



*Original Research*

## A Study on Body Weights and Biometrical Measurements of Indigenous Goats under Field Conditions

U. Vinod\* and B. Punyakumari

Department of Animal Genetics and Breeding, College of Veterinary Science, Sri Venkateswara Veterinary University, Tirupati- 517 502, Andhra Pradesh, INDIA

\*Corresponding author: [drvinod.ugripalli@gmail.com](mailto:drvinod.ugripalli@gmail.com)

Rec. Date:	Feb 16, 2019 14:25
Accept Date:	Mar 29, 2019 18:02
DOI	<a href="https://doi.org/10.5455/ijlr.20190216022545">10.5455/ijlr.20190216022545</a>

### Abstract

The data recorded on body weights and biometrical traits viz., height at withers (HAW), chest girth (CG), paunch girth (PG), hip width (HW), body length (BL), face length (FL), ear length (EL) and tail length (TL) on total of 546 indigenous goats at milk teeth, 2- teeth and 4- teeth of age reared under field conditions were utilized for the present study. The overall least squares mean body weights at milk teeth, 2- teeth and 4- teeth age were  $13.12 \pm .22$ ,  $23.23 \pm .49$  and  $32.71 \pm .38$  kg, respectively. The overall least square means for HAW, CG, PG, HW, BL, FL, EL and TL were  $68.57 \pm .25$ ,  $63.10 \pm .36$ ,  $64.39 \pm .35$ ,  $12.27 \pm .11$ ,  $55.93 \pm .28$ ,  $16.14 \pm .10$ ,  $13.63 \pm .08$  and  $13.83 \pm .10$  cm at milk teeth,  $74.63 \pm .34$ ,  $70.72 \pm .42$ ,  $71.64 \pm .46$ ,  $14.40 \pm .12$ ,  $60.40 \pm .39$ ,  $17.55 \pm .16$ ,  $14.53 \pm .10$  and  $14.88 \pm .16$  cm at 2- teeth and  $80.02 \pm .29$ ,  $79.15 \pm .38$ ,  $80.32 \pm .47$ ,  $16.11 \pm .13$ ,  $66.63 \pm .32$ ,  $17.78 \pm .26$ ,  $14.90 \pm .15$  and  $15.38 \pm .21$  cm at 4 teeth of age, respectively. The least squares means for body weights and biometrical measurements were linearly increased with advancement of age. Both sex and age had significant influence on majority of the traits under study.

**Key words:** Biometrical Measurements, Body Weight, Indigenous Goats

**How to cite:** Vinod, U., & Punyakumari, B. (2019). A Study on Body Weights and Bio-Metrical Measurements of Indigenous Goats under Field Conditions. International Journal of Livestock Research, 9(5), 275-283. doi: 10.5455/ijlr.20190216022545

### Introduction

Goat farming is a traditional occupation among the small and marginal farmers and landless agricultural labourers. In India, more than 70 per cent of marginal farmers prefer to rear small ruminants rather than cows or buffaloes. India is bestowed with rich goat genetic resources with 34 recognized breeds and ranked first in the world in terms of goat population with 135.17 million populations (Livestock Census, 2012) and constitutes 26.40 % of total livestock of the country. Andhra Pradesh possesses about 44.11 lakhs goats which constitutes 3.32 percent of the total country's goat population. Goats can efficiently survive on available shrubs and trees in adverse harsh environment, where no other crop can be grown. But little



information is available on the genetic and phenotypic variability among and between local populations of goats throughout the Andhra Pradesh. Hence, the present study was planned to identify the variation in body weights and biometrical measurements of indigenous goats maintained under farmers flocks.

## Materials and Methods

### Collection of Data

The present study was conducted in the five villages (Chandragiri, Pakala, Kothapalli, Gangudupalli and Pudhipatla) of Chittoor district of Andhra Pradesh. Data on the body weights (BW) and biometrical traits viz., height at withers (HAW), chest girth (CG), paunch girth (PG), hip width (HW), body length (BL), face length (FL), ear length (EL) and tail length (TL) were recorded on total of 546 goats in the morning before the animals left for grazing. Since the particulars of the date of birth of animal were not available under the field conditions, the eruption of permanent incisor teeth was taken as an indicator of the age of the animal (Turner, 1937). Thus, all the animals with two permanent incisors were regarded as one year old, four permanent incisors as two years old, six permanent incisors as three years old and those with eight permanent incisors (full mouth) were regarded as four years or more in age.

