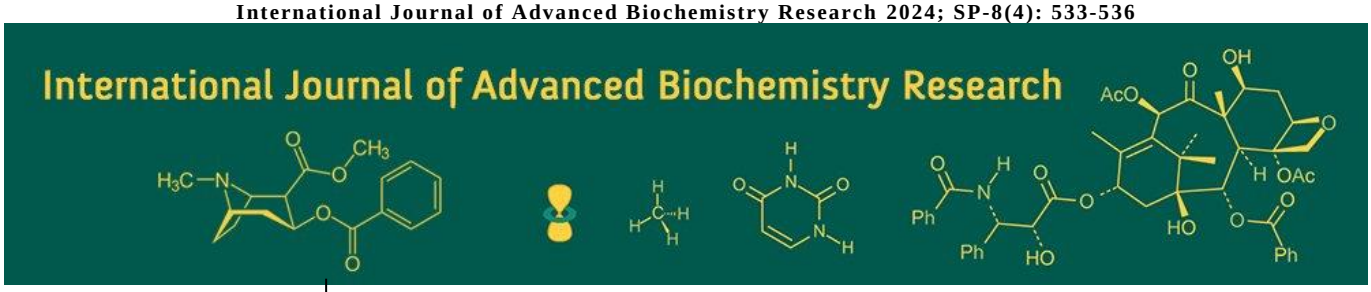

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Effect of season and sex on birth weight and growth performance of Gangatiri calves

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Abstract
The present study was undertaken on **"**Effect of season and sex on birth weight and growth performance of Gangatiri Calves"on28birth weight records of Gangatiri calves obtained from SHUATS dairy farm Prayagraj, during the period from1st April, 2015 to 1st September 2017. Season of birth was divided in three seasons (summer, rainy and winter) as per three groups which were weight at birth, weights at 03 months age and weights at 6 months age. Sex on birth was divided into two groups male and female. It was concluded that the season had no – significant effects on weight at birth, weights at 03 months age and weights at 06 months age of Gangatiri calves, hence season has no role to play with regard to birth weight and growth performance. Sex had significant effect on birth weights, whereas weights at 03 months age and weights at 06 months age of Gangatiri calves registered no significance influence of sex of calves. It is clear that paternal birth weight is associated with the birth weight of male calves but not with female calves and therefore supports the notion that there is a genetic regulation along the male line.

Keywords: Gangatiri calves, season, birth weight, sex, growth performance

Introduction
In India with the expansion in dairy industry it becomes necessary for its future glory to find out Indigenous cows breeds in different zone of our country. Therefore, our scientist started to see the most popular breed of north India i.e. Gangatiri cow, which is mostly found in eastern zone of U.P. especially in Ganga watershed areas of Allahabad, Mirzapur, Varanasi & Baliya, Ganga river and nearby to its nearer area. Indigenous breeds of cows which were producing more milk could not survive due ill treatment by their master or bad or poor management. Their milk production reduced gradually and they became poor to poorer, thus these breeds slowly and slowly became worthless and came to the danger zone (Verma DK *et al.,* 2018) [11]. Gangatiri is an indigenous cattle breed of North India and has been recognized as a separate breed by NBAGR-ICAR (Accession no. 03039). This is an important dual purpose breed, average daily milk yields of ranged between 4-6 litters per day. The lactation length is of 150-250 days. Inter calving period varies between 14-24 month. Coat colour of Gangatiri cow is dull white. Muzzle is black, Hump and dewlap are medium. Gangatiri cow is remarkably an important breed of cattle for small and marginal farmers, mostly found in small herds (Singh PK *et al.,* 2018) [7]. Population percentage of Gangatiri cattle is merely 0.188% (Livestock census, 2007) of total cattle present in India but it helps many fold number of human population to secure their well being. Gangatiri cattle husbandry has been acknowledged as not just cattle rearing practice but also a tradition that passes from generation to generation (Singh PK *et al.,* 2018) [7]. It closely resembles to Haryana cattle. It is also known as Eastern Haryana or Shahabadi.

Materials and Methods
The Department of Animal Husbandry and Dairying, SHUATS had no objection with regard to providing all the necessary information for the present study as the co-author was involved in conducting the research on growth performance of Gangatiri calves.

The present study was undertaken on **"**Effect of season and sex on birth weight and growth performance of Gangatiri Calves" on 28 birth weight records of Gangatiri calves obtained from SHUATS dairy farm Prayagraj, during the period from 1st April, 2015 to 1st September 2017. Season of birth was divided in three seasons (summer, rainy and winter) as per three groups which were weight at birth, weight at 03 months age and weight at 6 months age. Sex on birth was divided into two groups male and female. The data were subjected to statistical analysis technique (ANOVA) as per Completely Randomized Design (CRD) was for season of calves born as per Snedecar and Cochran (1994) and T-test was for sex of calf born.

