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Comparison of performances between 50% and 25% graded Brahman calves in Bangladesh

N G Saha, M O Faruque, S K Fouzder[1], M Sultana, B Matubber
Patuakhali Science and Technology University, Barishal, Bangladesh

Abstract
The performances of 289 (149 males and 140 females) of 50% graded Brahman calves and 422 (217 males and 205 females) of 25% graded Brahman calves were evaluated. The pooled Birth weight (BWT) for 50% Brahman (21.40±0.24kg) was significantly ($p<0.01$) higher than that of 25% calves (18.59±0.08kg). Mean BWT for 50% Brahman male calves (22.50±0.36kg) was also remarkably ($p<0.01$) higher that that observed in 25%male calves (18.97±0.10kg). Similarly, BWT for 50% Brahman female progenies was much heavier ($p<0.01$) than that of 25% female calves (20.24±0.29kg vs. 18.18±0.12kg). The pooled year weight (YWT) and average daily gain (ADG) were found to be 229.62±2.08kg and 570.52±5.19g, respectively for 50% graded calves. These values were significantly ($p<0.01$) higher than those in 25% calves (209.29±1.74kg and 529.98±4.54g, respectively). However, the YWT and ADG followed exactly similar trend. The 50% graded Brahman progenies were much better than 25% Brahman with respect to BWT and YWT, and ADG as well. Average BWT and YWT along with ADG of male of both graded (50 and 25%) calves were distinctly heavier to female ones. Although 50% Brahman progenies performed better, these crosses need detailed economic analysis.

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I. Introduction

In Bangladesh, from the time immemorial, are reared and sometimes upgraded preferably to meet the dairy demands. But the beef industry is yet to develop and it is due to lack of initiation and proper guidance to upgrade the local cattle for increasing beef production.Total meat (beef, mutton and poultry) production stood at 7.51 million MT during 2018-2019 against the demand of 7.30 million MT (Rahman and Chakma 2019). Increasing the beef cattle production than any other livestock species may be the best way to recover the gap between demand and supply of meat in Bangladesh. Beef in Bangladesh usually comes from unproductive old bullocks, cows, culled farm animals, and partly from animals imported from India and other nearby countries (Banglapedia, 2006). Therefore, it is essential to adopt planned beef cattle production to meet the high demand for animal protein. However, some farmers in Bangladesh have taken advantage of beef fattening program to have improved male calves by scientific feeding methods. A huge number of cattle are sacrificed each year during Eid-ul-Azha. Whatever may be the fact, there is no alternative way but increasing the meat production in the country by rising the number of quality cattle, buffalo, sheep, goat, poultry etc. In fact, cattle may be the suitable livestock species that is well manageable and profitable and have been facilitated because beef is enormously preferred by the people.

For establishing the beef industry and increasing the productivity of the existing stock, it needs an appropriate breeding program. Development of well adopted beef cattle genotype will enhance productivity as well as to fulfill the requirements. The technological interventions may create a remarkable change in beef production and self-employment. Considering weather, agro-climatic condition, heat tolerance, disease and insect resistance, longevity, grazing ability, calving ease, mothering ability and management, the Brahman breed is thought to be the most suitable and compatible beef breed in tropical and sub-tropical region (Antonio *et al.* 2006). Therefore, it is expected that Brahman breed is to be more appropriate and well-matched beef type cattle to breed the indigenous stocks for increasing the beef production in the country. With above facts and justification, a program has been undertaken to estimate the performances of 50% and 25% graded Brahman calves obtained by inseminating indigenous cows with Brahman and Brahman crossed semen. The present study was formulated to compare the performances between 50%and 25% Brahman calves, and to find out the beneficial effects of these performances at farmers' level.

[1] Corresponding author, e-mail: fouzder.bd@gmail.com

II. Materials and Methods

Source of the data of 50% Brahman calves

Local cows were inseminated with imported Brahman semen in some selected areas of Bangladesh, and a total of 289 Brahman (50%) calves of which 149 males and 140 females were included in the study. Date of AI, date of parturition, birth weight (BWT) and year weight (YWT) was recorded in herdbook maintained by the Upazila Livestock Office with the help of appointed animal recorders in the respective selected field areas of DLS with its on-going project entitled "Beef breed improvement project". Average BWT, YWT and daily gain (ADG) were calculated.