For recording the body measurements the animals were made to stand squarely on an even surface and measured using a tailor tape. Body weight was measured with the help of a weighing balance with 500 g accuracy.

- Body length : Distance from point of shoulder to the point of tuber ischii.  
Heart girth : Body circumference around the chest, just behind the elbow joint  
Height at withers: Distance from the base of the hoof to the highest point of withers.  
Hip width : Distance from the tuberosity prominence to ileum of one side to the other, across the rump.  
Paunch girth : Body circumference in front of the sacrum  
Face length : Distance from midpoint of poll between 2 horns to tip of nose.  
Ear length : Length of straight line drawn from tip to base of the ear.  
Tail length : Distance from base to the tip of the tail.

Data recorded on body weight (BW), height at withers (HAW), chest girth (CG), paunch girth (PG), hip width (HW), body length (BL), face length (FL), ear length (EL) and tail length (TL) were subjected to least square analysis (Harvey, 1987) to study the effect of village and sex within each age group by using the following statistical model-

$$Y_{ijk} = \mu + V_i + S_j + e_{ijk}$$

Where,

$Y_{ijk}$  = the measurement on  $k^{\text{th}}$  animal belonging to  $j^{\text{th}}$  sex and  $i^{\text{th}}$  village

$\mu$  = Overall mean

$V_i$  = Effect of  $i^{\text{th}}$  village ( $i=1$  to 5); 1 = Gangudupalli; 2 = Perur; 3 = Pudipatla; 4 = Kothuru; 5= Chandragiri

$S_j$  = Effect of  $j^{\text{th}}$  sex ( $j=1$  for female and 2 for male)

$e_{ijk}$  = Random error.

## Result and Discussion

Indigenous goats (Fig. 1) are medium sized animals and mostly maintained for meat purpose. Coat colour is predominantly black followed by black with white patches and brown with white patches. Head is straight and slightly convex. Ears are medium droopy and leaf like. Both the sexes have thick and small horns. Udder was fully developed and has conical shaped teats. Indigenous goats are highly prolific and an incidence of multiple births (twinning and triplets) was very common.



**Fig. 1:** Indigenous goats

Feeding and management practices followed by the farmers were almost uniform in all the areas selected. Flock grazing on natural vegetation (forest, grasses and shrubs) with little or no supplementation is practiced in all the areas studied. Goats were allowed to browse for about 9 to 10 hours a day and lopping was practiced in the field itself. The animals were watered at the browsing place itself. No permanent sheds were provided to the animals by majority of farmers. In some areas housing with thatched roof and kutcha floor was practiced. Natural service was followed by maintaining 1 to 2 bucks in every flock. An average flock size was 25-30 with one or two adult males. Marketing age was 9 to 12 months. Regular deworming, vaccinations and traditional (herbal) treatment methods were followed. The overall least-squares mean body weights and body measurements are presented in Table 1.

## Body Weight

The overall least squares mean body weights at milk teeth, 2 and 4 teeth of age were  $13.13 \pm 0.22$ ,  $23.23 \pm 0.49$  and  $32.70 \pm 0.8$  kg, respectively (Table 1). Mean body weight recorded in the present study was higher than Ganjam goats (Karna *et al.*, 2016). The effect of sex on body weight was highly significant ( $p < 0.01$ ) at all ages studied. Females were heavier than males at milk teeth and two teeth of age, where as in four teeth age

group, males were heavier than females. Significant difference ( $p < 0.05$ ) was observed for body weights among all villages. Goats of Pudipatla village recorded highest means and the means varied from  $22.14 \pm 1.14$  at milk teeth to  $39.30 \pm 0.74$  4-teeth (Table 1). The variation of body weights at different ages among males and females might be due to the dominant and aggressive behavior, anabolic effect of hormones and variation in genetic constitution of the animals (Hafez, 1962).

