

A comparative study on reproductive performance and productivity of the Black Bengal and Crossbred goat at Atrai, Bangladesh

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Abstract : The present investigation was carried out to detect the status of different productive and reproductive parameters of Black Bengal and Crossbred goats at Bandaikhara village under Atrai Upazilla of Naogaon district during the period of September to December/2005. The average age at first sign of heat of Black Bengal goats was better than that of Crossbred goats. In Black Bengal goat the average age at first kidding was 360.5 ± 10 days, whereas, in crossbred goats it was 411.5 ± 15.5 day. Significantly ($P < 0.01$) lower the post partum heat period in Black Bengal goat than the crossbred goat. The average kidding interval in Black Bengal and Crossbred goats were 179 ± 20 and 270 ± 22 days respectively and differences are statistically significant ($P < 0.01$). The usual numbers of kids at one time in Black Bengal goats vary from single to quadruplet. On the other hand, litter size of crossbred goat was single or twin. The average birth weight of Black Bengal goat was lower than Crossbred goats, which are statistically significant ($P < 0.05$). The average body weight gain after 365 days is better in Crossbred than Black Bengal goats and statistically significant ($P < 0.01$). The average milk yield in Crossbred goat was 1.05 liter/day, whereas, in Black Bengal goat, it produces milk that only nourished its kids. It was concluded that the reproductive performance like early maturity, larger litter size, shorter postpartum period, minimum kidding interval are better in Black Bengal goat. On the other hand productive performance like higher birth weight, maximum body weight gain, high milk yield, longer lactation length are suitable in crossbred goat.

Key words: Black Bengal goat, Crossbred goat, Production, Reproduction, Performance

Introduction

Goat is numerically and economically important and promising animal resources in the developing countries especially in Asia and Africa (Hussain, 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). It is estimated that more than 90% of goat population comprised of Black Bengal goat (BBGs). Goats rank first position in terms of total livestock population in Bangladesh (FAO, 1999). The total contribution of livestock sub-sector to the GDP (Gross Domestic Product) is approximately 6.5% (DLS, 1998). The contribution of livestock sub-sector is 13% earning of total foreign currency in Bangladesh (Alam, 1993).

Considering the possibilities, a participatory approach in rearing poultry and later goat as a small scale subsistent family enterprise has been promoted by the government and various non-government organizations with the credit and input support since 1980's in this country (Islam *et al.* 1992; DLS 1998; Fattah, 1999; Das, 2004). 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 (Kader, 2006). For rearing goats, a minimum investment of money is often required, even without specific arrangement of housing. Goat graze on barren and road-side land with grass and least home made supplies such as rice gruel,

boiled rice, vegetables peels etc. In addition goats fed on jackfruit leaves, which often are available in most of the rearing areas. The higher demands for meat and especially for skin in the local as well as foreign markets focused the goat enterprise extremely prominent to the vulnerable group of people and the existing socio-economic condition of the country. Goat also have important role in generating employment, income, capital storage and improving household nutrition (Devendra, 1992; Hussain, 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). The normal requirement of animal protein for a man is about 62.5 per day, while people of our country get only 6.90 meats per day (Jabber, 1985).

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. The present study was therefore undertaken to assess the reproductive performance and productivity of BBGs and the available crossbred goat (CBGs).

Materials and Methods

The data for reproductive performance such as age of puberty (days), age at insemination, age at first kidding

(days), litter size (number), post partum heat period (days), kidding interval (days) and productivity such as birth weight (kg), body weight gain (kg), milk production (litre/day), lactation length (days) were taken from the different families (goat keeper) using a pre-structured questionnaire. The study area was selected on a village named Bandaikhara under the Atrai Upazilla in Naogaon District due to large number of goats are raised in this area. A total of 159 inhabitant were included in this study which comprised 718 adult female (doe) goats of which BBGs and CBGs were 662 and 56 respectively and 68 adult male goats of which BBGs and CBGs were 50 and 18 respectively. The research work was conducted from September to December /2005 and the data was collected through direct interviewing method (randomly) from the goats owner. The survey schedule was developed according to the objectives of the study. Survey sheet was prepared to collect the desired information from the goats owner and sheet contains reproductive performance such as age of puberty in days, age at insemination, age at first kidding in days, litter size in number, post partum heat period in days, kidding interval in days and productivity such as birth weight in kg, body weight gain in kg at 365 days, milk production in litre per-day, lactation length in days. The obtained information was loaded and stored on to the Excel spread sheet. Then data was analyzed using STATA (Stata Corporation College Station) version 9.0. Different types of birth of kidding and their frequency were expressed in percentage.

