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Morphometric characteristics of indigenous non-descript female cattle of Manipur (Meetei San), India

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Abstract

The indigenous cattle of Manipur known as Meetei San are medium size, stout, hardy and a dual-purpose and non-descript cattle. Due to its low productivity, the household and national economies are presently under-utilized, and populations leaving to extinction. Therefore, the present study was undertaken to study the various morphometric distinctiveness of local female cattle of Manipur. A total number of 40 (forty) Manipuri local female cattle were included in this experiment. The data were collected from their native tract of Imphal west and Imphal east districts of Manipur, India. To minimise erroneousness and avoid between-recorder effects, the two recordings of each measurement has been taken. A measuring tape was used to measure the circumference, and a mapping stick was used to measure the other dimensions. As per the findings, the averages of body length (Inch), heart girth (Inch), paunch girth (Inch), withers height (Inch), top length (Inch), face length (Inch), face breadth (Inch), horn length (Inch), poll length (Inch), ear length (Inch), neck length (Inch), arm length (Inch), elbow length (Inch), fore-shank length (Inch), thigh length (Inch), hind shank length (Inch), pes length (Inch), tail length (Inch), udder depth (Inch) and teat length (Inch) of local cattle of Manipur (Meetei San) was 41.65 ± 0.82 , 47.53 ± 0.94 , 50.50 ± 1.15 , 40.88 ± 0.52 , 53.00 ± 1.22 , 14.89 ± 0.21 , 8.20 ± 0.17 , 2.98 ± 0.20 , 4.11 ± 0.12 , 6.80 ± 0.11 , 10.56 ± 0.17 , 12.90 ± 0.16 , 10.68 ± 0.18 , 10.51 ± 0.17 , 10.48 ± 0.18 , 13.03 ± 0.15 , 13.08 ± 0.15 , 21.94 ± 0.43 , 4.10 ± 0.12 and 1.78 ± 0.05 , respectively. In conclusion, the indigenous non-descript female cattle of Manipur are comparatively smaller in size than most of the recognized exotic and indigenous breeds of cattle. These cattle were having unique characteristic features and are different from the known breeds of India and abroad.

Keywords: Manipur, cattle, Meetei San, morphometric characteristics

Introduction

Manipur is one of the North-Eastern states of India. It comprises mostly hilly areas in the boundary and plain areas i.e. so-called Valley areas in the center, Imphal the capital of Manipur. Other plain areas include several districts e.g. Imphal East, Imphal West districts, Thoubal district, Bishnupur district etc. The Imphal River, Nambul River, Iiril River and Thoubal River are the main rivers of Manipur. Manipur lies at latitude of 23.83°N and longitude of 93.03°E - 94.78°E , covers an area of 22,347 square kilometers. Manipur shares its border with some north-eastern states, Nagaland in the north, Assam in the west and Mizoram in the south. Manipur also shares its international border with country Myanmar in the east. The indigenous cow of Manipur is also known as Meetei San as their local native name. The meaning of Meetei San is, Meetei means an indigenous Manipuri people and San means Cow. So, they are popularly known as Meetei San throughout the state and widely reared by different communities in the state. Meetei San or local cattle of Manipur, its original nature is of semi wild type and it is a rare bovine species belongs to Phylum-Cordata, Class-Mammalia, order-Antiodactyla, family-Bovidae, genus-Bos and species-Bos indicus (hampless). Meetei San is only found in Manipur and are distributed in different districts of Manipur which have plain areas and grazing fields. They are also reared in closed cowsheds with semi-intensive type management system. The animal is mainly reared for draught purpose and milk purpose to some extent; they are also used for meat purposes.

In the nation, Manipur's native cattle are still regarded as unremarkable. In order to determine which of these measures best captures the body conformation of native female cattle in Manipur, the current study was conducted to examine several physical and morphometric traits and to develop unobservable features (latent). As a result, the study will support the conservation efforts and breed stabilization of these cattle.

