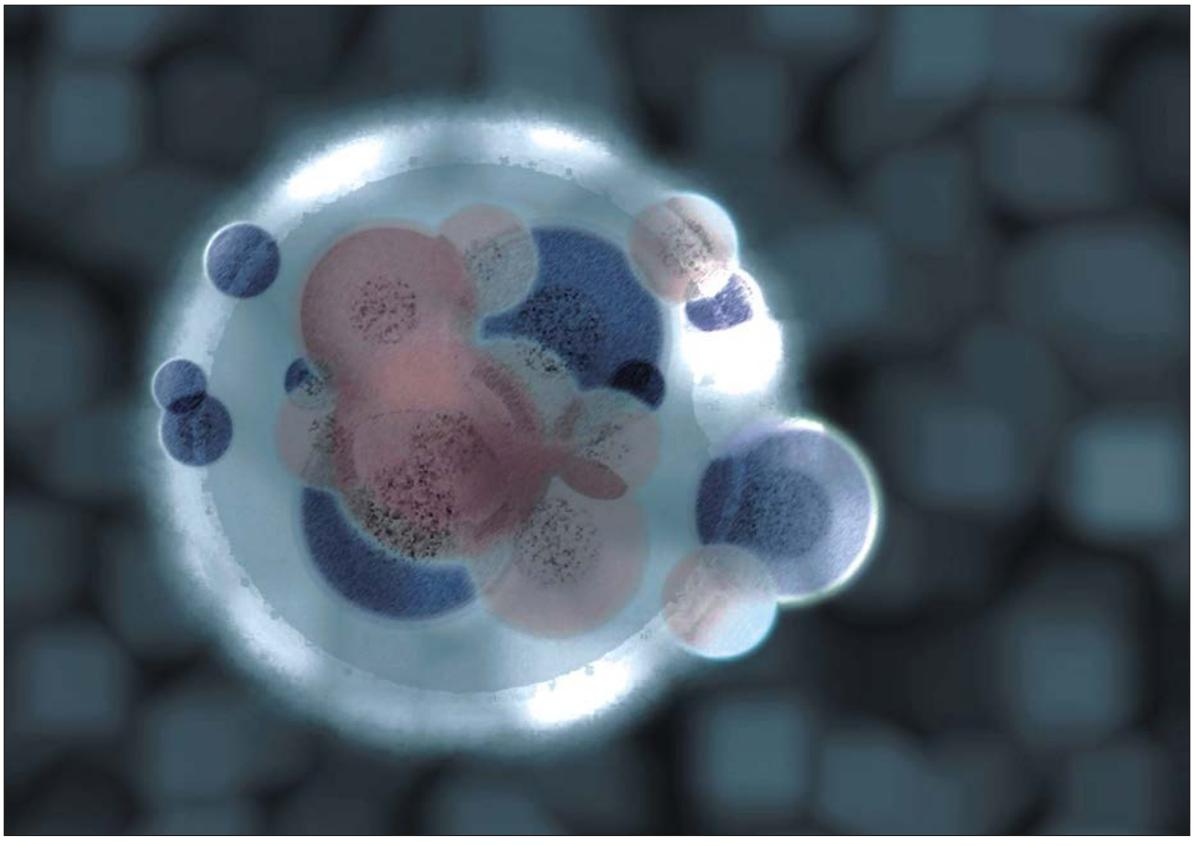

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Milk Production from Indigenous Black Bengal Goat in Bangladesh

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Abstract: The study was conducted to investigate milk production performance of Black Bengal goat in different parity reared in semi-intensive system. Twenty five pre-pubertal (6-7 months) female Black Bengal goats were selected on the basis of their phenotypic characteristics and their ancestral history from Goat Development farm, Savar, Dhaka. Milk production records of the Black Bengal goat were recorded from January 2000 to December 2002. During the trial they are allowed to graze and concentrate supplement at the rate of 300, 200 and 100 g d^{-1} to does bucks and kids respectively. Average litter size in the 1st, 2nd and 3rd parity was 1.08, 1.76 and 1.96, respectively. Total milk yield d^{-1} in the 1st, 2nd and 3rd parity was 275, 312 and 332 g d^{-1}, respectively. Lactation length and milk yield kg^{-1} live weight $lactation^{-1}$ in the 1st, 2nd and 3rd parity were 61.56, 66.4 and 67 days and 1.02, 1.2 and 1.2 kg, respectively. Milk yield $lactation^{-1}$ was 16.37, 20.86 and 21.8 kg, respectively. Milk production performance of Black Bengal goat was better in 3rd parity than that of the 2nd and 1st parity.

