

GROWTH PERFORMANCE AND FEED INTAKE OF BUFFALO HEIFERS UNDER DIFFERENT HOUSING SYSTEM DURING WINTER SEASON

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Abstract: The present study was carried out during winter season for a period of 126 days to see the effect of different housing system on the performance of eighteen buffalo heifers. The experimental animals were randomly divided into three treatment groups on the basis of their body weight viz T₁ (control): Loose House-House, T₂: Loose house + Curtain (Palli) and T₃: Conventional closed barn house. There was non-significant effect of microclimate between treatments. The average daily body weight gain were 0.492 ± 0.029 , 0.516 ± 0.030 and 0.540 ± 0.025 kg in T₁, T₂ and T₃, respectively indicated that there was no significant difference in body weight gain between treatments. However, the calves under T₂ and T₃ gain 5 and 9.8 per cent more weight as compared to calves of T₁. The daily increase in body size was not significantly influenced by the treatments. The dry matter, digestible crude protein and total digestible nutrient intake were also not significantly influenced by the treatments, but the intake of these nutrients was 0.45, 0.095 and 0.81 kg more in T₂ as compared to T₁.

Keywords: Body measurements, Conventional, Growth, Heart girth, loose house.

Introduction

The performance of any domestic species including buffalo depends on the influence of heredity and environmental factors. Keeping aside the genetic make-up of the individual management practices play an important role for improving the overall performance of animal to a great extent. The main aim of better management of heifer is to obtain optimum growth rate, efficient feed conversion efficiency as per their genetic potential thereby to attain early maturity weight and subsequently reduce the age at first calving which has direct effect on the life time production performance of animals. The adverse environmental influence can be overcome by adopting proper housing and management practices. Therefore, management of buffalo heifers especially in winter season is of paramount importance in prevailing ecosystem of Indian subcontinent, as they are highly susceptible to cold stress and have a poor heat regulating mechanism.

Growth is a complex phenomenon and is difficult to define in simple terms. Growth is taken as increase in body weight. However, an animal can show skeletal growth without putting water or fat from the body. So combinations of body weight and body measurements were applied. In this study gain in body weight and size (length, height, heart girth and abdominal girth) were used as measurements of growth. The winter climate in Northern region of the country is quite harsh due to low ambient temperature ($1-2^{\circ}\text{C}$) which causes high mortality and low growth rate in buffalo calves leading to great economic loss⁸. It is, therefore essential to protect the buffalo calves from cold to obtain optimum growth as per their genetic potential [11].

Materials & Methods

The present study was conducted during winter season for a period of 126 days (mid November to 20th March) to see the effect of shelter management on the performance of eighteen buffalo heifers at the Animal farm of the Department of Livestock Production & Management, CCS Haryana Agricultural University, Hisar. The experimental animals were randomly divided into three treatment groups on the basis of their body weight *viz.* T₁ (control): Loose House-House having covered area of asbestos sheet roofing and open area with surrounded by 1.5 meter high wall from three sides. T₂: Loose house + Curtain (Palli) and T₃: Conventional closed barn house- completely closed with asbestos roof with 4 gates and 4 windows. The floor was made up of cement with proper underground sewerage system. All the buffalo calves were fed green, dry fodder and concentrate as per their requirement⁶. The calves were offered concentrate mixture in the morning daily. The concentrate mixture fed during the experiment Conc. Mix. I (DCP 15.46%, TDN 72.26%), Conc. Mix. II (DCP 14.50%, TDN 71.44%). The requirements and rations of the calves were revised at fortnightly intervals depending on the change in their body weight. The experiment was analyzed as CRD. The difference among the treatment means were tested for significance by performing Duncan's multiple range test [10].

