Bangladesh Veterinary Journal (2021) 55(1-4): 55-59
pISSN 0378-8113 •eISSN 2708-6054
https://doi.org/10.32856/BVJ-55-2021.06

Research Article

OPEN ACCESS

Prospect of brahman beef cattle farming in military farms of Bangladesh

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Abstract

Beef cattle farming is very much popular throughout the world to fill up the growing demand for animal protein. Beef cattle production is an integral part of farming in Bangladesh. Therefore, the present cross-sectional study was aimed to evaluate the birth weight and growth rate of three types of cattle including Brahman-Holstein Frisian- crossbred, Holstein -Friesian crossbred and indigenous cattle at three Military Farms of the Bangladesh Army. For this study, the retrospective data were collected on birth weight and yearly growth rate of 48 crossbred calves among which Brahman- Holstein Frisian- crossbred (n=33), Holstein Frisian crossbred (n=10) and indigenous (n=5) up to three years of age from three Military farms in Bangladesh Army namely Savar, Jessore, and Ishawardi. Irrespective of cattle types, calf weight was ranged between 18-39 kg. The mean birth weight of Brahman- Holstein Frisian-cross bred calves was 27.36 ± 5.59 kg, Holstein Frisian crossbred calves were 30.50 ± 4.25 kg and indigenous crossbred calves was 20.80 ± 2.59 kg. However, the Brahman- Holstein Frisian- cross calves gained significantly ($P < 0.01$) higher body weight 171.90 ± 23.54 kg at first year, 316.90 ± 35.12 kg at second year and 525.45 ± 48.26 kg at the third year) than the Holstein Frisian cross and indigenous calves over the next three years. An average daily body weight gain of Brahman- Holstein Frisian-cross-bred was found higher in (556.18 ± 64.27 gm) in 3rd year than both second year and first year of age. Considering the area, the birth weight of Brahman- Holstein Frisian- crossbred calves in Savar ranges from 32-37 kg, which was better than Isharwdi and Jessore. First-year average daily body weight was more in Savar though in second-and third-year daily weight gain was more in Ishawardi. Results showed a better growth rate of Brahman- Holstein Frisian- crossbred in comparison to the Holstein Frisian crossbred and Indigenous calves. This study suggests that the Brahman crossbred might be a very promising source to reduce the deficiency of animal proteins in Bangladesh.

Keywords: Brahman, Beef production, Bodyweight gain

INTRODUCTION

Livestock in Bangladesh is one of the most potential subsectors of agriculture, which plays an indispensable role in promoting human health and the national economy of the country. Bangladesh has achieved the distinction of being the seventh-largest cattle producer in the globe. We are lagging far behind in meat consumption because the average daily requirement per capita is 120 gm, whereas the average daily intake is 80 gm per day only. Earlier studies showed that the total production of meat stands at 2.33 million metric tons against the demand for 6.48 metric tons leaving a deficit of 4.15 million metric tons (Islam, 2012; Ahammed *et al.*, 2020). Beef cattle farming helps to meet the rising demand for high protein foods in the country and plays a great role. However, the countries meat producers estimate that slaughterhouses need up to 3 million beef cattle every year to feed Bangladeshi appetites and to help meet demand. More than 2 mil-

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Article history: Received: 12 October 2021; Accepted: 24 December 2021.

lion beef cattle are smuggled from India to Bangladesh every year. To fill up this gap, the department of livestock of Bangladesh has taken a beef cattle development project to meet the demand for beef across the country. For this purpose, Brahman semen was used to inseminate indigenous cows to produce graded calves (Haque *et al.*, 2013).

As part of the country "Beef breed development project" of DLS, the directorate of Remount Veterinary and Farm Corps of Bangladesh Army was instructed to select the farms (Military Farm Savar, Military Farm Ishwardi, Military Farm Jessore) for insemination with Brahman semen in 2017. Brahman bulls developed from the first phase semen were kept in Artificial Insemination and Research Centre, Savar. Currently, the semen of this breed is distributed across the country, following the appropriate scientific process. Brahman breed is considered to be the most suitable and compatible beef breed in tropical and sub-tropical regions (Hernandez *et al.*, 2004). In this socio-economic condition, upgraded Brahman crossed bull may be more adaptable to our agro-climatic condition owing to the improvement of indigenous cattle for beef production. But there are limited studies on this breed in Bangladesh. Recently, Haque *et al.* (2016) conducted a study to compare the growth of 25% and 50% Brahman breed in Bangladesh. However, there is no such study on comparative growth between Brahman cross, Holstein Frisian cross and Indigenous breed. Considering the above circumstances, this study was undertaken to evaluate the birth weight and growth performance of Brahman crossbred calves in comparison to Holstein Frisian crossbred and Indigenous breeds in different Military Farms of Bangladesh.