Key words: Milk production, parity, black bengal goat

INTRODUCTION

Small ruminants like goat and sheep play an integral part of the livestock production systems in Bangladesh. During 1980 to 1996 the number of cattle, sheep, buffalo and pigs have decreased in developed countries but increased in the developing countries. Goat, however, is the exception increased both in developed (26%) and developing (49%) countries[1]. In developing countries, very high goat population growth is largely due to multiple roles of goat, as a reliable producer in bad time, fast breeder, lower nutritional requirement (compared to cattle, buffalo), inquisitive feeding habit, good market price as an asset that can be easily liquidized to finance in time of need, as a meat animal with convenient size to slaughter for religious and social celebration[2]. The correlations between the number of goat per in habitant and the mean income of population –0.77 and –0.52[3] clearly suggest that the old saying of "the goat is the poor man's cow" is still hold true for developing country such as Bangladesh. While dairy cattle and poultry industry are making significant impact as a provider of animal protein in the country, small ruminants, especially goats have become very important in rural economy and nutrition through out the country. Culturally, goat keeping in Bangladesh is related to the rural poor and landless specially woman. Most of the goats reared are Black Bengal, reputed for their prolificacy, fertility, early sexual maturity and adaptability to hot humid conditions. However, Black Bengal goats are reported to be slower in growth, low producer of milk, higher kid mortality[4-6]. In many areas of the world milk is seen as being of special benefit to such children, high quality protein and high levels of minerals, especially calcium and vitamins, in a very palatable form. Composition of Black Bengal goat milk in terms of total solid, fat, protein, lactose and ash are 14.41, 4.37, 4.0, 5.24 and 1.42%, respectively[7]. Besides goat milk casein and goat milk fat are more easily digested than from cow milk. Goat milk is valued for the elderly, sick, babies, children with cow milk allergies, patients with ulcers and even preferred for raising orphan foals or puppies. There does not appear to be any custom or taboo prohibiting the drinking of goat milk[8] and in a recent survey[9] showed that goat milk was acceptable to many people and was indeed, preferred to that of the cow or the sheep. The aim of the study was therefore to examine the potential of milk production of the Black Bengal goat under semi intensive management.

MATERIALS AND METHODS

The experimental animal: The study was conducted for 24 months started from January, 2001 to December, 2002. A total of 25 elite pre-puberal Black Bengal does and 4

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bucks were selected from own stock of the Goat Development Farm, Savar, Dhaka. Initial age of female was 8.44±1.04 months and weight was 10.0±1.31 kg. Selection was mostly based on the basis of body structure, type of conformation and their ancestral history on milk production and reproductive performance. All the goats were individually ear tagged before starting the work. Productive and reproductive performances of 25 selected Black Bengal does were recorded until 3rd parity. The goats were managed under semi-intensive husbandry system.

Management of the research activities

Housing: All does were kept on the wooden platform of concrete house. Kids were kept in a specially designed wooden brooding pen with adequate bedding materials, feeding and watering provision and facilities for temperature control. Kids were housed along with their mother in the wooden metabolic stall up to one month of age. Bucks are always kept separately from the does to avoid random mating. Floor space provided for does, buck and kid was 1.86, 2.3 and 2.32 m^2, respectively.

Feeds and feeding: Goats were allowed to graze in the farm from 8 A.M to 5 P.M with 1 h rest (1-2 PM). A concentrate mixture halving 17% CP; 13.4 MJ ME kg^{-1} DM was fed twice daily at 8.00 A.M and at 5.00 P.M at the rate of 300, 200 and 100 g d^{-1} for does, buck and kid, respectively. *Ad libitum* green grasses were supplied to buck daily. Kids were kept with their mother for the whole day (7.30 A.M. to 5.00 P.M.) up to dry period. Fresh drinking water was made available throughout the study period.

Health: Animals were dewormed three times a year. They were vaccinated against Pest Des petits Ruminants. All animals were deeped in 0.5% malathion solution fortnightly.

Mating: Four Black Bengal buck were selected for mating of does during the experimental period. The average age and weight of bucks were 18±1.25 months and 20±2.5 kg, respectively. All the does were naturally mated at 24 hours after onset of estrus and at the mating does were found to be pregnant.

Litter size: It was recorded as the number of kids born per parturition per does during 1st to 3rd parity.

Milk production: All the does were milked by hand and daily milk yield of individual does was recorded. Three days after kidding, newly born kids were kept with their mother during 24 h except the grazing time. After 3 days, kid had free access to their mother's milk from 8.00 A.M to 5.00 P M. Milking was done at 7.30 A.M. The amount of milk suckled by kids could not measure. Milk yield was recorded from three days after parturition based on hand milking.

Statistical analysis: Data were analyzed by using univariate General Linear Model procedure of SPSS 9.0 for windows[10]. The following statistical model was used to measure to the effect of parity on different productive and reproductive parameters.

$$Yij = \mu + \alpha i + eij$$

Here,
μ = is the general mean,
αi= is the effect of parity (I = 1, 2 and 3)
eij = is the random error

Linear, logarithmic or exponential models were used for expressing the relationship of two variables where appropriate.

