

Comparative study on performances between Madaripur type and local cattle in Madaripur district under common management system

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ABSTRACT

The study was conducted to find out the performances under common management system of Madaripur type and local cattle of different areas in Madaripur district. Data was collected on cattle by randomly selected of 75 each of Madaripur type and local cattle owners of four Upazilas at Madaripur district in Bangladesh. The average birth weight of the calves from Madaripur type observed 17.31 ± 3.31 kg was significantly ($p < 0.01$) heavier than that of 14.58 ± 2.91 kg observed from local cattle. The average daily milk yield of Madaripur type was found to be 4.24 ± 1.74 litters was tremendously ($p < 0.01$) higher than the local cattle was 1.5 ± 2.94 liters, and meanwhile the lactation yield for Madaripur type obtained 472.32 ± 16.24 litters was larger ($p < 0.01$) to 174.37 ± 6.52 litters for local cattle. Relatively, early sexual maturity at 31.5 ± 3.87 months observed for Madaripur type was higher ($p < 0.05$) than that observed 37.3 ± 3.50 months for local. Moreover, Madaripur type cattle relatively faster at first calving and gave birth at 48.0 ± 1.50 months of age was lower than local cattle gave birth at 52.0 ± 2.55 months of age i.e age at first calving of local cattle was significantly ($p < 0.01$) higher than Madaripur type. Post-partum heat period (days) and service per conception (in number) was found to be 53.04 ± 5.51 and 1.72 ± 0.08 was also both significantly higher ($p < 0.05$) in Madaripur type than that of the values observed 45.0 ± 2.51 and 1.54 ± 0.04 in local cattle, respectively. These findings established that Madaripur type was superior to local cattle in their performances and these could be improved much with proper breeding, feeding, care, and management that did not practically found in present study.

Introduction

Cattles are valuable constituents of agriculture and play an important role in the national economy of Bangladesh. In addition to milk and meat cattle also support crop agriculture by preparing land for crop production, providing manure to enrich soil fertility, power for harvesting and threshing. Apart from these they help to earn foreign exchange and to create employment opportunity. However, the cattle products (meat, milk) in Bangladesh are insufficient to meet the current domestic demand for balanced nutritional needs of the people.

Milk is considered as an ideal and complete food for people in the whole world. Pastoral men acquired the habit of consuming meat, milk and milk products because of their long dependence

on foods of animal origin, while the people of Bangladesh acquired this habit because of their long association with the migrants and invaders from pastoral societies of central and West Asia (Jabbar & Raha, 1984). Milk plays an important role in human nutrition and also acts as secondary source of income generation in rural areas in the country. In Bangladesh 87 percent of the total population is undernourished since the supply of protein from fish is not sufficient enough to meet the requirement, thus the deficit has to be met from animal source. Most of the indigenous cattle in Bangladesh are of indicus and they are kept by the 80% of the rural people of the country, and depending upon the people need, climate, soil type and availability of fodder, different types or varieties of cattle genetic resources are available in different parts in our

country as Deshi, Red Chittagong Cattle (RCC) in Chittagong, Pabna type in Pabna region, North Bengal Grey in different areas in North Bengal, Madaripur type in Madaripur, Hilly and Munshigonj type (Bhuiyan et al., 2004). The Madaripur cattle are found indiscriminately in surrounding areas of Madaripur district and unfortunately they become unable to come in focus. Consequently, an insufficient work on these types of cattle been found and most of their characteristics still now unknown.

Therefore, a study was essential for identifying and establishing the industrious characteristics of these types of cattle and to deliver their rearing map to the cattle farmers. The present study was undertaken which can be helpful to the individual farmers by demonstrating the productive and reproductive performances between Madaripur and local cattle. With these ideas keeping in mind the present study was conducted to find out the productive performance (birth weight, milk yield, lactation length, lactation yield, etc.) and reproductive performance (age at maturity, age at first calving, services per conception, gestation length, post-partum heat period, calving interval, etc.) of Madaripur type cattle in *in situ* condition. It is expected that this study will provide useful information to the policy makers to formulate appropriate policies in respect of milk production for improving of dairy sector. Increased production of milk will serve as saving of foreign exchange on the one hand and contribute to national product and hence increase farmer's income on the other hand.

Methods and materials

The information was collected from individual farmer. For the reliable results of the study, the questionnaire was carefully designed to collect authentic and valid information from the farmers, and to analyze them properly and correctly.

