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Preliminary Study on Productive and Reproductive Performances of Jamunapari, Black Bengal and Crossbred Goats at Chittagong Region of Bangladesh

Research Article

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ABSTRACT

The present study was conducted with a view to know the productive and reproductive performance of Jamunapari, Black Bengal and crossbred goats in Chittagong district during the period of May to December 2012. The data on productive and reproductive traits were collected from 324 goats as a whole. In the present study, the birth weight of Jamunapari goats was higher than other crosses. The adult weight of Jamunapari, Black Bengal and crossbred bucks and does were 50.70 ± 3.53, 24.27 ± 1.67 and 40.38 ± 2.90 kg and 45.47 ± 3.78, 21.06 ± 2.33 and 35.72 ± 2.97 kg, respectively. The highest milk yield and lactation period were observed in Jamunapari goats than other crosses. The average age at puberty of Jamunapari, Black Bengal and crossbred goats were 335.00 ± 25.77, 194.12 ± 18.73 and 287.50 ± 22.57 days, respectively. Age at first conception of Jamunapari, Black Bengal and crossbred goats were 381.00 ± 22.54, 217.94 ± 16.87 and 321.25 ± 21.25 days, respectively. Age at first kidding of Jamunapari, Black Bengal and crossbred goats were 534.00 ± 24.58, 368.12 ± 16.96 and 471.25 ± 21.25 days, respectively. The kidding interval of Black Bengal goat was lower i.e. the reproductive performance is better in Black Bengal goat than Jamunapari and crossbred goats. Gestation period of Jamunapari, Black Bengal and crossbred goats were 151.71 ± 8.19, 146.72 ± 7.61 and 147.85 ± 7.74 days, respectively.

KEY WORDS Black Bengal goat, crossbred goats, Jamunapari, productive traits, reproductive traits.

INTRODUCTION

Bangladesh is one of the poorest and densely populated country, having about 145 millions of people in its 144750 sq. km of area with a per capita annual income of USD 482 and about 49% of population of the country is female (BBS, 2007). The goat secures second position in terms of meat, milk and skin production, representing about 38.0, 23.0 and 28.0%, respectively to the total contribution of livestock in Bangladesh (FAO, 1997). Goat is economically an important and promising animal in the developing countries especially in Asia and Africa (Husain, 1999). It is an important source of income for the poor people. Goats are raised by poor farmers and distressed women with little capital investment (FAO, 1991). In most of the countries of the world goats are reared for the milking purpose. Meat and skin come as the byproducts. About 90% of the world's goat population is found in the developing countries, while continent-wise Asia leads, where 80% of goat milk is being produced. In this regard main countries include India, China, Bangladesh, Iran, Pakistan and Turkey (Khan *et al.* 1992).

The total contribution of livestock to the gross domestic product (GDP) is approximately 6.5%. Bangladesh Government has also given special emphasis and adopted a national programme on Black Bengal goats for poor farmers to reduce poverty with targeting the Millennium Development Goals (MDGs) achievement since 2003. Goat plays an important role in generating employment, income, capital storage and improving household nutrition (Husain, 1999). It has been anticipated that over the next decade, there will be a massive increase in the demand for food of animal origin (100 million tons of meat and 201 million tons of milk), as a result of global population growth, an extra 2.5 billion people to feed by 2020 (DFID, 2000).

Goats are found abundantly in the Chittagong region of Bangladesh. Chittagong is a hilly area. These hot and humid climates in fact make this area a paradise for the rearing of goat. Jamunapari, Black Bengal and crossbred goats are available in this region. The importance of goat is strongly emphasized for their versatile production profile and valuable contribution like meat, milk, industrial raw product such as skin, fiber and manure. Black Bengal goats are known to be famous for its adaptability, fertility, prolificacy, meat and skin quality. Jamunapari goats are multipurpose animals, producing meat, milk, skin and hair (Amin *et al.* 2001). Their main function is meat production, although in temperate countries milk has of greater importance; skins are valuable by-products, especially in those countries with large goat population. But there is paucity of information regarding their potential and true role in rural development. In order to undertake any development work in the rural area, the goat production problems and prospects should be identified. The present study was therefore undertaken to study the productive and reproductive performance of Jamunapari, Black Bengal and crossbred goats in Chittagong region of Bangladesh.

