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UG Badole

Post Graduate Student, College of Agriculture, Nagpur, PDKV, Akola, Maharashtra, India

BR Wankhede

Assistant Professor, Animal Science and Dairy Science, College of agriculture, Nagpur, PDKV, Akola, Maharashtra, India

NP Kadam

Assistant Professor, Animal Science and Dairy Science, College of Agriculture, Sonai, Assam, India

AB Motghare

Assistant Professor, Veterinary Science, College of Agriculture, Nagpur, PDKV, Akola, Maharashtra, India

SL Khatke

Assistant Professor, Animal Science and Dairy Science, College of Agriculture, Udgir, Maharashtra, India

Corresponding Author:

NP Kadam

Assistant Professor, Animal Science and Dairy Science, College of Agriculture, Sonai, Assam, India

Studies on morphological characteristics and body measurement of Kathani cattle in Gondia tahsil of Gondia district

UG Badole, BR Wankhede, NP Kadam, AB Motghare and SL Khatke

Abstract

The present study entitled “Studies on morphological characteristics of Kathani cattle in Gondia tahsil of Gondia district” was conducted in the year 2021-2022 by selecting 200 cattles, belonging to different age groups *i.e.*, up to 1 year, 1 to 2 year, 2 to 3 year and above 3 years, from ten villages of Gondia tahsil in Gondia district. The population of female cattle was higher in the age group of above 3 years. The cattles were mostly seen having white coat colour. The colour of muzzle, hoof, tail switch, and eyelid was mostly black and the colour of horns were found to be grey. Horns were small to medium curved with outward orientation, horizontal ear orientation. Hump and dewlap were mostly found to be medium sized and the naval flap in most of the cattles was small in size. The forehead was found to be straight. The cattles were mostly found with bowl shaped udder, cylindrical shaped teats and small size of milk vein. The average body weight of adult female was 226.1 ± 4.41 kg. The biometric measurements of chest girth, body length, height at wither, length of tail, length of neck was 153.82 ± 1.01 , 103.28 ± 1.30 , 108.88 ± 1.34 , 75.64 ± 1.49 , 42.9 ± 0.55 cm respectively. The study on morphological characteristics of Kathani cattle, suggested that this unexplored breed can be considered as drought purpose breed having higher biological potential for improvement in production. By assessment of these characters, it will be useful for the breeders for recognition of breed in the region.

Keywords: Kathani cattle, geography of district, morphological characteristics, body measurement, body weight

Introduction

India has world's largest livestock population accounting for over 37.28 per cent of cattle, 21.23 percent of buffalo, 26.40 percent of sheep (Sonavale *et al.* 2020) [5]. Most of the Indian native cattle breeds can survive in extreme agro-climatic conditions and are known for its adaptability to high temperature, powerful draught capacity and resistance to tick borne diseases. Only 6% of cattle account under well-defined indigenous milch and best dual-purpose breeds among total indigenous cattle population, mostly found in the north-western region of the country. Our country possesses some of the well-known cattle milch breeds namely Gir, Sahiwal, Tharparkar, Kankrej, Red Sindhi, and Rathi, which can be used as improve breed to upgrade our native low yielders (Niranjan, 2016) [4]. There are about 50 recognized cattle breeds in the country, broadly classified in to dairy, draft and dual-purpose breed depending upon their utility either in dairying or in Agriculture work. There is a vast diversity in the phenotype, utility pattern and adaptability of the cattle populations reared and adopted in varying agro-climatic conditions and production systems in India. The genetic diversity among the cattle breeds is due to the process of domestication over the centuries, mutations, selective breeding and adaptations to local environment, isolation and genetic drift (Groeneveld *et al.* 2010) [3]. About 20-25% of total livestock population in our country can be classified as descript and recognized breeds. Various livestock breeds in our country evolving over centuries are endowed with desirable attributes like disease resistance, tolerance to heat stress, adaptability to environmental fluctuations and extremities, ability to utilize coarse fibres and crop residues (Gandhi and Sharma, 2016) [2].

