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Research Article

Influence of feeding regime on semen quality and conception rate of Black Bengal goat's by artificial insemination under the semi-intensive system

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ABSTRACT

The research work was conducted to study the quality of semen using two different feeding regime and conception rate by artificial insemination of Black Bengal goat's under the semi-intensive system The Black Bengal goats were fed by two types of concentrate supplements and graze them on the field for 5 to 6 hours per day for a period of 6 months. Semen from buck was collected using artificial vagina and the collected semen was evaluated for physical and microscopical test (total sperm cell counts by hemocytometer, normal and abnormal sperm counts and live and dead sperm cell counts). For total count 3115 to 3120 million sperm per ml, 82% to 87% live sperm and 85 to 88% normal sperm cells were observed from the Black Bengal bucks. Goats were artificially inseminated by using a vaginal speculum and a locally developed inseminating device, and it was found that about 50% goats were conceived.

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INTRODUCTION

The initial investment for Black Bengal goat rearing is lower and the poor and low income people can easily keep goat for their livelihood and income generation. Furthermore, the government of Bangladesh has a programme for Black Bengal goat multiplication and distribution to the poor for poverty reduction. Therefore, it is important to increase the number as well as the productivity of Black Bengal goat's in Bangladesh. For increasing the number and productivity of Black Bengal goat it is essential to use the modern techniques for reproductive manipulation i.e. artificial insemination (AI) can enhance its' number and productivity. Good genetic potential buck can be disseminated easily and chiefly by AI.

For artificial insemination good quality semen is essential for better conception and to offspring of higher genetic potential. The quality of semen could be assessed by physically, chemically and microscopically. Although AI practice is abundant for cattle however, so far AI technique has not been well adapted for Black Bengal goat of Bangladesh. Therefore, this study was undertaken with the objectives (i) to collect semen from Black Bengal buck from different feeding regime and evaluate it; and (ii) to practice artificial insemination and detection of conception rate in Black Bengal goat using AI.

MATERIAL AND METHODS

This study was conducted at the research farm of Chittagong Veterinary and Animal Sciences University, Bangladesh. Initially, 16 Black Bengal goatling and four buckling were collected from the village market

according to their phenotypic characteristics. After purchasing the males and females they were quarantined for 15 days. Goats were vaccinated against PPR and flushed them for 3-4 weeks with good quality roughage and concentrate. Anthelmintics (albendazole 10%) was used before the start of the experiment to control the parasitic infestation. The goats were reared under a semi-intensive condition and divided them into two groups. Each group consists of 02 male and 08 female goats. The goats were grouped on the basis of feeding regime, group-A and B. All the goats were allowed for free grazing for 5 to 6 hours per day and they were fed with neem leave *(Azadirachta indica)*, jackfruit *(Artocarpus heterophyllus)* leave and common concentrate mix (wheat bran, maize crush, mustard oil cake and vitamin mineral premix). The group-A fed with high energy feed i.e. 10.5 Mega Joule (MJ) metabolisable energy (ME) per kg feed dry matter (DM) and the group-B (non treated group) fed with normal feeding regime. The similar feed ingredients were used as Khan et al. (2016).

Semen collection from Black Bengal buck and evaluation

Black Bengal buck semen's physiological and microscopic evaluation was conducted at the Animal Breeding laboratory of Chittagong Veterinary and Animal Sciences University. Firstly, the semen from the bucks was collected using the artificial vagina (artificial vagina's temperature was kept at 42°C). Ejaculated semen volume was recorded immediately after collection in a graduated collection vial. Then the collected semen sample was brought to the laboratory and placed in a water bath at 37°C. The physical test and mass motility were assessed by transferring a drop of undiluted semen to a warm slide (35.8°C), placing a cover slip on it, and observing it under a microscope at the 40x objective. The assessment of mass motility was made on the basis of an arbitrary scale from 0 to 5 (0 = no motility, 5 = 100% motility) (Baril et al., 1993). Then the motility of the spermatozoa was studied by placing a drop of semen on a slide and add a drop of PBS and observed it under the microscope. A field was considered to observe the different types of motility (progressive, oscillatory and rotatory). The total number of spermatozoa per ejaculate was calculated by measuring the volume and sperm concentration using a haemocytometer method (Anderson, 1945). The live and dead sperm cell was counted by eosin nigrosin stain method, and the normal and abnormal sperm cell was counted by Rose Bengal stain method (Anderson, 1945).

Study the artificial insemination and pregnancy diagnosis

The goats were bred by artificially. Artificial insemination was done by using a locally made device (the catheter made by syringe with a tube) for depositing the semen into the female reproductive tract. When the goats showed heat then they were inseminated with the fresh semen and recorded for the detection of pregnancy by Ultrasonoram and estimated the conception rate.