Materials and Methods

Twenty distinct body measures of forty native female cattle from the Imphal west and Imphal east regions of Manipur, India, were part of the data. The same recorder took two recordings of every measurement in order to reduce inaccuracy and prevent between-recorder effects. A mapping stick was used for the other measurements, and a measuring tape was used for the circumference (Figure 2). Ear length, head length, neck length, horn length, poll length, udder depth, forehead width, arm length, elbow length, fore shank length, thigh length, hind shank length, pes length, tail length, switch length, body length, height at wither, heart girth, paunch girth, and teat length were all measured. The body measurements were taken following the anatomical points and procedures precise by ICAR (2017) [4], FAO (2012) [3] and as per the procedure described by Tolenkomba *et al.* (2012) [12] and Coffie *et al.* (2018) [2].

1. **Body length (BL):** Body length was measured from point of shoulder (greater tubercle corresponding to the outer central tuberosity) to pin bone (tuber ischii).
2. **Heart/Chest Girth (HG):** Heart/Chest Girth was measured and recorded as the circumference of the chest immediately posterior to the fore limbs at right angle to the body axis.
3. **Paunch Girth:** Circumference at the pouch region just anterior to the hip joint.
4. **Body height at withers (BHW):** This was measured as the distance from the withers to the ground level.
5. **Top length:** It was measured from the head to the base of the tail.
6. **Face length:** It was measured from the horn site/ poll to the lower lip.
7. **Face breadth:** It was measured as the widest point of head.
8. **Horn length:** It was measured from the base of the horn to its tip.
9. **Poll length:** It was measured as distance between the two horn.
10. **Ear length:** Ear length was taken by measuring from the base of ear to its tip.
11. **Neck length:** Distance from neck attachment to breast.
12. **Arm length:** Length between the point of shoulder up to the point of elbow.
13. **Elbow length:** Length between the knee joint up to the point of elbow.
14. **Fore-shank length:** Length between the pastern joint up to the knee joint.
15. **Thigh length:** Length between the hip joint up to the stifle joint.
16. **Length of the hind shank:** From the pastern joint to the hock joint.
17. **Pes Length:** Length between the tarsal joint / hock joint up to the end of distal phalange.
18. **Tail length:** It was measured from the base (around the first caudal vertebra) of the tail to the tip of the tail switch.

19. **Udder depth:** It was measured from the base of the udder to base of the teat.

20. **Teat length:** It was measured from the base of the teat to its tip.

The collected data were compiled, tabulated and subjected to various appropriate statistical tests to draw meaningful results and logical conclusion. The data were subjected to statistical analysis as per Snedecor and Cochran (1995) [11].

Results and Discussion

The native cattle of Manipur are robust, medium in size, resilient, and multipurpose (Figure 1). Brown (76%), black (12%), gray (4%), and speckled with black or white spots on a brown body (8%), are the different coat colors (Lalhruaipuii *et al.*, 2021) [7]. The bullocks have short horns and a medium hump (Pundir *et al.*, 2015) [10]. These cattle are raised by the farmer in an open grazing strategy for both milk and drought. A chance to increase the milk output in the state of Manipur through systematic genetic improvement initiatives has been created by the average daily milk yield of 2.65 ± 0.18 kg (2.0 to 4.5 kg). However, at the same time, a declining pattern of 20.86% in indigenous cattle population (2.19 lakhs) was registered in Manipur (Pundir *et al.*, 2015) [10].