Material and Methods

Source of data

The data on the morphological characteristics of Kathani cattle were used for present investigation from 10 villages *viz.* Garra, Seoni, Ghiwari, Nilaj, Dasgaon, Murpar, Rawanwadi, Nagra, Sawari, Arjuni of Gondia tahsil of Gondia district.

From each village 20 cattle were selected. Total 200 cattle were selected by random sampling technique.

Collection of data

The data comprised of different observation and questionnaires designed relevant to the objectives of the study to collect the information from farmers.

Geography of the district

Gondia district lies at latitudes 20.390C and 21.380C North and longitudes 79.270C to 80.420C east. The district occupies an area of 5,234 km² (2,021 sq mi) and has a population of 1,322,507 of which 11.95% were urban. Gondia is also known as Rice City due to the abundance of Rice Mill in the area. The average maximum and minimum temperature were 420C and 280C respectively.

Variables under study, their observation and measurement

Variables like colour of coat, shape and size of horn, length and orientation of ear, forehead, body characteristics, body measurement, lactational milk yield, lactation period and milk yield per day were taken into consideration for identifying different groups of Kathani cattle. The adopted procedure is described below.

1. Colour pattern

Colour of body coat, hoofs, muzzle, eyelids, horn and tail switch colour were observed in qualitative term i.e., white, black, brown and grey.

2. Shape, length and orientation of horn

The presence or absences of horns were observed. Shape of horn was observed in terms of straight or curved, horn orientation was observed i.e., whether outward or upward. Horn length was measured from the base of the horn to the tip of the horn.

3. Shape of fore head

The shape of forehead was observed in terms of convex, concave and straight like shapes.

4. Body characteristics

The shape of the body was observed in terms of hump, dewlap and naval flap as large, medium and small type.

5. Udder characteristics

A. Shape of udder

Udder shape was observed as bowl, round, trough and pendulous type.

B. Shape of teat

Shape of teat was observed as cylindrical, funnel and pear type of teat shape.

C. Shape of milk vein

Shapes of milk vein were observed as large, medium and small type shape.

6. Length and orientation of ear

The length of ear was measured from the base of the ear to the tip of the ear. The orientation of the ear includes horizontal and drooping ears.

7. Body measurement

A. 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.

B. Body length

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

C. 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).

D. Length of tail

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

E. Length of neck

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

8. Bodyweight

The body weight of Kathani cattle was estimated by using Schaeffer's formula (Sastry and Thomas, 1976) [7].

$$\text{Live weight (Lbs)} = \frac{\text{Body length in inches} \times \text{Girth in inches}^2}{300}$$

(Conversion factor of 1 lbs=0.4536 kg was used)

Statistical method

A. The data collected in respect of all the parameters were tabulated and subjected to statistical evaluation by adopting the standard technique prescribed by Snedecor and Cochran (1967) [8].

B. Chi-square test: Testing of homogeneity for various morphological characteristics was tested by $r \times c$ contingency as per Amble (1975) [9].

The chi-square values for each observation were calculated as per following formula.

$$\chi^2 = \sum \frac{(\text{Observed value} - \text{Expected value})^2}{\text{Expected value}}$$

Results and Discussion

Morphological characteristics

A. Colour

The colour variations in Kathani cattle were observed and recorded for coat, muzzle, hoof, eyelids, tail switch and horn in percent and presented in Table 1.

