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ORIGINAL ARTICLE

# Superior performance of the Brahma cattle in terms of meat production and disease resistance in comparison with the indigenous cattle of Bangladesh

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**Abstract**

**Background:** The Brahma is a breed of cattle which grows very rapidly and suitable for high quality meat production. The breed originating from native cattle dwelling at unfavorable climate of India has adapted with scarcity of food, external and internal parasitism, infectious diseases and weather extremities. There is very limited study on adaptation and performance of Brahma cattle particularly in the context of Bangladesh where meat production is a crying demand. In this study, we evaluated the comparative performance of Brahma and indigenous cattle in terms of body weight gain and disease resistance in Bangladesh.

**Methods:** A total of 10 Brahma calves and 10 indigenous calves were monitored for a period of 18 months during June 2018 to November 2020. Body weight gain and occurrence of diseases in both breeds were recorded. Two-way repeated measure ANOVA with Bonferroni post-tests was performed to compare the growth of both Brahma and indigenous calves.

**Results:** At birth, both Brahma (15.75±0.19 kg) and indigenous (17.55±0.35 kg) calves had overall similar body weight. However, the Brahma calves gained significantly higher body weight than the indigenous calves over the next months. For example, the Brahma calves had higher body weight at 6 months (85.5±2.50 kg vs 70.75±0.43 kg), 12 months (160.3 kg±5.667 vs 120.4±0.89 kg) and 18 months (237.5±4.58 kg vs 169.8±1.72 kg) than the indigenous calves. An average daily body weight gain was 410.6±7.7 g and 282±2.9 g for Brahma and indigenous calves, respectively. Analysis of the disease records also showed a decreased number of diseases in Brahma than the indigenous cattle.

**Conclusion:** Our study indicated a better adaptation and growth of Brahma cattle in comparison to the indigenous breed. Therefore, the Brahma breed can be a very promising source to reduce the deficiency of animal proteins in Bangladesh.

**Keywords:** Breed, Beef production, Adaptibility, Body weight gain

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## Introduction

Human population in Bangladesh is increasing at a very fast rate but the amount of beef production is not increasing keeping pace with human growth which results in acute deficiency of protein of animal origin. The average meat requirement per capita in Bangladesh is 120 g per day. To meet this demand Bangladesh needs to produce about 6.48 million metric tons of meat but it is producing an approximate of 2.33 million metric tons, leaving a deficit of 4.15 million metric ton (Islam, 2012).

The large deficit of meat supply could be resolved by producing rapidly growing beef breed of cattle such as Brahma breed. The Brahma breed (also known as Brahman) originated from *Bos indicus* cattle from India, also termed as the "sacred cattle of India". The Brahma cattle was bred in the USA from 1885, imported at various times from the United Kingdom, India and Brazil. Three principal strains of Indian cattle were brought to the United States and used in the development of the Brahma breed; the Guzerat, the Nelore and the Gir (Sanders, 1980). The Krishna Valley strain was also introduced and used but to a lesser extent. Through centuries of exposure to inadequate food supplies, insect pests, parasites, diseases and the weather extremes of tropical India, the native Brahma cattle developed some remarkable adaptations for survival which cattle producers in the USA found useful and advantageous (Briggs and Briggs, 1980).

To mitigate the increasing protein demand in Bangladesh, recently the government has started a program to inspire the farmers for rearing Brahma as a beef breed (Islam *et al.*, 2016). A beef breed development project has been carried out in the Department of Livestock Services (DLS) in 2009 in selected areas of Bangladesh. Under this project, semen of Brahma bulls was imported from the USA and used to inseminate indigenous cows to produce graded calves (Haque *et al.*, 2013). Although there are some high yielding dairy breed of cattle, there is limited number of high yielding meat producing breeds in Bangladesh. So Brahma breed could be a suitable candidate for this vacancy. But there is limited study on this breed in Bangladesh. Recently, Haque *et al.* (2013) conducted a study to compare the growth of 25% and 50% Brahma breed in Bangladesh, however there is no such study on disease resistance of this breed in our native climate. Beef production is the result of a combination of both genetic and environmental factors. Genetic factors may be masked by induced or natural environmental influences which hinder expression of hereditary traits (Sanders, 1980). Environmental influences either complement or limit the genetic potential of the animal. Thus, it is important to assess the productivity of genetically improved breed. The study was designed to evaluate the comparative production and disease resistance of Brahma and indigenous breeds of cattle when maintained under the same native rearing system of Bangladesh.