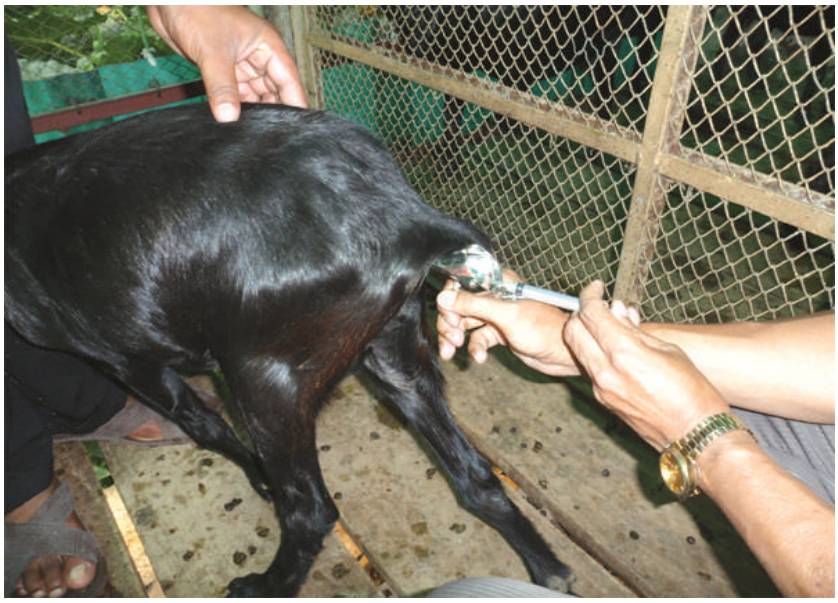

Figure 1: Insemination of fresh semen to Black Bengal doe

Statistical Analysis

The percentages were calculated by using EXCEL and the mean with the standard error was estimated by Proc GLM procedure of SAS (SAS, 2000) using completely randomized design (CRD). The mean differences were compared using least significant difference (LSD) test (Steel et al. 1997) at 5% level of significance.

RESULTS AND DISCUSSION

Semen quality

The Physiological and microscopic characteristics of Black Bengal buck semen are shown in Table 1 and 2, respectively.

Table 1. Physiological and microscopic characteristics of Black Bengal buck semen

Buck group	Volume (ml	Colour	Consistency	P^H	Mass motility	Individual motility
Group A	$0.54^b \pm 0.03$	Whitish	Thick	6.5	Scale-4	Progressive -65% Oscillatory - 20% Rounded - 15%
Group B	$0.40^a \pm 0.03$	Yellowish	Watery	6.5	Scale-3	Progressive - 55% Oscillatory - 25% Rounded - 20%

Legends: Group A - high energy feeding group; and group B - normal feeding group.

From Table 1, it can be seen that the semen from the Black Bengal buck of the group A was comparatively good than the group B in terms of physiological and microscopic characteristics. This might be due to the nutritional effect. Table 1 showed the semen volume of the group A was significantly (p<0.05) higher than the group B. The value of the current finding is similar with other researchers (Das et al. 2006; Karim, 2008; Sanjoy et al., 2011). Higher semen volume in group A might be due to the age of the bucks and nutritional effect. Semen volume of buck can vary according to breed, age, season, nutritional status, general health condition, endocrine balance and soundness of the sex organs (Peters, 2002 and Karagiannidis et al., 2000).

The concentration of spermatozoa for both groups of bucks was same (Table 2). Sperm concentration could be varied due to testicular size, animals age etc. Karim (2008) who reported the average sperm concentration ranged from 2750±28 to 3240±0.37 million/ml in Black Bengal buck, which was similar to the current study. But Sanjoy et al. (2011) and Afroz (2005) reported lower sperm concentrated than the present study. They reported averages of sperm concentrations of buck semen were 2678.33 ± 30.59 to 2913.33 ± 46.23 million/ml.

Table 2. Mean ± SE of sperm concentration, live sperm percentage and normal-abnormal count in studied Black Bengal buck's semen

Buck group	Sperm concentration (million/ml)	Live sperm (%)	Normal-abnormal sperm (%)
Group A	3115 ± 13.50	$86.75^b \pm 0.89$	88.2 ± 1.30
Group B	3120 ± 17.20	$82.76^a \pm 0.98$	84.5 ± 2.23

Legends: Group A - high energy feeding group ; and group B - normal feeding group.

The live sperm percentage was differed significantly (p>0.05) among the two group of buck (Table 3). The highest percentage of live sperm was found in the group A than the group B. The highest percentage of live spermatozoa of the animals of group A might be attributed to their nutritional status. Sanjoy et al., (2011) reported about 84.50% live spermatozoa in buck semen which was similar to the current study. On the other hand, Karagiannidis et al. (2000) reported 89.50 to 95.27% live spermatozoa in buck semen and which was higher than the present study. Sperm viability depends on a number of factors such as variations in age, breed, feeding regime (Leon et al., 1991) pH and osmolarity of semen (Makler et al., 1981). The difference in live sperm percentage of the studied groups might be due to any of the reason.

Artificial insemination and conception rate

The artificial insemination of black Bengal goats was done by using locally made devices. The conception rate for artificial insemination as shown about 50% goat was by artificial insemination. The conception rate of artificial insemination was lowered might be due to the fact of semen deposition in the inappropriate place and also the time of insemination at the end of estrus. Hasan et al. (2010) reported that pregnancy rate for Black Bengal goats was 52.38% after artificial insemination, which was slightly higher than the current study.

The study reveals that the conception rate of artificial insemination in Black Bengal goat was lower. There were some constraints in the current study which included small population size, PPR infestation etc. However, for making final comments further study with more sample size are recommended.

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