Table 1: Colour pattern of different morphological characteristics along with χ^2 values in Kathani cattle

Sr. No.	Characters	No. of observations	Percentage %	Chi-square (X ²)	D.F.	Significance
1	Coat colour					
	White	179	89.5	124.82	1	*
	Brownish	21	10.5			
2	Muzzle colour					
	Black	190	95	162	1	*
	Reddish	10	5			
3	Hoof colour					
	Black	188	94	154.88	1	*
	Brown	12	6			
4	Eye lid colour					
	Black	189	94.5	158.42	1	*
	White	11	5.5			
5	Tail switch colour					
	Black	185	92.5	144.50	1	*
	Brown	15	7.5			
6	Horn colour					
	Grey	38	76	13.52	1	*
	Blackish	12	24			

1. Coat colour

The colour pattern observed in Kathani cattle in Gondia tahsil of Gondia district exhibited white body colour, while remaining cattles were found to be brown in colour. Out of 200 Kathani cattles, 179 cattles (89.5%) were having white coat colour and 21 cattles (10.5%) were found to be with brownish coat colour. The chi-square test applied and chi-square value found to be 124.82, which is statistically significant, indicating variation among coat colour of animal. Similarly, results were found by Chavhan *et al.* (2022) [1]. He observed that the coat colour of Kathani cattle were white (85%). Yadav *et al.* (2021) [6] she observed that the coat colour of Kathani cattle were white (87%).

2. Muzzle colour

From Table 1 it was revealed that, black and reddish colour of muzzle was found in Kathani breed. Mostly the muzzle colour were found to be black 190 (95%) and remaining cattles were having reddish muzzle colour 10 (5%). The chi-square test was applied and the chi-square value was found to be 162.00, which was statistically significant and indicates variation in muzzle colour. Chavhan *et al.* (2022) [1] observed that the muzzle colour was black in almost all the animals of Kathani cattle (94%). Yadav *et al.* (2021) [6] observed that the muzzle colour was black in almost all the animals of Kathani cattle (94%).

3. Hoof colour

From Table 1 it was indicated that the hoof colour in Kathani cattle were found to be black and brown. Hoof colour was mostly found to be black 188 (94%) and the remaining cattles were having brown hoof colour 12 (6%). The chi-square values were found to be 154.88 which was statistically significant and indicates variation in hoof colour. Chavhan *et al.* (2022) [1] observed that the hoof colour was found to be black (92.5%). Yadav *et al.* (2021) [6] observed that the hoof colour was found to be black (96%).

4. Eyelid colour

From the present study, it was seen from the Table 1 that most of the cattle having black eyelid colour and the remaining

cattles were found with the white eyelid colour. It is observed that 189 (95.5%) cattles were having the black colour eyelid and 11 (5.5%) of the cattles were having white colour of eyelid. The chi-square test was applied and the chi-square value was found to be 158.42, which was statistically significant and indicates variation in the eyelid colour. Chavhan *et al.* (2022) [1] observed that the eyelid colour of Kathani colour was mostly found to be black (93.0%). Yadav *et al.* (2021) [6] observed that the eyelid colour of Kathani was mostly found to be black (96%).

5. Tail switch colour

The result presented in Table 1 indicate that most of the Kathani cattles were having black tail switch colour 185 (92.5%) and the remaining cattles were having brown tail switch 15 (7.5%). The chi-square test was applied and the chi-square value was found to be 144.50, which was statistically significant and indicates variation in tail colour. Chavhan *et al.* (2022) [1] observed that the tail switch colour was found to be black (91.5%). Yadav *et al.* (2021) [1] observed that the tail switch colour was found to be black (91.5%).

6. Horn colour

The information regarding horn colour pattern of Kathani cattle is presented in Table 1. The grey and blackish colours of horn were found in this animal. Horn colour mostly found to be grey 38 (76%) and the remaining were found with the blackish coloured horn 12 (24%). The chi-square test was applied and the chi-square value was 13.52, which is statistically significant and indicates the variation in horn colour. Chavhan *et al.* (2022) [1] observed that the horn colour of Kathani cattle was grey (76%). Yadav *et al.* (2021) [6] observed that the horn colour of Kathani cattle was grey (74%).

B. Shape and orientation of horn, ear and forehead

The observations pertaining to the orientation of horn, ear and forehead were recorded and their per cent values were calculated along with chi-square values and presented in Table 2.