**Table 1:** Least squares mean for body weights (kg) and biometrical measurements (cm) at various ages in indigenous goats

Milk Teeth-Village									
Village	BW (kg)	HAW (cm)	CG (cm)	PG (cm)	HW (cm)	BL (cm)	FL (cm)	EL (cm)	TL (cm)
V 1	10.21 <sup>a</sup> ±.21	68.22 <sup>a</sup> ±.82	62.36 <sup>a</sup> ±1.1	63.60 <sup>a</sup> ±1.1	12.30 <sup>a</sup> ±.35	55.95 <sup>a</sup> ±.92	16.03 <sup>a</sup> ±.35	13.31 <sup>a</sup> ±.25	13.55 <sup>a</sup> ±.34
V 2	11.97 <sup>b</sup> ±.37	68.37 <sup>a</sup> ±.41	63.98 <sup>b</sup> ±.60	64.82 <sup>b</sup> ±.59	12.44 <sup>a</sup> ±.18	55.71 <sup>a</sup> ±.48	16.56 <sup>a</sup> ±.18	13.82 <sup>bc</sup> ±.13	14.05 <sup>bc</sup> ±.18
V 3	22.14 <sup>c</sup> ±.14	70.34 <sup>b</sup> ±.45	65.31 <sup>c</sup> ±.65	66.79 <sup>c</sup> ±.64	12.54 <sup>a</sup> ±.20	57.24 <sup>b</sup> ±.52	16.19 <sup>a</sup> ±.19	13.98 <sup>c</sup> ±.14	14.27 <sup>c</sup> ±.19
V 4	10.77 <sup>a</sup> ±.38	68.12 <sup>a</sup> ±.42	62.04 <sup>a</sup> ±.61	63.47 <sup>ab</sup> ±.60	12.05 <sup>a</sup> ±.18	55.42 <sup>a</sup> ±.48	15.95 <sup>a</sup> ±.18	13.47 <sup>ab</sup> ±.13	13.43 <sup>ab</sup> ±.18
V 5	10.51 <sup>a</sup> ±.54	67.81 <sup>a</sup> ±.60	61.78 <sup>a</sup> ±.87	63.29 <sup>ab</sup> ±.86	12.01 <sup>a</sup> ±.27	55.35 <sup>a</sup> ±.69	15.95 <sup>a</sup> ±.26	13.58 <sup>ab</sup> ±.19	13.83 <sup>ab</sup> ±.26
Mean	13.12±.22	68.57 <sup>a</sup> ±.25	63.10±.36	64.39±.35	12.27±.11	55.93±.28	16.14±.10	13.63±.08	13.83±.10
Sex									
Female	13.61 <sup>b</sup> ±.26	68.80 <sup>a</sup> ±.29	63.85 <sup>b</sup> ±.42	65.02 <sup>b</sup> ±.02	12.33 <sup>a</sup> ±.13	55.74 <sup>a</sup> ±.33	16.39 <sup>b</sup> ±.12	13.71 <sup>a</sup> ±.09	14.09 <sup>a</sup> ±.12
Male	12.63 <sup>a</sup> ±.36	68.35 <sup>a</sup> ±.40	62.34 <sup>a</sup> ±.59	63.77 <sup>a</sup> ±.57	12.21 <sup>a</sup> ±.18	56.13 <sup>a</sup> ±.47	15.89 <sup>a</sup> ±.17	13.55 <sup>a</sup> ±.13	13.56 <sup>a</sup> ±.17
Two Teeth									
V 1	23.98 <sup>ab</sup> ±.70	75.70 <sup>bc</sup> ±.48	72.58 <sup>bc</sup> ±.60	73.06 <sup>bc</sup> ±.65	14.18 <sup>ab</sup> ±.20	60.72 <sup>ab</sup> ±.55	17.61 <sup>a</sup> ±.23	14.57 <sup>ab</sup> ±.14	14.36 <sup>a</sup> ±.23
V 2	21.33 <sup>a</sup> ±1.0	73.19 <sup>ab</sup> ±.73	69.58 <sup>ab</sup> ±.92	71.01 <sup>ab</sup> ±.99	13.65 <sup>a</sup> ±.31	59.45 <sup>a</sup> ±.45	17.32 <sup>a</sup> ±.35	14.96 <sup>ab</sup> ±.21	15.21 <sup>ab</sup> ±.35
V 3	28.47 <sup>c</sup> ±1.3	76.67 <sup>c</sup> ±.89	73.98 <sup>c</sup> ±1.1	74.82 <sup>c</sup> ±1.2	14.67 <sup>b</sup> ±.38	61.65 <sup>c</sup> ±1.0	18.37 <sup>b</sup> ±.44	14.68 <sup>ab</sup> ±.26	15.46 <sup>b</sup> ±.43
