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SHORT COMMUNICATION

Growth Performance of Murrah Buffalo Calves under Humid Tropical Conditions of Kerala

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ABSTRACT

Data obtained from Murrah buffalo herd maintained at Livestock Research Station, Thiruvazhamkunnu (Kerala) was analysed to determine average birth weight and average daily gain of calves. Mean body weight (±SE) at birth observed was 34.76 ± 0.54 Kg. Body weight at birth of female and male Murrah calves were 32.83 ± 0.63 Kg and 37.06 ± 0.73 Kg respectively. Significant difference was observed between sexes with respect to birth weight and body weight at 15 days of age ($p<0.05$). Average daily gain observed in male and female calves during 90 day period was 0.595 Kg and 0.612 Kg respectively. Difference in average daily gain was not statistically significant, except between 30-45 days during which female calves gained more weight than males ($p<0.05$).

Keywords: Murrah, buffalo calf, birth weight, daily gain

Buffalo is a valuable animal genetic resource which provides income and employment to a large number of agrarian households in India. Buffalo milk and meat contribute immensely to the economy of India. According to annual report (2016-17) of Ministry of Commerce, Government of India, the nation exported buffalo meat worth INR 260.34 Billion (US $ 4069.08 Million) during 2016-17. Milk production from buffalo was estimated at 76459 thousand tonnes during 2015-16 by Department of Animal Husbandry, Dairying & Fisheries, Government of India, which accounted to about half of India's total milk output. Murrah buffalo is a milk type animal with the home tract located around Rohtak, Jind, Hisar and Bhiwani districts of Haryana. The animals are also found in Nabha, Patiala districts of Punjab and around Delhi (Dhilod *et al*., 2017). Total buffalo population of India was 108.70 million heads and the buffalo population of Kerala represented less than 0.1% of the national population (102 thousand heads) according to 19th Livestock census (2012) report. However there is renewed enthusiasm from farmers to rear buffaloes under low input systems. Birth weight is an early indicator of an animal's future performance. Growth rate of livestock assessed in terms of average daily gain (ADG) reflects efficiency of feed utilisation and is an economically important trait. Besides ADG also helps farmers to evaluate whether expected market weight targets are achieved or not, especially in the case of male buffaloes. The present study focussed on analysis of birth weight and average daily gain of Murrah buffalo calves under humid tropical conditions of Kerala.

The data was collected from Murrah buffalo herd maintained at Livestock Research Station, Thiruvazhamkunnu (11˚22' N and 76˚22' E), under Kerala Veterinary and Animal Sciences University. Mean weather parameters like air temperature and relative humidity were calculated by processing data from November 2014 to April 2018 obtained from weather station maintained in the campus (Campbell Scientific, CR 800 data logger). Maximum air temperature ranged from 24.49 ˚C (December) to 42.85 ˚C (March), while minimum air temperature ranged from 13.43 ˚C (January) to 27.02 ˚C (April). Relative humidity ranged from 9.11% to 100%. The climate is humid to sub humid and the average annual rainfall recorded in the region is 2171 mm (Premakumar *et al*., 2015). Animals

Table 1: Feeding schedule of weaned calves

Colostrum/ Milk		Calf starter		Green fodder	
Age in days	**Quantity**	**Age in days**	**Quantity**	**Age in days**	**Quantity**
0-42	1/10 th of body weight	15-30	250 g/day	15-30	Adlibitum
43-60	1/15th of body weight	30-60	500 g/day	30-60	
61-90	1/20th of body weight	60-90	750 g/day	60-90	

Table 2: Mean body weight of Male and Female Murrah calves

Age in days	Female		n	Male		n	Overall		n
	Mean	**SE**		**Mean**	**SE**		**Mean**	**SE**	
0	32.83^{a}	0.63	35	37.06^{b}	0.73	34	34.76	0.54	71
15	41.48^{a}	0.79	33	44.47^{b}	0.88	32	42.81	0.60	67
30	49.84	1.05	31	53.28	1.21	32	51.26	0.84	65
45	58.50	1.31	32	61.0	1.29	30	60.68	0.89	57
60	68.78	1.72	32	68.63	1.63	32	70.82	1.08	55
75	75.65	1.85	31	77.30	1.88	30	77.53	1.16	59
90	85.43	3.09	23	88.16	1.55	25	86.94	1.65	49

Means bearing different superscripts in the same row differ significantly ($p<0.05$).

sampled for the study were born between 2011 and 2018. The calves were weaned on day 0 and were raised on milk, calf starter and fodder. The feeding schedule until 90 days of age is given in Table (1). The calves were dewormed on 21 days and 60 days of age. The body weight of animals was recorded on 0, 15, 30, 45, 60, 75 and 90 days of age. The animals were handled gently so as to minimize stress during the recording process. Mean body weights and average daily gains were computed and subjected to statistical analysis using 't' test.

