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Effect of bedding materials on morphometric parameters of barbari kids during winter season

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Abstract

The present study was conducted with the objective to compare the morphometric parameters of Barbari Kids raised on different bedding materials during winter season. Thirty post-weaned Barbari kids of about three months age were selected from the institutional flock, which were divided into three groups viz. group I, II and III with ten kids in each group and were kept on plastic slats, soil and rubber mats, respectively. The body measurements like height at withers (HAW), body length (BL), heart girth (HG) and paunch girth (PG) were taken at fortnightly intervals. The fortnightly comparison of body measurements of kids exhibited no significant difference ($P>0.05$) in different groups.

Keywords: Morphometry, winter, barbari kids, bedding material

Introduction

Goat farming is an important source of income for the marginalized section of rural population that owns majority of the small ruminants. A persistent rise in demand for animal products due to changes in consumer tastes and expanding markets; particularly in developing countries showing expansion in wealth has created a challenge for animal scientists to meet this demand by optimization of housing for better production (Hopkins *et al.*, 2007) [7]. Barbari goats are small, short-haired and distributed across Uttar Pradesh and Rajasthan States of India; the most typical colour is white with small light brown patches. (Acharya, 1982) [1]. The highly prolific breed is quite important for milk and meat and highly suited for rearing under stall-fed conditions.

Housing system had a significant effect on body weight (Kovnerev and Smironov, 1988) [10]. Assuring appropriate housing provides one means of modifying stressful environmental conditions and ensuring proper growth (Pusillo *et al.*, 1990) [15]. The main problem of kid rearing is the post-weaning poor growth which is significantly affected by housing management (Dadi *et al.*, 2008; Gbangboche *et al.*, 2006) [3] [6]. Different management systems can be assessed by using morphometric parameters as an effective tool and indicator of growth and health. Better growth rates indicate towards enhanced general adaptability and feed conversion efficiency of animals which ultimately translates into improved morphometric performance of animals. Bedding material is a vital component of housing for kids during winters. The essential function of the bedding material are its ability to abate the extremes of climatic stress and providing conducive microclimatic conditions (Rahman *et al.*, 2013) [17]. Therefore, the present study was conducted to assess the effect of bedding materials on morphometry of barbari kids in winter season.

Materials and methods

The present study was conducted at Experimental shed complex on ICAR-Central Institute for Research on Goat (C.I.R.G) Makhdoom, Mathura, Uttar Pradesh, India. The climate is hot and semi-arid. Weather turns colder with winter stretching from November to February and summer ranges from May to August month annually.

The animal experiment was initiated in December 2017 and ended in March 2018. A total of 30 post weaned Barbari kids (21 males and 9 females) aged 3 months were selected from institute flock. The kids were randomly allocated to the two treatment groups (Plastic slats and rubber mat) and one control group (Soil floor) on the basis of similar body weight.

Table 1: Dimensions of partitions of pen made for different groups

Group	Bedding material used	Dimensions of partition
1	Plastic Slats	10 feet x 10 feet
2	Soil	10 feet x 10 feet
3	Rubber mats	10 feet x 10 feet

Each group comprised of ten kids (7 males and 3 females). While selecting the animals, due care was taken to minimize the error by narrowing down the range of age and live weights of these experimental animals as far as possible. The study was conducted for a period of 90 days duration with an adaptation period of 1 week prior to recording of variables. The animals were raised under an intensive housing system. A single pen (400 feet²) was partitioned equally into 4 parts using welded wire mesh. The control and treatment groups were housed in separate partition of the pen having different bedding materials. Out of the three groups, second group served as control.

The attainment of physical biometrics parameters could be an indicator of the nutritional status of the animal. Therefore, external body measurements viz. length, height, heart girth and abdominal girth were recorded at alternate weakly intervals before feeding and watering. The body measurements were taken with the help of measuring tape, while the animals were made to stand on a levelled floor with the head held up.

(a) Heart girth (HG) The circumference of the chest in (cm) around the thoracic cavity behind the elbow was measured as girth of the animals.

(b) Body length (BL) The length (cm) of the Animals was measured between the point of shoulder and the point of hip (Tuber Coxae).

(c) Height at wither (HAW) The distance in inches between point of the toe (hoof) of the fore limb to the highest point on wither (thoracic vertebrae) was measured as height.

(d) Paunch girth (PG) The circumference of the abdomen in front of sacrum (cm) was measured as girth of the animals.

Results and Discussion

Various body measurements viz., Body length (BL), Height at wither (HAW), Heart girth (HG) and Paunch girth (PG) of kids in different groups were recorded fortnightly and are presented in table 2, 3, 4 and 5, respectively.