V 4	24.72 <sup>b</sup> ±.91	75.79 <sup>abc</sup> ±.62	72.07 <sup>bc</sup> ±.79	72.13 <sup>ab</sup> ±.85	14.24 <sup>ab</sup> ±.26	60.71 <sup>ab</sup> ±.71	17.37 <sup>a</sup> ±.30	14.58 <sup>ab</sup> ±.18	15.05 <sup>ab</sup> ±.30
V 5	17.66 <sup>a</sup> ±1.4	71.80 <sup>a</sup> ±.96	65.37 <sup>a</sup> ±1.2	67.21 <sup>a</sup> ±1.3	13.52 <sup>ab</sup> ±.40	59.45 <sup>ab</sup> ±1.1	17.08 <sup>a</sup> ±.47	13.85 <sup>a</sup> ±.28	14.31 <sup>a</sup> ±.46
Mean	23.23±.49	74.63±.34	70.72±.42	71.64±.46	14.40±.12	60.40±.39	17.55±.16	14.53±.10	14.88±.16
Sex									
Female	25.02 <sup>b</sup> ±.42	75.24 <sup>b</sup> ±.29	71.48 <sup>b</sup> ±.36	72.50 <sup>b</sup> ±.39	14.40 <sup>b</sup> ±.12	60.78 <sup>a</sup> ±.33	17.49 <sup>a</sup> ±.14	14.53 <sup>a</sup> ±.08	15.24 <sup>b</sup> ±.14
Male	21.45 <sup>a</sup> ±.89	74.02 <sup>a</sup> ±.61	69.95 <sup>a</sup> ±.77	70.79 <sup>a</sup> ±.83	13.70 <sup>a</sup> ±.26	60.01 <sup>a</sup> ±.70	17.61 <sup>a</sup> ±.30	14.53 <sup>a</sup> ±.18	14.52 <sup>a</sup> ±.29
Four Teeth									
V 1	30.84 <sup>a</sup> ±.87	80.43 <sup>a</sup> ±.65	79.72 <sup>a</sup> ±.85	80.48 <sup>a</sup> ±1.0	15.66 <sup>ab</sup> ±.31	66.18 <sup>b</sup> ±.71	19.12 <sup>cd</sup> ±.59	15.39 <sup>bc</sup> ±.34	15.71 <sup>bc</sup> ±.48
V 2	30.02 <sup>a</sup> ±.90	79.28 <sup>a</sup> ±.68	79.05 <sup>a</sup> ±.89	80.46 <sup>a</sup> ±1.1	17.00 <sup>c</sup> ±.32	67.96 <sup>b</sup> ±.74	16.15 <sup>b</sup> ±.62	13.72 <sup>a</sup> ±.36	14.62 <sup>a</sup> ±.50
V 3	39.30 <sup>b</sup> ±.74	81.37 <sup>b</sup> ±.56	79.78 <sup>a</sup> ±.73	80.49 <sup>a</sup> ±.91	15.20 <sup>a</sup> ±.26	64.21 <sup>a</sup> ±.61	19.86 <sup>d</sup> ±.51	16.20 <sup>c</sup> ±.29	16.89 <sup>c</sup> ±.41
V 4	31.46 <sup>a</sup> ±.65	79.28 <sup>a</sup> ±.49	78.90 <sup>a</sup> ±.64	80.45 <sup>a</sup> ±.79	16.40 <sup>bc</sup> ±.23	67.48 <sup>b</sup> ±.53	17.56 <sup>bc</sup> ±.44	14.67 <sup>ab</sup> ±.25	15.05 <sup>ab</sup> ±.36
V 5	31.12 <sup>a</sup> ±1.4	79.50 <sup>a</sup> ±1.0	77.50 <sup>a</sup> ±1.3	79.12 <sup>a</sup> ±1.7	16.50 <sup>bc</sup> ±.50	68.00 <sup>b</sup> ±1.1	14.62 <sup>a</sup> ±.97	14.12 <sup>a</sup> ±.56	13.87 <sup>a</sup> ±.79
Mean	32.71±.38	80.02±.29	79.15±.38	80.32±.47	16.11±.13	66.63±.32	17.78±.26	14.90±.15	15.38±.21
Sex									
Female	31.92 <sup>b</sup> ±.39	79.56 <sup>a</sup> ±.30	78.92 <sup>a</sup> ±.39	80.48 <sup>a</sup> ±.48	16.21 <sup>a</sup> ±.14	66.90 <sup>a</sup> ±.32	17.52 <sup>a</sup> ±.27	14.80 <sup>a</sup> ±.15	15.31 <sup>a</sup> ±.22
Male	33.69 <sup>a</sup> ±.72	80.60 <sup>b</sup> ±.54	79.45 <sup>a</sup> ±.70	80.12 <sup>a</sup> ±.88	15.99 <sup>a</sup> ±.25	66.29 <sup>a</sup> ±.59	18.11 <sup>b</sup> ±.49	15.07 <sup>a</sup> ±.28	15.46 <sup>a</sup> ±.40