## Materials and Methods

### Study areas and animals cohort

The study was conducted in two villages namely Kalibazail and Chorkalibazail under the Deokhola union of Fulbaria upazilla of Mymensingh district during June 2018 to November 2020. For this study, comparatively large size indigenous cows were selected from a group of trained farmers in the study areas. Semen of pure Brahma bull was collected from Department of Livestock Services (DLS) and inseminated in indigenous cows. From the cows, a total of 36 Brahma calves containing the 50% genetic constituents of Brahma bull were born. From these calves, we randomly selected ten calves (six male and four female) for this study. In addition, ten more indigenous calves (six male and four female) were also employed for the comparative study. Calves from both groups were reared under similar management practices under the care of a mobile veterinary clinic. Routine deworming, vaccination and medication were done as per schedule and necessary.

### Data collection

The body weight gain of the ten Brahma calves as well as ten indigenous calves was monitored during a period of 18 months. Month-wise body weight gain was recorded from both breed types. Initially the body weight was measured by weighing machine but when the animal grew beyond ones raising capacity then the weight was measured by using the following weighing formula: Bodyweight = $(\text{Girth})^2$ x Length/660 kg. During the same time, occurrencee of various diseases or disease conditions was monitored and recorded for both animal groups. Upon disease occurrence, the farmers called the mobile veterinary clinic and the veterinarian moved to the house, took

samples and diagnosed the disease. Appropriate treatment and management suggestions were provided to the sick animals.

**Data analysis**

Data analysis and graph preparation were performed using GraphPad Prism 5.0 software. Two-way repeated measure ANOVA with Bonferroni post-tests was performed to compare the growth of both Brahma and indigenous calves over the period of 18 months.

**Results**

**Body weight gain**

We compared the body weight gain of both Brahma and indigenous calves over a period of 18 months of age. The average final body weight of male Brahma calves (243.7±5.58 Kg) was slightly higher than the female calves (228.3±5.65 Kg), however was not statistically sigficant ($p>0.05$). Comparative analysis showed that, the Brahma calves gained a significantly ($p\leq0.05$) higher body weight than the indigenous calves (Fig. 1). The average birth weight of both Brahma (15.75±0.19 kg) and indigenous (17.5±0.35 kg) calves was comparable. However, with time the Brahma calves achieved significantly ($p\leq0.05$) higher body weight than the indigenous calves. For example, the Brahma calves had higher body weight at 6 months (85.5±2.50 kg vs 70.75±0.43 kg), 12 months (160.3 kg±5.667 vs 120.4±0.89 kg) and 18 months (237.5±4.58 kg vs 169.8±1.72 kg) than the indigenous calves. The average daily body weight gain was 410.6±7.7 g and 282±2.9 g for Brahma and indigenous calves, respectively.

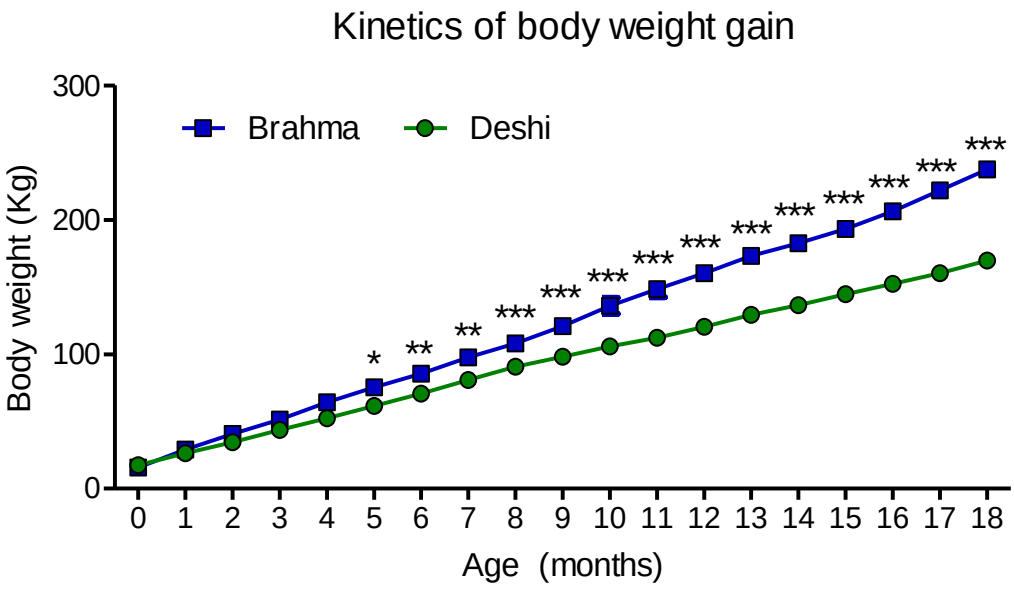


Fig. 1: Kinetics of body weight gain of Brahma calves and indigenous calves over a period of 18 months. Data indicate mean±SEM of 10 replicates. Two-way repeated measure ANOVA with Bonferroni post-tests to compare replicate means by row. *$p\leq0.05$, **$p\leq0.01$, **$p\leq0.001$.