Results and Discussion

Reproductive performance

Table 1: Reproductive performances of Black Bengal and Crossbred goats

Parameters	Black Bengal goat Mean \pm SD (n)	Crossbred goat Mean \pm SD (n)
Age at puberty (Days)	*196.5 \pm 5.5 (662)	*222.5 \pm 7.5 (56)
Age at first kidding (Days)	*360.5 \pm 10 (662)	*411.5 \pm 15.5 (56)
Litter size (Number)	1.96 \pm 0.75 (662)	1.25 \pm .25 (56)
Post partum heat period (Days)	**38.75 \pm 10.5 (662)	**121.75 \pm 15 (56)
Kidding interval (Days)	**179 \pm 20 (662)	**270 \pm 22 (56)

*P<0.05, ** P<0.01

Age at puberty: The average age at first sign of heat of crossbred and Black Bengal goats were 222.5 \pm 5.5 and 196.5 \pm 7.5 days respectively, here the duration was greater in crossbred than Black Bengal goats and statistically significant (P<0.05). BBGs was reported early (200 days) maturing goats than CBGs (225days) (Banerjee, 2004). Somewhat variation occurs due to various causes like presence of buck in the herd

(Devendra & Burns, 1983), plan of nutrition, availability of forages and temperature.

Age at first kidding: In Black Bengal goat the average age at first kidding was 360.5 \pm 10 days whereas in crossbred goats it was 411.5 \pm 15.5 day. So, reproductive performance of Black Bengal goats was higher than crossbred goats and statistically significant (P<0.05). This result is agreed with Epstein & Hertz (1964) which depends on photoperiod, kidding season and nutritional status.

Post partum heat period: The average post partum heat period of Black Bengal and crossbred goats were 38.75 \pm 10.5 and 121.75 \pm 15 days respectively and differences are highly significant (P<0.01). Lower the post partum heat period higher the reproductive performance, so, the reproductive performance of Black Bengal goat was better than crossbred goat. This result is in agreement with the study of Shill *et al.* (2003).

Kidding interval: The average kidding interval in Black Bengal and Crossbred goats were 179 \pm 20 and 270 \pm 22days respectively and differences are highly significant (P<0.01). Kidding interval of Black Bengal goat was lower that is the reproductive performance is better in Black Bengal goat than the crossbred goat. This result is in agreement with the study of Shill *et al.* (2003).

Table 2: Different types of litter size per kidding

Birth types (Litter size)	Black Bengal goat		Crossbred goat	
	Frequency (n)	Percentage	Frequency (n)	Percentage
Single	140	21.14	42	75
Twin	373	56.34	14	25
Triplet	135	20.39	-	-
Quadruplet	14	2.11	-	-

Litter size: The usual number of kids at one time in Black Bengal goats vary from single to quadruplet of which twin were the most frequent (56.32%) and quadruplet were the least frequent (2.11%) litter size. On the other hand, litter size of crossbred goat was either single (75%) or twin (25%). This result is in agreement with the study of Hussain *et al.* (1995) and Banerjee (2004).

Productive performance

Table 3: Productive performances of Black Bengal and Crossbred goat

Parameters	Black Bengal goat Mean \pm SD (n)	Crossbred goat Mean \pm SD (n)
Birth weight (Kg)	*1.60 \pm .50 (662)	*1.90 \pm .75 (56)
Body weight gain after 365 days (Kg)	**20.25 \pm 2.5 (50)	**29.5 \pm 3.5 (18)
Milk production (Liter/day)	**Nourished only its kids (662)	**1.05 \pm .50 (56)
Lactation length (Days)	*99.25 \pm 10 (662)	*65.50 \pm 7.5 (56)

* P<0.05, ** P<0.01

Birth weight: The average birth weight of Black Bengal goat and Crossbred goats were 1.60 ± 0.50 and 1.90 ± 0.75 respectively and differences are statistically significant ($P < 0.05$). The birth weight of BBGs and CBGs were 1.5 kg and 2.0 kg respectively under traditional farming condition of sub-continent (Banerjee, 2004).

Body weight gain: 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 differences are statistically significant ($P < 0.05$), which agreed with Banerjee (2004).

Milk production: The average milk production in Crossbred goat was 1.05 ± 0.50 liter/day, whereas in Black Bengal goat, it produces milk that only nourished its kids and differences are highly significant ($P < 0.01$). This result of milk production is agreed with the result of Hussain *et al.* (1995) and Banerjee (2004). Due to genetic factor Black Bengal goats yield very poor amount of milk (Payne, 2000).

Lactation Period: Lactation period of Crossbred goats and Black Bengal goats were 99.25 ± 10 and 65.50 ± 7.5 days respectively and differences are statistically significant ($P < 0.05$). This result is agreed with the result of Shill *et al.* (2003).

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