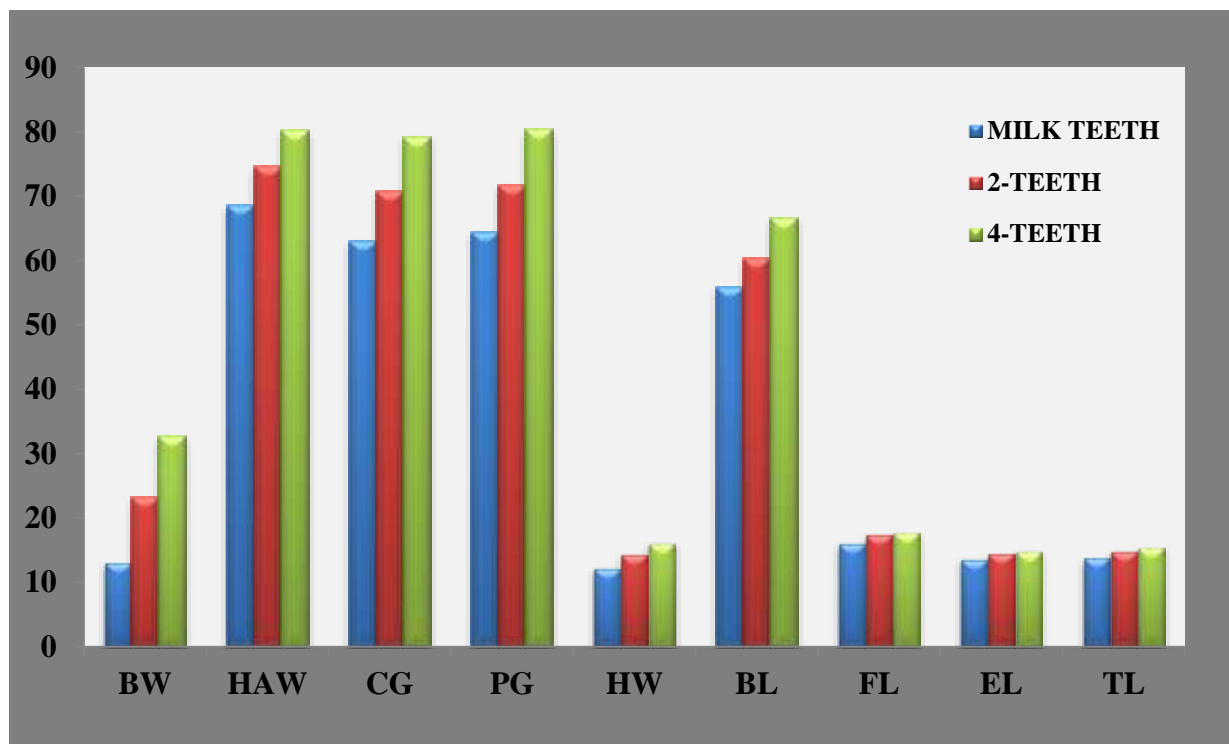
Means followed by same superscript (s) do not differ significantly ( $p < 0.05$ ) BW- Body weight, HAW- Height at withers, CG- chest girth, PG- paunch girth, HW- hip width, BL- body length, FL-face length, EL- ear length and TL- tail length. V- Village