Management of animals

The management and feeding practices followed at cattle unit farm were uniform. Calves were provided milk and creep ration according to the feeding schedule and as per body weight. The greens were fed as per availability (Maize, Jowar and Berseem). Calve were housed in existing facilities at the farm. A regular health check up was provided to protect the calves from epidemics and causal incidences.

Factors of study

A- Season of birth

- Summer season (March to June)
- Rainy season (July to October)
- Winter season (November to February)

B- Sex of birth

- Male
- Female

Parameters of study

- At birth weight (Kg.)
- Weight at 03 months age (Kg).
- weight at 06 months age (Kg.)

Results and Discussion

A-Season on birth

At birth weight of calves

The highest mean at birth weight of Gangatiri calves was25.43 kgin summer season fallowed by 25.14 kg in winter and 23.33 kg in rainy season, respectively, but the differences in these were non-significant. Intan Sofienaz Ahmad Fuad *et al.* (2014) [2] reported a no significant difference (p>0.05) on birth weight of KK calves born in different seasons. M A Habib *et al.* (2009) [1] reported that season of birth had no significant effect (p>0.05) on birth weight of calves. These results are similar to the findings of present study Matin *et al.* (1993) [5] reported higher birth weight of calves born in summer, followed by rainy and winter born calves, H Hizil *et al.* (2018) [12] Birth weight was 24.01 kg in summer, 23.64 kg in winter, 23.30 kg in autumn and 23.06 kg in spring. The birth weights (24.01 kg) of the calves born during the summer season were higher than the other seasons (p>0.05), which are in agreement to the findings of present study.

Weight at 03 months age of calves

The highest mean of body weight of calves was found at 03 months age 44.21 kg in rainy season followed by 41.79 kg in summer season and 34.97 kg in winter season of Gangatiri calves, respectively, and the differences in these were non-significant. N. Govardhana Sagar *et al.* (2017) [8] observed that period of birth and season of birth have significant effect on the weight at 3 months of age, which is not in agreement to the findings of present study.

Weight at 06 months age of calves

The highest mean of body weight of calves at o6 month's age was68.59 kg in rainy season followed by 58.22 kg in winter season and 50.79 kg in summer season of Gangatiri calves, respectively, but the differences in these were non-significant. N. Govardhana Sagar *et al.* (2017) [8] body weight at 6 months of age was 89.263±0.510 kg. Period of birth and season of birth have significant effect on the weight at 6 months of age, which is not similar to the results of present study.

B-Sex on birth

At birth weight of calves

The average mean birth weight of male calves and female calves' was 27.61 kg and 22.81 kg respectively. It was observed that male birth weight was better than female birth weight of Gangatiri calves, but the differences in these were significant. Similar results are also reported by Nweze *et al.* (2012) [6] N. dama, Muturm Nigerian cattle breeds' studied male calves birth weight (14.10 kg) were superior to female calves (12.53 kg) birth weight. Matin MA, *et al.* (1993) [5] Observed mean birth weight of RCC calves found in his study was 15.79 ± 0.286 kg for male and 13.96 ± 0.298 kg for female with the pooled value of 14.89 ± 0.224 kg. Male calves were heavier (p<0.05) than female. Kabir and Islam (2009) [3] reported that calf sex had significant effect on birth weight in crossbred calves. Intan Sofienaz Ahmad Fuad *et al.* (2014) [2] it was found that the mean birth weight of KK male and female calves (n=374) were 14.27±0.55 kg and 13.50±0.058 kg (n=364), respectively. Effect of sex of calves on birth weight of KK calves was highly significant (p<0.01) with 0.77 kg mean advantage of male over female. These findings are in agreement with the present study**.** It was a trend in most cases that, male is heavier than female at birth.

Weight at 03 months age of calves

The average mean weight at03 months age of male calves was 42.14 kg and of female calves was 39.56 kg. It was observed that male calves' weight at 03 months age was better than female weight of Gangatiri calves, but the differences in these were non-significant. Intan Sofienaz Ahmad Fuad *et al.* (2014) [2] reported that sex of calves at 3 months age showed no significant (p>0.05) difference on body weight between male and female calves.

Weight at 06 months age of calves

The average mean weight at 06 months age of male calves and female calves was 60.09 kg and 61.86 kg, respectively. It was observed that female calves' weight was better than male calves of weight of Gangatiri calves, but the differences in these were non-significant. Intan Sofienaz Ahmad Fuad *et al.* (2014) [2] reported that effect of sex of calves at 6 month of showed a no significant (p>0.05) difference on weight between male and female calves. Generally, whether it is birth weight at birth or at any growing stage males are always found better than females but in present study female calves had showed a better

growth performance at 06 months age than the males, it may be due to better care given to the female calves considering their value in future since India is milk consuming country.

