

Environmental and genetic effects on body weight in Surti buffalo calves

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The present study was carried out to see the effect of genetic and non genetic factors on weight at different ages.

The records of 317 Surti calves born at Livestock Research Station, Navsari (Gujarat) during 2003–2007 were collected and utilized for this study. The sire having less than 4 progenies were excluded for studying the sire effects. Each year was divided into 3 seasons for study of effects of season of calving, viz. winter (16 Oct–15 Feb), summer (16 Feb–15 June) and monsoon (16 June–15 Oct).

The data were analyzed using least squares analysis

(Harvey 1990). The means in different treatments were tested for statistical significance using Duncan's multiple range tests. The Pearson's coefficient of correlation technique was used for analysis of phenotypic correlations. The average weight of different ages is presented in Table 1.

The findings were slightly lower than the results reported by Pandya (2005) at all the age groups, may be due to difference in period involved in study as period also reported to be significantly associated with body weight of calves (Pandya 2005, Kocak *et al.* 2007).

Table 1. Least square means and standard errors for body weight (kg) at various age group in Surti buffalo calves

Category	n	BW ₀	BW ₃	BW ₆	BW ₁₂
μ (Overall mean)	148	24.89±0.37	47.32±0.60	67.64±1.04	122.17±1.78
Season					
Winter (S ₁)	48	23.69±0.61 ^a	44.08±0.99 ^a	65.34±1.83	114.89±2.88 ^a
Summer (S ₂)	22	23.68±0.98 ^a	46.85±1.61 ^a	69.20±2.42	130.6±4.84 ^b
Monsoon (S ₃)	78	25.97±0.49 ^b	49.44±0.77 ^b	68.62±1.47	124.26±2.42 ^b
Sex					
Male	62	25.56±0.61	49.74±0.83 ^b	69.24±1.48	125.30±2.86
Female	86	24.40±0.45	45.57±0.79 ^a	66.49±1.44	119.91±2.26
Sire					
1	11	25.09±1.16	47.61±1.89	68.47±4.05 ^a	119.55±7.73 ^a
2	16	26.33±1.65	45.15±3.74	64.25±1.54 ^a	115.32±9.13 ^a
3	13	25.00±1.66	50.00±2.59	84.14±6.49 ^b	138.00±10.59 ^b
4	42	25.23±0.77	45.89±1.26	62.00±1.70 ^a	114.94±2.85
5	18	25.89±0.92	45.55±1.55	66.54±3.31 ^a	116.83±5.37 ^a
6	19	24.63±0.80	47.63±1.31	69.24±1.80 ^a	124.42±3.89 ^a
7	17	24.06±1.00	50.82±1.91	74.18±2.93 ^a	131.71±4.96 ^b
8	12	25.00±1.60	47.92±1.24	69.83±2.47 ^a	136.08±3.65 ^b
Parity					
1	62	24.03±0.55	45.40±0.77	63.52±1.30 ^a	119.06±2.43
2	29	25.14±0.88	47.08±1.41	68.18±2.45 ^a	122.22±4.18
3	18	25.56±0.90	49.37±1.93	70.31±3.87 ^b	123.28±5.87
4	39	25.30±1.82	48.12±2.75	74.3±4.78 ^b	137.2±3.45

Means with different superscript within columns for each group differs significantly.

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Our findings (Table 1) showed that the calves born during monsoon season have higher weight at birth and at 3 month of age than calves born during other seasons. The effects of

Table 2. Estimates of correlations among body weight traits and AFC

	BW ₀	BW ₃	BW ₆	BW ₁₂
BW ₃	0.543*			
BW ₆	0.638*	0.835*		
BW ₁₂	0.530*	0.576*	0.823*	
AFC	-0.214	0.539*	-0.327	-0.125

n=148

season had significant effect at all the ages under study. Seasonal changes in the availability of fodder may affect the body weight by altering growth rate after rumen development of calves. The calves born in summer and weaned in next winter got good nutrition lead to more body weight at 12 month. The finding of present study regarding heavier weights of the calves born during monsoon (season S₃) than calves born during other seasons were in agreement with the findings of Pandya (2005). However, they were contradictory to the results reported by Kocak *et al.* (2007).

Male calves were heavier than female calves at all the ages (Table 1). Our results pertaining to effects of sex were in agreement with the results reported by Pandya (2005). Sires had significant influence on weight at 6 and 12 month of age.

In general, there was a progressive increase in weight at different age with advancement of parity (Table 1). However, effect was significant at 6 months only. Nonsignificant effect of parity on birth weight was also reported by Kocak *et al.* (2007).

The phenotypic correlation among various body weights were positive and significant. Pandya (2005) also got positive and high correlation. The AFC was significantly and negatively correlated with body weights at 3 months

but it was nonsignificant with either at birth, 6 and 12 months of age.

SUMMARY

The data pertaining to birth dates, birth weights and weights at 3, 6 and 12 months age of 317 buffalo calves were collected from records of Livestock Research Station, Navsari from year 2003–2007. Effects of season of calving were found significant on birth weight, BW₃ and BW₁₂. The male calves showed higher weight at all age groups but statistically the effect of sex of calves was only found significant at BW₃. Effects of sire were significant for BW₆ and BW₁₂. Effects of parity were nonsignificant for birth weight but found significant for BW₆. The AFC was significantly and negatively correlated with body weights at 3 months but it was nonsignificant with either birth weights or weights at 6 or 12 months. The birth weight were significantly and positively correlated with BW₃, BW₆ and BW₁₂ suggesting that body weights at early age can be a fairly good indicator of body weight in subsequent period. The sex ratio (male:female calves) during the period of study was 1.22:1. The frequency distribution of calving was maximum during the S₃–rainy season (53.94%) and minimum during S₂–summer (17.35%).

REFERENCES

- Harvey W R. 1990. Uses guideline for mixed model least squares and maximum likelihood computer programme PC-2, version, USDA-ARS.
- Kocak S, Tekerli M, Ozbeyaz C and Yuceer B. 2007. Environmental and genetic effects on birth weight and survival rate in holstein calves. *Turkish Journal of Veterinary and Animal Sciences* **31**(4): 241–46.
- Pandya G M. 2005. 'Genetic analysis of production traits of Surti buffalo on an organized farm.' M.V.Sc. Thesis, College of Veterinary Science and Animal Husbandry, Anand Agricultural University, Anand.