RESEARCH PAPER

Breeding practices of cattle at the villages of Dinajpur district in Bangladesh

Jahura Begum[1], Ashika Akbar Trisha[2], Md. Kamrul Hasan Majumder[3],

Md. Shamsul Hossain[4], Farukul Islam[*4]

[1]*Department of Dairy Science, Bangladesh Agricultural University, Mymensingh, Bangladesh*

[2]*Department of Livestock Services, Farm gate, Dhaka, Bangladesh*

[3]*Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh*

[4]*Department of Animal Breeding and Genetics, Bangladesh Agricultural University,*

Mymensingh, Bangladesh

Abstract

To explore the genetic potential of a breed, nutrition, care and breeding practices are the most important prerequisite. So to gather information about breeding practices exercised at the studied villages and learn about knowledge gap of cattle keeping farmers, this research work was designed and conducted. The study was conducted at the villages of Dinajpur district in Bangladesh during June to July 2016. A total of 301 farmers were randomly selected to collect data on cattle breeds kept, milk production, mating systems, knowledge of farmers about genetic relationship of breeding bulls and cows. Collected data were analyzed using SPSS software. Secondary level educated peoples (52.82%) were dominating the cattle farming. Farmers kept Deshi (68.11%), Holstein-Friesian (38.87%), Shahiwal (14.29%) and Jersey crossbred cattle. Most of the farmers (69.77%) were practicing artificial insemination (AI) system to inseminate their cows. During insemination their cows (neither in natural nor in AI system) they collected information on genetic merit of breeding bulls. Many farmers (57.81%) reported that peak milk production was in the second month of lactation period of their lactating cows and average milk production was 7.25±0.67 liter/day/cow. Per farm female and male cattle numbers were 4.34±0.22 and 2.84±0.12, respectively. Many farmers did not consider the genetic relationship between breeding bulls and breeding cows during insemination. Present research findings might be suggested that, knowledge of farmers in the study area in cattle reproductive management was very poor.

* Corresponding Author: Farukul Islam ✉ farukkrishibid@gmail.com

Introduction

Being a vital component of agriculture, livestock is contributing 3.10% to gross domestic products (GDP) in Bangladesh and more than 6% of total foreign exchange earnings is coming from this sector (BER, 2015). In Bangladesh, per capita milk and meat requirement are 250 ml/day and 120 gm/day, respectively but per capita availability of milk and meat are 120 ml/day and 102 gm/day, respectively (BER, 2013). Bangladesh has the greatest potentiality with proper utilization of its huge man power to increase milk production (Islam *et al.*, 2017). Both for satisfying animal protein requirement and production of quality beef there are great potentialities for organic beef cattle production in Bangladesh, because different inorganic substances are used for beef cattle fattening (Hossain *et al.*, 2016a). In Bangladesh, introduced exotic breeds like Holstein-Friesian, Jersey crossbred, Shahiwal crossbred, Hariana, Sindhi, Australian and improved varieties like: Pabna Cattle, Red Chittagong, Munshiganj Cattle and North Bengal Grey Cattle etc are available (Banglapedia, 2014).

The Friesian x Local crossbred animals contributes about 24% of the 6.9 million breedable cows and heifers (Huque *et al.,* 2011) and their milk production performance under Bangladesh condition considerably improved over the decades (Bhuiyan, 2011). By increasing the concentrate ratio in the diet from 30 to 45 %, digestibility of organic matter and crude protein were improved and the milk yield also increased but there was no effect on milk composition (Tuan, 2000). Feed intake, through supplementation of straw-based diets with vigna hay, nutrient digestibility and live weight gain of indigenous cattle were improved in Bangladesh (Hossain *et al.,* 2015).

Among the various mating systems, to improve genetic merit of the dairy animals, crossbreeding of local non-descript cattle with exotic breeds of high genetic potential is considered to be a rapid and effective method (Usman *et al.*, 2012). Progeny tested bulls are new additions as proven bull in dairy cattle industry, for dairy development in the country are in progress (Bhuiyan *et al.*, 2015).

Many research works have been carried out using exotic hi-yielding breeding bulls through crossbreeding with local cattle to improve milk and meat production. But published data of systematic research investigation in breeding practices exercised by village cattle keepers of Dinajpur district in Bangladesh is scanty. So, the present study was designed and conducted to gather information about practices exercised in insemination, breeding bull selection and reproduction for Deshi and Crossbred cattle in study area.

Materials and methods

Site and farmers selection

A total of 301 cattle farmers at 95 villages under 13 upazilas (sub-district) like DinajpurSadar, Biral, Bochaganj, Birganj, Kaharole, Khanshama, Birampur, Chirirbandar, Parbatipur, Nawabganj, Fulbari, Ghoraghat and Hakimpur of Dinajpur district in Bangladeshduring June to July 2016, were randomly selected to explore knowledge about productive and reproductive management systems practiced for their cattle.

Data collection and experimental design

A pre-structured and tested questionnaire was used to collect data. An in-depth survey was performed by door to door visit and detail information on cattle breeds kept, milk production, mating systems, knowledge of farmers about genetic relationship of breeding bulls and cows etc. were collected.

