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Effect of managerial conditions like housing systems and levels of feeding on body measurement in murrah buffalo calves in hot-humid weather

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Abstract

A study was conducted on 24 Murrah buffalo calves of either sex between 6 to 9 months of age at animal Farm, LUVAS, Hisar during the summer season from July 15, 2015 to October 15, 2015 (90Days). Experimental calves were divided into four treatments having six animals in each treatment viz. Loose housing system + 100% feeding level (T1), Loose housing system + 120% feeding level (T2), Conventional barn housing system + 100% feeding level (T3) and Conventional barn housing system + 120% feeding level (T4). There was significantly higher ($p < 0.05$) temperature and temperature humidity index in conventional house than loose house. The analysis of variance revealed that there was no significant difference in increase in body measurement viz. body length, height, heart girth, abdominal girth due to housing system and feeding levels. However there was an increasing trend in body measurements in each group during the experimental period.

Keywords: Murrah buffalo calves, body length, height, heart girth, abdominal girth, loose housing system, conventional barn housing system and feeding level

Introduction

Buffalo is a triple purpose animal, being suitable for milk, meat and draught. Buffalo can efficiently utilize the roughages and crop by-products into high quality milk suitable for a wide range of dairy products. The growth traits of buffaloes are influenced by many environmental factors besides their genetic make-up. These environmental factors may suppress the animals true genetic potential for growth (Thevarnanoharan *et al.*, 2001) [1]. One of the reasons for a poor body growth in buffaloes is due to improper management of calves. The information on the effect of level of feeding, types of housing and other managerial regimes is inadequate on growth of buffalo calves during summer season. So, the present work was undertaken to study the effect of managerial conditions like housing systems and levels of feeding on body measurement in murrah buffalo calves in hot-humid weather.

Materials & Methods

The experiment was conducted from 15th July 2015 to 15th October, 2015 at the Buffalo farm of the Livestock Production Management Department, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar. Hisar city is situated in semi-arid region and climatic condition is sub-tropical in nature. Geographically, Hisar is situated at 29° 10' N latitude, 75° 40' E longitude and 215.2 meters altitude.

Animals and Experimental Design

Twenty four Murrah buffalo calves of either sex between 6 to 9 month of age were selected from the Old Buffalo Farm, Livestock Production Management Department, LUVAS, Hisar. These calves were divided into four groups of six calves each on the basis of nearness of their weight. Prior to start of experiment an adjustment period of 10 days will be given to all the calves. The experimental groups were randomly allocated to one of the four treatments viz. Loose housing system + 100% feeding level (T1), Loose housing system + 120% feeding level (T2), Conventional barn housing system + 100% feeding level (T3) and Conventional barn housing system + 120% feeding level (T4). Feeding level were according to the ICAR recommendation.

Feeding and Watering

All the experimental calves were fed jowar during the experimental period. Wheat straw ad libitum and a concentrate mixture containing Barley, Ground Nut cake (GNC), Deoiled Rice Polish (DORP), Mineral mixture (MM) and Salt was prepared. The allowance of concentrate mixture was fixed in such a way that calves of T₂ and T₄ got 20 per cent higher and calves of T₁ and T₃ at the normal ICAR recommendation level of concentrate per head per day. A weighted amount of Jowar was fed to all calves daily according to the dry matter requirement of calves other than the dry matter present in the concentrate mixture. The Quantity of different feeds fed to each calf was adjusted at fortnightly intervals in order to meet the requirement of the calves with the change in their body weight. Animals were given ad lib fresh water throughout the experimental period. Before the formulation of rations, the feed ingredients were analyzed (AOAC, 2005) for proximate composition (Table 1)^[2]. Based upon the proximate composition of feed ingredients, the ration for the different experimental groups of animals was formulated. The composition of the experimental diet of different treatment groups and proximate chemical composition is presented in (Table 2.).

Observations

Chemical Analysis of Feed Ingredients for Proximate Principles

Analysis of chemical constituents of feed ingredients was done in the laboratory. All parameters like Total moisture, Crude proteins, Crude fibers, Total Ash and Ether extract were analyzed accurately by laboratory methods.

A. Body Measurements

Body measurements viz. body length, height, heart girth, abdominal girth and hip width of experimental animals were recorded in Centimetres (cm) at the beginning and then at the fortnightly during the experiment. These includes:

1. Body length: The distance from point of shoulder to the point of pin bone.
2. Body height: The distance from the floor to the highest point of wither.
3. Heart girth: Circumference of the body over the chest of the animal just behind the elbow.
4. Abdominal girth: The circumference of the body over the flank just in front of the udder.
5. Hip width: The distance between the points of two pin

bones

Statistical Analysis

The experiment data was planned and analyzed as per Snedecor and Cochran, 1999^[3].