**Disease occurenece**

The occurrence of various diseases or disease conditions in both Brahma and indigenous cattle was monitored throughout the study period. A total of 11 diseases or disease conditions were recorded during the study period including lumpy skin disease (LSD), ring worm, navel ill, pneumonia, diarrhoea, anorexia, cachexia, ecto- and endoparasitic infestation, babesiosis and dystocia (Table 1). The comparative study revealed a frequent occurrence of these diseases in indigenous breed than the Brahma breed,

suggesting an increased disease resistance of the Brahma breed.

Table 1. Disease occurrence in Brahma and indigenous calves.

| Sl. No | Disease/disease conditions | No. of cases | |
|---|---|---|---|
| | | **Brahma** | **Indigenous** |
| 1 | Lumpy skin disease (LSD) | 1 | 2 |
| 2 | Ring worm | 0 | 1 |
| 3 | Navel ill | 0 | 1 |
| 4 | Pneumonia | 0 | 2 |
| 5 | Diarrhoea | 2 | 4 |
| 6 | Anorexia | 1 | 2 |
| 7 | Cachecxia | 1 | 3 |
| 8 | Parasitic infestation | 2 | 5 |
| 9 | Ectoparasitism | 0 | 3 |
| 10. | Babesiosis | 0 | 1 |
| 11. | Dystocia | 1 | 0 |
| | Total | 8 | 24 |

**Discussion**

Here, we performed a comparative study of body weight gain and disease occurrence in Brahma and indigenouse calves reared under similar management practices in Bangladesh. Overall, the Brahma calves showed higher growth and reduced disease occurrence in comparasion to the indigenous calves. The Brahma is one of the most popular breeds of beef cattle worldwide.Our study showed that the Brahma calves gain body weight more rapidly than that of indigenous calves, which could be due to their improved genetic constituents. Moreover they are less prone to diseases which could also favor their growth and body weight gain. Recently, Haque *et al.* (2016) showed that the average daily body weight gain was significantly higher (570.52 ± 5.19 g) in 50% Brahma cross than the 25% Brahma cross calves (529.98 ± 4.54 g). In this study, the daily average body weight gain of the 50% Brahma calves and indigenous calves were 410.6±7.7 g and 282±2.9 g, respectively. This slight difference from the earlier published study could be due to a differences in the managemental practices in both studies. It is interesting to note that, the male Brahma calves gained slightly higher body weight than the female calves, however was statistically insignificant. Of note, some of the farmers in the study cohort could not afford to supply adequate amount of milk to the calves becuase the mother cows were indigenous with low milk yield which was not sufficient to meet the demand of the calves. Body weight gain would be more exponential if enough milk could be provided for the calves at early stage of growth

The occurrence of disease in Brahma cattle was comparatively lower than that of indigenous calves. This trait may be inherited from their forefathers which were adapted to extremities of adverse climatic environment of India for centuries. Brahma cattle are known for their extreme tolerance to heat and are wide spread in tropical regions. They are resistant to insects due to their thick skin (Shyma *et al*., 2015). This fact further contributes to disease resistance specially tick borne diseases. In a similar study the Brahma breed was also found to be resistant to babesiosis, infectious kertaconjunctivitis and dermatophilosis (Francis, 1966; Maillard *et al.*, 1996; Sonowder *et al.*, 2005). It is a fact that Brahman cattle live longer than many other breeds. There was no report of calving difficulties or abnormal calf birth in the indigenous calves in the study cohort but one case of dystocia was found in Brahma breed. No mortality was found in both study groups of calves whereas the average calf mortality was 1.12% in the study area. It indicated that Brahma cross calves were well adapted under the climatic condition of Bangladesh.

**Conclusion**

Our study showed a better growth and disease resistance of Brahma cattle over the indigenous cattle breeds, indicating a better adapatation and growth of

Brahma cattle in Bangladesh. Therefore, the Brahma breed can be a very promising meat source to reduce the deficiency of animal proteins in Bangladesh.

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**Competing Interests**
The authors declare that they have no competing interests

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