MATERIALS AND METHODS

The cross-sectional study was conducted based on retrospective data obtained from three Military Farms namely, Savar, Ishwardi and Jessore from June 2017 to October 2021. Brahman semen was collected from Central Cattle Breeding Station, Savar, Dhaka of Department of Livestock Services and Artificial Insemination Centre, Jessore and Pabna. Collected Brahman semen has been used to inseminate 33 Holstein Frisian cross cows to improve beef production potentialities in the respective areas. A total of 33 calves produced from these crossing is considered experimental animal in this study. Moreover, 10 Holstein Frisian cross and 5 Indigenous calves were selected in Military Farm Jessore and included in this study. All calves were provided with similar types of management practices and the same quantity of feed for three years.

Data Collection

The birth weight and body weight gain of all calves were measured by a weighing machine. The body weight gain was monitored and recorded for three years. Bodyweight gain was calculated using the following formulas:

$$\text{Yearly weight gain (kg)} = \text{Weight at Year-End-Birth weight}$$

$$\text{Average daily gain (g)} = \frac{\text{Final Weight} - \text{Initial Weight}}{365}$$

Data Analysis

One way ANOVA was performed to compare the growth birth weight and growth rate of Brahman cross, Holstein Frisian cross and indigenous calves over three years. Results are presented as mean $\pm$ SD. 5% level of significance was considered. Statistical analysis was performed using SPSS 26.0 software.

RESULTS

The birth weight and growth performance of Brahman crossbred calves were evaluated in this study. Table 1 shows birth weight, yearly and daily body weight gain in different crossbred calves at different ages. The overall birth weight of crossbred calves was 27.33 ± 5.66kg with a range between 18-39 kg. The mean birth weight was found the highest in the Holstein Frisian crossbred calves (30.50 ± 4.25kg) as compared to Brahman-Holstein-Frisian cross (27.36 ± 5.59kg) and indigenous calves (20.80 ± 2.59kg). Brahman-Holstein-Frisian cross calves had higher body weight in the first year (171.90 ± 23.54 kg), second-year (316.90 ± 35.12 kg) and third-year (525.45 ± 48.26 kg) in comparison to that of Holstein Frisian cross and Indigenous calves. Similarly, Brahman cross calves also had higher average daily body weight gain in the first year (464.77 ± 70.55 gm), second-year (400.14 ± 62.97 gm) and third-year (556.18 ± 64.27 gm) in comparison to that of Holstein Frisian cross and Indigenous calves. Both annual and daily body weight gain was decreased during the second year when compared to the first and second years in all crossbred cattle. The highest average daily body weight gain (487.92 ± 113.42 gm) was observed in all calves at third year irrespective of breeds. However,

the Brahman-Holstein-Frisian cross calves gained significantly ($P < 0.01$) higher body weight than the Holstein Frisian crosses and indigenous calves over the next three years.

In this study, the individual military farm was considered to study the birth weight, yearly and daily body weight gain in Brahman-Holstein-Frisian cross calves at different ages. Results are shown in Table 2. In this study, the highest birth weight of Brahman- Holstein Frisian-calves were observed in Savar Military farm (34.50 ± 2.08 kg) that of Ishawardi (29.83 ± 4.63 kg) and Jessore (23.94 ± 4.16 kg). It was observed that all Brahman-Holstein-Frisian cross calves of Savar Military farm had the highest yearly bodyweight gain all three years. When daily body weight gain was considered, it was found that Brahman-Holstein-Frisian cross calves of Savar Military farm had the highest body weight gain at first year. Whereas, Brahman-Holstein-Frisian crossbred cattle of Ishwardi Military farm showed the highest body weight gain in the second year (425.50 ± 69.38 gm) and third-year (561.57 ± 70.29gm). The daily body weight gain was decreased during the second year when compared to the first and second years in Brahman-Holstein-Frisian crossbred cattle irrespective of farms. Moreover, there was no significant variation among yearly and daily body weight gain observed during the second and third years.

Table 1: Bodyweight characteristics of Holstein Frisian, Indigenous and Brahman-Holstein Frisian crossbred Cattle in three Military Farms

Parameter	**Value (Mean ± SD) (min-max)**				**Level of significance**
	Holstein Frisian	**Indigenous**	**Brahman**	**Overall**	
Birth weight (kg)	30.50 ± 4.25 (10) (25-39)	20.80 ± 2.59 (5) (18-24)	27.36 ± 5.59 (33) (19-37)	27.33 ± 5.66 (48) (18-39)	**
1st year weight (kg)	158.80 ± 15.35 (10) (134-185)	105 ± 10.51 (5) (96-122)	171.90 ± 23.54 (31) (123-237)	161.78 ± 29.28 (46) (96-237)	**
1st year daily weight gain (gm)	435.07 ± 42.05 (10) (367-507)	287.67 ± 28.8 (5) (263-334)	464.77 ± 70.55 (31) (337-649)	439.06 ± 82.16 (46) (263-649)	**
2nd year weight (kg)	281.50 ± 18.04 (10) (259-315)	193 ± 7.78 (5) (186-205)	316.90 ± 35.12 (29) (230-367)	294.77 ± 49.52 (44) (186-367)	**
2nd year daily weight gain (gm)	335.90 ± 36.74 (10) (287-383)	241 ± 11.81 (5) (227-254)	400.14 ± 62.97 (29) (293-531)	367.45 ± 75.42 (44) (227-531)	**
3rd year weight (kg)	448 ± 32.53 (10) (403-495)	321.60 ± 11.68 (5) (305-333)	525.45 ± 48.26 (11) (427-590)	456.46 ± 84.23 (26) (305-590)	**
3rd year daily weight gain (gm)	480.60 ± 121.18 (10) (356-781)	352.40 ± 33.67 (5) (299-389)	556.18 ± 64.27 (11) (444-644)	487.92 ± 113.42 (26) (299-781)	**