Table 2: Shape and orientation of horn, ear and forehead characteristics along with χ^2 values of Kathani cattle

Sr. No.	Characters	No. of observations	Percentage %	Chi-square (X2)	D.F.	Significance
1	Horn shape					
	Curve	35	70	8	1	*
	Straight	15	30			
2	Horn orientation					
	Outward	39	78	45.66	2	*
	Upward	8	16			
	Backward	3	6			
3	Ear orientation					
	Horizontal	186	93	147.92	1	*
	Drooping	14	7			
4	Forehead shape					
	Straight	186	93	320.46	2	*
	Concave	8	4			
	Convex	6	3			

1. Horn shape

The shape of horn was observed in 50 cattles which includes the age group of adult females. The two types of horn shape were observed (curve like and straight shape) in Kathani cattle. Most of the Kathani cattles were having curve shape of horns. The data in the Table 2 indicated that most of the cattle 35 (70%) had curve shape horns, while 15 (30%) cattles had straight horns. The chi-square was applied and the chi-square value was found to be 8.00, which was found to be statistically significant, indicating variation between different shapes of horn in Kathani cattle. Chavhan *et al.* (2022) ^[1] observed curve. Shaped horn in Kathani cattle (70%). Yadav *et al.* (2021) ^[6] observed curve shaped horn in Kathani cattle (66%).

2. Horn orientation

The orientation of horn was observed in 50 cattle which includes age group of adult females of Kathani cattle. The three types of horn orientations (outwards, upwards and backwards) were observed in Kathani cattle. The data presented in Table 2 indicate that the majority of cattles were found to be with outward orientation of horn 39 (78%), while the upward orientation of horns is 8(16%) and the backward orientation of horn is 3 (6). The chi-square test was applied and the chi-square value was found to be 45.66, which was statistically significant which indicated the variation in the orientation of horns in Kathani cattle. Chavhan *et al.* (2022) ^[1] observed the outward horn orientation (78%) in Kathani cattle. Yadav *et al.* (2021) ^[6] observed the outward horn orientation (86%) in Kathani cattle.

3. Ear orientation

From Table 2 it was revealed that 186 (93%) cattle exhibited

horizontal ear orientation while 14 (7%) cattles were found with drooping ears. The chi-square was applied and the chi-square value was found to be 147.92, which is statistically significant and indicates the variation in the orientation of ears in Kathani cattles. Chavhan *et al.* (2022) ^[1] also found the horizontal orientation of ear was highest 188(94%) and drooping orientation was low 12 (6%) in Kathani cattle. Yadav *et al.* (2021) ^[6] she was found the horizontal orientation of ear was highest 182 (91%) and drooping orientation was low 18 (9%) in Kathani cattle.

4. Forehead shape

The shape of forehead was observed in 200 Kathani cattle of all age groups from Table 2. The shape of forehead was observed as straight, concave and convex in Kathani cattle. The percent values calculated for straight forehead was 93 percent, concave 4 per cent and convex 3 per cent respectively. The chi-square test was applied and the chi-square value was found to be 320.46, which was statistically significant indicating the variations in the shape of forehead in Kathani cattle. Similarly, Chavhan *et al.* (2022) ^[1] observed the shape of forehead as straight, concave and convex and the percentages were 85.5,12.5 and 2 percent respectively in Kathani cattle. Yadav *et al.* (2021) ^[6] observed the shape of forehead as straight, concave and convex and the percentages were 90, 7 and 3 per cent respectively in Kathani cattle.

C. Body characteristics of hump, dewlap and naval flap

The observations on body characteristics pertaining to shape of hump, dewlap and naval flap were recorded in 100 female cattle of age group 2-3 years and above 3 years and their percent values were calculated along with the chi-square values and presented in Table 3.