### Biometrical Measurements

All the biometrical parameters revealed increasing trend with the advancement of the age (Fig. 2). Sexual dimorphism was observed for all the traits, where females recorded significantly ( $p < 0.05$ ) higher means

than males. Considerable variation between villages was also observed for all the parameters under the study (Table 1).

**Fig. 2:** Biometrical measurements of indigenous goats of Andhra Pradesh at various age groups



BW- Body Weight, HAW-Height at Withers, CG-Chest Girth, PG -Paunch Girth, HP-Hip Width, BL-Body Length, FL-Face Length, EL- Ear Length and TL-Tail Length

### Height at Withers (HAW)

The overall least squares means recorded for height at withers at milk teeth ( $68.57 \pm 0.25$  cm), 2 ( $74.63 \pm 0.34$  cm) and 4 teeth of age ( $80.02 \pm 0.29$  cm) in the present study were higher than the earlier findings of Verma *et al.* (2008) in Pantja and Chitra *et al.* (2012) in Malabari goats. The height at withers increased with the age. Significant differences ( $P < 0.05$ ) were observed among villages for HAW. Animals of Pudipatla village recorded higher means compared to the remaining villages. Females were taller by 0.55 and 1.22 cm than males at milk and 2-teeth stage, whereas males ( $33.69 \pm 0.72$ ) were taller than females ( $31.92 \pm 0.39$ ) at 4- teeth of age, which might be due to the influence of growth hormones which resulted in development of bones and muscle growth. The indigenous goats of Andhra Pradesh recorded higher means for height at withers which might be due to variation in the germplasm /genetic base of the populations, growth rate and the habitat under which the animals are maintained.

### Chest Girth (CG)

Chest girth is one of the important contributors for prediction of body weight which indicates the lung capacity and rib cage circumferences. The overall least square means for chest girth at milk teeth, 2 and 4 teeth of age were  $63.10 \pm 0.6$ ,  $70.72 \pm 0.42$  and  $79.15 \pm 0.8$  cm, respectively. Highly significant ( $P < 0.01$ ) variation observed between the sexes at all the age groups. At 4-teeth of age males recorded ( $79.45 \pm 0.70$ ) higher chest girth than females ( $78.92 \pm 0.39$ ), whereas at milk teeth and 2-teeth females showed higher chest girth than males. The results obtained for chest girth in Indigenous goats were fairly higher than previous findings of Black Bengal goats (Siddiqua and Amin 2009), Salem goats (Gopu *et al.*, 2013) and local goats of Mandya (Siddalingamurthy *et al.*, 2017). The villages had a significant ( $p < 0.05$ ) influence on chest girth at milk teeth and two teeth age and means ranged from  $61.78 \pm 0.87$  to  $62.04 \pm 0.61$  and  $65.37 \pm 1.2$  to  $69.58 \pm 0.92$  cm, respectively.

### Paunch Girth (PG)

The overall least squares means for paunch girth at milk teeth, 2 and 4 teeth of age were  $64.39 \pm 0.39$ ,  $71.64 \pm 0.46$  and  $80.32 \pm 0.47$  cm, respectively. The means recorded in the present investigation were lower compared to the values observed in Singharey goat of Sikkim (Verma *et al.*, 2015) and Karnataka goats (Siddalingamurthy *et al.*, 2017). Villages showed significant ( $p < 0.05$ ) effect on paunch girth at milk teeth and 2-teeth of age, but not at 4-teeth of age. The increase in paunch girth from milk teeth to four teeth was  $63.77 \pm 0.57$  to  $80.12 \pm 0.88$  cm, in males and  $65.02 \pm 0.02$  to  $80.48 \pm 0.48$  cm in females, which revealed that the skeletal frame and muscular growth of the bucks and does are different and increased with the age. The variation in agro-climatic conditions, cropping patterns, availability of browsing material and other managerial practices being adopted by the farmers in the villages resulted in variation of body weights and in turn showed significant ( $p < 0.05$ ) difference for paunch girth at all ages among all the locations.