Figures in the parenthesis indicate the total number of observations; * Significant at 5% level;
** Significant at 1% level; NS - Non-significant

Table 2: Bodyweight characteristics of Brahman- Holstein Frisian cross-bred Cattle in three different Military farms

Parameter	**Value (Mean ± SD) (min-max)**			**Level of significance**
	Savar	**Ishawardi**	**Jessore**	
Birth weight (kg)	34.50 ± 2.08 (4) (32-37)	29.83 ± 4.63 (12) (20-37)	23.94 ± 4.16 (17) (19-35)	**
1st year weight (kg)	206.25 ± 25.1 (4) (177-237)	166.92 ± 17.02 (12) (137-185)	166.73 ± 20.77 (15) (123-194)	**
1st year daily weight gain (gm)	565.07 ± 70.43 (4) (485-649)	449.30 ± 55.08 (12) (356-507)	450.40 ± 62.59 (15) (337-532)	**
2nd year weight (kg)	347.75 ± 19.48 (4) (321-367)	322.25 ± 34.40 (12) (258-365)	302.46 ± 33.57 (13) (230-343)	*
2nd year daily weight gain (gm)	387.75 ± 58.29 (4) (304-436)	425.50 ± 69.38 (12) (315-531)	380.54 ± 53.65 (13) (293-471)	NS
3rd year weight (kg)	547.25 ± 11.21 (4) (531-556)	513.00 ± 57.63 (7) (427-590)	-	NS
3rd year daily weight gain (gm)	546.75 ± 60.84 (4) (501-636)	561.57 ± 70.29 (7) (444-644)	-	NS

Figures in the parenthesis indicate the total number of observations; * Significant at 5% level; ** Significant at 1% level; NS - Non-significant

DISCUSSION

The overall birth weight of crossbred calves was 27.33 ± 5.66 kg with a range between 18-39 kg. The mean birth weight was found the highest in the Holstein Frisian crossbred calves. The birth weight was higher in Savar than that in Ishwardi and Jessore. However, the Brahman cross calves gained significantly ($P < 0.01$) higher body weight than the Holstein Frisian cross and indigenous calves over the next months. This result supports the finding of Haque *et al.* (2016). Brahman-Holstein-Frisian cross calves had higher body weight gain compared to that of Holstein Frisian cross and Indigenous calves. Similarly, Brahman cross calves also had higher average daily body weight gain all years in comparison to that of Holstein Frisian cross and Indigenous calves. Both annual and daily body weight gains were decreased during the second year when compared to the first and second years in all crossbred cattle. The highest average daily body weight gain (487.92 ± 113.42gm) was observed in all calves in the third year irrespective of breeds However, the Brahman-Holstein-Frisian cross calves gained significantly ($P < 0.01$) higher body weight than the Holstein Frisian crosses and indigenous calves over the next three years. Similar observations have been reported by Haque *et al.* (2016) and Ahammed *et al.* (2020). This study shows that the growth rate of the Brahman crossbreed is better in comparison to the Holstein Frisian crossbreed and Indigenous breed despite providing the same quantity of feed.

It was observed that all Brahman-Holstein-Frisian cross calves of Savar Military farm had the highest yearly bodyweight gain all three years. However, daily average body weight gain was found that Brahman-Holstein-Frisian cross calves of Savar Military farm had the highest body weight gain in the first year. Whereas, Brahman-Holstein-Frisian crossbred cattle of Ishwardi Military farm showed the highest body weight gain in second year and third-year. The daily average body weight gain was decreased during the second year when compared to first and third years in Brahman-Holstein-Frisian crossbred cattle irrespective of farms. The birth weight and growth rate of Brahman cross breed varied in different areas might be due to quality of semen and feed, management and environmental factors.

CONCLUSION

The Brahman crossbred can be a very promising source to reduce the deficiency of animal proteins in Bangladesh. As the Brahman cross breed cattle is a new introduction to Bangladesh, a further in-depth study is needed to explore more information from breed development approaches.

ACKNOWLEDGEMENTS

The authors express thanks to Professor Dr. S.K.M. Azizul Islam, Department of Physiology, Biochemistry and Pharmacology, Faculty of Veterinary Medicine, Chattogram Veterinary and Animal Sciences University, Khulshi, Chattogram-4225, Bangladesh

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