Results and Discussion

Body weight and body measurements:

The average daily body weight gain (Table 1) were recorded as 0.492 ± 0.029 , 0.516 ± 0.030 and 0.540 ± 0.025 kg in T₁, T₂ and T₃, respectively indicated that there was no significant difference in body weight gain between treatment. However, the calves under T₂ and T₃ gain 5 and 9.8 per cent more weight as compared to calves of T₁. Similar trend was observed for final body weight gain. This indicates that the calves under T₂ and T₃ were more comfortable

during the experimental period in comparison to the calves of T₁. This is in agreement with earlier reports [1,4] who also found that there was practically no difference in the effects of indoor and outdoor as well as group and individual housing on growth.

The mean values of meteorological data viz. maximum temperature in treatment T₁, T₂ and T₃ were 21.49 ± 1.100 , 20.74 ± 1.060 and 20.288 ± 1.033 °C, respectively and the corresponding values for minimum temperature were 7.32 ± 0.709 , 8.13 ± 0.687 and 9.068 ± 0.675 , respectively indicated that there was non-significant effect of maximum and minimum temperature between treatments. However, the maximum temperature was 1.2 °C less in T₃ as compared to T₁ and T₂. The average temperature humidity index was not significantly influenced by the treatments both in morning and evening. However, the average THI values were six per cent higher in evening than in the morning in all the treatments. Similar results were reported by many workers [2,5,9] under different housing condition.

The reduction in growth rate was more or less same in all the treatments during the experiment. However, the growth rate was marginally low in T₁ throughout the experiment due to lowest minimum temperature among all the treatment. It is clear from the minimum temperature that during severe cold season, the growth rate was low because due to cold season part of the feed energy might be diverted towards keeping the body temperature from falling below normal.

Voluntary feed intake:

Average daily dry matter intake per heifer was 4.62 ± 0.117 , 4.73 ± 0.104 and 4.75 ± 0.122 kg in T₁, T₂ and T₃, respectively revealed that there was non-significant influenced by the treatments (Table 2). Although the daily dry matter consumed was not significant but the calves raised under T₂ and T₃ consumed marginally higher amount of dry matter as compared to T₁. These results are in agreement with few researcher [3,7,9]. The average dry matter intake per 100 kg body weight were 2.15 ± 0.068 , 2.58 ± 0.077 and 2.56 ± 0.080 kg and the corresponding figure for per kg metabolic size ($w^{0.75}$) were 92 ± 1.979 , 94 ± 2.156 and 94 ± 2.229 g in T₁, T₂ and T₃, respectively indicated that non-significant affected. The average daily digestible crude protein intake was 291 ± 6.237 , 299 ± 5.507 and 301 ± 6.252 g in T₁, T₂ and T₃, respectively. The corresponding values for digestible crude protein intake per 100 kg body weight were 158 ± 3.798 , 162 ± 3.929 and 162 ± 4.287 g and for per kg metabolic body size were 6 ± 0.098 , 6 ± 0.093 and 6 ± 0.102 g in T₁, T₂ and T₃, respectively indicated that non-significant affected. Average values of daily total digestible nutrient intake was 2.75

± 0.069 , 2.82 ± 0.061 and 2.84 ± 0.070 and the corresponding values for total digestible nutrient intake per 100 kg were 1.49 ± 0.040 , 1.54 ± 0.047 and 1.53 ± 0.047 kg and per kg metabolic size were 55 ± 1.166 , 56 ± 1.319 and 56 ± 1.299 g in T₁, T₂ and T₃, respectively indicated that non-significant affected. The results of the present study are in accordance with several workers [3,7,9].

Conclusion

The results of present study clearly indicates that the buffalo heifers raised in conventional barn during winter had better growth and utilization of nutrients and were in more comfortable conditions as compared to calves maintained in the loose house system. The practice of altering loose house by making provision of curtains also resulted in good performance.

