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Production performance, management practices and treatment response of native anoestrus bubaline at Coastal areas of Bangladesh

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Abstract

Background

The purpose of the study to find out the productivity, existing management system and pregnancy rate of anestrous buffalo cows following hormonal treatment protocol at the Coastal areas of Bangladesh.

Methods

The study was conducted during the period from August 2017 to May 2018 at Charfashion and Golachipa upazila of Bhola and Patuakhali district, respectively. A total of 101 buffalo cows' data were collected randomly by using an interview schedule as well as examination of genital system by rectal palpation. Among them, 60 anoestrus buffalo cows were selected for four treatment protocol: treatment-A (anthelmintics+vitamin), treatment-B (injection of PGF2α), treatment-C (injection of GnRH) and treatment-D (Injection of GnRH+PGF2α).

Results

Out of 101 buffalo cows, the calving interval, number of service required per conception, gestation length, milk yield per day, lactation length, post-partum anoestrous period, number of days of peak milk yield, total milk yield of 305 days were 379.21±7.87 days, 1.13±0.03 times, 318±0.05 days, 2.42±0.05 liters, 156.53±3.06 days, 101.98±1.06 days, 98.07±207 days and 745.89±15.46 liters, respectively. We found that the buffalo cows were reared significantly ($p<0.05$) in extensive system (82.18%) and 100% farmers used to feed the calf directly from its mother. The de-worming, vaccination and showering of cows were not practiced properly. In case of treatment response, the estrus and pregnancy rate of treatment A, B, C and D were 20 and 13.3%, 33.3 and 20%, 40 and 26.7%, and 66.7 and 46.7%, respectively.

Conclusions

It may be concluded that the rearing system of buffaloes at the coastal areas of Bangladesh is not followed the scientific method, which provides bad impact on the productive and reproductive performances of buffaloes. The treatment of anoestrus buffalo cows with GnRH and PGF2α is recommended to have better oestrus and pregnancy rate.

Key words: Anoestrus, buffalo, coastal area, productivity, hormone

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Introduction

Buffalo is one of the most economically important species not only in Bangladesh but also in the world. But, the popularity of buffalo rearing is not higher than that of cattle in Bangladesh. Bangladesh has about 1.3 million buffaloes (DLS, 2009) mostly found in the Brahmaputra-Jamuna flood plain of central Bangladesh and Ganges-Meghna flood–plain of southern Bangladesh. Buffaloes are mainly raised under an extensive system in the coastal and hilly areas where large scale pasture land and enough green forages are available (Faruque, 2003).

The dynamics of buffalo production systems in South Asia is transforming day by day due to increase in the population more rapidly, especially in Asia, for its emerging role in economic development. Buffalo production system varies widely in accordance with climatic condition, soil-type and socio-economic opportunities in Bangladesh (Saadullah, 2012). Buffaloes always graze through long way of inland nearby in the case of extensive feeding practices in coastal areas. In these areas, approximately 22.13% of farmers supply only straw and 69.00 % straw with roughage and 8.87% of farmers' supplies only concentrate to their buffaloes. 11%, 5% and 84% farmers rear buffaloes for milk purpose, meat purpose and, milk and meat purpose respectively (Islam *et al.*, 2017). There are several published reports regarding productive and reproductive parameters and management systems of buffalo cows throughout the world (EI-Kirabi, 1995), but there is very limited information about this issue in context of Bangladesh, especially in coastal areas (Faruque *et al.*, 2003).

Anestrus is the most important cause of poor reproductive performance in buffaloes (Das and Khan, 2010; Devkota *et al.*, 2012). Several methods of estrus and ovulation induction using hormones have been recently developed in buffaloes for treating anestrus and improving reproductive efficiency (De Rensis *et al.*, 2007). More veterinarians have started to use hormones, such as PGF2α and GnRH, for the treatment of anestrus in buffaloes. However, the low management system, poor nutrition, lack of feed supply and climatic condition are the main challenges for buffalo reproduction at the island coastal areas. To our knowledge, there is no report on hormonal synchronization of buffalo at the Coastal areas of Bangladesh. Therefore, the aim of the study to find out the productivity, existing management system and pregnancy rate of anestrous buffalo cows following hormonal treatment protocol at the Coastal areas of Bangladesh.

Materials and Methods

Study area and period

The study was conducted during the period from August 2017 to May 2018 at Char fashion and Golachipa upazila of Bhola and Patuakhali district, respectively.

