The Pharma Innovation

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Morphometric characterization of Kanni goat population in Southern Tamil Nadu

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Abstract
The study was conducted to access the different morphometric traits of Kanni goats in Tamil Nadu. Data were collected from 40 goats for different sexes and age groups. The goats were classified into three groups based on the permanent incisor's teeth *viz*., one year (first permanent incisor), two years (two permanent incisors), three-years age groups (three permanent incisors) and four years of age groups (four permanent incisors). The standard morphometric traits such as body weight, body length, chest girth, height at withers, and paunch girth were recorded. The body weight and height at withers were statistically significant ($P<0.05$) in all age groups. The body length was statistically significant in 1st, 3rd, and 4th year age groups. However, the 2nd year age groups were statistically non-significant ($P>0.05$). In the chest girth, 2nd, 3rd, and 4th year age groups were statistically significant ($P<0.05$). Though, the 1st year age groups were non-significant ($P>0.05$) statistically. Paunch girth, were statistically significant on 1st and 2nd year age groups. But, the 3rd and 4th year of age group was statistically non-significant ($P<0.05$) at 5% difference level. The study highlighted that the role of the sex has also influences the body measurements of male goats as compared to the female goats. The average body measurements were increased progressively as the age advanced. This study will give basics idea about the characterization, management, improvement of shed and it will facilitate the conservation strategy. So, that we can select the elite animals for future breeding program.

Keywords: Body measurements, body weight, body length, Kanni goats

Introduction

Phenotypic characterization of animal genetic resources is the practice of systematically documenting of observed characteristics, and also identify the elite animals for breed improvement programmes. This also refers to the process of identifying the distinct breed of population and describing their physical, body biometry and production parameters within a particular environment where it was evolved. It is important for mapping out an inventory of characteristics for peculiar to a group of animals and sustainable use of animal genetic resources. Lack of information on characterization of genetic resources may leads to underutilization, replacement and dilution through crossbreeding despite their local adaptation to prevailing environments constraints (Manizi *et al*., 2011).

The selection of goats for breeding purpose more attention should be given to age, growth rate, live body weight, body length and height at withers. Among this body weight is an important criterion for selection, the potential for genetic improvement largely depends upon the genotypic and phenotypic parameters for this trait upon selection may be applied (Mavrogenis *et al*., 1984 and Das *et al*., 1996) [17, 5]. Moreover, the non-genetic factors should be adjusted and corrected to get more accurate identification of genetic differences (Hermiz, 1998) [10]. The different body measurements traits are used to evaluate several characteristics and will give significant evidence for growth of the animals. In addition, different phenotypic traits are important sources in terms of reflecting the breed standards (Riva *et al.,* 2002) [23] and giving information about the morphological structure and development ability of the animals.

Morphological measurements are a very important method used to estimate and access the characteristics of different breeds (Martins, *et al*., 2009) [15]. Yakubu *et al*., 2010 [27] reported that these morphometric traits may help to know the basic information on the suitability of the animals towards selection. Also, morphological measurements can be used as a scientific management tool to promote their productivity (Abd-Allah *et al*., 2019) [1], prediction of genetic improvement, growth rate, body condition score, confirmation and carcass traits (Wilson *et al*., 1997; Slippers *et al*., 2000 and lambe *et al*., 2008) [26, 24, 13]. Till today very few literatures are available about the body measurements in Kanni goats.

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This study will give basics idea about the characterization, management, improvement of shed and it will facilitate the conservation strategy. So, that we can select the elite animals for future breeding program.

Materials and Methods
Location of Study: The study was carried out at Livestock Farm Complex, Veterinary College and Research Institute, Tirunelveli, Tamil Nadu Veterinary and Animal Sciences University.

Ethical Approval: The present study does not involve any intervention of collection of blood or the tissues from the animals under the study.

