International Journal of Livestock Research, Vol. 10 (11) Nov' 2020
http://www.ijlr.org
eISSN: 2277-1964
NAAS Rating 2020 – 5.36

Original Research

Effect on Morphometric Characters of Weaned Kids of Sirohi Goat Fed with Different Levels of Concentrates

Hanuman Lal Nehra[1], Athar Uddin[1] and Vinod Bhateshwar[2]*

[1]Department of Livestock Production Management, S. K. N. College of Agriculture, Sri Karan Narendra Agriculture University, Jobner, Jaipur, Rajasthan, INDIA
[2]Department of Animal Husbandry and Dairying, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, INDIA

*Corresponding Author: vinodbhu0883@gmail.com

How to cite this paper: Nehra, H., Uddin, A., & Bhateshwar, V. (2020). Effect on Morphometric Characters of Weaned Kids of Sirohi Goat Fed with Different Levels of Concentrates. *International Journal of Livestock Research*, 10(11), 126-131. doi: http://dx.doi.org/10.5455/ijlr.20200323102833

Received : Mar 23, 2020
Accepted : Sep 23, 2020
Published : Nov 30, 2020

Abstract

The present research work entitled "Effect on morphometric characters of weaned kids of Sirohi goat fed with different levels of concentrates" was carried out to study the effect of concentrate feeding on morphometric characters. Twenty-four kids of Sirohi breed between 3-4 months age were randomly selected on the basis of uniform body weight, age and divided into 3 groups of 8 kids each at the goat farm of S.K.N. College of Agriculture, Jobner. Group T1 served as control supplemented with 50 g concentrate per kid per day for 3 months. Group T2 (treatment) supplemented with 50, 100 and 150 g concentrate and T3 (treatment) with 100, 150 and 200 g concentrate per head per day for 1st, 2nd and 3rd month, respectively. Other management practices were similar for each group. Fodder of khejri loom (Prosopis cineraria) was offered ad-libitum to all groups. Morphometric characters viz., body length, height at withers, heart girth and paunch girth of kids was recorded fortnightly. The overall increase in body length was 6.44, 7.62 and 8.25 cm, heart girth was 6.39, 7.15 and 8.09 cm, height was 6.80, 7.07 and 7.89 cm and paunch girth was 7.72, 8.20 and 9.05 cm in group T1, T2 and T3 groups, respectively. It is concluded from the results that the higher quantity of concentrate supplemented kids shown maximum body lengths, heart girth and paunch girth. While height at wither had non-significant effect over different treatments.

Keywords: Characters, Concentrates, Morphometric, Sirohi Goat Kids

Introduction

Goats have multifaceted utility as a livestock species and play significant role in rural economy. Rearing of goats is very useful for small and marginal farmers and landless labourers especially in the areas, where crops and dairy farming are not economical. Goat plays an important role in generating employment in rural areas. Being small in size, they do not require any large management skills and can be easily handled and managed by women and children. Goats can survive in areas with low quality vegetation. In India, goats are mainly fed on crop residues, green fodder, top feeds and non-conventional feed resources.

Goat meat has no religious taboo and the market for it is well established. They are traditionally raised by poverty-stricken village people in a secondary system of grazing on harvested fellow land, along the road and canal sides, community pasture land without any supplementation. For the poor farmers who are unable to maintain large ruminants, goat justifies its designation as "the poor man's cow". Under the changing agro-geo-climatic conditions and depleting resources for livelihood, the goat has tremendous potential to be projected as the 'Future Animal' for rural prosperity. As per 19th livestock census 2012, the Goat population of India is 135.17 million, which is 26.40% of total livestock population of the country. The goat population reduced by 3.82 percent in 2012 over 2007 census, India rank 2nd in total goat meat production and average yield of meat of indigenous goat is 10.74 kg/animal (Annual report 2015-2016, Department of Animal Husbandry, Dairy and Fisheries, GOI).