The body measurement of local cows of Manipur (Meetei San) is given in table 1. As per the findings, the averages of body length (Inch), heart girth (Inch), paunch girth (Inch), withers height (Inch), top length (Inch), face length (Inch), face breadth (Inch), horn length (Inch), poll length (Inch), ear length (Inch), neck length (Inch), arm length (Inch), elbow length (Inch), fore-shank length (Inch), thigh length (Inch), hind shank length (Inch), pes length (Inch), tail length (Inch), udder depth (Inch) and teat length (Inch) of local cattle of Manipur (Meetei San) was 41.65 ± 0.82 , 47.53 ± 0.94 , 50.50 ± 1.15 , 40.88 ± 0.52 , 53.00 ± 1.22 , 14.89 ± 0.21 , 8.20 ± 0.17 , 2.98 ± 0.20 , 4.11 ± 0.12 , 6.80 ± 0.11 , 10.56 ± 0.17 , 12.90 ± 0.16 , 10.68 ± 0.18 , 10.51 ± 0.17 , 10.48 ± 0.18 , 13.03 ± 0.15 , 13.08 ± 0.15 , 21.94 ± 0.43 , 4.10 ± 0.12 and 1.78 ± 0.05 , respectively (Table 1). Pundir *et al.* (2010) [9], while studying physical and management related parameters of hill cattle of Almora district of Uttarakhand stated that, the average body length, height at wither, heart guard, paunch guard, ear length, face length, tail length without switch and Horn length of cows were 98.75 ± 1.15 , 96.49 ± 0.9 , 126.38 ± 1.66 , 134.35 ± 1.86 , 19.14 ± 0.24 , 36.84 ± 0.41 , 70.89 ± 1.07 and 11.85 ± 0.57 cm., respectively. The body length and height at wither of hill cattle of Almora district of Uttarakhand were found to be smaller than the local cattle of Manipur. Rest of the parameters i.e. heart guard, paunch guard, ear length, face length, tail length without switch and horn length of hill cattle of Almora district of Uttarakhand were found to be higher than the local female cattle of Manipur. Kayastha *et al.* (2011) [5] reported that the mean body length, height at wither, heart girth, pouch girth, length of tail, switch, neck, ear and head of indigenous cattle of Assam were 83.668 ± 0.590 , 91.942 ± 0.55 , 113.146 ± 0.738 , 121.181 ± 0.761 , 54.196 ± 0.527 , 26.098 ± 0.186 , 32.705 ± 0.166 , 18.131 ± 0.111 and 35.035 ± 0.195 cm, respectively which was found to be smaller than the local cattle of Manipur. Kulkarni *et al.* (2013) [6] reported the adult female cattle in Uruli Kanchan, Pune, Maharashtra that, the average chest girth (cm.), body length (cm), height at girth (cm), horn length (cm), ear length (cm) and tail length (cm) were 140.32 ± 0.87 , 113.19 ± 0.70 , 105.77 ± 0.79 , 12.42 ± 0.30 , 17.04 ± 0.18 , 68.82 ± 0.66 , respectively. The average chest girth, body length, height at girth, horn length, ear length and tail

length of adult female cattle of Uruli Kanchan, Pune, and Maharashtra were found to be higher than the local female cattle of Manipur. Tolenkhomba *et al.* (2012) [12] revealed that, the mean height at withers (HW), body length, heart girth, paunch girth, forehead width, ear length, tail length, switch length, neck circumference, neck length, arm length, elbow length, fore-shank length, thigh length, hind-shank length, pes length, head length and eye to eye space of Manipuri cattle were 103.92 ± 0.33 , 111.34 ± 0.92 , 135.34 ± 0.47 , 140.31 ± 0.53 , 14.90 ± 0.15 , 15.24 ± 0.13 , 75.50 ± 0.55 , 31.04 ± 0.24 , 58.61 ± 0.53 , 29.95 ± 0.21 , 29.34 ± 0.19 , 29.88 ± 0.17 , 29.59 ± 0.20 , 30.32 ± 0.20 , 29.88 ± 0.13 , 31.65 ± 0.25 , 37.30 ± 0.25 and 26.47 ± 0.20 cm, respectively. The findings were found to be similar with the present study. Pundir *et al.* (2015) [10] recorded average body length was 101.14 ± 0.46 cm of three different indigenous cattle of north east states of India which was similar with the present findings. The mean body length, height at wither, chest girth, horn length, ear length and body weight of adult male or bull/bullock of local indigenous non-descript cattle of Mizoram were 112.35 ± 0.80 cm, 111.78 ± 0.72 cm, 145.41 ± 0.92 cm, 11.50 ± 0.33 cm, 28.60 ± 0.51 cm and 220.14 ± 3.09 kg, respectively. The analogous values for adult female cow of Mizoram was 105.32 ± 0.69 cm, 104.94 ± 0.84 cm, 132.13 ± 1.08 cm, 13.21 ± 0.37 cm, 27.92 ± 0.51 cm and 170.62 ± 2.92 kg, respectively (Lalhruaipui *et al.*, 2021) [7]. The body measurements of nondescript adult cows of Mizoram were found to be almost similar with the present study. The average length of neck, chest girth, body length, length of tail and height at wither was 41.90 ± 0.35 cm, 142.86 ± 1.24 cm, 113.10 ± 0.60 cm, 76.00 ± 1.80 cm and 115.04 ± 0.72 cm, respectively of Kathani cattle in Goregaon Tahsil of Gondia district, Maharashtra (Chavhan *et al.*, 2022) [1]. The body measurements of adult Kathani cattle were found to be almost similar with the present study. Mundinamani *et al.* (2024) [8] revealed that, the average horn length, chest girth, body length and height at withers (cm) were 19.63 ± 0.49 , 142.81 ± 0.88 , 118.73 ± 0.81 and 105.89 ± 0.48 in adult cows, respectively in Northern Karnataka. The body measurements of adult cows of Northern Karnataka were found to be almost similar with the indigenous non-descript female cattle of Manipur.