Experimental animals and Data collection
In the present study, the data comprised of forty (40) Kanni goats of both sexes on different age groups. Based on the permanent incisor's teeth, goats were classified into three categories *viz.*, one year (first permanent incisor), two years (two permanent incisors), and three-years (three permanent incisors), four years of age groups (four permanent incisors). The experimental animals were subjected to the traditional management system, which allows them to graze and feed on communal land during the day and returns them to the shed. The scientific management practices such as feeding, vaccination, deworming and other routine practices were followed.

Statistical analysis
The statistical data package for social science (SPSS, version 21) was used to analyse the data at 5% level of significance.

Results and Discussion
Different morphometric traits in Kanni goats
1. Body weight
The mean body weight of different age groups in Kanni goats are depicted in Table1. In the present study, the average body weight of different age groups *viz.* 1 pair (one year), 2 pairs (two years), 3 pairs (three years), and 4 pairs (four years) were considered. The mean body weight at one year of age group was 10.43 ± 0.53 and 8.26 ± 0.49 kg for males and females. In the two years of age group was estimated as 15.06 ± 0.27 for males and 13.23 ± 0.45 kg for females. Correspondingly, 24.72 ± 0.70 and 17.27 ± 0.71 kg in males and females at three years of age group. Similarly, at four year of age group was reported to be 26.40 ± 0.67 and 19.31 ± 0.51 kg for males and female, respectively. The study revealed that the mean body weight of males was higher than females in all age groups. The study highlighted that the role of the sex influences the body weight of male goats. The average body length was increased progressively as the age advanced. In body weight, all the age groups were statistically significant ($P<0.05$).

The present study had agreements with Misra and Koratkar, (1994) [18]; Poonia *et al.* (2004) [21]; Dayanand *et al.,* (2013) [6] and Sun *et al.,* 2020 who reported that the males had higher body weight as compared to female goats in different age groups. The mean body weight of combined and individual was 12.28 ± 2.25 kg and 14.55 ± 4.71 kg. The individual body weight was significantly higher in males ($P<0.01$) than the female's goats. The mean live body weight (LBW) of the male group was 35.40 kg, while female group was 33.46 kg (Abd-Allah *et al.*, 2019) [1]. The body weight at full mouth age

was 38.5 ± 1.0 kg and 29.50 ± 0.60 kg for males and females in Salem black goats. However, Karna *et al.,* 2020 [12] reported that the mean body weight for one, two, three and four year of age group was reported as 22.51 ± 4.31, 27.18 ± 4.53, 27.39 ± 4.07 and 30.60 ± 4.85 kg, respectively.

Table 1: Mean body weight in different age group in Kanni goats (Kg)

S. No	Age group (years)	Male	Female	P value
1	1 pair	10.43±0.53	8.26±0.49	0.01*
2	2 pairs	15.06±0.27	13.23±0.45	0.02*
3	3 pairs	24.72±0.70	17.27±0.71	0.00*
4	4 pairs	26.40±0.67	19.31±0.51	0.02*
Non-significant (*P*>0.05) **, Significant* (*P*<0.05) at 5% difference				

2. Body length
The average body length of different age groups in Kanni goats are presented in Table 2. In the present study, the average body length of different age groups *viz.* 1 pair (one year), 2 pairs (two years), 3 pairs (three years), and 4 pairs (four years) were considered. The average body length for males in one year age group was computed as 48.75 ± 0.72 cm and for females; it was 44.38 ± 0.49 cm. During 2 years, the mean body length was estimated as 60.38 ± 0.50 cm in males and 58.88 ± 0.19 cm in females. Similarly, the average body length in 3 years of age group was intended for males and females was 69.88 ± 0.81 cm and 63.25 ± 0.59 cm. Likewise, the average body length for 4 years age group was reported as 73.89 ± 0.63 & 68.84 ± 0.76 cm in males and females, respectively. The present study revealed that the mean body length of males was higher than females in all age groups. The average body length was increased progressively as the age advanced. The 1st, 3rd, and 4th year age groups were statistically significant ($P<0.05$). However, the 2nd year age groups were statistically non-significant ($P>0.05$) at 5% difference level.