### Hip Width (HW)

The overall least squares means for hip width at milk teeth, 2 and 4 teeth of age were  $12.27 \pm 0.11$ ,  $14.40 \pm 0.12$  and  $16.11 \pm 0.13$  cm, respectively and these means were higher than the mean values recorded in Korean native black goat (Son, 1999), West African dwarf goat of South western Nigeria (Fajemilehin and Salako, 2008) and goat breeds of Uganda (Jimmy *et al.*, 2010). Villages had significant ( $p < 0.05$ ) influence on hip width at all age groups except milk teeth. These results indicated that hip width from milk teeth to 4-teeth age increased linearly with age in both the sexes. Varied climatic conditions, plane of nutrition and managerial practices being followed by the farmers might have resulted in variation of body weights, growth rate and hip width of goats. Sex had no significant effect at all ages except at 2 teeth of age.

### Body Length (BL)

The overall least squares means for body length at milk teeth, 2 and 4 teeth of age were  $55.93 \pm 0.38$ ,  $60.40 \pm 0.39$  and  $66.63 \pm 0.32$  cm, respectively and were lower compared to earlier findings of Verma *et al.* (2015) in Singharey and Mandakmale *et al.* (2016) in Kathewadi, while, the values reported in the present study were higher compared to findings in Pantja goat (Ravimurugan *et al.*, 2009). Sex had a no significant effect ( $p < 0.05$ ) at all ages, which ranged from  $56.13 \pm 0.47$  to  $66.29 \pm 0.59$  cm at milk teeth age and 4-teeth of age in males and from  $55.74 \pm 0.33$  to  $66.90 \pm 0.32$  cm in females, respectively. Significant ( $p < 0.05$ ) differences are observed among the villages at all the ages for body length.

### Face Length

The least-squares means for face length was  $16.14 \pm 0.10$ ,  $17.55 \pm 0.16$  and  $17.78 \pm 0.26$  cm at milk teeth, 2 and 4 teeth age, respectively, which are lower than Salem Black (Gopu *et al.*, 2013) and Bakerwali goats (Reotheria *et al.*, 2013) but higher than Surti (Dixit *et al.*, 2013) and Singharey goats (Verma *et al.*, 2015). Villages had non-significant effect ( $p < 0.05$ ) on face length at milk teeth and 2-teeth age except at 4-teeth age. Higher mean values for face length recorded in the present study coincided with the findings of Reddy (2004) in Mahabubnagar goats.

### Ear Length

The overall least square means for ear length was  $13.63 \pm 0.08$ ,  $14.53 \pm 0.10$  and  $14.90 \pm 0.15$  cm at milk teeth, 2 and 4 teeth age, respectively. The village but not sex had highly significant influence on ear length of all age groups. The ear length observed in indigenous goats of Andhra Pradesh was lower than the means reported in Berari goats (Kuralkar *et al.*, 2013) and Baladi, Jabali and Shami goats (Hassen *et al.*, 2016).

### Tail Length

The overall least square means for tail length was  $13.83 \pm 0.10$ ,  $14.88 \pm 0.16$  and  $15.38 \pm 0.21$  cm at milk teeth, 2 and 4 teeth age, respectively. These results were similar to previous findings of Ravimurugan *et al.* (2009) in Pallai Adu, but higher than Singharey goats of Sikkim (Verma *et al.*, 2015). Village and sex had significant effect on tail length and females expressed higher mean values over males at all age studied.

### Conclusion

The mean body weight and biometrical measurements were increased with the advancement of age. Both sex and age had significant influence on body measurements at majority of ages. Under minimum input system goat farming is considered as profit oriented. Variation observed in the biometrical traits of Indigenous goats in the present study has given fair view about the breeding and management strategies to



be adopted for the improvement of these indigenous goats. Systematic survey and data recording has to be done on large scale to recognize this untapped genetic resource.