The design of the study was unbalanced factorial in nature, as observation number of different traits was unequal.

Data analysis

Collected data were entered into the MS excel sheet and then these were edited for further processing. For having frequency, percentages and mean value, descriptive statistics menu under the Statistical Package for the Social Sciences version 14.0 were used (SPSS, 2005).

Results and discussion

Educational qualification of farmers

Interestingly it was observed that, higher educated (BA and MA pass) peoples were also engaged in cattle farming in the enumerated zone and most of the farmers (30.23%+22.59%=52.82%) were class eight to SSC pass (Table 1).

Table 1. Educational qualification of cattle farmers in the villages of Dinajpur district.

Level of education	Number and percent of farmers
Signature	6 (1.99)
Five	58 (19.27)
Eight	91 (30.23)
SSC	68 (22.59)
HSC	39 (12.96)
BA/BSc	32 (10.63)
MA/MSc	7 (2.33)
Total	301 (100.00)

Similarly, Islam *et al.* (2016) found that education level of cattle farmers were classified as B.A. to M.A. (19.60%), H.S.C (56.10%) and S.S.C (24.30%). The above findings might be indicative that, secondary level educated peoples were dominating the cattle farming in the villages of Dinajpur district.

Breeding practices of cattle

Most of the farmers kept Deshi (indigenous) cattle but some of them reared Holstein-Friesian crossbred and a few farmers' had Shahiwal and Jersey crossbred cattle (Table 2).

Table 2. Cattle breeds kept, insemination process and mating systems practices at the villages of Dinajpur district.

Parameter	Number of farmers	
Cattle breed kept	Deshi	205 (68.11%)
	Holstein Friesian crossbred	117 (38.87%)
	Jersey crossbred	4 (1.33%)
	Shahiwal crossbred	43 (14.29%)
Insemination process	Artificial insemination	210 (69.77%)
	Natural insemination	91 (30.23%)
Information about genetic merit of breeding bulls	Consider breeding bulls merit	130 (43.19%)
	Do not consider	171 (56.81%)
Mating system	Close mating	16 (5.32%)
	Do not perform close mating	120 (39.86%)
	Do not take care about	165 (54.82%)

On the contrary, Hossain *et al.* (2005) observed that farm owners kept mainly Friesian cross and Jersey cross cattle but a few of them reared indigenous cattle. However, Taurine (*Bostaurus*) and Zebu (*Bosindicus)* cattle were found in five regions of the Kingdom of Saudi Arabia (Al-Atiyat*et al.*, 2015). Artificial insemination system was exercised by the majority of the enumerated farmers (69.77%) for their cows and similarly, 87% cows were inseminated artificially and a few cows were inseminated using natural or artificial system (Hossain *et al.,* 2005).

However, many of them did not collect information on genetic merit of breeding bulls before

insemination their cows. But very interestingly, a few farmers used close relatives like son; full sib brother and sire to inseminate their heated cows, on the other hand, many of the farmers even, did not take care about the genetic relationship between cow and inseminating bulls. According to Henryon *et al.* (2014), for animal breeding, genomic information is an exciting prospect and breeding plans using genomic information, maximize long-term genetic gains in breeding schemes. The above discussions might be suggestive that, though artificial insemination systems were exercised but many farmers were not aware about genetic merit of inseminating bulls and genetic relationship between inseminating bulls and cows.

Table 3. Peak milk production and facility for parturition.

Parameter	Number of farmers	
Peak milk production month	First month of lactation	15 (4.98%)
	Second month of lactation	174 (57.81%)
	Third month of lactation	112 (37.21%)
Having Separate room or living facility for parturition	Yes	99 (32.90%)
	No	202 (67.10%)

Peak milk production period and parturition facility
Many farmers reported that peak milk production was in the second month of lactation period of their lactating cows and a few of them said their cows produced peak milk at the first month of the lactation period (Table 3). Similar findings were reported by Hossain *et al.* (2016b), who found peak milk production in a whole lactation period for both local (86.67%) and crossbred (80.95%) cows in Bangladesh were the second month of the lactation period.

Table 4. Milk production and number of cattle per farmer in the villages of Dinajpur district.

Parameter	Unit	Highest	Mean ±SE	Lowest	CV%
Milk production in liter (70 cattle)	Liter	30	7.25±0.67	2	77.66
Female cattle (293 farmers)	Nos.	34	4.34±0.22	1	85.71
Male cattle (282 farmers)	Nos.	19	2.84±0.12	1	69.01

But there was a matter of regret that many farmers did not have separate space and facility for their pregnant cows to take special care before, during and after parturition and this might be indicative that, farmers could not pay for or were not aware and knowledgeable about how to manage a safe parturition of their pregnant cows.

Daily milk production and number of cattle per farm
Daily milk production (Table 4) for human consumption purpose per cow was higher than (2.1 litres) the mean daily milk production for same purpose by Mursi cattle per cow (Terefe *et al.,* 2015).
We found lower number of cattle per household than Hossain *et al.* (2005), who reported the average numbers of cows in the farms were 11.1 and 1.89 for crossbred and indigenous cattle, respectively.