The present study was closely associated with an earlier finding by Thiruvenkadan and Karunanithi reported that the average body length at 6 months of age was 58.80 ± 0.50 cm in males, at 12 months of age group was 67.40 ± 1.10 cm in Salem Black goats for pooled sexes. The present report had low value than the Thiruvenkadan and Karunanithi study at one year of age group, whereas, Mathapo and Tyasi, 2021 observed higher body length than the present study in-between one year of age groups in Boer goats. Karna *et al.*, 2020 [12] revealed that the mean body length was 63.06, 66.28, 67.67, and 69.6 cm for one pair, two pair, three pair, and four pairs of permanent incisor teeth in Kanjam goats. The mean body length was reported to be 51.08 ± 3.05 and 52.17 ± 2.73 cm in lowland and highland areas in Kacang goats (Depison *et al.* 2020) [7].

Table 2: Mean body length in different age group in Kanni goats (cm)

S. No	Age group (years)	Male	Female	P value
1	1 pair	48.75±0.72	44.38±0.49	0.00*
2	2 pairs	60.38±0.50	58.88±0.19	0.46**
3	3 pairs	69.88±0.81	63.25±0.59	0.00*
4	4 pairs	73.89±0.63	68.84±0.76	0.01*
Non-significant (*P*>0.05) **, Significant (*P*<0.05) * at 5% difference				

3. Chest girth
The mean chest girth of various age groups *viz.*, 1 pair (one

year), 2 pair (two years), 3 pairs (three years), and 4 pairs (four years) in Kanni goats are presented in table 3. The average chest girth for males and females at one year of age group was 52.38±0.82 and 51.50±1.00 cm. The mean chest girth in the two-year age groups was estimated as 63.38±0.59 cm for males and 59.75±0.70 cm for females, respectively. Correspondingly, during three years age groups, average chest girth was reported to be 69.38±1.06 and 64.75±0.67 cm for males and females. Similarly, the mean chest girth was revealed as 75.22±0.88 cm for males and 70.14±0.23 cm for females in the four years of age groups. Generally, the male goats had higher body measurements than the female goats. Likewise, mean chest girth was reported to be higher in males than females in all age groups and also, as the age increased, the average chest girth also increased progressively in both males and females. The 2nd, 3rd, and 4th year age groups were statistically significant ($P<0.05$) in chest girth. However, the 1st year age group were non-significant ($P>0.05$) statistically at 5% difference level.

The findings of the study were closely correlated with Nor Ashani *et al*. 2001 [19]; Khan *et al*., 2006; Apka *et al*., 1998; Osuhor *et al*., 2002 [20] researchers reported that the male Kanni goats had higher value than the female goats. While contrast study was reported by Asuku 2010 [4] and Ijomanta 2012, the females had higher body measurements than the males. Thiruvenkadan and Karunanithi have reported that the average chest girth was 52.30±0.50 cm at 6 months of age and 61.80±0.60 cm at one year of age group. Karna *et al*., 2020 revealed that the mean chest girth was 68.67, 71.99, 71.82, and 76.03 cm for one pair, two pairs, three pairs, and four pairs of permanent incisor teeth in Kanjam goats. However, these reports were higher than the present study. The average chest girth was estimated as 57.18±2.64 and 58.18±2.68 cm in lowland and highland areas in Kacang goats (Depison *et al*., 2020) [7].