Supplementation of concentrates is important for growth and productivity of goats (Kochapakdee *et al*., 1994). By feeding good quality concentrate we can satisfy requirement of both protein and energy. Increasing concentrate levels in kid diet results in increased live weight, as well as carcass weight (Ryan *et al*., 2007). However, reports on the nutrient requirements are scanty and very little information is available particularly on the contribution of dietary protein and energy to the performance of growing kids under farm conditions and the cost benefit of feeding additional concentrates has not been fully explored in goat-production systems and needs to be evaluated. The quality and quantity of concentrate fed to growing kids has got very much importance for their maintenance and weight gain. Improved livestock production could be achieved through cultivation of high-quality forage adapted to local conditions as well as feeding concentrate. Concentrate feed promote rapid growth of goat, reduced ruminal methane production and increase ruminal propionate production, thereby lowering energy losses and contributing to higher overall efficiency of utilization of dietary energy for body weight gain (Mandebvu and Galbraith, 1999). Therefore, tree foliage or forage based ruminant feeding with an appropriate level of concentrate may provide optimum nutrient balance to improve animal productivity. Existing feedstuffs in tropical countries often provide inadequate energy, protein, minerals and vitamins to support optimum animal productivity (Reed *et al.*, 1990). Growing small ruminants supplemented with concentrates in addition to grazing in semi-arid regions of India is the prevailing kid production system, however, their growth performance is not optimum (Karim *et al.*, 2007). Therefore, Khejri (*Prosopis cineraria)* foliage or forage based ruminant feeding with an appropriate level of concentrate may provide nutrient balance to improve animal productivity.

Relationship between body weight and linear body measurement of goats is important for the estimation of size and shape of goats suitable for breeding, slaughter and to predict body weight from linear body measurements in goats (Kamarudin *et al.*, 2011). The common measure of estimation of body weights has been simple correlation coefficients between body weight and morphometric measures or regression of body weight on a number of body measurements.

Materials and Method

The experiment was conducted at goat farm, S.K.N. college of Agriculture, S.K.N. Agriculture University Jobner, District Jaipur, (Rajasthan, India). Twenty-four Sirohi goat kids of either sex having approximately uniform body weight of kids in group (T_1), (T_2) and (T_3) were recorded as 11.05, 11.08 and 11.03 kg and age group (4 months) were selected. These kids were divided into three equal groups consisting of eight kids in each group and the study was carried out for a period of thirteen weeks. The experiment was conducted using randomized block design.

Table 1: Distribution of experimental Sirohi goat kids

Treatments	No. of animals	Average body weight (in kg)
T_1	8	11.05±0.80
T_2	8	11.08±0.71
T_3	8	11.03±0.78

Table 2: Feeding schedule of weaned kids of Sirohi goat

Experimental period (days)	Concentrate supplementation gram/head/day		
	T_1	**T_2**	**T_3**
0-30	50	50	100
31-60	50	100	150
61-90	50	150	200

Table 3: Chemical composition (%DM Basis) of concentrate mixture

S. No.	Nutrients	Percentage
1	Total digestible nutrient (TDN)	75%
2	Crude protein (CP)	18%
3	Crude fibre (CF)	10%
4	Common salt (CS)	1.00%
5	Mineral mixture (M.M.)	2.00%

Similar housing and managemental facilities were provided to all the groups. Animals were penned in well-ventilated enclosures for the experiment. The concentrate mixture in pelleted form was obtained from local market Concentrate and roughages were fed separately to each kid in all treatment groups. The concentrate was fed once in a day at 10:00 am. Whereas, the roughage (khejri l00 m) was offered at 10:30 am and 4:00 pm to all treatment groups. Ad-libitum clean drinking water was available round the clock to all treatment groups. All the experimental kids the body morphometric measurements were recorded at fortnightly interval, before feeding, by using a measuring tape (cm) up to 12 weeks from the commencement of the experiment. Linear body dimensions viz. body length, height at withers, heart girth and paunch girth were recorded.

Statistical Analysis

Statistical analysis was carried out by standard statistical methods RBD and the calculation of ANOVA was done. This formula was given by Fisher and Yates (1950). Superscripts are used for significantly difference in means by DMRT method. Duncan's new multiple range test (DMRT) is a multiple comparison procedure developed by David B. Duncan in 1955.