Body length (BL)

The average BL of kids in Gr-I, II and III was 53.47, 53.21 and 52.44 cm, respectively. There was no significant difference (P>0.05) between BL of kids in different groups throughout the experiment. Similar studies carried were out by Khan *et al.* (2006)^[9], Pesmen and Yardimci (2008)^[14] and Iqbal *et al.* (2013)^[8] which indicated existence of positive correlation between body weight and body length.

Table 2: Effect of different bedding materials on Body Length (cm) of kids in different groups

	Group I	Group II	Group III	Mean	SEM	P Value
Body Length (cm)						
1 st Fortnight	50.50	50.10	50.00	50.20	0.62	0.946
2 nd Fortnight	52.50	51.95	51.45	51.96	0.65	0.818
3 rd Fortnight	54.00	53.80	52.65	53.48	0.67	0.690
4 th Fortnight	54.65	54.65	53.55	54.28	0.66	0.752
5 th Fortnight	55.70	55.55	54.55	55.26	0.65	0.754
Overall	53.47	53.21	52.44	53.04	0.32	0.405

Height at wither (HAW)

The average HAW of kids in Gr-I, II and III was 51.39, 52.23 and 50.53 cm, respectively. There was no significant difference (P>0.05) between HAW of kids in different groups. A positive correlation between body weight and height at wither of kids was reported by Khan *et al.* (2006)^[9], Pesmen and Yardimci (2008)^[14] and Iqbal *et al.* (2013)^[8].

Table 3: Effect of different bedding materials on Height at Withers (cm) of kids in different groups

	Group I	Group II	Group III	Mean	SEM	P Value
Height at Withers (cm)						
1 st Fortnight	48.15	48.60	47.65	48.13	0.65	0.848
2 nd Fortnight	49.95	50.60	49.35	49.96	0.66	0.756
3 rd Fortnight	51.85	52.45	50.75	51.68	0.67	0.593
4 th Fortnight	52.95	53.85	51.80	52.86	0.63	0.431
5 th Fortnight	54.05	55.65	53.10	54.26	0.63	0.260
Overall	51.39	52.23	50.53	51.38	0.33	0.120

Heart girth (HG)

The average HG of kids in Gr-I, II and III was 53.89, 54.38 and 52.99 cm, respectively. There was no significant difference (P>0.05) between HG of kids in different groups. Mohammed and Amin (1997)^[11]; Khan *et al.* (2006)^[9]; Ojedapo *et al.* (2007)^[13]; Rahman *et al.*, (2008)^[16] and Mule *et al.* (2014)^[12] found similar gradual increase in heart girth of kids and attributed it to the age advancement.

Table 4: Effect of different bedding materials on Heart Girth (cm) of kids in different groups

	Group I	Group II	Group III	Mean	SEM	P Value
Heart Girth (cm)						
1 st Fortnight	51.70	52.55	50.85	51.70	0.67	0.606
2 nd Fortnight	52.95	53.45	51.80	52.73	0.67	0.613
3 rd Fortnight	54.50	54.65	52.95	54.03	0.69	0.556
4 th Fortnight	54.75	55.20	53.95	54.63	0.70	0.778
5 th Fortnight	55.55	56.05	55.40	55.66	0.71	0.932
Overall	53.89	54.38	52.99	53.75	0.32	0.213

Paunch girth (PG)

The average PG of kids in Gr-I, II and III was 53.08, 53.91 and 53.23 cm, respectively. There was no significant difference (P>0.05) between PG of kids in different groups throughout the experiment. Similar studies carried out by Eydurán *et al.* (2013)^[5] and Akinyemi *et al.* (2014)^[2] exhibited a positive correlation between body weight and paunch girth.

Table 5: Effect of different bedding materials on Paunch Girth (cm) of kids in different groups

	Group I	Group II	Group III	Mean	SEM	P Value
Paunch Girth (cm)						
1 st Fortnight	51.05	52.45	51.40	51.63	0.65	0.680
2 nd Fortnight	52.55	53.05	52.15	52.58	0.69	0.877
3 rd Fortnight	53.35	54.15	53.30	53.60	0.69	0.864
4 th Fortnight	54.00	54.65	54.10	54.25	0.68	0.923
5 th Fortnight	54.45	55.25	55.20	54.96	0.69	0.878
Overall	53.47	53.21	52.44	53.04	0.32	0.405

Conclusion

Bedding material is one of the most vital components of housing of kids during winters. The bedding material can help in augmentation of animal welfare and health. Lack of

appropriate bedding may lead to uncomfortable conditions during winters, which consequentially hampers the productivity of livestock making them prone to different diseases and parasitic infestation (internal and external). Provision of different bedding materials viz. plastic slats, rubber and soil had similar effect on performance of the Barbari kids in terms of growth and morphometry, however, plastic slats improved the hygienic aspects in kids and may also be used as an alternative for straw in conditions of scarcity.

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