Table 3: Body characteristics of hump, dewlap and naval flap along with χ^2 values of Kathani cattle

Sr. No.	Characters	No. of observations	Percentage %	Chi-square (X2)	D. F.	Significance
A	Hump					
	Large	4	4	79.29	2	*
	Medium	74	74			
	Small	22	22			
B	Dewlap					
	Large	6	6	71.12	2	*
	Medium	72	72			
	Small	22	22			
C	Naval flap					
	Large	2	2	109.48	2	*
	Medium	16	16			
	Small	82	82			

1. Hump

On the basis of data collected the hump of Kathani cattle was found as large, medium and small. Table 3 indicates that the percentage value was highest for medium sized hump (74%) followed by small sized hump (22%) and large sized hump (4%). The chi-square test was applied and the chi-square value was found to be 79.29, which was statistically significant indicating variation between the different hump of Kathani cattle. Chavhan *et al.* (2022) ^[1] observed medium sized hump (76%), followed by small type hump (20%) and large size hump (4%) in Kathani cattle. Yadav *et al.* (2021) ^[6] observed medium sized hump (72%), followed by small type hump (22%) and large size hump (6%) in Kathani cattle.

2. Dewlap

The dewlap of Kathani cattle was observed as large, medium and small. The persual of Table 3 indicates that the percentage value was found highest for medium type dewlap (72%), followed by small sized dewlap (22%) and large sized dewlap(6%).The chi-square test was applied and the chi-square value was found to be 71.12, which is statistically significant and indicates the variation in the size of dewlap of Kathani cattle. Similar results were found by Chavhan *et al.* (2022) ^[1] who observed (74%) medium type of dewlap and (22%) small sized dewlap. Yadav *et al.* (2021) ^[6] who

observed (74%) medium type of dewlap and (18%) small sized dewlap.

3. Naval flap

The naval flap of the Kathani cattle was found to be of different sizes i.e large, medium and small. The perusal of Table 3 indicates that the percentage values were found to be highest for small sized naval flap (82%) followed by medium sized naval flap (16%) and large size naval flap (2%) in Kathani cattle. The chi-square test was applied and the chi-square value was found to be 109.48, which was statistically significant and indicates the variation in the size of naval flap. Chavhan *et al.* (2022) ^[1] observed small sized naval flap (77%), followed by medium sized naval flap (21%). Yadav *et al.* (2021) ^[6] observed small sized naval flap (74%), followed by medium sized naval flap (24%).

D. Udder characteristics

The observations on the udder characteristics pertaining to udder shape, teat shape and milk vein were recorded in 50 cattle which include age group of adult females along with lactating as well as dry Kathani cows and their per cent values were calculated along with chi-square values and presented in Table 4.

Table 4: Shape of udder, teat shape and milk vein characteristics along with X² values of Kathani cattle

Sr. No.	Characters	No. of observations	Percentage %	Chi-square (X ²)	D. F.	Significance
1	Udder shape					
	Bowl	42	84	93.20	3	*
	Round	4	8			
	Trough	1	2			
	Pendulous	3	6			
2	Teat shape					
	Cylindrical	37	74	37.25	2	*
	Funnel	7	14			
	Pear	6	12			
3	Milk vein					
	Large	2	4	27.05	2	*
	Medium	16	32			
	Small	32	64			

1. Udder shape

The characteristics of udder were observed in 50 cattle which include age group of above 3 years. Table 4 indicates the percentage value of bowl-shaped udder was found to be highest (84%) followed by round shaped udder (8%), trough shaped udder (2%) and pendulous shaped udder (6%) in Kathani cattle. The chi-square test was applied and the chi-square value was found to be 93.20, which was statistically significant, indicating the variations in different udder shapes of cattle. Similar result was recorded by Chavhan *et al.* (2022) ^[1] who observed bowl shaped udder (76%), round shaped udder (14%), trough shaped udder (6%) and pendulous shaped udder (4%). Yadav *et al.* (2021) ^[6] who observed bowl shaped udder (74%), round shaped udder (14%), trough shaped udder (4%) and pendulous shaped udder (8%).