Conclusion
Secondary level educated peoples were dominating the cattle farming in the villages of Dinajpur district. Most of the farmers kept Deshi (indigenous) cattle but some of them reared Holstein-Friesian crossbred and a few farmers' had Shahiwal and Jersey crossbred cattle. Daily milk production for human consumption per cow was 7.25±0.67 liters. Though artificial insemination systems were exercised but many farmers were not aware about genetic merit of inseminating bulls and genetic relationship between inseminating bulls and cows. A few farmers used close relatives like son; full sib brother and sire to inseminate their heated cows. Many farmers reported that peak milk production was in the second month of lactation period of their lactating cows. Farmers did not provide with separate and special house for parturition to their pregnant cows.

References
Al-Atiyat RM, Aljumaah RS, Abudabos AM, Alghamdi AA, Alharthi AS, Al-Jooan HS, Alotybi MN. 2015. Current situation and diversity of indigenous cattle breeds of Saudi Arabia. Animal Genetic Resources. **57,** 39–49. Banglapedia, Banglapedia, National Encyclopedia of Bangladesh. http://en.banglapedia.org/index.php?title=Cattle

BER. 2013. Bangladesh Economic Review (BER), Economic Division, Ministry of Finance. The Government of the People's Republic of Bangladesh www.mof.gov.bd

BER. 2015. Bangladesh Economic Review (BER), Economic Division, Ministry of Finance. The Government of the People's Republic of Bangladesh, from
www.mof.gov.bd

Bhuiyan AKFH. 2011. Progeny Tested Seed Bull Production: Progress towards National Dairy Development. Keynote paper presented at the 3rd National Seminar of Breed Up-gradation through Progeny Test Project held on 15 June 2011 at BIAM, Dhaka.

Bhuiyan AKFH, Rashid MM, Khan RA, Habib MA, Bhuiyan MSA, Faiz MA. 2015. Progeny tested bull production for dairy cattle development in Bangladesh. Bangladesh Journal of Animal Science **44(2),** 106-112.

Henryon M, Berg P, Sørensen AC. 2014. Animal-breeding schemes using genomic information need breeding plans designed to maximize long-term genetic gains. Livestock Science **166,** 38–47.

Hossain MD, Hossain MM, Hashem MA, Bhuiyan KJ. 2016a. Organic beef cattle production pattern at Shahjadpur Upazilla of Sirajgonj district in Bangladesh. Bangladesh Journal of Animal Science **45(1),** 25-30.

Hossain MM, Alam MM, Rashid MM, Asaduzzaman M, Rahman MM. 2005. Small Scale Dairy Farming Practice in a Selective Area of Bangladesh. Pakistan Journal of Nutrition **4(4),** 215-221.

Hossain MS, Islam F, Rashid MHO, Leena SA, Sarker SC. 2016b. Productive and Reproductive Performances of Holstein Friesian ×Local Crossbred and Pabna×Pabna Cattle Genotypes. International Journal of Business, Social and Scientific Research **4(4),** 261-266.

Hossain MS, Miah MY, Khandaker ZH, Islam F. 2015. Effect of different levels of matikalai (*Vigna mungo*) hay supplementation to straw-based diets on feed intake, digestibility and growth rate of indigenous cattle. Livestock Research for Rural Development **27 (2).**

Huque KS, Dev GK, Jalil MA. 2011.High yielding dairy breed development in Bangladesh- limitations and opportunities. Paper presented in international workshop on "High yielding dairy breed development in Bangladesh" held at Bangladesh Livestock Research Institute, Dhaka from 28-29 September.

Islam F, Alam MP, Hossain MS, Leena SA, Islam MR, Hasan SMR. 2016. Prospects and challenges of homestead cattle production in the villages of Chapai Nawabganj District in Bangladesh. International Journal of Agronomy and Agricultural Research **9(6),** 44-50.

Islam F, Faruque MO, Ferdous F, Joya SH, Islam R, Hossain MS. 2017. Effect of genetic and non-genetic factors on milk production performance of Holstein-Friesian×Local crossbreds at the villages of Noakhali district in Bangladesh. Research in Agriculture, Livestock and Fisheries **4(1)**, 21-28.

SPSS. 2005. Windows for version-14.0. Release on 27.10.2005. (Microsoft Corp. 1998). Trends SPSS Inc., Michigan Avenue, Chicago, IL. 19-182.

Terefe E, Tadelle D, Aynalem H, Wudyalew M, Okeyo M. 2015. On-farm phenotypic characterization of Mursi cattle in its production environment in South Omo Zone, Southwest Ethiopia. Animal Genetic Resources **57,** 15–24.

Tuan BQ. 2000. Effects of Protein and concentrate levels on rumen digestion and milk production of crossbred dairy cattle in Hanoi. PhD Thesis. University of Agriculture, Hanoi, Vietnam.

Usman T, Guo G, Suhail SM, Ahmed S, Qiaoxiang L, Qureshi MS, Wang Y. 2012. Performance traits study of Holstein-Friesian crossbred cattle under subtropical conditions. The Journal of Animal and Plant Sciences **22(2),** 92-95.