Selection of 50% graded Brahman breeding bulls

Analyzing the records of 149 male calves from *"Beef breed improvement project"* indicated that population mean was found to be 610.12g and the mean of selected animals was 785.41g. Therefore, the estimated selection differential was 175.29g. Accordingly, four 50% graded Brahman breeding bulls were selected for further breeding purposes on the basis of their ADG, physical appearance and libido with a selection intensity of 2.263. The selected bulls were numbered as ABG011, ABG012, ABG013 and ABG014 and reared at BAU Artificial Insemination Center for producing 25% graded Brahman calves.

Source of the data of 25% Brahman calves

Performances of 25% graded Brahman calves produced by inseminating the indigenous cows with selected 50% graded Brahman semen were evaluated under farmers' condition. Average yield from these animals was then compared to that of 50% graded Brahman calves. The date of insemination and parturition were recorded. The data on BWT and YWT of the 25% graded Brahman calves were recorded, and thereby ADG was calculated.

Data analysis

Calculations were performed in Microsoft Excel program. The collected data were analyzed using SAS (1998, Version 6.12) computer package.

III. Results

Comparison of growth traits between 50% and 25% Brahman calves

The comparison of growth traits between 50% and 25% Brahman calves is summarized in Table 1. The pooled BWT, YWT and ADG of 50% Brahman calves were 21.40±0.24kg, 229.62±2.08kg and 570.52±5.19g, which were significantly ($p<0.01$) higher than those recorded for 25% Brahman calves (18.59±0.08kg, 209.29±1.74kg and 529.98±4.54g, respectively).

Table 1. Polled growth performances of 50% and 25% Brahman calves

Parameter	50% Brahman calves	25% Brahman calves
BWT (kg)	21.40^{a}±0.24 (289)	18.59^{b}±0.08 (422)
YWT (kg)	229.62^{a}±2.08 (289)	209.29^{b}±1.74 (422)
ADG (g/d)	570.52^{a}±5.19 (289)	529.98^{b}±4.54 (422)

Means with different superscripts in the same row differed significantly ($p<0.01$); Figures in the parentheses indicate the number of observations

Growth performances of 50% and 25% Brahman male calves

All growth traits like BWT, YWT and ADG of 50% Brahman male calves were recorded as 22.50±0.36kg, 245.13±2.88kg and 610.12±7.11g, respectively. These data were remarkably ($p<0.01$) higher than those recorded in 25% Brahman male calves (18.97±0.10kg, 226.21±2.37kg and 576.04±6.15g, respectively) (Table 2).

Table 2. Birth and year weights and daily gain of 50% and 25% Brahman graded male calves

Parameter	50% Brahman calves	25% Brahman calves
BWT (kg)	22.50^{a}±0.36 (149)	18.97^{b}±0.10 (217)
YWT (kg)	245.13^{a}±2.88 (149)	226.21^{b}±2.37 (217)
ADG (g/d)	610.12^{a}±7.11 (149)	576.04^{b}±6.15 (217)

Means bearing different superscripts in the same row differed significantly ($p<0.01$); Figures in the parentheses indicate the number of observations

Growth performances of 50% and 25% Brahman female calves

Likewise male calves, BWT, YWT and ADG (20.24±0.29kg, 213.10±2.29kg and 528.38±5.77g) recorded in 50% Brahman female calves were also significantly ($p<0.01$) higher than those recorded in Brahman female calves (18.18±0.12kg, 191.38±1.86kg and 481.21±4.75g), respectively (Table 3).

Table 3. Birth and year weights and daily gain of 50% and 25% Brahman graded female calves

Parameter	50% Brahman calves	25% Brahman calves
BWT (kg)	20.24^{a}±0.29 (140)	18.18^{b}±0.12 (205)
YWT (kg)	213.10^{a}±2.29 (140)	191.38^{b}±1.86 (205)
ADG (g/d)	528.38^{a}±5.77 (140)	481.21^{b}±4.75 (205)

Means with different superscripts in the same row differed significantly ($p<0.01$); Figures in the parentheses indicate the number of observations