MATERIALS AND METHODS

The present survey was conducted in four sub-districts (Anwara, Banshkhali, Boalkhali and Patiya) of Chittagong district from May 2012 to December 2012. The survey was done at random in different villages of Anwara, Banshkhali, Boalkhali and Patiya sub-districts. For that, 21 bucks, 28 does and 59 kids for each breed (Jamunapari, Black Bengal and crossbred goats) of 112 households from different villages of four sub-districts were selected for this study.

In Chittagong, goats were maintained by farmers themselves under traditional management system for village herd. The goats were kept in open air without any shed near the farmers homestead from evening to morning, however, some farmers used to keep goats in shed. Goats were allowed to graze in roadside or agricultural land for daylong and were driven back to home in the afternoon. Few farmers used to give concentrates to the goats. The does were served naturally when they were in estrous. Routine vaccination and deworming was not practised by the farmers, however animals were treated by Veterinarians in case of diseases.

The productive traits analyzed in this study were lactation period, milk yield, and body weight at different ages. The reproductive traits analyzed were age at puberty, age at first conception, age at first kidding, kidding interval and gestation period. The statistical analysis was done by using Completely Randomized Design (CRD) as per the procedures laid down by Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

Productive traits

The productive traits of Jamunapari, Black Bengal and crossbred goats were presented in Table 1.

Birth weight

The average birth weight of Jamunapari, Black Bengal and crossbred goats were 1.53 ± 0.22, 0.89 ± 0.09 and 1.26 ± 0.20 kg, respectively (Table 1). Hassan *et al.* (2010) reported that the average birth weight of Jamunapari goats was 1.6 ± 0.6 kg which is in agreement with the present study. Hasan *et al.* (2007) also reported that the average birth weight of Black Bengal goat and crossbred goats were 1.60 ± 0.50 and 1.90 ± 0.75 kg, respectively which are higher than the results of the present study. The birth weight of BBGs and CBGs were 1.5 and 2.0 kg, respectively under traditional farming condition of sub-continent (Banerjee, 2004).

Patnaik and Nayak (1988) observed that the birth weight of Jamunapari was 2.3 ± 0.1 kg which is higher than the present findings. Mia *et al.* (1993) found that the birth weight of Black Bengal was 1.35 kg which is slightly higher than the findings of the present study. Within-breed, variation in birth weight is partly genetic but largely due to variation within the environment, especially nutrition and health (Devendra and Burns, 1983).

Adult weight

The adult weight of Jamunapari, Black Bengal and crossbred bucks and does were 50.70 ± 3.53, 24.27 ± 1.67 and 40.38 ± 2.90 kg and 45.47 ± 3.78, 21.06 ± 2.33 and 35.72 ± 2.97 kg, respectively (Table 1).

Hassan *et al.* (2007) reported that the average body weight gain after 365 days in Black Bengal and crossbred goats were 20.25 ± 2.5 and 29.50 ± 3.5 kg, respectively and they are lower than the results of present study. The body weight of goats of Patuakhali, Jhalokathi and Barisal regions

were 39.08 ± 3.27, 42.17 ± 3.25 and 38.33 ± 2.80 kg, respectively (Rume, 2003). The body weight of Black Bengal goats is higher than the report of Khan *et al.* (1992). They reported that body weight of Bengal goats was 11.76 kg at 15.08 months of age. In this study, the body weight was relatively high which indicates that the goats in that selected regions have high genetic potentialities.