RESULTS AND DISCUSSION

Milk yield: The average number of kid born increased significantly from 1.08 to 1.96 kids upto 3rd parity (Table 1). Average milk yield was also increased significantly ($p<0.01$) with the parity (Table 1). The highest milk yield was recorded in 3rd parity (436 ml d^{-1}) that having three kids. Average daily milk yield in each parity was increased up to 4th week. Then after the 4th week there was a gradual decrease till end of lactation. The milk yield of goats in the present study were lower than an average 294 ml d^{-1} in the 1st parity to 563 ml d^{-1} in the 4th parity reported by Chowdhury *et al.*[11] from Black Bengal goat at same rearing condition, but was higher than that reported for rural scavenging condition by Husain[5] of 121 ml/day for same breed. The variation of milk yield may be due to feeding and management system. The effect of birth type on milk yield at different parity is presented in Table 2. Total milk production was increased with the parity and the number of kid suckled. The highest milk production (25 L $lactation^{-1}$) was shown in triple birth of 2nd parity where lactation length was higher (Table 2).

Lactation length: Average length was increased from 61.56 days in 1st parity to 66.0 days and 67.0 days for 2nd and 3rd parity. In the 1st, 2nd and 3rd parity, milking record with 25 does was range from 35 to 77 days 50 to 85 day and 55 to 80 days, respectively. The highest lactation length was observed in 2nd parity. Lactation length was increased with the parity or age, although bit higher at

Table 1: Lactation performances of does at different parity

Parameters	1st parity	SE	2nd parity	SE	3rd parity	SE	Overall	SE	F value and level of significance
Litter size (no.)	1.08a	0.11	1.76b	0.12	1.96b	0.12	1.60	0.06	2.41*
Total milk yield (ml)	274.76a	5.94	311.64b	5.94	331.60c	5.94	306.00	3.43	23.56**
Lactation length (days)	61.56a	1.89	66.4ab	1.89	67.00b	1.89	64.99	1.08	2.50*
Lactation yield (L)	16.37	0.68	20.86	0.68	21.80	0.68	19.68	0.40	17.59**
Milk yield kg^{-1} LW lactation-1 (L)	1.022	0.05	1.20	0.05	1.20	0.05	1.15	0.027	5.30*

Means with different superscripts in the same row differed significantly. * = P<0.05; ** = P<0.01

Table 2: Effect of birth type on milk yield at different parity

Parity	Single	SE	Twine	SE	Triplet	SE	F-value	Significance
1st	16.13±3.4 (n=23)	-	18.95±3.36 (n=2)	-	-	-	-	-
2nd	19.22a (n=9)	0.85	20.84a (n=13)	0.71	25.19b (n=3)	1.48	6.08	*
3rd	21.45 (n=5)	1.22	21.15 (n=16)	0.68	22.13 (n=4)	1.37	0.20	NS

Means with different superscripts in the same row differed significantly. * = P<0.05

2nd parity. Lactation lengths were longer in older than in younger does observed by Lyatuu *et al.*[12] which partially agrees with the present study. The lactation length of the present findings are lower than the findings of Chowdhury *et al.*[11] who found that average lactation length of Black Bengal goat of 1st, 2nd 3rd and 4th parity was 72, 82, 81 and 83 days, respectively. Husain[5] reported that lactation length of Black Bengal goats were 98-105 days under rural scavenging condition. Lactation length may be affected by age and management factors.

Lactation yield: Lactation yield of different parity was highly significant ($p<0.001$) and highest lactation yield was found in 3rd parity. Milk yield was shown to increase from 16.37 kg in the 1st parity to 20.86 kg and 21.8 kg in the 2nd and 3rd parity, respectively (Table 1). Lactation yield of Anglo-Nubian×Anglonubian Barbari×Barbari and Barbari ×Black Bengal goats were 171.27, 88.22 and 52.31 litres, respectively. The lactation yield of the present findings is almost similar to[11]. They also observed that milk yield increased from 26 kg at low level of feeding to 46 kg at higher level of feeding. From this result, milk yield may have affected by nutrition. Lactation yield was positively correlated with the nutrition, age, genotype and season suggested by[11,13]. Differences of genotype in total lactation yield were evident[13]. The above reasons may have confounded in milk yield observed in present study. Moreover, the amount of milk suckled by kids during the day when they were allowed to room with mother. Therefore, the data are based on partial milking. It only provided a trend of milk yield rather total yield of does.

Milk yield KLW^{-1} $lactation^{-1}$: Milk yield kg^{-1} live weight $lactation^{-1}$ for different parity (Table 1). Milk yield KLW^{-1} was 1.02, 1.20 and 1.20 kg for the 1st, 2nd and 3rd parity, respectively. Milk yield per KLW^{-1} in 1st parity is lower (1.02) than 2nd and 3rd parity (1.2 and 1.2) From the result, milk yield per KLW is increased with parity, although similar yield was in 2nd and 3rd parity.

The result from the study, concluded that Black Bengal goats have potentiality of milk production. Milk production increased with the number of parity. Milk yield will be increased due to minor traditional management practice.

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