Productive and reproductive performance of crossbred and indigenous Dairy cows under rural conditions in Comilla, Bangladesh

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Abstract : A comparative account of the productive and reproductive performance of crossbred and indigenous dairy cows at some selected areas of Comilla district. The survey was conducted on 50 dairy cows for a period of four months from June to September, 2004. Out of 50 cows 25 were crossbred and 25 were indigenous. Results showed that the average daily milk production of Local, Shahiwal x Local, Friesian x Local and Jersey x Local dairy cows was 2.26±0.19, 4.9±0.95, 6.0±1.0 and 5.71±0.87 liter respectively. The average age of calving interval and lactation length of the crossbred and indigenous cows did not differ significantly (P>0.05). However, the average age at puberty of Shahiwal x Local, Friesian x Local and Jersey x Local was significantly (P<0.01) lower than the local breed. The crossbred cows had significantly (P<0.01) lower pubertal age than local. The postpartum heat period and service per conception of different crossbred and local cows did not differ significantly (P>0.05). The average gestation length of Local, Shahiwal x Local, Friesian x Local and Jersey x Local was 289.88±1.44, 285.0±0.0, 285.0±4.18, and 282.08±2.42 days respectively. The productive and reproductive performance of Friesian x Local cows was superior to the rest of the breeds under study.

Key words: Dairy cows, indigenous, crossbred, production, reproduction and performance

Introduction

Livestock plays an important role in the subsistence agro-based economy of Bangladesh. Nearly, 85 percent of the populations are engaged in agriculture and livestock sector (Raha, 2000). The magnitude of contribution of the livestock sub-sector to the GDP is 6.5 percent. It generates 13 percent of the total foreign exchange earning and provides fulltime employment to about 20 percent of the rural population (BOS, 2004). This sector also partially meets the demands of animal protein in the form of meat, milk and milk products.

The domestic production and imports of milk and milk products are not sufficient to meet the standard requirement of people. The daily per capita availability and requirement of milk are estimated at about 34.86 and 250 ml respectively in order to fulfill the normal requirement of people. The cattle of Bangladesh are mostly of indigenous types (*Bos indicus*) with few cross-breds along with some purebreds such as Sahiwal, Holstein etc. The number of crossbred cattle is increasing day by day with the spread of artificial insemination (AI) practices throughout the country. The milk production of indigenous cattle is low compared to improved breeds of cattle (Rahman *et al.*, 1998). The number of milking cows in Bangladesh is 3.75 million, which is 35 percent of all cattle population of Bangladesh. Of the total milking cows, only 1.90 percent was reported to be crossbred and also stated that a milking cow in Bangladesh yields only 137 liters per lactation (BBS, 1996). Although, milk production of indigenous cows are not up to the mark, but we cannot ignore them because they possess some unique characteristics, for example they have more disease resistance capacity, survive well in threaten level of nutrition and well adjusted with hot and humid climatic conditions. The better performance with regard to the reproductive and productive efficiency of the heifers and cows included age at first service and calving, parturition to the service, calving interval, gestation length, daily and total milk yield, and age and body weight of cows influence the onset of estrus and the subsequent fertility after calving (Khan *et al.*, 1998). The productive performances of the crossbred cows may differ from that of the indigenous ones living in different geographical areas where harsh environmental condition exists (Alam *et al.*, 2001). With this end in view the study was undertaken with the following objectives: (a) to evaluate the productive performance of crossbred and indigenous cows and (b) to compare the reproductive performance of crossbred and indigenous cows at farmers level in rural conditions.

Materials and Methods

Study area and duration: The survey was conducted on 50 dairy cows for a period of four months from June 10 to September 09, 2004 at some selected areas of Comilla district. The areas where found available cross breed near to the artificial insemination(AI) center and point were selected .

Animal Selection: The dairy cows had been selected on the basis of milking period was on going. The cows were in same lactation condition also near to same age.

Preparation of Questionnaire: The questionnaire was developed in accordance with objectives of the study. It was designed in a simple manner to get accurate

information from the dairy cow owners. The questionnaire contained following information.

   i) General identification and information of the selected dairy cow owners.
    a) Name of the owner
    b) Location of the owner
    c) Reared breed
    d) General management system
    e) Supporting or target job
   ii) Productive and reproductive parameters of indigenous and cross bred cows such as-
    a) Age at puberty (month)
    b) Age at first calving (month)
    c) Length of calving interval (month)
    d) Post partum heat period (days)
    e) Length of gestation period (days)
    f) Length of lactation (days)
    g) Milk yield (lit/day)
    h) Service per conception (Number)

Method of data collection: The data were collected directly from farmer of some selected area of Comilla district. The farmers under the study areas were maintained the general rural managemental system. They supported their dairy cow with a shed and scatteredly supplied some roughage and concentrate feeds. The local cows are most common tan tat of cross bred cows. Under cross bred cows, more common is Sahiwal x Local and Friesian x Local, and less frequent is Jersy x Local. So on the availability of the breeds I had selected Local (25), Sahiwal x Local (10), Friesian x Local (10) and Jersy x Local (5) for the data collections. Data were collected from the farmers of selected areas by using the questionnaire.

