

## **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 T<sub>1</sub> (control): Loose House-House, T<sub>2</sub>: Loose house + Curtain (Palli) and T<sub>3</sub>: Conventional closed barn house. There was non-significant effect of microclimate between treatments. The average daily body weight gain were  $0.492 \pm 0.029$ ,  $0.516 \pm 0.030$  and  $0.540 \pm 0.025$  kg in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively indicated that there was no significant difference in body weight gain between treatments. However, the calves under T<sub>2</sub> and T<sub>3</sub> gain 5 and 9.8 per cent more weight as compared to calves of T<sub>1</sub>. 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 T<sub>2</sub> as compared to T<sub>1</sub>.

**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 loss<sup>8</sup>. 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 20<sup>th</sup> 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.* T<sub>1</sub> (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. T<sub>2</sub>: Loose house + Curtain (Palli) and T<sub>3</sub>: 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 requirement<sup>6</sup>. 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  $0.492 \pm 0.029$ ,  $0.516 \pm 0.030$  and  $0.540 \pm 0.025$  kg in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively indicated that there was no significant difference in body weight gain between treatment. However, the calves under T<sub>2</sub> and T<sub>3</sub> gain 5 and 9.8 per cent more weight as compared to calves of T<sub>1</sub>. Similar trend was observed for final body weight gain. This indicates that the calves under T<sub>2</sub> and T<sub>3</sub> were more comfortable

during the experimental period in comparison to the calves of T<sub>1</sub>. 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 T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were  $21.49 \pm 1.100$ ,  $20.74 \pm 1.060$  and  $20.288 \pm 1.033$  °C, respectively and the corresponding values for minimum temperature were  $7.32 \pm 0.709$ ,  $8.13 \pm 0.687$  and  $9.068 \pm 0.675$ , 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 T<sub>3</sub> as compared to T<sub>1</sub> and T<sub>2</sub>. 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 T<sub>1</sub> 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  $4.62 \pm 0.117$ ,  $4.73 \pm 0.104$  and  $4.75 \pm 0.122$  kg in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, 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 T<sub>2</sub> and T<sub>3</sub> consumed marginally higher amount of dry matter as compared to T<sub>1</sub>. These results are in agreement with few researcher [3,7,9]. The average dry matter intake per 100 kg body weight were  $2.15 \pm 0.068$ ,  $2.58 \pm 0.077$  and  $2.56 \pm 0.080$  kg and the corresponding figure for per kg metabolic size ( $w^{0.75}$ ) were  $92 \pm 1.979$ ,  $94 \pm 2.156$  and  $94 \pm 2.229$  g in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively indicated that non-significant affected. The average daily digestible crude protein intake was  $291 \pm 6.237$ ,  $299 \pm 5.507$  and  $301 \pm 6.252$  g in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively. The corresponding values for digestible crude protein intake per 100 kg body weight were  $158 \pm 3.798$ ,  $162 \pm 3.929$  and  $162 \pm 4.287$  g and for per kg metabolic body size were  $6 \pm 0.098$ ,  $6 \pm 0.093$  and  $6 \pm 0.102$  g in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively indicated that non-significant affected. Average values of daily total digestible nutrient intake was 2.75

$\pm 0.069$ ,  $2.82 \pm 0.061$  and  $2.84 \pm 0.070$  and the corresponding values for total digestible nutrient intake per 100 kg were  $1.49 \pm 0.040$ ,  $1.54 \pm 0.047$  and  $1.53 \pm 0.047$  kg and per kg metabolic size were  $55 \pm 1.166$ ,  $56 \pm 1.319$  and  $56 \pm 1.299$  g in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, 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 <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
<b>A. Average body weight (kg)</b>			
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>B. Body measurements (cm)</b>			
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 <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
<b>A. Average daily dry mater intake (DMI)</b>			
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 <sup>0.75</sup>	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 <sup>0.75</sup>	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 <sup>0.75</sup>	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. 7<sup>th</sup> 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.