Selection of study areas and data collection

For executing the objectives, data and information was collected from a period of July to October 2017 with randomly selected of 150 households. The information was accumulated by filling up the structured questionnaire through interviewing with the farmers of different areas of Sadar, Kolagaisia, Pachkhola, Khalikhola, Rasti, Mohisherchar in Madaripur district. The needed information was recorded by asking farmers from previous breeding history of animal. Moreover, where the farmers had not any written records on them, there it depended on the memory of respondents for having targeted information. When the interview was over, the information was checked carefully before leaving the farmers' house at study areas, and any confusion was rationalized and corrected by

comparing these with local standards to keep consistency of the data.

Data entry, reliability test and data sorting

After collection of data from the field, it was recorded in computer Microsoft Excel sheet. A number of tables and graphs were prepared on the basis of the purposes and goal of the study by using Microsoft Excel program. The data, those are out of normal range were omitted from the data bank.

Data analysis

Data were analyzed using the SAS (1998, Version 6.12.) statistical package. The effects which were showed significant in GLM procedure using SAS are then included as main effect in further analysis.

Results

Productive characteristics

Productive performance of Madaripur type and local cattle are shown in Table 1. The average birth weight of calves observed 17.31 ± 3.31 and 14.58 ± 2.91 kg for Madaripur, and local cattle, respectively. The average daily milk yield was found to be 4.24 ± 1.74 and 1.5 ± 2.94 liters for Madaripur and local cattle, respectively. Moreover, lactation yield and lactation length for Madaripur type and local cattle observed 472.32 ± 16.24 and 174.37 ± 6.52 liters; and 223.86 ± 5.12 and 210.86 ± 8.12 days, respectively.

Reproductive characteristics

Reproductive performance of Madaripur type and local cattle are represented on Table 2. The average age at sexual maturity and age at first calving observed 31.5 ± 3.87 and 48.0 ± 1.50 months for Madaripur type and 37.3 ± 3.50 and 52.0 ± 2.55 months for local, respectively. Moreover, the average gestation periods was found to be 281.0 ± 10.15 and 282.8 ± 7.89 days for Madaripur and local cattle, respectively. The average calving interval for Madaripur type and local cattle obtained 17.43 ± 1.50 and 15.43 ± 1.50 months, respectively. Post-partum heat period (days) and service per conception (in number) was found to be 53.04 ± 5.51 and 1.72 ± 0.08 for Madaripur type, and 45.0 ± 2.51 and 1.54 ± 0.04 for local, respectively.

Discussion

Birth weight

The average birth weight of the calves from Madaripur type observed 17.31 ± 3.31 kg was

significantly ($p < 0.01$) heavier than that of 14.58 ± 2.91 kg observed from local cattle (Table 1). Habib et al. (2003) reported 16.70 ± 0.48 kg birth weight for Red Chittagong cattle which was nearly similar to Madaripur type but higher to local cattle in present experiment, but Khan et al. (2000) obtained 17.28 ± 0.76 kg for Red Chittagong cattle was nearly similar to Madaripur type. The birth weight of Madaripur calves in this study was higher to average birth weight of calves for Jersey, Sahiwal, Sindhi crossbred (Khan, 1990, Habib et al., 2010). The higher birth weight observed for Madaripur type might be due to better genetic makeup than that of the local cattle.

Milk yield

The average daily milk yield of Madaripur type was found to be 4.24 ± 1.74 liters was tremendously ($p < 0.01$) higher than the local cattle was 1.5 ± 2.94 liters (Table 1). Udo et al., (1990) obtained 2.29 ± 0.11 liters from Pabna cattle, while Khan et al., (1999) and Habib et al., (2003) obtained 2.0 ± 0.65 and 2.55 ± 0.11 liters, respectively, from Red Chittagong cattle were lower than the present value for Madaripur type, but higher than local one (Table 1). Azizunnesa et al., (2010) and Hasanuzzaman et al., (2012) found average milk yield of 1.9 to 2.3 liters per day in Red Chittagong cows was lower than present finding for Madaripur type. Ahmed & Islam, (1987) reported also the lower yield (2.56 liter per day) of Red Chittagong cows in farm condition than that found in present study for Madaripur cattle.

Jabbar and Ali (1988) found to be 2.42 ± 0.42 liters for local which was also smaller than that obtained from Madaripur type, but much higher to the local cattle. The higher in daily milk yield for Madaripur type might have been due to environment along with better genetic makeup than the local one.

