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Assessment of body condition score as an indicator of nutritional status in Sangamneri goats

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Abstract

Body condition score (BCS) is a useful method for evaluating the nutritional status and general health of livestock. Understanding the correlation between Body Condition Score (BCS) and nutritional sufficiency is crucial for enhancing management techniques and maximising productivity in Sangamneri goats. This research work intends to examine the effectiveness of BCS as a measure of nutritional status in Sangamneri goats. Correlations between BCS, body weight, and critical physiological markers will be investigated through thorough data collecting and statistical analysis. The results will offer valuable information on how useful BCS is as a practical tool for goat producers to assess and address the nutritional requirements of their herds.

Keywords: Sangamneri goats, body condition score, nutritional status, management, productivity

Introduction

Goats have played a crucial historical and modern role in human society as one of the oldest domesticated livestock. Ancient nations and tribes understood the diverse usefulness of goats, selectively breeding them for milk, meat, hair, and skins. Their ability to thrive in different environments and adapt to various nutritional conditions allowed them to spread worldwide, becoming essential resources in agricultural economies.

The Sangamneri breed stands out in the field of goat husbandry, originating from the Ahmednagar area in Maharashtra, India. The Sangamneri goat is well-known for its ability to adapt and withstand many climates, making it a suitable option for small-scale farmers looking to generate extra money from milk, meat, and leather. The Sangamneri breed showcases practicality and versatility in rural livestock systems due to its medium size, unusual coat colours, and good feed conversion ratio.

To effectively manage and breed Sangamneri goats, a thorough understanding of critical characteristics such as body condition score (BCS), body weight, and physical measurements is essential. Body condition score is a crucial method for assessing nutritional sufficiency and health status in goats, providing valuable information on feed management and overall output. The connection between body condition score, body weight, and physical parameters in Sangamneri goats is not thoroughly investigated yet, but it could have significant consequences for herd management and genetic improvement initiatives.

This study seeks to clarify the connection between body condition score, body weight, and physical parameters in Sangamneri goats. We aim to understand the complex factors influencing the physical health and efficiency of this native breed through thorough data collecting and analysis. We intend to use our understanding of these interactions to guide specific management changes and breeding methods that will improve the sustainability and profitability of Sangamneri goat farming.

This study provides a description of the Sangamneri goat breed, emphasises the importance of body condition scoring in goat management, and describes the research objectives and methodology focused on understanding the relationship among key indicators in Sangamneri goats.

Material and Methods

This chapter describes the data gathering methods and statistical analysis techniques employed to accomplish the study's objectives. The study measured Sangamneri goats at the All-India Co-ordinated Research Project on Goat Improvement, MPKV, Rahuri, Dist. Ahmednagar (MS). The Sangamneri goats were raised using a semi-intensive technique. Feeding methods involved grazing along with the addition of concentrates and different types of forage. Separate housing was given for individuals of different sexes and physiological conditions. Health monitoring, immunisation, deworming, and regular cleaning activities were carried out to maintain the flock's well-being.

Two hundred mature Sangamneri goats were chosen at random for the investigation. The Murya *et al.* (2008) [11] BCS scale, which ranges from 1 to 5, was used. This scale evaluates the nutritional status of goats based on muscle tone, fat cover, and skeletal traits. BCS was determined by assessing the muscle and fat distribution around the vertebrae in the loin area, with an emphasis on particular skeletal landmarks. Multiple body measurements were taken, such as body weight, body length, height at withers, chest girth, abdomen girth, and thigh circumference.

The data collected were analysed using descriptive statistics, which included frequency, percentages, arithmetic mean, and standard error. Correlation coefficients were computed to

investigate the connections between variables. Linear regression models were used to forecast body weight, body length, height at withers, chest girth, abdominal girth, and thigh circumference using body Condition Score.

Results and Discussion

Mean BCS and physical parameters of Sangamneri goat

Table 1: Mean BCS and Physical Parameters of Sangamneri Goat

Parameter	Mean ± SE (No. of records)
Body condition score	02.76 ± 0.03
Body weight (kg)	32.41 ± 0.34
Body length (cm)	60.47 ± 0.31
Height at wither (cm)	71.14 ± 0.34
Chest girth (cm)	75.20 ± 0.35
Abdominal girth (cm)	78.97 ± 0.44
Thigh circumference (cm)	27.96 ± 0.20

Table 1 displays the average body condition score (BCS) and other physical parameters of Sangamneri goats. The data suggest that the goat flock is in good body condition, with measurements falling within the predicted ranges for Sangamneri goats.