Milk yield

The milk yield of Jamunapari, Black Bengal and crossbred were 1103.33 ± 154.07, 158.82 ± 40.45 and 933.33 ± 132.84 mL/d, respectively (Table 1). Highest milk yield was observed in Jamunapari goats. Rout *et al.* (1999) reported that Jamunapari can produce 4.9 liters of milk daily with average lactation yields of 1.5 L/d which is slightly higher than the present study. Milk yields increased up to the end of two months and then started to decline with an average lactation period of 150 days. The result of the present study is higher than the report of Salni *et al.* (1988). They reported overall means for lactation yield and daily yield in Jamunapari goats as 70.30 and 0.686 kg, respectively. Milk yield/lactation might have been affected by nutrition.

Lactation yield was positively correlated with the nutrition, age, genotype and season (Chowdhury *et al.* 2002; Mia *et al.* 1993).

The result of milk yield in crossbred goats is close to the findings of Hassan (2007) who reported the milk production in crossbred goats as 1.05 ± 0.50 L/d, whereas in Black Bengal goat it produces milk only for nourishment of its kids. Due to genetic factor Black Bengal goats yield very poor amount of milk (Payne, 2000).

Lactation period

The lactation period of Jamunapari, Black Bengal and crossbred were 168.20 ± 17.18, 90.18 ± 7.46 and 148.17 ± 15.34 days, respectively (Table 1). The highest lactation period was observed in Jamunapari than other crosses. The present results of lactation period are similar to the results of some studies. Hassan *et al.* (2007) reported that the lactation period of crossbred goats and Black Bengal goats were 99.25 ± 10 and 65.50 ± 7.5 days, respectively which are lower than the results of the present study. It was also reported that lactation length of Black Bengal goats was 98-105 days under rural scavenging condition (Hussein *et al.* 1983) which differs with the present study because lactation length might have been affected by age and management factors.

Reproductive traits

The reproductive traits of Jamunapari, Black Bengal and crossbred goats were shown in Table 2.

Age at puberty

The average age at puberty of Jamunapari, Black Bengal and crossbred goats were 335.00 ± 25.77, 194.12 ± 18.73 and 287.50 ± 22.57 days, respectively (Table 2). The average age at puberty of crossbred and Black Bengal goats were 222.5 ± 5.5 and 196.5 ± 7.5 days, respectively (Hassan, 2007) which supports the result of Black Bengal goats but was found to be lower than the value of crossbred goats. BBGs was reported early (200 days) maturing goats than CBGs (225 days) (Banerjee, 2004). Somewhat variation occurs due to various causes like presence of a buck in the herd (Devendra and Burns, 1983), plane of nutrition, availability of forages and temperature. Hassan *et al.* (2010) reported that the Jamunapari goats showed first oestrus (puberty) at 354.7 ± 17.1 days which is higher than the present study. Chowdhury (2002) reported that the age at 1st heat varied considerably between goats with a mean of 216 days (7.2 months), which supports the result observed in Black Bengal goat.

Age at first conception

Age at first conception of Jamunapari, Black Bengal and crossbred goats were 381.00 ± 22.54, 217.94 ± 16.87 and 321.25 ± 21.25 days, respectively (Table 2). Hassan *et al.* (2010) reported that the mean age at first pregnancy of Jamunapari goats was 395.4 ± 29.6 days with a range of 12-13 months which supports the result of the present study. The present findings are almost similar with that result of Mia *et al.* (1993).

Age at first kidding

Age at first kidding of Jamunapari, Black Bengal and crossbred goats were 534.00 ± 24.58, 368.12 ± 16.96 and 471.25 ± 21.25 days, respectively (Table 2). Hasan *et al.* (2007) reported that in Black Bengal goat the average age at first kidding was 360.5 ± 10 days which is in consonance with the present findings, whereas in crossbred goats it was 411.5 ± 15.5 days which is slightly lower than the present study. Hassan *et al.* (2010) reported that the average age at first kidding of Jamunapari goats was 548.6 ± 68.1 days which are similar to the result of the present study.

