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Studies on body measurement of Red Kandhari cattle in Pathri tehsil of Parbhani district

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Abstract

The study entitled "Studies on body measurement of Red Kandhari cattle in Pathri tahsil of Parbhani district" was conducted, supervised by selecting 200 cattle from five villages of Pathri tehsil in Parbhani district. The cattle were categorized into different age groups: up to 1 year, 1 to 2 years, 2 to 3 years, and above 3 years. The population of female cattle was observed to be greater in the age group of above 3 years. The average body weight of adult females was determined to be 378.48 ± 4.16 kg. Biometric assessments were conducted, measuring chest girth, body length, height at wither, length of tail, and length of neck, yielding values of 153.82 ± 1.01 , 103.28 ± 1.30 , 108.88 ± 1.34 , 75.64 ± 1.49 , and 42.9 ± 0.55 cm respectively. This study provides valuable insights into the physical characteristics of Red Kandhari cattle in the specified region, contributing to the understanding of their morphology and potentially informing management and breeding practices.

Keywords: Red Kandhari cattle, body characteristics, body measurement, body weight, chest girth, length of neck

Introduction

The global cattle population reached approximately one billion head in 2022, marking an increase from around 996 million in 2021 (Shahbandeh, M. 2021) [9]. India boasts the world's largest livestock population, comprising over 37.28% of cattle, 21.23% of buffalo, and 26.40% of sheep (Sonavale *et al.* 2020) [11]. Indian native cattle breeds exhibit remarkable adaptability to diverse agro-climatic conditions, characterized by their ability to thrive in high to moderate temperatures, strong draught capacity, and resistance to diseases transmitted by ticks. Notably, India harbors several prominent milch cattle breeds including Gir, Sahiwal, Tharparkar, Kankrej, Red Sindhi, and Rathi, which can serve as valuable genetic resources for improving the productivity of indigenous low-yielding cattle through selective breeding (Niranjan, 2016) [8]. The country's bovine populations exhibit vast phenotypic diversity, utility patterns, and adaptability to various agro-climatic conditions and production systems. The genetic diversity observed among Indian cattle breeds arises from centuries of domestication, accompanied by mutations, selective breeding, and adaptations to local environments, as well as factors such as isolation and genetic drift (Groeneveld *et al.* 2010) [5]. Over time, different livestock breeds in India have developed advantageous attributes including disease resistance, tolerance to heat stress, adaptability to environmental fluctuations, and the ability to efficiently utilize coarse fibers and crop residues (Gandhi and Sharma, 2016) [4].

Material and Methods

For the current study, data regarding body measurements of Red Kandhari cattle were collected from five villages: Renapur, Deonandra, Babultar, Bandarwada, and Kherda, located in Pathri tahsil of Parbhani district. Direct measurements of various body parts of 200 Red Kandhari cattle were recorded in their respective native habitats. The collected data were categorized based on different age groups.

The data was classified in the following age groups.

Sr. No.	Age between (years)
1.	Up to 1 year
2.	1-2 year
3.	2-3 year
4.	3 year and above (Adult female)

Body measurements

1. Chest girth

Chest girth was measured as the circumference of the chest immediately behind the point of elbow passing over the tape around the chest behind point of withers.

2. Body length

Body length was measured from the point of shoulder to the point of pin bone.

3. Height at wither

Height at wither was measured perpendicular from the lateral lower edge of the fore hoof to the point of wither (where sole of the hoof touch to the ground).

4. Length of tail

Length of tail was measured from the distance between base and tip of tail.

5. Length of neck

It is upper most line of neck and it starts from the head crest to hump and measured accordingly.

Results and Discussion

Body part measurements

Chest girth, body length, height at wither, tail length and neck length of the animals are the indicator of body growth and production capacity of animal.