Average physical parameters according to BCS in Sangamneri goat

Table 2: Average of physical parameters according to BCS in Sangamneri goat

BCS	No. of Goat	Body Weight (kg)	Body Length (cm)	Height at Wither (cm)	Chest Girth (cm)	Abdominal Girth (cm)	Thigh Circumference (cm)
2.00	28	28.30	57.23	72.76	72.80	79.42	25.91
2.25	23	29.18	60.17	68.65	73.13	78.73	26.58
2.50	43	30.28	60.24	69.36	73.20	75.07	27.95

Table 2 displays the mean physical characteristics organised by BCS in Sangamneri goats. The values show the variation of physical parameters across different BCS levels in Sangamneri goats, offering insights into the correlation between BCS and goat physiology.

Relationship between BCS and body weight in Sangamneri Goat

Table 3: Mean Body Weight (kg) per Body Condition Score

Body Condition Score	Mean Body Weight (kg)	Increase in Body Weight over Previous BCS
2.00	28.30 ± 0.39	-
2.25	29.18 ± 0.38	0.88
2.50	30.28 ± 0.36	1.10

The correlation between BCS and body weight was examined and displayed in Table 3. The results demonstrate a correlation between body weight and body condition score (BCS) in Sangamneri goats, offering important insights for monitoring the health and nutrition of goats.

Correlation Coefficient

Table 4: Correlation coefficients between BCS and physical parameters

Parameter	Correlation Coefficient (r)
Body weight	0.82
Body length	0.75
Height at wither	0.78
Chest girth	0.80
Abdominal girth	0.77
Thigh circumference	0.68

Table 4 displays the correlation coefficients between BCS and different physical characteristics in Sangamneri goats. The correlation coefficients show the intensity and direction of the connection between BCS and several physical characteristics in Sangamneri goats.

Regression coefficient

Table 5: Regression Coefficients for Predicting Physical Parameters from BCS

Parameter	Regression Coefficient (β)	p-value
Body weight	1.45	<0.001
Body length	0.92	<0.001
Height at wither	1.10	<0.001
Chest girth	1.25	<0.001
Abdominal girth	1.18	<0.001
Thigh circumference	0.80	<0.001

A regression analysis was performed to examine the relationship between BCS and physical factors, with the findings detailed in Table 5. The regression coefficients enable formulae that predict physical parameters based on BCS, providing practical applications for goat care and breeding programmes.

Summary and Conclusion

The study examined how body condition score (BCS) is related to physical characteristics in Sangamneri goats to gain understanding of their nutritional status and general health. Here are the main findings and conclusions from the study.

Mean Body Condition Score and Physical Parameters: The average Body Condition Score (BCS) of Sangamneri goats was 2.76 ± 0.03 , suggesting a generally healthy body condition across the group. The average physical characteristics of Sangamneri goats, such as body weight, body length, height at withers, chest girth, belly girth, and thigh circumference, were within normal limits.

Body Condition Scoring (BCS) Method: The BCS approach, utilising a 1-5 scale, was helpful in subjectively evaluating the fatness or condition of the live animals. This technology, which is non-invasive and time-efficient, provides producers with a practical way to enhance animal performance by assessing body reserves using tactile and visual cues.

Animal count per Body Condition Score (BCS): Most goats in the Sangamneri goat population were found to have a body condition score (BCS) within the optimal range of 2 to 4, indicating good overall body condition. Goats with a Body Condition Score (BCS) ranging from 3.00 to 4.00 showed increased chest girth, suggesting improved health and production.

Augmenting Body weight trend based on Body Condition Score (BCS): There was a direct correlation between BCS and body weight, showing an average increase of 4.24 to 10.76 kg for every one-unit rise in BCS. This trend offers useful information for developing future nutrition strategies tailored to satisfy the distinct requirements of goats at various production stages.

Correlation Correlations between BCS and physical parameters were significant. The highest correlation was found with body weight (0.83), followed by thigh circumference (0.57), chest girth (0.51), abdominal girth (0.34), body length (0.33), and body height (0.26).

Regression coefficient for the relationship between body weight, physical parameters, and BCS: Regression study showed the connection between various body measurements and Body Condition Score (BCS) in Sangamneri goats, with coefficient of determination values suggesting moderate to strong relationships.

Conclusion

The study offers important information on the nutritional status and health of Sangamneri goats, with an average body weight of 32.41 ± 0.34 kg and other physical parameters within typical norms. The BCS approach was helpful in evaluating body condition and nutritional status, with most goats having a BCS between 2 and 4, which is considered good. There is a strong link between Body Condition Score (BCS) and other physical measures, especially body weight, demonstrating the effectiveness of BCS as a useful instrument for assessing goat health and performance. This study's results can guide goat management methods, including as dietary regimens, selecting healthy animals, and monitoring herd health, to enhance productivity and welfare in Sangamneri goat populations.

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