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To study the body weight with body condition score & body measurements in Surati Goat

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Abstract

The data for this study was collected from goats maintained by farmers in the Dhule district. Data concerning 200 Surti goats was categorized into rearing tract, two sex categories, and age of animals. The body measurements were obtained using a measuring tape for the measurement scale. BCS scoring was conducted on a scale of 1 to 5, focusing on the lumbar region, rib cage, and sternal region. The body weights of the goats varied between 23 to 37 kg, while their body lengths ranged from 55 to 76 cm. The height at the withers was between 59 and 84 cm, and the chest girth ranged from 58 to 80 cm. Additionally, the paunch girth varied from 64 to 85 cm. The average BCS-L, BCS-R and BCS-S of the Surti goat was recorded at (2.83 ± 0.06) cm, (2.57 ± 0.06) cm and (2.35 ± 0.06) cm, respectively. The average physical parameters measured for the goat, specifically body weight, body length, height at the withers, hearth girth and paunch girth were found to be (31.42 ± 0.23) kg, (65.55 ± 0.28) cm, (69.83 ± 0.30) cm, (71.22 ± 0.26) cm and (76.35 ± 0.30) cm, respectively. In conclusion the values for body weight, body condition score, and body measurements were significantly higher in females than in males within the sex groups.

Keywords: Goat, body weight, body measurement, body condition score etc.

Introduction

Goats play a pivotal role in the rural economy, particularly in arid and semi-arid regions, where their adaptability to harsh environments ensures a sustainable livelihood for smallholder farmers. Globally and nationally, goat populations have increased significantly due to their contribution to meat, milk, skin, and fiber production. In India, the 20th Livestock Census (2019) ^[3] reported a population of 148.88 million goats, a 10.1% increase from 135.7 million recorded in 2012. In addition to this, the goats contribute approximately 35% of total meat production and 3.5% of milk production (Department of Animal Husbandry & Dairying, 2019).

The Surti goat, a dual-purpose breed native to South Gujarat, is valued for its superior meat and milk quality. In Dhule district of Maharashtra, goat numbers reached 332,041 in 2019, of which only 5.44% (18,089) were pure or graded breeds, while 94.55% (313,952) were non-descript. Within pure breeds, the Surti goat accounted for a relatively higher proportion (27.58%) compared to other breeds (Livestock Census, 2019) ^[3].

However, challenges such as lack of weighing facilities hinder accurate economic valuation. Body Condition Scoring offers a practical, low-cost method for assessing goat condition, improving feeding strategies, and ensuring fair market pricing. Body Condition Scoring (BCS) provides a practical, low-cost tool for assessing nutritional status and productivity potential, especially in regions where weighing scales are unavailable. Accordingly research was planned to study the body weight with body condition score & body measurements in goat particular in Surati Goat.

Methodology

The present study was conducted over a period from November 2024 to March 2025.

Initial observations were carried out on a pilot basis to familiarize the researchers with the observational methods. The same herds were subsequently revisited to gather data for documentation. This research focused on the selection of the Surti breed of goats. True types of animals were selected as per the description given by NBAGR, Karnal, Haryana. In this study, only adult animals of either sex that were more than one year old were included. Animals that were ill, had physical defects, or were otherwise unsuitable for observation were not utilized, even if they were part of the herd during the observation period. BCS scoring was conducted on a scale of 1 to 5, focusing on the lumbar region, rib cage, and sternal region. Surti goats are mainly located in Gujarat State and Khandesi region of Maharashtra state, with data collected from goats maintained by farmers in Dhule district. Data concerning 200 Surti goats was collected and the age of each animal was evaluated on dentition as per method established by Mitchell (1982) [7] and organized accordingly. Weight was measured and accurately grouped. Body measurements were taken, and body condition scores were assessed visually. In addition to this the Body measurements for each animal were conducted with a flexible tape measure while the animals were at rest. No distinction was made between pregnant and open does due to the uncertainty of their pregnancy status. The animals were positioned on all fours in a calm and relaxed manner, and measurements were recorded consistently. Data was recorded on a specifically designed collection sheet and prepared for statistical analysis.