Results and Discussion

Body Length

The observations (fortnightly) on body length (cm) of T_1, T_2 and T_3 groups of Sirohi kids from 3 to 6 months of age are presented in Table 4. It is observed that the average initial body length of the kids of group T_1, T_2 and T_3 was 44.44, 44.88 and 44.55 cm, respectively, and after 12 weeks of experiment body length was found to be 50.88, 52.50 and 52.79 cm, respectively. The increase in body length of Sirohi kids of all age groups has a linear significant difference in body length of kids between group T_1, T_2 and T_3, whereas, non-significant difference in body length of kids between group T_2 and T_3 was noticed. The highest increase in body length of kids was found in group T_3 fed with higher quantity of concentrate. The results of the present study are in agreement with the findings of Mandakmale *et al.* (2012) who also reported that body length of Sangamneri kids ranging from 42.78±0.27 to 49.81±0.63 cm during 3 and 6 months of age. Kochewad *et al.* (2009) reported the body length of Osmanabadi kids of three months age as 41.03 ± 0.28 cm while studying the effect of probiotic supplementation on growth

performance.

Table 4: Average fortnightly body length (cm) of Sirohi kids in different experimental groups

Fortnights	T_1 (Mean ± SE)	T_2 (Mean ± SE)	T_3 (Mean ± SE)	Total (Mean ± SE)	P- Value
Initial	44.44±1.18	44.88±1.05	44.55±1.15	44.59±0.64	0.07
1	45.43±1.07	45.96±1.00	45.91±1.13	45.76±0.59	0.07
2	46.43±0.97	47.51±1.02	47.55±1.15	47.29±0.58	0.06
3	47.59±1.10	48.83±1.02	48.85±1.16	48.42±0.61	0.04*
4	48.94±1.10	50.23±1.02	50.36±1.16	49.84±0.62	0.03*
5	50.01±1.09	51.37±1.01	51.84±1.17	51.07±0.62	0.02*
6	50.88±1.08	52.50±0.89	52.79±1.17	52.05±0.60	0.02*

**Significant at 5 % level*

Heart Girth

The results of average fortnightly heart girth (cm) of Sirohi kids are shown in Table 5. The initial heart girth of kids recorded for T_1, T_2 and T_3 groups was 50.65, 50.38 and 50.50 cm at an age of three months which was increased to 57.02, 57.53 and 58.59 cm at six months of age, respectively. The trend of increase in heart girth of kids of all groups was found to be linear later on. The statistical analysis showed that there was no significant difference in heart girth of kids in between various treatment groups i.e. T_1, T_2 and T_3. These results are in close agreement with Mandakmale *et al.* (2012) who reported that body length at 3 and 6 months to be 47.81±0.21 and 55.86±0.78 cm for Sangamneri kids, respectively. There was gradual increase in heart girth with advancement of age (Mule *et al.*, 2014; Kochewad *et al.*, 2009; Ojedapo *et al.*, 2007; Rahman, 2007).

Table 5: Average fortnightly heart girth (cm) of Sirohi kids from different experimental groups

Fortnights	T_1 (Mean±SE)	T_2 (Mean±SE)	T_3 (Mean±SE)	Total Mean±SE	P-Value
Initial	50.65±1.13	50.38±1.11	50.50±1.14	50.51±0.62	0.08
1.	51.88±1.15	51.66±1.05	51.74±1.13	51.76±0.61	0.08
2.	53.01±1.14	53.03±1.06	53.46±1.20	53.16±0.62	0.07
3.	54.33±1.14	54.53±0.92	55.01±1.21	54.62±0.61	0.06
4.	55.23±1.15	55.02±0.99	56.30±1.13	55.51±0.61	0.04*
5.	55.93±1.17	56.11±0.96	57.54±1.14	56.52±0.62	0.03*
6.	57.02±1.19	57.53±0.95	58.59±1.16	57.71±0.62	0.03*

**Significant at 5 % level*

Height at Withers

It is revealed from Table 6. that the initial average height at wither was 48.59, 48.51 and 48.58 cm and it increased to 55.39, 55.58, 56.60 cm for T_1 T_2 and T_3, respectively at 6 months of age. There was linear increment in height at wither of kids of all groups as their age advanced. These results are in close agreement with Mandakmale *et al.* (2012) who reported height at withers for 3- and 6-months age in Sangamneri kid's ranging from 47.89±0.21 to 55.86±0.98 cm. A gradual increase in body height with advancement in age was also reported by (Mule *et al.*, 2014, Kochewad *et al.*, 2009 and Ojedapo *et al.*, 2007).