Statistical analysis: The collected data was compiled, tabulated and analyzed in accordance with the objectives of the study. The data were subjected to statistical analysis using completely randomized design to compute analysis of variance and means of each variance with standard error (SE) according to Steel & Torrie (1980). For meaningful comparison, least significant difference (LSD) test were performed with SPSS (7.5 verson).

Results and Discussion

Age at puberty: Age at puberty of the indigenous cows was comparatively higher than crossbred cows (Table 1). The differences between crossbred and indigenous cows were significant (P<0.01). The age at puberty of Local, Shahiwal x Local and Holstein x Local and Jersey x Local was 25.92 ±1.08, 18.0 ±00, 21.6 ±2.40 and 20.44 ±1.60 month respectively. These findings are in agreement with Morrow (1986) who found the age at puberty ranging from 1.4 months to over 2 years. In case of indigenous cows the age at puberty was not

similar with other experiments because Rahman *et al*., (1998) conducted an experiment and found age at puberty to be 35 ±5.2 months. Sahiwal x Local had the lowest age at puberty (18.0±0.00). In contrast Rahman *et al.,* (1993) found that the age at puberty of Friesian x Local cows was 19±2.3 months.

The pubertal age of Jersey x Local and Friesian x Local did not coincide with the findings of Rahman *et al.,* (1987) who observed the values to be 31 month 27 days and 34 month 27 days respectively. This variation occurs due to numerous genetic (sex and breed) and environmental (nutritional status, social interactions, temperature and photoperiod) factors.

Age at first calving: Age at first calving of crossbred and indigenous cows were 31.16±1.26 and 37.60±1.3 months respectively (Table 1) and it was significant (P<0.01). This result was supported by Hafez (1987) who found age at first calving ranging from 24 to 36 months. However, in case of indigenous cows the result was not similar because Amble *et al.* (1958) and Majid *et al.* (1993) found 49.5 months and 1269.29±42.01 days respectively. In present study, the average age of first calving between Friesian x Local and Sahiwal x Local was 32.6±2.32 and 28.0±00 months respectively. This was not similar with Asaduzzaman & Miah (2004) who found that the age at first calving of Friesian x Local and Sahiwal x Local was 36.3±3.08 and 37.3±3.01 months respectively. In this experiment, the average age at first calving was higher for indigenous dairy cows (37.60±1.3 months) and lower for the Sahiwal x Local (28.0±0 month) and the average age at first calving between crossbred and indigenous dairy cows differed significantly (P<0.01). It was also observed that the intensive management practices reduced the age at first calving (Sarder *et al.,* 2001)

Calving interval: The calving interval of Local, Sahiwal x Local, Friesian x Local and Jersey x Local was 15.4±0.75, 15.0±3.0, 14.2±0.49 and 14.08±0.62 month respectively (Table 2).

These results coincides the findings of Asaduzzaman & Miah (2004) who observed that the calving interval of indigenous, Sahiwal x Local and Holstein x Local were 422.4±49.53, 417.0±34.38 and 393.8±33.64 days respectively. However, these results contradict the findings of Mondal (1998) who found that the mean calving interval of Jersey cross, Sahiwal cross and Holstein Friesian cross cows was 501.4±86.41, 444.9±94.93 and 414.21±45.14 days respectively at Bangladesh Agricultural University (BAU) Dairy Farm. Calving interval was highest for Local cows (15.4±075 months) and lowest for Jersey x Local (14.08±0.62 months). It was also observed that three was no significant difference (P>0.05) between the calving interval of different crossbred and indigenous dairy cows.

Service per conception: Service per conception for local and crossbred was 1.32±0.13 and 1.37 ± 0.11 respectively (Table 2) Statistical analysis showed that there were no significant differences (P>0.05) in the service per conception of different genetic groups of cows. These results are nearly in agreement with Rahman *et al. (*1998) who reported that service per conception was 1.30 and 1.70 for crossbred respectively. In Table 1 service per conception for Local, Sahiwal x Local, Friesian x Local and Jersey x Local is 1.32±0.13, 1.50±0.50, 1.60±0.24 and 1.25±0.13 respectively. But in case of Friesian x Local this is contradict with Asaduzzaman & Miah (2004) who reported that service per conception for Local, Sahiwal x Local was 1.5±0.6 and 1.7±0.7 respectively.