Results from present study indicate that birth weight of male murrah calves was significantly higher ($p<0.05$) than that of female calves. Significant difference was also noted between body weights of the sexes at 15 days of age, with males being heavier ($p<0.05$). Male calves on an average remained heavier during all periods of the study though the differences were not statistically significant. The birth weight of female calves ranged from 27 Kg and 42 Kg whereas that of males ranged from 30 Kg to 46 Kg. The results are presented in Table 2.

Average daily gain of female Murrah calves was higher than that of male calves between 0-15 days and between 30-45 days of age. Weight gain among male and female calves differed significantly ($p<0.05$) between 30-45 days of age, with female calves gaining more weight per day than males. During other periods, male calves gained more weight on an average, though the difference was not statistically significant. The average daily weight gain observed in male calves was 0.595 Kg over 90 days whereas female calves gained at the rate of 0.612 Kg during a similar period. The results from present study are presented in Table 3.

Lower but closely similar birth weights of 32.4 ± 0.30 kg, 32.63±.0.42 Kg and 32.00±1.11 Kg in Murrah calves were reported by Thiruvenkadan *et al*. (2009); Gupta *et al*. (2012) and Kumar *et al*. (2017). Within breed difference in birth weight could be due to difference in management and breeding practises. The average birth weight of Surti buffalo (24.60±0.18 Kg) according to report by Pandya *et al*. (2015) was lower that observed in Murrah calves. Nili Ravi calves had higher average birth weight (35.86±4.30 Kg)) than Murrah calves as per report by Akhtar *et al*. (2012) from Pakistan. Lower body weight of 28.8±3.80 Kg was also reported in Nili Ravi calves by Charlini *et al*. (2015) from Sri Lanka.. The birth weight of Murrah calves

in the present study was therefore intermediate to that of Nili Ravi calves reported from Pakistan and Sri Lanka. The mean birth weight of male calves (32.2 ± 0.57 kg) and female calves (26.0 ± 0.50 kg) of Anatolian Buffaloes (Kul *et al*., 2018) was lower than that of Murrah breed as concluded from the present study. Mean birth weights reported by Aguiar *et al*. (2014) of 36.6 kg in water buffalo calves of Brazilian plateau was higher than that of Murrah calves observed in the current study. Therefore it could be assumed that Murrah calves have higher birth weight than Anatolian buffaloes but lower than that of Brazilian water buffaloes.

Table 3: Average daily gain in Murrah calves until 90 days

Age in days	Average daily weight gain (Kg)			
	Female	n	Male	n
0-14	0.585	32	0.510	31
15-30	0.563	31	0.588	32
31-45	0.752[a]	33	0.478[b]	30
46-60	0.702	32	0.763	32
61-75	0.454	32	0.600	29
76-90	0.615	22	0.631	24
Overall	0.612	—	0.595	—

* Means bearing different superscripts in the same row differ significantly ($p<0.05$).

Higher average body weight at 90 days of age (113.12 Kg) was reported from a sample of male & female Murrah calves by Kumar *et al*. (2017). However weight of Murrah calves at 3 months of age (62.0 ± 0.65 Kg) reported by Thiruvenkadan *et al*. (2009) was lower than that observed in present study. Weight gain over three month period observed in the present study was intermediate to these two studies and the difference could be due to changes in agro-climatic conditions and management practises. The former study was conducted in Haryana and the later was performed in Tamil Nadu.

The average gain observed in the study indicate normal growth rate for medium input conditions. Average daily gain of weaned Murrah calves reported by Kumar *et al*. (2017) was lower (0.451± 0.02 kg) than that observed in the present study.

CONCLUSION

Analysis of available records indicates that birth weight of Murrah calves at LRS was 34.76 ± 0.54 Kg. Significant difference was noted between body weights of the sexes at birth and at 15 days of age, with males being heavier ($p<0.05$). Average daily gain differed significantly ($p<0.05$) during 30-45 days of age between male and female calves, during which female calves gained more weight. The average daily gain observed was 0.595 Kg and 0.612 Kg in male and female calves respectively.

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