Table 1: Average daily body weight gain (kg) and increase in body measurements (cm) of buffalo heifers under different treatments

Parameters	T ₁	T ₂	T ₃
A. Average body weight (kg)			
Initial body weight (kg)	167.67±20.513	168.50±22.099	168.83±22.809
Final body weight (kg)	229.67±23.614	233.50±25.235	236.83±26.361
Daily body weight gain (kg)	0.492±0.029	0.516±0.030	0.540±0.025
B. Body measurements (cm)			
Length (cm)	0.090±0.006	0.096±0.005	0.104±0.006
Height (cm)	0.088±0.006	0.089±0.005	0.119±0.027
Heart girth (cm)	0.120±0.006	0.126±0.006	0.129±0.007
Abdominal girth (cm)	0.155±0.005	0.162±0.006	0.164±0.007

Table 2: Average daily dry matter, digestible crude protein and total digestible nutrient intake of buffalo heifers under different treatments

Parameters	T ₁	T ₂	T ₃
A. Average daily dry mater intake (DMI)			
DMI (kg)/day	4.62±0.117	4.73±0.104	4.75±0.122
DMI (kg)/100 kg b. wt.	2.51±0.068	2.58±0.077	2.56±0.080
DMI (g)/kg W ^{0.75}	92±1.979	94±2.156	94±2.229

B. Average daily digestible crude protein intake (DCPI)

DCPI (g)/day	291±6.237	299±5.507	301±6.252
DCPI (g)/100 kg b. wt.	158±3.798	162±3.929	162±4.287
DCPI(g)/kg w ^{0.75}	6±0.098	6±0.093	6±0.102

C. Average daily total digestible nutrient intake (TDNI)

TDNI (kg)/day	2.75±0.069	2.82±0.061	2.84±0.070
TDN (kg)/100 kg b. wt.	1.49±0.040	1.54±0.047	1.53±0.047
TDNI (g)/kg w ^{0.75}	55±1.166	56±1.319	56±1.299

REFERENCES

- [1] Barradas Lagumes, H.V., Roman Ponce, H. and Moneoy Ayon, V. 1981. Performance of calves of dairy breeds in different types of housing in tropical climate. *An. Breed. Abstr.* **49**:2469.
- [2] Chakrabarti, A. 1991. Effect of winter management system on growth performance of female Murrah buffalo calves. M.V. Sc. Thesis, Haryana Agricultural University, Hisar.
- [3] Dahiya, P. 1997. Effect of feeding two levels of dietary protein and bedding on growth performance of female buffalo calves during winter season. M.V. Sc. Thesis, Haryana Agricultural University, Hisar.
- [4] Lee, A. 1977. A note on the effect of winter housing on the live weight gain and behavior of cattle. *Record Agril. Res.* **25**: 99-101.
- [5] Mehla, O.P. 1982. Effect of mode of housing during winter on growth and some physiological parameters of buffalo calves. M. Sc. Thesis, Haryana Agricultural University, Hisar.
- [6] Pathak, N.N. and Verma, D.N. 1993. Nutrient requirements of buffalo. International Book Distributing Co., Lucknow.
- [7] Rohilla, P.P. and Shri Ram. 1990. Effect of type of bedding on growth rate, feed and water intake, feed efficiency, disease incidence and economy of rearing buffalo calves in winter. *Indian J. Anim. Prod. Mgmt.* **6(2)**: 60-65.
- [8] Sastry, N.S.R. and Verma, A.K. 1988. Overcoming morbidity and mortality in buffalo calves. *Indian J. Anim. Prod. Mgmt.* **4(3&4)**: 353-363.
- [9] Singh, Y. 2000. Effect of certain Managemental practices on the performance of buffalo heifers. Ph. D. Thesis, CCS Haryana Agricultural University, Hisar.

[10] Snedecor, G.W. and Cochran, W.G. 1980. Statistical Methods. 7th Edn. Oxford and IBH publishing Co., Calcutta.

[11] Yadav, R.S. and Yadav, M.S., Singh, M.P. and Kashi Ram. 1990. Effect of provision of bedding and jacketing on growth performance of buffalo calves during winter season. *Indian J. Anim. Prod. Mgmt.* **6**(4):195-200.