Results and Discussion

Body Measurement

Average daily increase in body length, height, heart girth, abdominal girth and hip width of buffalo calves under different treatment and management practices have been presented in Table 3. The average daily increase in body length and height were 0.113±0.022, 0.133±0.006, 0.126±0.016 and 0.169±0.024, and 0.106±0.007, 0.113±0.010, 0.093±0.009 and 0.100±0.009 cm in treatments T₁, T₂, T₃ and T₄ Respectively and the corresponding figure for heart girth, abdominal girth and hip width were 0.241±0.016, 0.221±0.027, 0.221±0.013 and 0.237±0.017, and 0.135±0.027, 0.180±0.038, 0.120±0.008 and 0.143±0.009, and 0.067±0.015, 0.063±0.007, 0.048±0.008 and 0.065±0.007 in treatments T₁, T₂, T₃ and T₄ Respectively. The average daily increase in body length and height were 0.123±0.013, 0.147±0.017, 0.119±0.014 and 0.151±0.012, and 0.106±0.007, 0.113±0.010, 0.093±0.009 and 0.100±0.009 in loose house, Conventional barn, ICAR 100% and ICAR 120% respectively and corresponding figure for heart girth, abdominal girth and hip width were 0.229±0.017, 0.205±0.013, 0.206±0.009 and 0.227±0.017, and 0.157±0.026, 0.131±0.005, 0.128±0.013 and 0.161±0.021, and 0.065±0.006, 0.056±0.006, 0.057±0.005, and 0.064±0.005 (Table 4).

The analysis of variance revealed that there was no significance difference in increase in body measurement due to housing system and feeding levels. However there was an increasing trend in body measurements in each group during the experimental period. Iqbal *et al.* (2014) while doing the experiment on the effect of varying levels of concentrate ration on the performance of Nili- Ravi buffalo heifer calves found that there was non-significant ($P>0.05$) difference in the body measurements (height at wither, body length and heart girth) due to concentrate level^[4]. Jat *et al.* (2010) also found no significant effect of housing systems on daily gain in body measurements^[5]. Singh *et al.* (2014) found that there was no significant effect of modification of house on increase in body measurement^[6].

Table 1: Chemical analysis of feed ingredient (on DM basis)

Ingredients	DM%	OM%	CP%	CF%	EE%	ASH%	NDF%	ADF%	NFE%
Barley	92.06	89.71	10.5	7.02	3.5	2.3	24.23	8.71	76.7
GNC	92.72	85.74	39.16	8.12	8.31	7.1	23.07	10.12	37.54
DORP	90.07	83.61	14.5	13.09	2.1	6.41	49.23	16.13	64.1
Sorghum	25	14.32	7.45	27.01	3.4	10.73	64.87	37.84	51.45
Wheat Straw	90	78	2.81	35	1.05	12.16	74.83	51.9	49.14

Table 2: Ingredients of concentrate mixture (kg) and its chemical composition (on DM basis).

Ingredients	Quantity in kg	DM%	OM%	CP%	CF%	EE%	ASH%	NDF%	ADF%	NFE%
Barley	40	36.8	35.88	4.2	2.8	1.4	0.92	9.692	3.484	30.68
GNC	30	27.81	25.71	11.748	2.4	2.49	2.1	6.921	3.036	11.262
DORP	27	24.3	22.572	3.915	3.51	0.54	1.728	13.2921	4.3551	17.307
Whole conc.	100	88.91	84.162	19.863	8.71	4.43	4.748	29.9051	10.8751	59.249

Whole concentrate mixture also contain 2 kg Mineral mixture (MM) and 1kg Salt

Table 3: Average daily increase in body measurements (in cm) of buffalo calves under different treatments

Variables	T ₁	T ₂	T ₃	T ₄
Body Length	0.113±0.022	0.133±0.006	0.126±0.016	0.169±0.024
Body Height	0.106±0.007	0.113±0.010	0.093±0.009	0.100±0.009
Heart Girth	0.241±0.016	0.221±0.027	0.221±0.013	0.237±0.017
Abdominal Girth	0.135±0.027	0.180±0.038	0.120±0.008	0.143±0.009
Hip Width	0.067±0.015	0.063±0.007	0.048±0.008	0.065±0.007

Table 4: Effect of Housing System and level of feeding on daily increase in body measurement (in cm).

Variables	Housing System		Feeding Level	
	Loose House	Conventional Barn	100% ICAR	120% ICAR
Body length	0.123±0.013	0.147±0.017	0.119±0.014	0.151±0.012
Body Height	0.109±0.006	0.096±0.005	0.099±0.004	0.106±0.008
Heart Girth	0.229±0.017	0.205±0.013	0.206±0.009	0.227±0.017
Abdominal Girth	0.157±0.026	0.131±0.005	0.128±0.013	0.161±0.021
Hip Width	0.065±0.006	0.056±0.006	0.057±0.005	0.064±0.005

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