Data collection

A total of 101 data were collected directly from the farmer by using an interview schedule and observation of buffalo cows. The interview schedule was included the information about breed, parity, age, body condition score (BCS), cliclicity, number of artificial insemination (AI), history of dystocia in last calving, calving interval, gestation length, milk yield, lactation length, post-partum anoestrus period, days of peak milk yield, total milk yield on 305 days, feeding system, calf feeding, de-worming, vaccination and cow showering of the buffalo cows. The reproductive features were examined by per rectal palpation of genital system. The demography data on buffaloes are shown in Table-1.

Experimental design:

A total of 60 anoestrus buffalo cows were selected for hormonal treatment protocol. Firstly the cows were treated with anthelmintic bolus containing triclabendazole 900mg and levamizole 600mg per 75-100 kg body weight (Renadex®, The Reneta Animal Health Ltd., Dhaka, Bangladesh), injection of 10 ml of vitamin ADE (Renasol® AD_3E, Renata Limited, Dhaka, Bangladesh) and supply of 5-10mg multivitamin powder (Renavit® DB, Renata Limited, Dhaka, Bangladesh). The selected cows were grouped

into four groups (A, B, C D and E) and each group consists of 15 animals.

Treatment - A (Control group)
Animals were treated with anthelmintics, vitamin ADE (Renasole® AD_3E, Renata Limited, Dhaka, Bangladesh) and multivitamin powder (Renavit® DB, Renata Limited, Dhaka, Bangladesh). Buffalo cows were inseminated by government Ai technicianafter observing estrus signs .

Treatment - B (PGF2α)
2 ml of Ovuprost® was injected intramuscular (IM) and inseminated the cows after observing estrus signs.

Figure 1: Protocol B

Treatment – C (GnRH)
2.5 ml Ovurelin was injected IM and inseminated the cows after observing estrus signs.

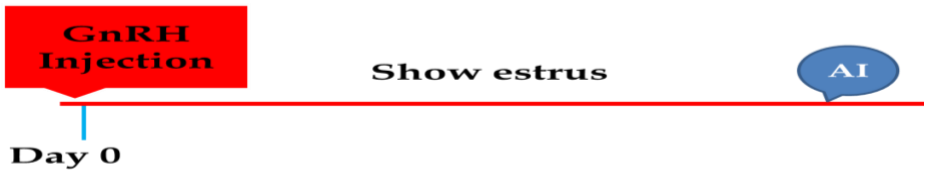

Figure 2: Protocol C

Treatment - D (GnRH +PGF2α)
At first 2.5 ml Ovurelin was injected IM followed by injection of 2 ml Ovuprost after 7 days. The animals were inseminated within after observing estrus signs.

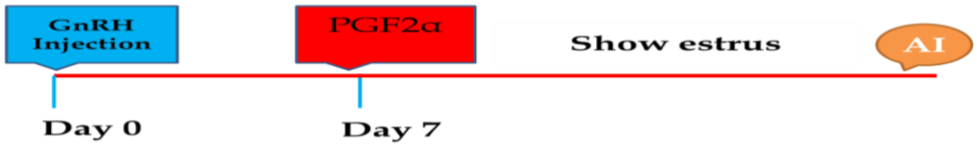

Figure 3: Protocol D

Estrus detection and timing of AI
The farmers detected the oestrus of cows observing Dorling of mucous from vagina, Bellowing, Excitement, Inappetance and others. On per rectal palpation, coiled and tonous uterus. The cows were inseminated between 6-20 hours of onset of oestrus.

Table 1. Demography of animals

Factors	Value
Total number of observation in study	101
Breed	Local
Parity	1 to 7
Age	3-12 years
BCS	2.5-3.5

Statistical analysis

The collected data were input in the Microsoft Excel sheet for coding and analysis. The rate of different variables was expressed as percentage (%). The mean ± standard error and the analysis of variance were analyzed by using SPSS® statistical software (Version 20.0). The statistical differences were considered significant at the level of $P< 0.01$ and $P< 0.05$.

Result and Discussion

Productive performances

Calving interval

The average calving interval of native buffaloes in coastal areas was 379.21 days (Table 2). Our finding has the similarity with Parera *et al.* (1987) who found that the average calving interval of indigenous buffaloes in Sri-Lanka was 384.9 days. However, comparatively higher rate was observed by the study of EI-Sheikh and Mohammed (1967) who reported that first calving interval of Egyptian buffalo was 484.74 days. Fadzil (1969) carried out an experiment on Swamp buffalo in Malaysia under village condition and found that calving interval was 639 days.