Kidding interval

The kidding interval of Jamunapari, Black Bengal and crossbred goats were 224.00 ± 14.42, 181.76 ± 15.81 and 199.17 ± 21.71 days, respectively (Table 2). Kidding interval of Black Bengal goat was lower i.e. the reproductive performance is better in Black Bengal goat than Jamunapari and crossbred goats. Hassan *et al.* (2007) reported that the average kidding interval in Black Bengal and crossbred goats were 179 ± 20 and 270 ± 22 days, respectively which corroborates with the result of Black Bengal goat.

Table 1 Mean±SD of productive traits of Jamunapari, Black Bengal and Crossbred goats

Parameters	Types of breed		
	Jamunapari (Mean±SD)	Black Bengal (Mean±SD)	Crossbred (Mean±SD)
Birth Weight (kg)	1.53±0.22 (59)	0.89±0.09 (59)	1.26±0.20 (59)
Weight of adult bucks (kg)	50.70±3.53 (21)	24.27±1.67 (21)	40.38±2.90 (21)
Weight of adult does (kg)	45.47±3.78 (28)	21.06±2.33 (28)	35.72±2.97 (28)
Milk yield (mL/d)	1103.33±154.07 (28)	158.82±40.45 (28)	933.33±132.84 (28)
Lactation period (d)	168.20±17.18 (28)	90.18±7.46 (28)	148.17±15.34 (28)

Legends: figures in the parentheses indicate number of observations.
SD: standard deviation.

Table 2 Mean±SD of reproductive traits of Jamunapari, Black Bengal and Crossbred goats

Parameters	Types of breed		
	Jamunapari (Mean±SD)	Black Bengal (Mean±SD)	Crossbred (Mean±SD)
Age at puberty (d)	335.00±25.77 (28)	194.12±18.73 (28)	287.50±22.57 (28)
Age at first conception (d)	381.00±22.54 (28)	217.94±16.87 (28)	321.25±21.25 (28)
Age at first kidding (d)	534.00±24.58 (28)	368.12±16.96 (28)	471.25±21.25 (28)
Kidding interval (d)	224.00±14.42 (28)	181.76±15.81 (28)	199.17±21.71 (28)
Gestation period (d)	151.71±8.19 (28)	146.72±7.61 (28)	147.85±7.74 (28)

Legends: figures in the parentheses indicate number of observations.
SD: standard deviation.

Rout *et al.* (1999) reported the kidding interval of Jamunapari goats was 229.3 ± 26.7 days, which is almost similar to the present findings. Amin *et al.* (2001) observed 211 days kidding interval for Black Bengal goat under subsistence rearing which is slightly higher than that of the present study.

Gestation period

Gestation period of Jamunapari, Black Bengal and crossbred goats were 151.71 ± 8.19, 146.72 ± 7.61 and 147.85 ± 7.74 days, respectively (Table 2). Hassan *et al.* (2010) reported that the range of gestation period of Jamunapari goats was slightly varying from 141 to 164 days with an average of 152.8 ± 17.5 days which is similar to the result of the present study.

The period of gestation was not affected by the parity and age of the does. Average gestation periods of Black Bengal goat were 146, 147, 142 and 146 days at 1st, 2nd, 3rd and 4th parity, respectively (Chowdhury *et al.* 2002) which supports the result of Black Bengal goat. Although goat gestation period is fairly constant at around 146 days (Devendra and Burns, 1983), yet it may be affected by factors like kid birth weight and weight of dam at mating (Mishra *et al.* 1979).

CONCLUSION

From the present findings it can be concluded that the performance of Jamunapari and crossbred goats were satisfactory which indicated their adaptability in the climatic condition of Chittagong region. Black Bengal goat had an excellent reproductive efficiency but its meat and milk production capability was low. Introduction of Jamunapari genes had positive effects in improving the meat and milk yield traits of Black Bengal goat. Improved feeding and better management practices may help in higher reproductive and productive performances of Jamunapari, Black Bengal and crossbred goats. Further studies on the performance of crossbred with other crosses would be helpful to choose a suitable exotic breed or their cross for improving the productive and reproductive performance in Chittagong region as well as Bangladesh.

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