Results and Discussion

The results emerged out of the analysis of collected empirical facts from the present study with relevant discussion there on has been presented as underneath.

The average body measurements and body condition score, along with their SE

Table 1: Average along with SE of body measurements of Surti goats

Parameter	Value
B.C.S-L (cm)	2.835±0.06
B.C.S-R (cm)	2.570±0.06
B.C.S-S (cm)	2.355±0.06
Age (yr)	2.885±0.20
Body weight (kg)	31.423±0.23
Body height (cm)	69.835±0.30
Body length (cm)	65.555±0.28
Heart girth (cm)	71.225±0.26
Paunch girth (cm)	76.350±0.30

From the Table 1 values, it indicates that the average age of Surti goats was recorded as (2.88±0.20) years. The average body weight of Surti goat was (31.42±0.23) kg, with mean body height and body length values of (69.83±0.30) cm and (65.55±0.28) cm, respectively. The heart girth and paunch girth were measured at (71.22±0.26) cm and (76.35±0.30) cm, respectively. Moreover, the body condition scores of Surti goat, the B.C.S-L averaged (2.83±0.06) cm, B.C.S-R was (2.57±0.06) cm, and the B.C.S-S was (2.35±0.06) cm, respectively.

These findings are at par with earlier studies conducted by Singh *et al.*, 2015 [10]; Patel *et al.*, 2017 [9] on Surti and other indigenous goat breeds, where moderate to good body condition and well-developed morphometric traits were reported.

Average along with SE of body measurements and body condition score distributed as per sex of the animals:

The data were categorized into two groups based on the sex of the animals, namely male (38) and female (162).

Table 2: Average along with SE of body measurements and body condition score distributed as per sex of the animals

Parameter	Male	Female
BCS-L	2.26±0.14	2.97±0.06
BCS-R	2.00±0.13	2.71±0.07
BCS-S	1.84±0.14	2.47±0.07
Age (yr)	2.44±0.40	2.98±0.05
Body weight (kg)	29.53±0.50	31.86±0.24
Body height (cm)	67.26±0.77	70.43±0.31
Body length (cm)	63.71±0.66	65.98±0.30
Heart girth (cm)	70.31±0.70	71.43±0.28
Paunch girth (cm)	74.92±0.82	76.68±0.32

From the Table 2 values, it is observed that the notable differences in morphometric traits between sexes. The average age of male Surti goat was (2.44±0.40) while female Surti goat was (2.98±0.05). Also average body weight of male Surti goats was observed (29.53±0.50) kg, whereas that of average body weight of female goat was slightly higher (31.86±0.24) kg. Similar trends are revealed in height at withers averaged (67.26±0.77) cm in males and (70.43±0.31) cm in females. Moreover, Males exhibited a body length of (63.71±0.66) cm and heart girth of (70.31±0.70) cm, compared to (65.98±0.30) cm and (71.43±0.28) cm, respectively, in females. The paunch girth measured (74.92±0.82) cm in males and (76.68±0.32) cm in females. Regarding body condition scores, males recorded average B.C.S-L, B.C.S-R, and B.C.S-S values of (2.26±0.14), (2.00±0.13), and (1.84±0.14), respectively. In contrast, females showed comparatively higher scores: (2.97±0.06) B.C.S-L, (2.71±0.07) B.C.S-R, and (2.47±0.07) B.C.S-S. According to these findings, it is shown that the better overall body condition score in female Surti goats in comparison with male Surti goats, potentially this might be due to physiological or nutritional factors. The findings are in line with results reported by Shegaw *et al.* (2022), who observed that female goats often exhibit superior girth and body dimensions, possibly due to selective feeding or maternal adaptations. Earlier study by Patel *et al.* (2017) [9] also supported the presence of sexual dimorphism in Surti and other indigenous goat breeds.

Average along with SE of body measurements and body condition score distributed as per age of the animals:

The age of the animals was assessed through the dentition method. Accordingly, goats are categorized as three age groups of goats i.e. Group A (1 to 2 years), Group B (2 to 3 years) and Group C (3 < years).