Table 6: Average fortnightly height at wither (cm) of Sirohi kids from different experimental groups

Fortnights	T_1 (Mean ± SE)	T_2 (Mean ± SE)	T_3 (Mean ± SE)	Total (Mean ± SE)	P- Value
Initial	48.59±1.08	48.50±1.07	48.58±1.05	48.56±0.59	0.09
1.	49.71±1.08	49.53±1.08	49.66±1.09	49.63±0.59	0.07
2.	51.03±1.06	50.69±1.10	51.35±1.11	51.02±0.60	0.06
3.	52.30±1.05	52.11±1.13	52.52±1.11	52.31±0.60	0.08
4.	53.48±1.04	53.39±1.15	54.15±1.10	53.67±0.61	0.06
5.	54.63±1.03	54.38±1.15	55.36±1.10	54.79±0.61	0.05
6.	55.39±1.00	55.58±1.15	56.60±1.08	55.85±0.60	0.04*

** Significant at 5 % level*

Paunch Girth

Table 7 exhibited the observations on average paunch girth of Sirohi kids for various groups from 0 to 6 fortnights. Which shows linear increase with advancement in age. The initial values of paunch girth for kids of group T_1, T_2 and T_3 were 56.68, 56.26 and 56.50 cm and increased to 64.40, 64.46 and 65.55 cm, respectively, after three months. The statistical analysis of the data on fortnightly paunch girth revealed that the fortnightly paunch girth of Sirohi kids did not differ significantly due to increased quantity of concentrate in the diet. The result of the present investigation similar observations was also reported by Agnihotri *et al.,* 2006 who found the paunch girth of Barbari goats at 6 months of age as ranging from 57.6 ± 2.80 to 60.4 ± 3.60 cm. and similar results also reported by Akinyemi *et al.,* 2014.

Table 7: Average fortnightly paunch girth (cm) of Sirohi kids from different experimental groups

Fortnights	T_1 (Mean ± SE)	T_2 (Mean ± SE)	T_3 (Mean ± SE)	Total (Mean ± SE)	P-Value
Initial	56.68±1.50	56.26±1.47	56.50±1.38	56.48±0.80	0.08
1	57.65±1.47	57.64±1.45	57.95±1.41	57.75±0.80	0.08
2	59.11±1.53	59.34±1.49	59.98±1.42	59.48±0.82	0.07
3	60.66±1.56	60.79±1.48	62.29±1.40	61.25±0.83	0.04*
4	62.24±1.56	62.26±1.48	63.35±1.40	62.61±0.82	0.06
5	63.66±1.55	63.39±1.46	64.58±1.41	63.87±0.82	0.05
6	64.40±1.55	64.46±1.47	65.55±1.40	64.80±0.82	0.06

** Significant at 5 % level*

Conclusion

On the basis of the present investigation, it may be concluded that the initial fortnightly body length of the kids in T_1, T_2 and T_3 groups was 44.44±1.18, 44.88±1.05 and 44.55±1.15 cm and at the end of the experiment 50.88±1.08, 52.50±0.89 and 52.79±1.17, respectively. The initial height of kids was 48.59±1.08, 48.51±1.07 and 48.58±1.05 cm and at the end of the experiment 55.39±1.0, 55.58±1.15 and 56.60±1.08 cm in T_1, T_2 and T_3 groups, respectively. The heart girth of the kids in T_1, T_2 and T_3 groups was 50.65±1.13, 50.38±1.11 and 50.50±1.14 cm, respectively, at the start of experiment and the final heart girths achieved at the end of the experiment was 57.02±1.19, 57.53±0.95 and 58.59±1.16 cm, respectively. The initial paunch girth of the kids in group T_1, T_2 and T_3 was 56.68±1.50, 56.26±1.47 and 56.50±1.38 cm, respectively. The final paunch girth achieved at the end of the experimental period in group T_1, T_2 and T_3 group was 64.40±1.55, 64.46±1.47 and 65.55±1.40, respectively. From the overall results of the present investigation it was concluded that feeding concentrate at the rate 100, 150, 200g per day per kid is useful. These results are only indicative and require further experimentation to arrive at some more consistent conclusion.