Lactation yield and length

However, the average daily milk yield (4.24 ± 1.74 liters) for Madaripur type was found to be higher than the local cattle (1.5 ± 2.94 liters) and accordingly the lactation yield of 472.32 ± 16.24 liters for Madaripur type was also bigger ($p < 0.01$) to 174.37 ± 6.52 liters for local cattle (Table 1). Roy, (1999) observed 1053.58 ± 380.56 liters milk per lactation in Pabna cattle and Habib et al., (2003) obtained 661.16 ± 39.79 liters in Red Chittagong cattle were much higher than that of observed value. These were probably due to longer lactation

length of Pabna (281 ± 10 days) and Red Chittagong (261.08 ± 14.51 days) cattle reported by Udo et al., (1990) and Habib et al., (2003) as compared to present values of 223.86 ± 5.12 and 210.86 ± 8.12 days for Madaripur and local cattle, respectively (Table 1). Taneja et al., (1986) reported lactation length of Kankrej- 351 ± 8 , Sahiwal- 283 ± 2 , Tharparkar- 280 ± 6 , Red Sindhi- 284 ± 2 , Gir- 257 ± 5 , Hariana- 291 ± 4 , Deoni- 270 ± 5 , Ongole- 217 ± 9 and Nondescript- 301 ± 6 days were much higher than present values for both of Madaripur and local cattle with an exception of Ongole was parallel to the both of observed values. It is well known that the milk yield of most breeds and types of cattle in the tropics is low-often less than 1 kg a day. That is partly genetic and partly due to poor feeding is also well understood, but, low yields also result if the calf dies when the cow usually dries off (Maule, 1990). The observed value in Madaripur type established their ability of efficient production of milk than the local ones.

Age at sexual maturity

Despite the fact that most tropical cattle are late in attaining sexual maturity, they are known to go on breeding for many years and it is not unusual to find cows that have had ten calves by which time they could be 15 to 20 years of age (Maule, 1990). Relatively, early sexual maturity at 31.5 ± 3.87 months observed for Madaripur type was higher ($p < 0.05$) than that observed 37.3 ± 3.50 months for local cattle (Table 2). This probably due to having high-quality genetic characteristics in Madaripur type than the local and obviously this might be of positive concern for successful animal production.

Gestation periods

Majid et al., (1995); Sultana & Bhuiyan, (1997); and Rahman et al., (2001) obtained the gestation periods of 273.48 ± 2.3 , 274.98 ± 2.51 and 278.5 ± 6.88 days, respectively for Non descriptive Deshi cattle and that were lower than the present values of 281.0 ± 10.15 and 282.8 ± 7.89 days observed in Madaripur type and local cattle in Madaripur, respectively (Table 2). Furthermore, Khan et al., (1999) established average gestation periods of 281.30 ± 1.43 days for Red Chittagong cattle; and Ghose et al., (1977) reported the 284.61 ± 4.56 days in Pabna cattle and both were comparable to present results for Madaripur and local cattle. These variations of gestation periods comparing to different findings might be due to genetic, age and parities of cows, and calves' sexes as well.

Age at first calving

The average age at first calving observed 48.0 ± 1.50 months for Madaripur type and

52.0±2.55 months for local cattle (Table 2). Gaur et al., (2002) worked on Ongole breed of cattle in India and found 52.7±5.9 months of age at first calving. In addition, Ghose et al. (1977) reported age at first calving were 49.93 (1468.40±139.7 days), 41.53 (1246.08±121.66 days) and 47.07 (1412.5±288.98 days) months for Red Sindhi, Red Chittagong and Sahiwal cattle, respectively. All these values obtained by them were comparable to both of the observed values from present study (Table 2). The result revealed that the Madaripur type were relatively faster at first calve than the local and this might be due to better genetic makeup in Madaripur type which obviously being an important issue that recognized the production ability of these cattle.

Calving interval

The calving interval in present work obtained 15.43±1.50 months for local was similar to 15.53 (466.0±107.92 days) months for local cattle was reported by Rahman et al., (2001), but lower than Madaripur type was 17.43±1.50 months (Table 2). Furthermore, the present value for Madaripur type was comparable to 19.29 (578.8±168.33 days) and 18.95 (568.4±144.84 days) months was also observed by Rahman et al., (2001) in Friesian and Shahiwal cattle, respectively. An experiment by Ali et al., (2006) was found to be the calving interval of 12.54 (376.122±39.11 days), 12.39 (371.796±34.64 days) and 12.30 (369.041±39.28 days) months for Indigenous, Shahiwal-Local cross and Holstein-Friesian, respectively, and these values were much lower to the values by present experiment obtained 17.43±1.50 and 15.43±1.50 months for Madaripur and local, respectively (Table 2). Rahman et al., (2001); Habib et al., (2003), and FAO, (2004b) reported the calving interval of 14.87 (446.0±107.92 days), 13.66 (409.9±0.12 days) and 15.12 (453.63±12.80 days) months, respectively and these were parallel to the present findings for both of the Madaripur and local cattle. However, a reasonable calving interval was found with this study as compare to other types/ varieties/ crossed/ breeds and that evidently indicate the

ability of Madaripur cattle of regularity in their production.