Table 3: Average along with SE of body measurements and body condition score distributed as per age of the animals

Parameter	Group A (1 to 2 yrs.)	Group B (2 to 3 yrs.)	Group C (3 < yrs.)
B.C.S-L	1.71±0.05	3.08±0.03	3.97±0.02
B.C.S-R	1.59±0.06	2.70±0.05	3.76±0.06
B.C.S-S	1.33±0.05	2.48±0.05	3.61±0.07
Body Weight	27.08±0.24	32.17±0.13	35.56±0.13
Body Height	63.87±0.46	70.97±0.23	73.78±0.52
Body Length	60.12±0.39	66.19±0.19	69.97±0.47
Heart Girth	66.32±0.52	71.90±0.26	73.95±0.35
Paunch Girth	71.28±0.56	76.60±0.39	79.76±0.30

The present study measured Body Condition Score (BCS) and linear body measurements across three age groups of goats i.e. Group A 65 no of goats (1 to 2 years), Group B 93 no of goats (2 to 3 years) and Group C 42 no of goats (3 < years), respectively. Moreover, results showed that all the traits increased progressively with age. In Group A (1 to 2 years), goats exhibited the lowest BCS values (L: 1.71 ± 0.05 , R: 1.59 ± 0.06 , S: 1.33 ± 0.05) and body weight (27.08 ± 0.24 kg). These values reflect might be due to early physiological development. In Group B (2 to 3 years), the traits increased to moderate levels (BCS L: 3.08 ± 0.03 , R: 2.70 ± 0.05 , S: 2.48 ± 0.05 ; weight: 32.17 ± 0.13 kg), which indicating active growth. Morphometric traits also increased significantly: body height (70.97 ± 0.23 cm), length (66.19 ± 0.19 cm), heart girth (71.90 ± 0.26 cm), and paunch girth (76.60 ± 0.39 cm). Moreover, in Group C (3 < years), all parameters increased over a previous two groups which shown physical maturity of goats. BCS reached (L: 3.97 ± 0.02 , R: 3.76 ± 0.06 , S: 3.61 ± 0.07), with body weight of (35.56 ± 0.13) kg. Linear traits also reached their maximum: height (73.78 ± 0.52 cm), length (69.97 ± 0.47 cm), heart girth (73.95 ± 0.35 cm), and paunch girth (79.76 ± 0.30 cm).

These results are in line with Malaviya *et al.*, (2022) [5], who noted strong age-related increases in body measurements and fat reserves in goats. The low standard errors reflect reliable measurements and limited variability, strengthening the validity of these findings.

Distribution of Surti goat per body condition score

Table 4: Distribution of Surti goat per body condition score

Score	BCS-L	BCS-R	BCS-S
1	17	29	42
2	50	63	72
3	82	73	59
4	51	35	27

The distribution of animals across different body condition scores (BCS) varied depending on the assessment method used, BCS-L, BCS-R, and BCS-S. At score 1, which is typically reflects poor body condition and the highest number of goats (42) were identified using the sternum method, suggesting its effectiveness in detecting under conditioned animals. As the score increased to 2, all three methods showed a rise in animal count, with BCS-S identifying the highest (72), followed by BCS-R (63) and BCS-L (50), which indicating a large proportion of goats in moderate condition. Notably, at score 3, the BCS-L method recorded the highest number of animals (82), it indicating that the lumbar-side assessment may be more sensitive in detecting well-conditioned goats. However, a sharp decline was observed at score 4 across all methods, especially in BCS-S (27), signifying that the fewer animals reached the highest condition score. These variations highlight the methodological differences in BCS assessment, where BCS-S appears more responsive at lower scores, while BCS-L is more prominent at higher scores. This emphasizes the importance of using multiple anatomical viewpoints for a more comprehensive evaluation of body condition in goats. Our findings aligned with the Atta & El Khidir (2004) [1] and Chilliard *et al.* (2005) [2], who recommended multiple-site BCS evaluations for improved accuracy in small ruminants.

Conflict of Interest

Not available

Financial Support

Not available

Reference

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