Table 3: Mean chest girth in different age group in Kanni goats (cm)

S. No	Age group (years)	Male	Female	P value
1	1 pair	52.38±0.82	51.50±1.00	0.51**
2	2 pairs	63.38±0.59	59.75±0.70	0.01*
3	3 pairs	69.38±1.06	64.75±0.67	0.00*
4	4 pairs	75.22±0.88	70.14±0.23	0.02*
Non-significant ($P>0.05$) **, Significant* ($P<0.05$) at 5% difference				

4. Height at withers
The average height at withers in the different age groups are showed in Table 4. The average height at withers in the one-year age group was 58.38±1.36 cm for males and 55.75±1.04 cm for females. In the two years of age group, the average height at withers for males and females was 68.75±0.99 and 63.00±1.19 cm, respectively. The mean height at withers for males it was 72.50±0.80 cm, for females, it was 68.38±0.94 cm at three-year age group. Correspondingly, the average height at withers in the four-year age group was 74.79±0.73 and 69.28±0.24 cm for males and females, respectively. All the age groups were statistically significant ($P<0.05$). The effect of the sex on body measurements of does and buck were statistically significant ($P<0.05$).

The present study had agreements with Elmaz *et al*., 2012 [8] stated that the average height at withers at 30 days was 47.50±0.30 and 56.50±0.34 cm for males and females, at 60 days was 63.30±0.42 and 60.80±0.40 cm for males and females in Konamli goats, respectively. Abd-Allah *et al*.,

2019 [1] reported that the average height at withers was 64.80±1.94 and 65.13±1.43 cm for males and females in Shami goats and it was higher ($P<0.05$) in males than the females.

Table 4: Mean height at withers in different age group in Kanni goats (cm)

S. No	Age group (years)	Male	Female	P value
1	1 pair	58.38±1.36	55.75±1.04	0.01*
2	2 pairs	68.75±0.99	63.00±1.19	0.00*
3	3 pairs	72.50±0.80	68.38±0.90	0.02*
4	4 pairs	74.79±0.73	69.28±0.24	0.01*
Non-significant ($P>0.05$) **, Significant* ($P<0.05$) at 5% difference				

5. Paunch girth
The mean paunch girth in the different age groups were presented in Table 5. The mean paunch girth at one year age group was reported to be 61.38±0.77 for males and 57.25±1.04 cm for females. In the two years, the average paunch girth was calculated as 72.00±0.70 and 68.63±1.14 cm for males and females, respectively. Similarly, the mean paunch girth was estimated as 73.88±1.12 and 73.00±1.82 cm for males and females at three age group. Likewise, four year of age group the average paunch girth was 75.71±0.09 and 73.72±0.89 cm for males and females. The 1st and 2rd year age groups were statistically significant. However, the 3rd and 4th year of age group was statistically non-significant ($P<0.05$).

The study was closely associated with earlier findings have reported by Ravimurugan and Devendran *et al*., 2009 [22], the mean paunch girth of Ramnad white sheep was 72.43±1.15cm and 69.96±0.54 cm for males and females. However, the contrast study stated by Abd -Allah *et al*., 2019 [1], the mean paunch girth was 32.93±2.13 and 33.46±2.11 cm for males and females. Alex *et al*., 2010 [3] reported that the mean paunch girth for different age groups for females and males was 32.46±0.27 and 32.46±0.26 cm at below one month of age, 51.12±0.34 and 51.92±0.44 cm at three months of age, 61.55±0.50 and 60.99±0.66 cm at 6 months of age, 71.43±0.61 and 69.61±1.78 cm at 9 months of age, respectively.

Table 5: Mean paunch girth in different age group in Kanni goats (cm)

S. No	Age group (years)	Male	Female	P value
1	1 pair	61.38±0.77	57.25±1.04	0.00*
2	2 pairs	72.00±0.70	68.63±1.14	0.02*
3	3 pairs	73.88±1.12	73.00±1.82	0.68**
4	4 pairs	75.71±0.09	73.72±0.89	0.06**
Non-significant ($P>0.05$) **, Significant* ($P<0.05$) at 5% difference				

Conclusion
The present study describes that different body measurements traits such as body weight, body length, chest girth, height at withers and paunch girth in Kanni goats. Further study that would compare the morphological characters with other local and common breeds would help to define the real characteristics in Kanni goats.

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