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Short Communication - Reproductive performance of Jamunapari crossbred using frozen semen

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ABSTRACT

Artificial insemination (AI) is modern techniques to introduce better and new genetic at the small holder farmer level by using frozen for livestock development. The aimed of the present study to popularization of goat's artificial insemination to increase goat production with improved genetic merit by assessing the productive and reproductive traits using Jamunapari frozen semen. The study has been conducted in ten upazila namely Paba, Bagha, Nachal, Chapai sador under Rajshahi region and Birampur, Parbotipur, Fulbari, Kaliganj, Ulipur, Kawnia upazilas under the Rangpur regions. Artificial insemination has been performed in 260 numbers of does. The semen samples initially qualified for freezing was frozen as per the protocol standardized in BRAC bull station, stored in liquid nitrogen (LN2) having the post thaw motility of 50% and were later used for AI. The service per conception was 1.10 in the present study. Moreover, we found that overall conception rate was 67.1%. The average birth weight of male and female kids was 0.98 and 0.95 kg, respectively. In the present study kidding produced single, twins and triplets in 37.7, 50.65 and 11.69% of cases, respectively. The average post-partum heat period was 76.5 days. The results indicated frozen semen AI could successfully be used for preservation, conservation and propagation in Jamunapari goats.

Introduction

Bangladesh has only one goat breed known as the Black Bengal goat. Black Bengal goat is a famous breed for high fertility, prolificacy, best quality skin, early sexual maturity, resistance against diseases, seasonality, low kidding interval and very good adaptability (Husain, 1999). On the other hand, Jamunapari (JP) is the dairy goat breed in India (Rout *et al.*, 2002). In Bangladesh, JP breeds are mostly foudn in Chuadanga, Meherpur, Kushtia, Jhenidah, Pabna, and Jessore districts (Faruque and Khandoker, 2007) and scatteredly found in Barishal division. It is one of the best dual purpose breeds, rearing for its milk as well as meat production. It is also prolific, twin and triplet births being common (Khan *et al.*, 1989).

Goat has been recognized as an excellent tool for poverty alleviation. To make the enterprise economically viable, overall goat production systems need to be modified and improved. But unfortunately, there is severe shortfall of stud bucks all over the country. In most situations, same buck has been used generation after generation which has created greater chance of increasing inbreeding and hence lowering reproductive performances along with disseminating various venereal diseases (Husain, 2007). On the other hand, goat farmers castrate almost all the male kids at an earlier age for economic and social reasons. Therefore, there remains no chance for judging breeding soundness and fertility of the buck. However, it is well established that the selection of good quality bucks and their widespread use could improve the overall potential production of goats (Husain, 2007). The selection of superior quality bucks could only be exploited rapidly using artificial insemination (AI) technique. Though AI has gained widespread acceptance in dairy cattle industries of most developed countries and is now-a-days also popular in Bangladesh. However, interest in AI in goats has

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increased day by day after achieving its outstanding success in cattle. There are very limited practices on semen collection, preservation and AI in goat in Bangladesh. Therefore, preservation of buck semen and performing AI in goat is vital need which would lead to increase conception rate with rapid genetic merit.

For this circumstances, the research will undertaken to produce superior quality bucks semen, implementation of AI to speed up of goats production with increased genetic merit will meet up the high quality protein requirement and improve socio-economic impact on the livelihoods of rural people. So, the aim of present study is to popularization goats' artificial insemination in Jamunapari and their crosses to increase goat production with improved genetic merit.

Materials and Methods

Selection and management of experimental animals

Two hundred sixty (260) pure Jumapnapari and their crossbred healthy does of 7 to < 18 month of ages were selected from Rajshahi, Chapainababgonj, Rangpur, and Natore districts for artificial insemination. After selection, all does were marked with tag for data collection. Regular vaccination (namely *Peste des petits* ruminants (PPR), goat pox) was done to prevent the contagious diseases. Deworming drugs was provided timely.