2. Teat shape

The observations on the teat shape were found to be cylindrical, funnel and pear. Values in Table 4 indicates the number of cattle and the percentage value of different shapes of teat among which the cylindrical shape of teats was found to be highest (74%), followed by funnel shaped teats (14%)

and pear-shaped teat (12%) in Kathani cattle. The chi-square test was applied and the chi-square value was found to be 37.25, which was statistically significant and indicates the variation in the shape of teat. Chavhan *et al.* (2022) ^[1] have observed the cylindrical shape udder (74%) followed by funnel shape udder (14%) and pear shape udder (12%). Yadav *et al.* (2021) ^[6] have observed the cylindrical shape udder (70%) followed by funnel shape udder (16%) and pear shape udder (14%).

3. Milk vein

The observations on the milk vein were made in the Table 4 which was found to be large, medium and small in size. Small milk vein was found to be highest (64%), medium was found to be (32%) and large were found to be (4%) in Kathani cattle. The chi-square test was applied and the chi-square value was 27.05, which was statistically significant and indicates the variation in the size of milk vein. Chavhan *et al.* (2022) ^[1] observed the small milk vein (76%), medium milk vein (16%) and large milk vein (8%) in Kathani cattle. Yadav *et al.* (2021) ^[6] observed the small milk vein (68%), medium milk vein (26%) and large milk vein (6%) in Kathani cattle.

E. Length of horn and ear

1. Length of horn

The data presented in Table 5 revealed that the horns are

medium sized. Many female cattles has shown horn orientation like curve.

Table 5: The mean value of horn length of Kathani cattle

Sr. No.	Age group (year)	No. of animals	Horn length (cm)		Average±S.E.	S.D.
			Max	Min		
1	Above 3 years	50	27	5	14.68±0.92	6.479

From Table 5 it was observed that the average length of horn in adult cattle above 3 years of age was 14.68±0.92 cm. The present study is in agreement with the horn length recorded by Chavhan *et al.* (2022) ^[1] in Kathani cattle which was 14.98±0.75 cm. The horn length reported by Yadav *et al.* (2021) ^[6] in Kathani cattle which was 12.06±0.87 cm.

revealed that the average length of ears in age group of upto 1 year, 1 to 2 year, 2 to 3 year and above 3 year were 12.58±0.43, 16.16±0.32, 17.92±0.38 and 20.68±0.37cm, respectively. The length of ears increases with the increase in age. Chavhan *et al.* (2022) ^[1] reported similar result in terms of ear length of cattle as 19.02±0.30 cm in Kathani cattle. Yadav *et al.* (2021) ^[6] reported more or less similar result in terms of ear length of cattle as 19.36±0.29 cm in Kathani cattle.

2. Length of ear

The data on length of ear is presented in Table 6, the data

Table 6: The mean value of ear length of Kathani cattle

Sr. No.	Age group (year)	No. of animals	Ear length (cm)		Average±S.E.	S.D.
			Max	Min		
1	Upto 1 year	50	18	8	12.58±0.43	3.086
2	1 to 2 year	50	20	13	16.16±0.32	2.327
3	2 to 3 year	50	22	14	17.92±0.38	2.697
4	Above 3 year	50	24	16	20.68±0.37	2.679

F. Body measurements

1. Chest girth

The mean value of chest girth along with standard error of Kathani cattle according to different age groups are presented in Table 7. It was reported that in the age groups of upto 1 year, the average chest girth was found to be 84.62±0.86 cm followed by 1 to 2 years of as 98.34±1.04 cm, 2 to 3 years of age as 115.2±0.93 cm and in age group above 3 years was found to be 153.82±1.01 cm, respectively. The chest girth had progressively increased with the age. Chavhan *et al.* (2022) ^[1] has found that the chest girth in the age group upto 1 year, 1 to 2 year, 2 to 3 year and above 3 year were as 95.18±1.49, 112.96±1.27, 119.78±1.02 and 142.86±1.24 cm, respectively. Yadav *et al.* (2021) ^[6] has found that the chest girth in the age group upto 1 year, 1 to 2 year, 2 to 3 year and above 3 year were as 84.14±0.65, 99.4±1.02, 112.92±0.85 and 142.32±0.54 cm, respectively.