1. Chest girth

Table 1 presents the average mean values of chest girth for Red Kandhari cattle across different age groups. The data indicate that in the age group up to 1 year, the average chest girth was measured at 100.92±0.92 cm, followed by 138.62±0.81 cm for the age group of 1 to 2 years, 147.62±0.49 cm for 2 to 3 years, and 170.78±0.83 cm for those above 3 years of age.

Comparative analysis with prior studies reveals consistency with findings by Das *et al.* (2018) [3], who reported a chest girth of Red Kandhari cattle in the age range of 4-12 months as 116.21±0.73 cm. Additionally, Magar (2013) [7] documented chest girth values for Red Kandhari cattle above 3 years, measuring 174.82±0.67 cm in males and 166.71±0.80 cm in females. Similarly, Shinde (2013) [10] reported a chest girth of 177.46±0.47 cm for Red Kandhari cattle above 3 years of age. These findings are in close agreement with the current study's observations.

Table 1: The average mean value of chest girth (cm)

Sr. No.	Age group (year)	No. of animals	Chest girth (cm)		Average ± S.E.
			Max	Min	
1	Up to 1 year	50	110	89	100.92±0.92
2	1 to 2 year	50	147	129	138.62±0.81
3	2 to 3 year	50	155	132	147.62±0.49
4	Above 3 year	50	178	158	170.78±0.83

2. Body length

Table 2 presents the average mean values of body length for Red Kandhari cattle across various age groups. In the age group up to 1 year, the body length was recorded as

92.66±1.28 cm, followed by 115.04±0.60 cm for the 1 to 2 years age group, and 128.6±1.06 cm for the 2 to 3 years age group. Notably, a progressive increase in body length was observed in the age group above 3 years, reaching 141.4±0.49 cm for adult females.

Comparable findings were reported by Das *et al.* (2018) [3], who documented average body lengths of 64.06±0.69 cm for the age group of 0-3 months and 99.89±0.51 cm for 4-12 months in Red Kandhari cattle from the Marathwada region. Similarly, Magar (2013) [7] observed body lengths of 75.18±1.20 cm for 0-3 months, 89.68±1.24 cm for 4-12 months, 105.16±1.32 cm for 13-24 months, 121.33±1.52 cm for 25-36 months, and 134.61±0.48 cm for above 36 months in males, and 127.25±0.98 cm for above 36 months in females.

Furthermore, Shinde (2013) [10] reported body lengths of 61.15±0.35 cm for 0-3 months, 87.68±0.63 cm for 4-12 months, 106.22±0.38 cm for 13-24 months, 120.41±0.35 cm for 25-36 months, and 155.02±0.38 cm for above 36 months in Red Kandhari cattle. These findings align closely with the results of the current study.

Table 2: The average mean values of body length (cm)

Sr. No.	Age group (year)	No. of animals	Body length (cm)		Average ± S.E.
			Max	Min	
1	Up to 1 year	50	99	88	92.66±1.28
2	1 to 2 year	50	120	105	115.04±0.60
3	2 to 3 year	50	133	112	128.6±1.06
4	Above 3 year	50	122	122	141.4±0.49

3. Height at wither

Table 3 presents the classified group-wise mean height at wither of Red Kandhari cattle across various age groups, along with their standard errors (SE). Within the age group up to 1 year, the median height at wither was observed to be 95.81±0.83 cm. As the age of the cattle advanced, there was a corresponding increase in the height at wither, reaching 141.4±0.92 cm in cattle above 3 years of age (adult females). These findings closely align with those reported by Das *et al.* (2018) [3], who observed a height at wither of 99.89±0.51 cm for the up to 1 year age group in Red Kandhari cattle. Similarly, Magar (2013) [7] documented average heights at wither of 134.16±0.48 cm for adult males and 127.49±0.56 cm for adult females in Red Kandhari cattle from Hingoli district. Additionally, Shinde (2013) [10] reported heights at wither of 95.50±0.67 cm for the below 1 year age group and 164.51±0.79 cm for adult cattle in Red Kandhari cattle from the Marathwada region.