Table 1: Seminal traits of Jamunapari Buck

Parameters	Value
Average Volume (ml)	1.1±0.05
Mass Activity (0–5 scale)	4±0.17
Initial progressive motility (%)	75%±1.36
Post thawed motility (%)	50%±0.59
Sperm Concentration (10^6/ml)	5717±1.51

Semen collection, evaluation and dilution

Ejaculates from bucks aged between 2–4 years old from Jamunapari were collected using artificial vagina, twice a week. After collection of semen, the volume, colour, consistency, and mass motility of ejaculate were assessed and were extended with Triladyl based egg yolk diluents. Semen having mass motility >4 and progressive motility >75% were taken for this study as this quality of semen sample qualify for freezing process (Table-01).

Artificial insemination in estrous goat

Intra-cervical AI was used to get maximum benefits. For Intra cervical AI, the estrous goat lifted from back for clear visualization of genitalia. A lubricated glass vaginal speculum was inserted through vagina for visualization of cervical opening. Then frozen thawed Jamunapari semen (supplied by BRAC AI Enterprise) straw was inserted through vaginal speculum which passed through cervical opening and semen was deposited there and lifted back side of goat for 5-10 min. The insemination was carried out 24~36 h after detection of estrous. After 45 days, all of the does were checked using ultrasonography machine (Draminski) to determine pregnancy. The following productive and reproductive traits were observed: service per conception, conception rate, the type of kid born (single kidding, twinning rate, and triplet rate), birth weight of kids and post-partum heat period. Analysis was done using standard software statistical analyses of Microsoft excel. Results were expressed as the percentage, mean ± SD.

Results and Discussions

The productive and reproductive traits: birth weight of kids, service per conception, conception rate, birth type and post-partum heat period, were analyzed that are presented in Table 2.

Table 2: Reproductive performance of JP goats at farmers' level

Sl. No.	Parameters		Value
1	Service per conception (No.)		1.1±0.70
2	Conception rate (%)		67.1
3	Birth type (%)	Single	37.66
		Twin	50.65
		Triplet	11.69
4	Birth weight of kids (Kg)	Male kids	0.98±0.43
			0.95±0.38
		Female kids	
5	Post partum heat period (months)		2.55±0.52

The service per conception was 1.10 in the present study. This result is slightly lower but similar to the observation of Faruque (1999) and Korathar et al., (1998) who recorded 1.24 and 1.23, respectively. Miah et al., 2016 shown that the service per conception was 1.34±0.085. Hassan et al., (2007) reported that the number of services per pregnancy was 1.3±0.6. Difference of number of services per conception may be due to lack of proper detection of heat and methods of insemination to the does. Our study demonstrated that overall conception rate was 67.1%. Kharche et al., (2013) reported that in Jamunapari does inseminate with frozen semen the conception rate was 53.13 which is lower than the present study. This variation may be due to initial semen quality and freezability, method of AI and skill of inseminator. The average birth weight was found 0.98 and 0.95 kg in male and female kids, respectively (Table 1). Hassan et al., (2010) found the average body weight of Jamunapari kid was 1.6 kg, which is higher than the present study which may be due to management, feeding and nutritional condition of the goats. In the current study kidding produced single, twins and triplets in 37.7, 50.65 and 11.69% of cases,

respectively in Jamunapari goat. Research found that JP does produce single, twins and triplets in 46.8, 46.8 and 6.25%, respectively (Miah *et al*., 2016). The average post-partum heat period for Jamunapari goat was found 76.5 days, whereas Miah *et al*., (2016) found 63.25±4.3 days, similar results was found in the present study.

Conclusion

The results indicated that Artificial Insemination using frozen semen could successfully be used in goats with satisfactory conception rate for preservation, conservation and propagation especially Jamunapari goats. Therefore, artificial insemination in Jamunapari goats will become a less costly tool for genetic improvement.

Authors Contribution

MM Rahmana contributed to collection of data and reviewed the manuscript, ME Ali contributed to the entire study work for collection of data, MA Latif helped to collection of semen and prepare frozen semen, M Fakruzzaman designed, writing the manuscript and reported this study.

Data Availability

All data underlying the results are available as part of the article.

Conflict of interest: The authors declare no conflict of interest.

Consent to Participate

All the authors are agreed to participate for any further clarification.

Consent for Publication

All the authors give full consent for the publication of this study in the Bangladesh Journal of Animal Science.

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