Table 7: The mean value of chest girth of Kathani cattle

Sr. No.	Age group (year)	No. of animals	Chest girth (cm)		Average±S.E.	S.D.
			Max	Min		
1	Upto 1 year	50	99	71	84.62±0.86	6.096
2	1 to 2 year	50	115	86	98.34±1.04	7.328
3	2 to 3 year	50	127	104	115.2±0.93	6.621
4	Above 3 year	50	164	140	153.82±1.01	7.132

2. Body length

The mean value of body length along with standard error of Kathani cattle according to different age groups are presented in Table 15 and depicted in Fig. 8. In the age group up to 1 year the body length was observed to be 56.08±1.04 cm, followed by 1 to 2 years as 74.02±0.96 cm, in 2 to 3 years of age as 89.94±1.06 cm. The body length progressively increased in age group above 3 years (adult female) and was observed as 103.28±1.30 cm. Chavhan *et al.* (2022) ^[1], who observed that the average body length in the age groups up to

1 year, 1 to 2 year, 2 to 3 year and above 3 years were 76.14±1.09, 81.16±1.13, 93.03±1.17 and 113.10±0.60 cm respectively in Kathani cattle. Yadav *et al.* (2021) ^[6], who observed that the average body length in the age groups up to 1 year, 1 to 2 year, 2 to 3 year and above 3 years were 74.62±0.66, 77.5±0.95, 89.4±1.47 and 114.4±0.66 cm respectively in Kathani cattle.

Table 8: The mean values of body length of Kathani cattle

Sr. No.	Age group (year)	No. of animals	Body length (cm)		Average±S.E.	S.D.
			Max	Min		
1	Upto 1 year	50	66	38	56.08±1.04	7.378
2	1 to 2 year	50	84	63	74.02±0.96	6.816
3	2 to 3 year	50	102	76	89.94±1.06	7.548
4	Above 3 year	50	117	84	103.28±1.30	9.25

3. Height at wither

The groups wise mean height at wither along with S.E. of Kathani cattle according to different age group are presented in Table 9.

Table 9: The mean values of height at wither of Kathani cattle

Sr. No.	Age group (year)	No. of animals	Height at wither (cm)		Average±S.E.	S.D.
			Max	Min		
1	Upto 1 year	50	94	56	73.94±1.65	11.7
2	1 to 2 year	50	96	68	80.62±1.39	9.865
3	2 to 3 year	50	105	82	91.66±1.13	8.007
4	Above 3 year	50	123	95	108.88±1.34	9.53

Data presented in Table 9 states that the average height at wither in the age group of upto 1 year was 73.94±1.65 cm. As the age advances the height at wither of cattle also increased. The height at wither was increased up to 108.88±1.34 cm in the cattles of above 3 years of age (Adult female). Chavhan *et al.* (2022) ^[1] who observed that the height at wither in the

adult animals was 111.44±0.88 cm in Kathani cattle. Yadav *et al.* (2021) ^[6] who observed that the height at wither in the adult animals was 111.44±0.88 cm in Kathani cattle.

4. Length of tail

From Table 10 it was indicated that the tail length of Kathani cattle was short as compared to other cattle. At the age of upto 1 year, the average length of tail was 40.1±1.21 cm, while with increase in age the length of tail slightly increases upto adult stage. In age group above 3 years (adult female), the length of tail was found to be 75.64±1.49 cm. The tail length recorded by Chavhan *et al.* (2022) ^[1] in adult Kathani cattle was 76.00±1.80 cm. The tail length recorded by Yadav *et al.* (2021) ^[6] in adult Kathani cattle was 68.12±0.96 cm.