Table 1: Effect of season at birth and growth performance of calves

Body weight of calves	Season			
	Summer	Rainy	Winter	Results
At birth weight(Kg.)	25.43	25.33	25.14	NS
Weight at 03 months age (Kg).	41.79	44.21	34.97	NS
Weight at 06 months age (Kg.)	50.79	68.59	58.22	NS

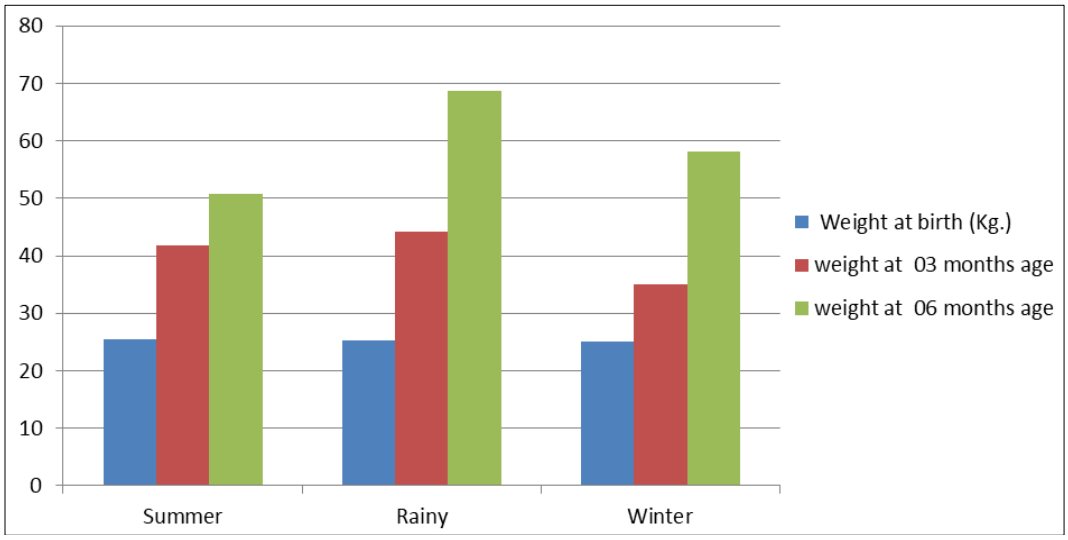

Fig 1: Effect of season at birth and growth performance of calves

Table 2: Effect of sex at birth and growth performance of calves

Sex of calves	Sex on birth		
	Male	Female	Results
At birth weight (Kg.)	27.61	22.81	S
Weight at 03 months age (Kg).	42.14	39.56	NS
Weight at 06 months age (Kg.)	60.09	61.86	NS

Note: S-Significant, NS-Non-Significant

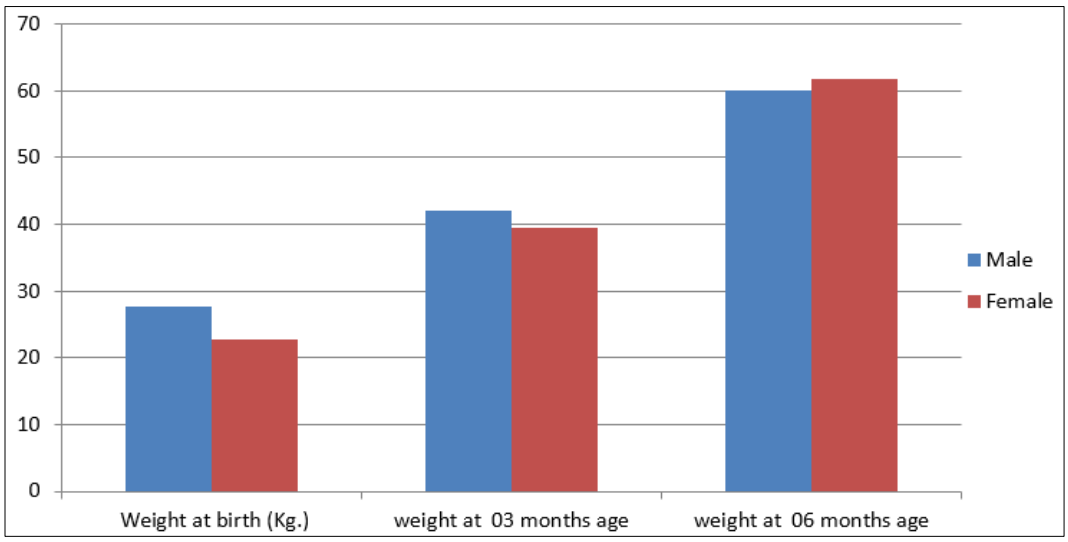

Fig 2: Effect of sex at birth and growth performance of calves

Conclusion

In the present study it was concluded that the season had no – significant effects on weight at birth, weights at 03 months age and weights at 06 months age of Gangatiri calves, hence season has no role to play with regard to birth weight and growth performance. Sex had significant effect on birth weights, whereas weights at 03 months age and weights at 06 months age of Gangatiri calves registered no significance influence of sex of calves. It is clear that paternal birth weight is associated with the birth weight of male calves but not with female calves and therefore supports the notion that there is a genetic regulation along the male line.

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Conflict of Interest statement
The author did not have any conflicts of interest.

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