Table 2. Productive and reproductive performances of buffalo cows

Parameters	Mean ±SE
Calving interval (day)	379.21± 7.87
Service per conception	1.13 ±0.03
Gestation length (day)	318 ±0.05
Milk Yield (liter/day)	2.42 ± 0.05
Lactation length (day)	156.53 ± 3.06
Post-partum anoestrous period (day)	101.98 ± 1.06
Days of peak milk yield (number)	98.07 ± 2.07
Total milk yield of 305 days (liter)	745.89± 15.46

Services per conception

The average number of services required per conception of buffalo cows in the study area was 1.13 (Table 2). Uddin et al. (2016) reported slightly higher average number of services per conception of buffaloes as 1.19.

Gestation length

In the study, the average gestation length of indigenous buffalo cows was 318 days (Table 2). EI-Sheikh and Mohammed (1967) found the average gestation period of Egyptian buffalo as 316.70 days. Joshi *et al.* (1968) found the average gestation length in Indian buffalo cows as 308 ± 9.6 days. So, the finding of the present study is similar to the findings of various researchers as mentioned above.

Milk yield per day

The average milk yield of indigenous buffalo cows was 2.42 liters/day (Table 2). Similarly, Hussen (1990) found that the average milk yield per day was 2.3 liters. Huque and Shahjahan (2016) reported the daily average milk production as 2.8 liters/day.

Lactation length

The average lactation length of indigenous buffalo cows was 156.53 days (Table 2). Hussen (1990) mentioned that the average lactation period of buffaloes in Tangail district as 328.89 days. Huque and Shahjahan (2016) reported the average lactation length as 227 days. The lactation length of our study animals was lower than that of others report. It is due to scarcity of food at the island areas.

Post-partum anoestrous period

The average post-partum anoestrous period was found 101.98 days (Table 2). Tailor *et al.* (1997) reported that the range of post-partum anoestrus period varied from 30-171 days whereas Uddin *et al.* (2016) reported that the average post-partum anoestrous period was 125 days.

Days of peak milk yield

The average days of peak milk yield of native buffaloes at coastal areas of Bangladesh were 98.07 days (Table 2). It was very short due to unavailability of food as well as poor management system.

Total milk yield of 305 days

The average milk yield of 305 days was 745.89 liters (Table 2). The result coincided with the result of Faruque *et al.* (1990) who reported that the annual milk yield was 712 liters for buffaloes in Mymensingh district. Faruque and Amin

(1995) reported that the annual milk yield of indigenous buffalo in Khulna region were 280 liters. Hussen (1990) found a total milk yield of 830 liters for buffaloes in Tangail district.

Management system

Feeding system

In the study, farmers were used to practice extensive feeding system (82.18%) which was significantly ($p<0.05$) higher than that of semi-intensive (10.89%) and stall-feeding (6.93%) (Table 3). Uddin *et al.* (2016) reported that about 88% buffaloes were fed in extensive feeding system and only 12% were fed in semi-intensive feeding system at the coastal areas in Bangladesh.

Table 3. Management systems of buffaloes

Parameter	Variable	Number	%
Feeding System	Stall feeding	7	6.93[a]
	Semi-intensive	11	10.89[a]
	Extensive	83	82.18[b]
Calf feeding	Freely directly from mother	101	100[a]
	Bottle feeding	0	0[b]
De-worming	Regularly	34	33.66[a]
	Irregularly	67	66.34[b]
Vaccination	Regularly	42	41.58[a]
	Irregularly	59	58.42[b]
Showering	Regularly	5	4.95[a]
	Irregularly	21	20.79[b]
	None	75	74.26[c]

[a,b, c] Values with different superscripts within same column differed significantly from each other ($P<0.05$).

Calf feeding system

The study showed that 100% buffalo calves took feed and got colostrum freely directly from mother (Table 3). The bottle feeding was not practiced at study area.

De-worming

In the study area, the percentage of de-worming at regular interval (33.66%) was significantly ($p<0.05$) lower than that of de-wormed irregularly (66.34%). It was clearly noticed that most of the buffalo owners were not aware for de-worming programs at the coastal areas. Uddin *et al.* (2016) also stated that the farmer has the lack of knowledge about de-worming their buffaloes.

Vaccination

The percentage of vaccination regularly (41.58%) was significantly ($p<0.05$) lower than that of vaccinated regularly (58.42%). Uddin *et al.*, (2016) and Faruque *et al.* (1990) also reported the similar results.

Showering

We found that the showering of milking cows used by farmers were 4.95% which was significantly ($p<0.05$) lower than that of regularly (20.79%). However, most of the farmers (74.26%) were not used shower the buffalo cows.