Post-partum heat period and service per conception

Post-partum heat period (days) and service per conception (in number) was found to be 53.04±5.51 and 1.72±0.08 was also both significantly higher ($p<0.05$) in Madaripur type than that of the values observed 45.0 ±2.51 and 1.54±0.04 in local cattle, respectively (Table 2). Rahman et al., (2001) reported the service per conception of 1.60±0.98, 1.60±0.86 and 1.70±0.98 for Friesian, Local and Shahiwal cattle, respectively, and these were comparatively similar to present value for Madaripur type (Table 2). Ali et al., (2006) established the service per conception of 1.245±0.43, 1.163±0.37 and 1.469±0.50 for Holstein-Friesian, Indigenous and Shahiwal-Local, respectively, and these were much lower than present findings of both Madaripur and local (Table 2). Ahmed & Islam, (1987); Majid et al., (1995); Sultana & Bhuiyan, (1997); and Rahman et al., (2001) worked on service per conception with Non-descript Deshi cattle and they found to be 1.76±0.08, 1.76±0.19, 1.78±0.22 and 1.6±0.86, respectively, were also comparable to the present observation for Madaripur type (Table 2). Khan et al., (1999), and Ahmed & Islam, (1987) observed the service per conception of 1.57±0.07 (Pabna cattle) and 1.57±0.53 (Red Chittagong cattle), respectively were alike to the observed value in present experiment for local cattle, but lower than the Madaripur type. The service per conception in Pabna cattle was 1.29±0.60 observed by Ahmed & Islam, (1987), and this was poorer to that found in Madaripur and local cattle (Table 2). Furthermore, Jabbar & Ali, (1988) obtained service per conception for local cattle of 1.60±0.57 were in between the values having in present study for Madaripur and local cattle. The post-partum heat period and service per conception of both of two important traits were found to be better in Madaripur type than that of local one and granted an idea for good producer.

Table 1. Productive performance of Madaripur type and local cattle.

Parameters	Madaripur cattle	Local cattle	Significance level
Birth weight (kg)	17.31 ± 3.31 ^a	14.58 ± 2.91 ^b	**
Milk yield (litters/day)	4.24 ± 1.74 ^a	1.5 ± 2.94 ^b	**
Lactation yield (litters)	472.32 ± 16.24 ^a	174.37 ± 6.52 ^b	**
Lactation length (days)	223.86 ± 5.12	210.86 ± 8.12	ns

Means with different superscripts in the same row differed significantly (*, $p<0.05$; **, $p<0.01$); ns, non-significant; Figures indicates means ±SE.

Table 2. Reproductive performance of Madaripur type and local cattle.

Parameters	Madaripur type cattle	Local cattle	Significance level
Age at sexual maturity (months)	31.5 ± 3.87 ^b	37.3 ± 3.50 ^a	*
Gestation periods (days)	281.0 ± 10.15	282.8 ± 7.89	ns
Age at first calving (days)	48.0 ± 1.50 ^d	52.0 ± 2.55 ^a	**
Calving interval (months)	17.4 ± 1.50	15.4 ± 1.50	ns
Post-partum heat period (days)	53.0 ± 5.51 ^a	45.0 ± 2.51 ^b	*
Service per conception (number)	1.72 ± 0.08 ^a	1.54 ± 0.04 ^b	*

Means with different superscripts in the same row differed significantly (*, p<0.05; **, p<0.01); ns, non-significant; Figures indicates means ± SE.

Conclusions

Madaripur type cattle were high in birth weight, heavy in milk yield, long in lactation length and also relatively faster at first calving than the local cattle in Madaripur district. Moreover, calving interval found for Madaripur type was sensible comparing to the value for local one and the values by different workers cited for other types/varieties/ cross breeds cattle. Thus, all observations with the study supported and ensured the ability of Madaripur type cattle in their regularity and very good efficiency in production. Therefore, the present findings revealed that Madaripur type were superior to local cattle in their performances and these could be improved much with properly breeding, feeding, care and management that did not practically found in present study.

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