## References

1. Chitra R, Rajendran S, Prasanna D. and Kirubakaran A. 2012. Prediction of body weight using appropriate regression model in adult female Malabari goat. *Veterinary World*, 5(7): 409-411.
2. Dixit S P, Aggarwal RAK, Dang PS, Verma NK, Vyas MK, Rana J, Sharma A, Kharadi V. B, Sabapara GP. and Deshpande SB. 2013. Phenotypic characteristics, management, performance and genetic variability in Surti breed of goat. *Indian Journal of Animal Sciences*, 83(4): 423-427.
3. Fajemilehin OKS. and Salako AE. 2008. Body measurement characteristics of the West African Dwarf (WAD) goat in deciduous forest zone of Southwestern Nigeria. *African Journal of Biotechnology*, 7(14): 2521-2526.
4. Gopu P, Raman KS, Thangaraju P, Saravanan R. and Panneerselvam S. 2013. Breed characteristics of Salem black goat of Tamil Nadu. *Shanlax International Journal of Veterinary Science*, 1(1): 15-19.
5. Hafez ESE. 1962. Reproduction in farm animals. Lea and Febiger, Philadelphia.
6. Hassen H, Rischkowsky B, Termanini A, Jessry G, Haile A, Baum M. and Lababidi S. 2016. Morphological and molecular genetic diversity of Syrian indigenous goat populations. *African Journal of Biotechnology*, 15(18): 745- 758.
7. Jimmy S, David M, Donald KR. and Dennis M. 2010. Variability in body morphometric measurements and their application in predicting live body weight of Mubende and Small East African goat breeds in Uganda. *Middle- East Journal of Scientific Research*, 5(2): 98-105.
8. Karna DK., Sahu SS. and Sahoo CS. 2016. Effect of non-genetic factors on growth of Ganjam goats of Odisha. *Indian Journal of Small Ruminants*, 22(1): 107-109.
9. Kuralkar S. V, Verma NK, Kharkar K. and Kuralkar P. 2013. Berari goats: characterization, management, performance and population status. *Indian Journal of Animal Sciences*, 83(12): 1292-1298.
10. Livestock census. 2012. <http://dahd.nic.in>.
11. Mandakmale SD, Mane SH. and Kankhare DH. 2016. Morphological characterization of Kathewadi goat breed (Unexplored) of Khandesh region Maharashtra. *International Research Journal of Multidisciplinary Studies*, 2(2): 1-7.
12. Ravimurugan T, Devendran P, Cauveri D. and Balachandran S. 2009. Performance of indigenous goat (Pallai adu) under field conditions. *Tamil Nadu Journal of Veterinary and Animal Sciences*, 5(5): 203-207.
13. Reddy KVK. 2004. Studies on phenotypic characterization of Mahabubnagar goats of Andhra Pradesh. M.V.Sc. Thesis submitted to Sri Venkateswara Veterinary University, Tirupathi.
14. Reotheia A, Khan A. and Suri S. 2013. Morpho-Metric traits of the Bakerwali goat under migratory production system. *Indian Veterinary Journal*, 90(12): 22- 25.
15. Siddalingamurthy HK, Manjunatha SS. and Sreesujatha RM. 2017. Determination of regression model for prediction of body weight in local goats of Mandya district in Karnataka. *International Journal of Innovative Research and Advanced Studies (IJIRAS)* 4(3): 182-184.
16. Siddiqua, S. A. and Amin, M. R. 2009. Characterization and performance evaluation of White, Silver Bezoar and Black coated type of Black Bengal goat in Bangladesh. *Journal of the Bangladesh Agricultural University*, 7(2): 309- 315.
17. Son YS. 1999. Production and uses of Korean native black goat. *Small Ruminant Research*, 34(3): 303-308.
18. Turner CW. 1937. Dairy goat in Missouri. Agricultural experiment station. University of Missouri. Bulletin 375: 9.



19. Verma NK, Aggarwal R. AK, Sharma R, Dangi PS. and Bhutia NT. 2015. Phenotypic characterization, biometry and management of Singharey goat of Sikkim. *The Indian Journal of Animal Sciences*, 85(7): 134-136.
20. Verma PK, Singh DV, Ashok K. and Singh SK. 2008. Morphological studies of a unique strain of goats (Pantja) of Tarai region of Uttarakhand. *Indian Journal of Small Ruminants*, 14(2): 271-27.