In a different context, Kebede *et al.* (2017) [6] observed an average height at wither of 128.4±2.8 cm for Gofa cattle. These comparative findings provide valuable insights into the height at wither of Red Kandhari cattle across different age groups, contributing to the understanding of their physical characteristics and growth patterns.

Table 3: The average mean values of height at wither (cm)

Sr. No.	Age group (year)	No. of animals	Height at wither (cm)		Average ± S.E.
			Max	Min	
1	Up to 1 year	50	106	83	95.81±0.83
2	1 to 2 year	50	107	89	99.78±0.69
3	2 to 3 year	50	130	98	113.18±1.16
4	Above 3 year	50	148	118	141.4±0.92

4. Length of tail

Table 4 presents the group-wise average mean values of tail length, accompanied by their standard errors (SE), for Red Kandhari cattle across different age groups. In the age group up to 1 year, the average length of the tail was measured at 44.71 ± 0.82 cm. As the cattle matured, there was a slight increase in tail length, culminating in the adult stage. Specifically, in the age group above 3 years (adult females), the length of the tail was found to be 88.78 ± 1.27 cm. These findings align with those reported by Das *et al.* (2018) [3], who observed tail lengths of 60.90 ± 0.39 cm for Red Kandhari cattle aged 4-12 months in the Marathwada region of Maharashtra state. Similarly, Magar (2013) [7] documented a tail length of 91.97 ± 0.53 cm for Red Kandhari cattle. Additionally, Shinde (2013) [10] observed a tail length of 83.48 ± 0.15 cm for adult Red Kandhari cattle.

Table 4: The mean value of tail length (cm)

Sr. No.	Age group (year)	No. of animals	Tail length (cm)		Average \pm S.E.
			Max	Min	
1	Up to 1 year	50	56	35	44.71 ± 0.82
2	1 to 2 year	50	67	42	54.34 ± 1.19
3	2 to 3 year	50	82	53	72.16 ± 0.98
4	Above 3 year	50	98	60	88.78 ± 1.27

5. Length of neck

Table 5 displays the data on the average neck length of Red Kandhari cattle across classified age groups. Within the age group up to 1 year, the average neck length was recorded as 28.02 ± 0.75 cm. As the age of the cattle increased, there was a corresponding increase in neck length. Specifically, the average neck length for cattle aged 1 to 2 years was 31.22 ± 0.62 cm, for 2 to 3 years was 37.32 ± 0.42 cm, and for those above 3 years (adult females) was 40.75 ± 0.51 cm. These findings are consistent with those reported by Chavhan *et al.* (2022) [2], who observed a neck length of 41.90 ± 0.35 cm in adult Kathani cattle. Similarly, Das *et al.* (2018) [3] documented a neck length of 38.50 ± 0.13 cm for Red Kandhari cattle aged 4-12 months in the Marathwada region of Maharashtra state. Additionally, Ashwini Kunghadkar (2017) [1] reported the length of the neck.

Table 5: The mean value of neck length (cm)

Sr. No.	Age group (year)	No. of animals	Neck length (cm)		Average \pm S.E.
			Max	Min	
1	Upto 1 year	50	36	18	28.02 ± 0.75
2	1 to 2 year	50	38	25	31.22 ± 0.62
3	2 to 3 year	50	45	32	37.32 ± 0.42
4	Above 3 year	50	48	36	40.75 ± 0.51

Conclusion

The Red Kandhari cattle, primarily found in the Pathri tehsil of the Parbhani district, are characterized as large-sized animals with a compact body structure, ideally suited for fieldwork. Despite their poor milk production performance, they are highly valued as a draught breed of cattle. The significance of Red Kandhari cattle lies in their ability to subsist solely on local resources, fulfilling their nutritional requirements and providing substantial draught power capacity. This study aims to facilitate the selection of promising animals for genetic improvement and the conservation of this breed, ultimately enhancing milk production. Through the determination of key characteristics, this research will aid breeders in evaluating the suitability of

the breed for the region and contribute to its acceptance within the local farming community.

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