Table 1. Productive and reproductive performance of the dairy cows from Comilla District

Parameters	Crossbred (n=25) (Mean ±SE)	Local (n=25) (Mean ±SE)	F Value	Level of Significance
Age at puberty(month)	20.42±1.17	25.92±1.08	11.774	**
Age at first calving (month)	31.16±1.26	37.60±1.13	14.446	**
Calving interval(month)	14.21±0.47	15.40±0.75	1.568	NS
Service per conception(number)	1.37±0.11	1.32±0.13	0.077	NS
Gestation length (days)	283.98±1.24	289.88±1.44	8.540	NS
Milk Yield (lit/day)	5.53±0.60	2.26±0.19	33.494	**
Lactation length (days)	246.05±6.67	235.40±6.95	1.165	NS
Post partum heat period (days)	92.37±5.84	102.0±8.77	0.728	NS

** Means in a row differ (P<0.01), NS=Non-significant

Table 2. Breedwise productive and reproductive performance of the dairy cows under study

Parameters	Local(n=25) (Mean ±SE)	Sahiwal x Local(n=10) (Mean ±SE)	Friesian x Local(n=10) (Mean±SE)	Jersey x Local(n=5) (Mean±SE)	F Value	Level of Sig.
Age at puberty (months)	25.92[a]±1.08	18.0[b]±0.00	21.6[b]±2.40	20.33[b]±1.60	4.02	**
Age at first calving (months)	37.6[a]±1.13	28.0[b]±0.0	32.6±2.32	31.08[b]±1.75	5.02	**
Calving interval (months)	15.4±0.75	15.3±3.0	14.2±0.49	14.08±0.62	0.55	NS
Service per conception(n)	1.32±0.13	1.5±0.50	1.60±0.24	1.25±0.13	0.49	NS
Gestation length (days)	289.88[a]±1.44	285.0±0.0	285.0±4.18	282.08[b]±2.42	2.97	NS
Milk Yield (lit/day)	2.26[a]±0.19	4.9[b]±0.95	6.0[b]±1.0	5.71[b]±0.87	11.11	**
Lactation length(days)	235.40±6.95	234.0±24.0	270.0±0.0	274.0±3.72	0.98	NS
Post partum heat period (days)	102.0±8.77	95.0±25.0	90.0±13.42	92.92±7.16	0.24	NS

* Means in a row differ (p<0.05), NS=Non-significant, Sig. =Significance

Gestation length: The average gestation length of indigenous and crossbred cows was 289.88±1.44 and 283.98±1.24 days respectively (Table 1). This result partially supports the observation of Rahman *et al.* (1998) who reported that the average gestation length for indigenous and crossbred were 287.79±8.0 and 285.40±6.18 days respectively. They also reported that there was no significant difference (P>0.05) between the gestation length of two types of milking cows and gestation length at different calving interval were also analyzed and found that different calving interval had no significant effect on gestation length. In Table 1, the gestation length for Sahiwal x Local, Friesian x Local was 285.0±0.0 and 285.0±4.8 days respectively. These results are partially in agreed with Asaduzzaman & Miah (2004) who observed that the gestation length for Sahiwal x Local and Friesian x Local were 281.1±4.63 and 282.7± 8.41 days respectively. Rahman *et al., (*1993) also observed the average gestation length for Local x Sahiwal, Local x Friesian and Local x Jersey cows to be 281±3.4, 289±8.1 and 289±8.1 days respectively.

Milk Yield: The average milk yield of Local, Sahiwal x Local, Friesian x Local and Jersey x Local was 2.26±0.19, 4.9±0.95, 6.0± 1.06 and 5.71± 0.87(l/d) respectively. It was observed that crossbreeding had a significant effect (P<0.01) on milk yield. Among different cows, highest milk production was recorded in case of Friesian x Local cross (6.0 ±1.0 litres) and lowest milk yield was recorded (2.26±0.19 litres) in Local cows. These results are in agreement with findings of Islam (1999) who found that the average milk yield of the Local, Sahiwal x Local, Friesian x Local cows was 2.1±0.69, 4.7±1.01 and 6.2±3.16 litres/day respectively.

Lactation Length: The average lactation length of Local, Sahiwal x Local, Friesian x Local and Jersey x Local was 235.40±6.95, 270, 234.0±24.0, 274.0±3.72 days respectively (Table 2). It was observed that genotype had no significant (P>0.05) effect on lactation length. Lactation length was highest for Jersy

x Local (270.00±0.00 days) and lowest for Friesian x Local (234.0±24.0 days). On the other hand, Asaduzzaman & Miah (2004) found that lactation length was highest for Friesian x Local cows (263±34.03 days) and lowest for the indigenous cows (252.5±68.2 days). This finding of lactation length of the present study was partially in agreement with the finding of Islam (1999) who found that average lactation length of Local, Local x Sahiwal, Friesian x Local dairy cows were 230.6±30.68, 256.3±24.37 and 263.0±30.68 days respectively.

Post partum heat period: The average post partum heat period of Local, Sahiwal x Local, Friesian x Local and Jersey x Local was 102±8.7, 95.0±25.0, 90.0±13.42 and 92.92 ±7.16 days respectively (Table 2). These results support the findings of other author who found that the average post partum heat period of Local, Sahiwal x Local and Friesian x Local was 108.46± 36.32, 97.63±36.03 and 98.75±40.58 days respectively. In this study the post partum heat period of Local cows was (102±8.7) days which was higher than the crossbred cows (92.37± 5.84 days) and the difference between them was significant (P>0.05). These results are partially similar with Majid *et al.,* (1993) who observed that average post partum heat period for Local and Friesian x Local were 120.04±7.84 and 117.24±7.29 days, respectively.

Acknowledgments

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