In conclusion, Manipur's native nondescript female cattle have a unique set of morphological traits that differentiate them apart from other recognized cattle breeds in nearby states. With little management inputs in the form of feeds, fodder, and medical attention, animals were well suited to harsh climates. The primary purposes of raising cattle are domestic milk consumption, manure production, and draught. Manipur's native cattle are medium-sized, robust, resilient, and multipurpose. On a brown body, the coat might be brown, black, gray, or speckled with black or white patches. The bullocks have modest horns and a medium hump. Under an open grazing method, the farmer raises these cattle for both milk and meat. Because the average daily milk yield was 2.65 ± 0.18 kg (2.0 to 4.5 kg), there is now a chance to increase the state of Manipur's milk yield through systematic genetic improvement projects. Additionally, it was noted throughout the study that these cattle were raised on a semi-intensive system, allowed to graze during the day without any additional feeding, and maintained in open space or kutch housing at night. Thus, it was clear from the current experiment that these cattle had distinct traits that set them apart from other known breeds in India and beyond. Additionally, because of their unique characteristics, they

might be registered as a new breed of cattle with the nodal agency.

Table 1: Body measurement of indigenous non-descript female cattle of Manipur (Meetei San) (Mean \pm S.E, N=40)

SL. No	Parameters	Value
1.	Body length (Inch)	41.65 \pm 0.82
2.	Heart Girth (Inch)	47.53 \pm 0.94
3.	Paunch Girth (Inch)	50.50 \pm 1.15
4.	Withers height (Inch)	40.88 \pm 0.52
5.	Top length (Inch)	53.00 \pm 1.22
6.	Face length (Inch)	14.89 \pm 0.21
7.	Face breadth (Inch)	8.20 \pm 0.17
8.	Horn length (Inch)	2.98 \pm 0.20
9.	Poll length (Inch)	4.11 \pm 0.12
10.	Ear length (Inch)	6.80 \pm 0.11
11.	Neck length (Inch)	10.56 \pm 0.17
12.	Arm length (Inch)	12.90 \pm 0.16
13.	Elbow length (Inch)	10.68 \pm 0.18
14.	Fore-shank length (Inch)	10.51 \pm 0.17
15.	Thigh length (Inch)	10.48 \pm 0.18
16.	Hind shank length (Inch)	13.03 \pm 0.15
17.	Pes Length (Inch)	13.08 \pm 0.15
18.	Tail length (Inch)	21.94 \pm 0.43
19.	Udder depth (Inch)	4.10 \pm 0.12
20.	Teat length (Inch)	1.78 \pm 0.05



Fig 1: Indigenous non-descript female cattle of Manipur (Meetei San)





Fig 2: Body measurement of indigenous non-descript female cattle of Manipur (Meetei San)

Conclusion

The indigenous nondescript female cattle of Manipur exhibit distinct morphological traits that set them apart from other regional breeds. Adapted to the local environment, these medium-sized, robust animals thrive with minimal management, primarily serving purposes such as milk production, manure generation, and draught work. Their varied coat colors and moderate physical features reflect their unique genetic heritage. With an average daily milk yield of 2.65 ± 0.18 kg, there is significant potential for enhancing milk production through targeted genetic improvement initiatives. This study underscores the importance of recognizing and conserving these cattle, which may warrant classification as a new breed due to their unique characteristics.

Conflict of Interest

Not available

Financial Support

Not available

Reference

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