ significant (p<0.05). Majid *et al.* (1995) found longest post pettum heat period 223.5 days in 25% local×75% Friesian and lowest 117 days in 50% local×50% Friesian. Miah (1998) observed PHP 104 days in indigenous local cows.

Calving to first service: The average calving to first service of crossbred and indigenous cows were 124.13±27.89 and 113.98±20.75 days respectively, which did not differ significantly (Table 1). Tesfu Kass (1990) observed the calving to conception of indigenous (Zebu) cows was 199.80±61.80 and 157.80±61.80 days in crossbred cows.

Dry period: Table 1 shows the days from end of the lactation upto next calving (dry period) of crossbred and indigenous cows. Significantly (p<0.01) higher dry period observed in indigenous cows than the crossbred cows.

Calving interval: Calving interval is the most important indicator of the reproductive performance of a dairy cows. The average calving interval of crossbred and indigenous cows were 653.10±84.90 and 539.40 t 128.10 days, respectively. Calving interval of crossbred cows was significantly (p<0.01) higher than the indigenous cows (Table 1). But, the results contradict with Ghose *et al.* (1977), they found calving interval (days) 524, 457 and 485 in local (indigenous), Sindhi×local and Sahiwal×local cows respectively.

Age at first calving: Age at first calving of crossbred and indigenous cows were 37.41±3.21 and 36.85±2.87 months respectively. Statistically there was no difference in age at first calving between crossbred and indigenous cows (Table 1). Singh and Desai (1961) obtained that the average age at first calving for 417 cows were 46.71 months.

Costs and returns of raising dairy cows: The items of costs included in this study were feed, labor, housing veterinary services and artificial insemination (AI) charge. On the return side, value of milk, calf, cowdung and empty gunny bag. The total costs, gross returns and net returns in raising crossbred and indigenous cows were presented in Table 2. From the field survey total number of 49 crossbred and 47 indigenous dairy cows owners were mentioned that for crossbred cows raising profitable 81.63% while the indigenous dairy cows raising profitable 42.55% while in case of crossbred and indigenous dairy cows were non profitable 18.37 and 57.45% respectively.

Problem faced by the dairy farms owners and their opinion for the improvement of dairy enterprises: The problems of raising dairy cows and possible solutions were presented in Table 3 as identified by the respondents. Total respondents of crossbred and indigenous dairy cows were 49 and 47 respectively. It is shown that the average service per conception and calving interval of indigenous cows was better than the crossbred cows, but other performance was better in crossbred cows than indigenous cows. The cost benefit ratio for crossbred and indigenous cows was 1:1.13 and 1:1.02 respectively. So, from the above results and discussions it may be recommended that the raising of crossbred cows a viable and profitable than the indigenous cows.

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