IV. Discussion

BWT in 50% and 25% Brahman calves

The distinct variation in the pooled BWT was found and hence, 50% Brahman was heavier ($p<0.01$) than that of 25% graded calves (Table 1.). Similarly, 25% graded male and female calves were much lighter than those of 50% graded ones (Tables 2 and 3). The pooled mean BWT found in the study was fairly close to the value of 25.3kg as reported by Crockett *et al*. (1978). The performances however found in 50% and 25% Brahman progenies were much inferior to the values observed in F1 Gray-Brahman progenies (36.63kg) and Brahman-Angus crosses (33.50kg) (Sanders *et al*. 2005, Holloway *et al*. 2005). The lower birth weight in present findings might be due to genetic and body soundness of the parents used in crossings. However, environment and management factors might also be a fact. BWT weights of male and female calves courageously indicated that male progeny had 2.26kg more weight at birth than the female ones. The present findings are very close to the results of 2.1kg (Vargas *et al.* 1999) and 2.00kg (Keith *et al.* (2010). A superior birth weight (27.50±0.79 and 23.05±0.32kg for male and female, respectively) to the present findings (22.50±0.36 and 20.24±0.29kg of 50% Brahman progenies, and 18.97±0.10 and 18.18±0.12kg of 25% Brahmans progenies) was obtained by Bhuiyan (1999) on Friesian and Friesian-Local grades of cattle. Average BWT of 16.7±0.48 and 15.74±0.22 kg for male and female, respectively in Red Chittagong cattle (Rabeya *et al.* 2009), 17.92±3.47 and 15.6±.02kg in Pabna local cattle (Hoque *et al.* 1999) and 16.37±0.20kg in Pabna local cattle (Hossain and Routledge 1982) were reported. It was found that 50% graded Brahman male calves was 11% heavier in birth weight than female within the group, and 19% and 24% heavier than male and female, respectively in 25% graded Brahman. Moreover, 50% graded Brahman female calves were also 11% heavier in birth weight than female calves of 25% Brahman. However, increased in BWT for 50% graded offspring compared to 25% Brahman calves were perhaps due to improved genetic makeup and soundness of the dams used in crossing.

YWT in 50% and 25% Brahman progenies

Marked difference was observed in pooled YWT between 50% and 25% Brahman calves and thus, the 50% Brahman observed gained much heavier weight than that of 25% graded calves. Exactly similar trend in YWT in both male and female progenies were observed. The mean pooled values of present study were definitely lower than those of 271, 270 and 231kg in F_1 Red Brahman, Gray Brahman, and Angus crosses (Sanders *et al.* 2005). Present findings however, were visibly larger than Red Chittagong cattle (67.6±6.2kg) (Habib 2011). Guar *et al.* (2003) stated that Gir cattle gained YWT of 137.0±4.9kg, which in was also lower than the present. The mean year weights found in the present study were extremely larger than the findings stated by Habib (2011) and Rabeya *et al.* (2009) for male and female of Red Chittagong cattle. The heavier year weight for 50% graded calves with respect to 25% graded calves might be due to improved genetic and physiological factors obviously influenced on faster growth of the body of 50% calves.

ADG of 50% and 25% Brahman calves

Marked variations in pooled and separate sex ADG between 50% and 25% Brahman calves was noted and thus, 50% Brahman progenies superiority over 25% graded ones. ADG in 50% and 25% Brahman calves observed in the present study were noticeably lower than the findings reported by some other authors (Colditz and Kellaway 1972), and Keith *et al.* 2010). In earlier studies, a daily gain of 168g in Red Chittagong cattle was established by Habib *et al.* (2003), and 190g in Pabna local cattle by Hossain and Routledge (1982), which were much lower than the present study results. Estimated daily gain of 157.5±15.9g and 176.9±.24.3g at pre-weaning and post-weaning period in Red Chittagong calves (Habib 2011), were also markedly smaller than the present findings. However, these variations might have been due to the genetic and environmental circumstances, and absolutely the Brahman graded calves were superior in ADG to other calves from local,

upgraded /varieties found in the country. The larger ADG for 50% graded calves in considering 25% graded calves might have been due to improved genetic, environmental and physiological factors that influenced on rapid growth of the 50% calves.

V. Conclusions

Pooled and separate sex average BWT, YWT and ADG in 50% Brahman progenies were appreciably higher than those in 25% Brahman progenies. It was found that 50% graded Brahman male calves was 11% heavier in birth weight than female within the population, and 19% and 24% heavier than male and female, respectively of 25% graded Brahmans Moreover, 50% graded Brahman female calves were also 11% heavier in birth weight than female calves of 25% Brahman progenies. This increased BWT in 50% Brahman compared to 25% ones were perhaps due to improved genetic makeup of the. Heavier year weight and superior average daily gain for 50% graded calves that those of 25% calves might be due to improved genetic and physiological factors that obviously influenced faster daily gain resulting of larger body weight in 50% calves. It was obvious that 50% graded Brahmans showed better performance than those of 25% ones. Economics of various crosses will be studied further to draw a valid conclusion.

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