Conflict of Interests

There is no conflict of interest.

Publisher Disclaimer

IJLR remains neutral concerning jurisdictional claims in published institutional affiliation.

References

1. Agnihotri, M. K., Rajkumar, V., and Dutta, T. K. (2006). Effect of feeding complete rations with variable protein and energy levels prepared using by-products of pulses and oilseeds on carcass characteristics, meat and meat ball quality of goats. *Asian Australasian Journal of Animal Sciences*, 19(10): 1437.
2. Akinyemi, M. O., Aina, A. J., Ewuola, E. O., Osaiyuwu, O. H. and Ajao, E. O. (2014). Relationships between body morphometrics and testicular biometrics of West Africa Dwarf bucks in southwestern Nigeria. *International Journal of Agriculture and Biosciences, 3*(6): 283-287.
3. Annual Report (2015). Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, GOI, Livestock Population. 19th Livestock Census, Department of Animal Husbandry, Dairying and Fisheries, M/o Agriculture, GOI.
4. Duncan, D.B. (1955). Multiple range and multiple F tests. *Biometrics*, 11: 1-42.
5. Fisher, R. A. and Yates, F. (1950). Statistical tables, Oliver and Boyd, Edinburgh, London. p.p. 146.
6. Kamarudin, N. A., Omar, M. A. and Marimuthu, M. (2011). Relationship between body weight and linear body measurements in boer goats. *6th Proceedings of the Seminar on Veterinary Sciences*, 68-73.
7. Karim, S. A., Tripathi, M. K. and Singh, V. K. (2007). Effect of varying levels of concentrate supplementation on growth performance and carcass trait of finisher lambs. *Livestock Research for Rural Development*, 19(11): 1-16.
8. Kochapakdee, S., Pralomkam, S., Saitanoo, A. and Norton, B. W. (1994). Productivity of female goat grazing newly established pasture with varying levels of supplementary feeding. *Asian-Australian Journal of Animal Science*, 7: 289-293.
9. Kochewad, S. A., Chahande, J. M., Kanduri, A. B., Deshmukh, D. S., Ali, S. A. and Patil, V. M. (2009). Effect of probiotic supplementation on growth parameters of Osmanabadi Kids. *Veterinary World*. 2(1):29-30.
10. Mandakmale S., Rai B., Jagtap D. Z. and Sakhare P. S. (2012). Sangamneri a city pride of Maharashtra, MPKV/Research Publication 30/2010.
11. Mandebvu, P. and Galbraith, H. (1999). Effect of sodium bicarbonate supplementation and variation in the proportion of barley and sugar beet pulp on growth performance and rumen, blood and carcass characteristics in young entire lambs. *Animal Feed Science and Technology*, 82: 37-49.
12. Mule, M. R., Barbind, R. P. and Korake, R. L. (2014). Relationship of body weight with linear body measurement in Osmanabadi goats. *Indian Journal of Animal Research*, 48(2): 155-158.
13. Ojedapo, L. O., Adedeji, T. A., Olayeni, T. B., Adedeji, O. S., Adbullah, A. R. and Ojebiyi, O. O. (2007). Influence of age and sex on body weight and somebody linear measurement of extensively reared Wad goats in derived zone of Nigeria. *Journal of Animal and Advances*, 6(1): 114-117.
14. Rahman, F. (2007). Prediction of carcass weight from the body characteristics of black goats. *International Journal of Agriculture and Biology*, 9(3): 431-434.
15. Reed, J. D., Soller, H. and Woodward, A. (1990). Fodder tree and Stover diets for intake, growth, digestibility and effect of phenol ice on nitrogen utilization. *Animal Science and Technology*, 30: 39- 50.
16. Ryan, S. M., Unruh, J. A., Corrigan, M. E., Drouillard, M. M. and Seyfert, M. (2007). Effects of concentrate level on carcass traits of Boer crossbred goats. *Small Ruminant Research*, 73: 67-76.

****