Effect of treatment on oestrus and pregnancy rate

After treating the anoestrus buffalo cows with different treatment protocols, the estrus and pregnancy rate of treatment A, B, C and D were 20 and 13.3%, 33.3 and 20%, 40 and 26.7% and 66.7 and 46.7%, respectively. The oestrus and pregnancy rate in group D (GnRH+PGF2α) were significantly ($p<0.05$) higher than that of group A, B and C. The trend line in both oestrus and pregnancy rate were showed rise up lines (Figure-4).

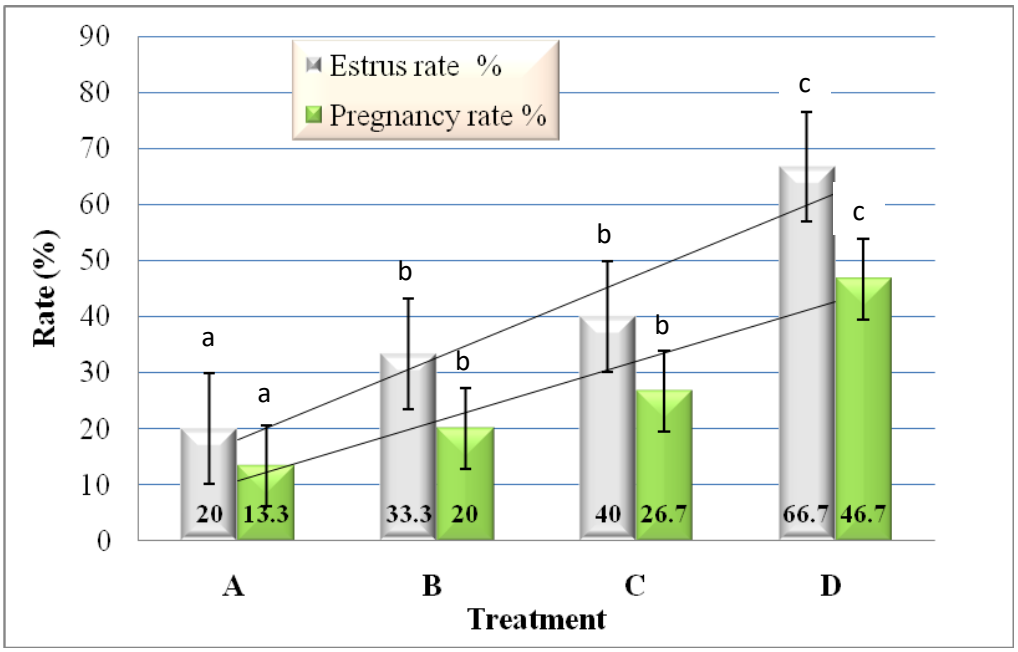

Figure 4. Estrus and pregnancy rate of cows in different group. ([a,b, c] Values with different superscripts within same column differed significantly from each other (P<0.05).

Administration of GnRH to anestrus buffaloes with inactive ovaries has been shown to produce a variable response (Barile, 2005). It has also been reported that a mid-cycle CL in cyclic buffaloes is sensitive to PGF2α (Dhaliwal *et al.*, 1988), and efficacy of PGF2α in buffalo cow is dependent upon CL size before treatment (Baruselli, 2001). The effect of treatment of anestrus buffaloes with PGF2α obtained in this study was closer to the results reported in previous studies Devkota *et al.*, 2012). The findings of the study were comparatively lower than that of the report of Khamas (2011) who reported the oestrus and pregnancy rate were 83.33 and 60%, respectively. Nutrition is one of the most important factors influencing reproductive performance in cattle (Butler, 2000). Several factors including nutrition affect the response of buffaloes with anoestrus to treatment (Das and Khan, 2010). It has been reported that BCS affects the response of anoestrus dairy cows after treatment (Rhodes *et al.*, 2003) and the success of timed AI after ovulation synchronization in beef cattle (Stevenson *et al.*, 2000).

Conclusion

It may be concluded that the management system of native buffaloes at the coastal areas of Bangladesh is not maintained in a proper scientific way, which provides bad impact on the productive and reproductive performances of buffaloes. The feeding system is still traditional and buffaloes are not getting balanced ration or feed as they require. Vaccination and deworming are not regularly practiced here. Most of the farmers perform vaccination and deworming to the buffaloes occasionally. The treatment of anoestrus buffalo cows with GnRH and PGF2α is recommended to have better oestrus and pregnancy rate.

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Conflicts of interest

The authors declare no conflicts of interest.

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