Table 10: The mean value of tail length of Kathani cattle

Sr. No.	Age group (year)	No. of animals	Tail length (cm)		Average±S.E.	S.D.
			Max	Min		
1	Upto 1 year	50	56	27	40.1±1.21	8.582
2	1 to 2 year	50	67	42	54.34±1.19	8.437
3	2 to 3 year	50	80	54	67.04±1.18	8.369
4	Above 3 year	50	90	58	75.64±1.49	10.566

5. Length of neck

The data presented in Table 11 indicates that the average neck length of age group upto 1 year was 27.84±0.85 cm. The length of neck increases with the increase in age. Average neck length of cattle of age group 1 to 2 years was 30.16±0.67 cm, 2 to 3 years was 36.9±0.47 cm and in age group above 3 years (adult female) was 42.9±0.55 cm. Chavhan *et al.* (2022) ^[1] who observed that the neck length in adult cattle was 41.9±0.35cm in Kathani cattle. Yadav *et al.* (2021) ^[6] who observed that the neck length in adult cattle was 40.122±0.59 cm in Kathani cattle.

Table 11: The mean value of neck length of Kathani cattle

Sr. No.	Age group (year)	No. of animals	Neck length (cm)		Average±S.E.	S.D.
			Max	Min		
1	Upto 1 year	50	37	18	27.84±0.85	6.015
2	1 to 2 year	50	38	24	30.16±0.67	4.764
3	2 to 3 year	50	42	32	36.9±0.47	3.36
4	Above 3 year	50	49	37	42.9±0.55	3.895

G. Body weight at different age groups

Table 12: The mean value of body weight of Kathani cattle

Sr. No.	Age group (year)	No. of animals	Body weight (kg)		Average±S.E.	S.D.
			Max	Min		
1	Upto 1 year	50	55	25	37.28±1.13	8.028
2	1 to 2 year	50	102	46	66.98±2.16	15.256
3	2 to 3 year	50	149	82	111±2.81	19.881
4	Above 3 year	50	289	179	226.1±4.41	31.183

To decide the heaviness and tightness it is essential to get an idea about the weight of animals. The weight of animal is calculated by Shaeffer's formula. The weight is obtained in lbs and then it is converted to kg. The mean value of 1 to 3 years above age groups body weight of Kathani cattle under study in Table 12.

The data recorded on body weight of female Kathani cattles are presented in Table 12 and indicates that the age group up to 1 year had the average body weight of about 37.28±1.13 kg and in the age group above 3 years of age has the body weight

of about 226.1±4.41 kg. Chavhan *et al.* (2022) ^[1] observed that the average body weight in age group upto 1 year, 1 to 2 year, 2 to 3 year and above 3 years were 43.26±1.03, 71.10±1.85, 112.97±3.04 and 215.96±2.92 kg respectively. Yadav *et al.* (2021) ^[6] observed that the average body weight in age group upto 1 year, 1 to 2 year, 2 to 3 year and above 3 years were 41.72±0.70, 70.8±2.25, 106.58±2.55 and 213.38±2.92 kg, respectively.

Summary and Conclusions

The present survey indicated that, in Gondia tahsil of Gondia district found the variations in morphological characters of Kathani cattle. The Kathani cattles are light built and small sized animals with their compact body, it is suitable for working in muddy paddy fields. Kathani cattle body characteristics are variation in their body coat colour pattern, mostly white followed by brownish colour and the hoof and muzzle colour were mostly black colour. The colour of eyelid and tail switch were also in black colour and horn colour was grey. The horn were small in size and curved shaped with outward orientation. Hump and dewlap were small to medium and fairly developed in adult. Naval flap was small in size. Ear was comparatively horizontal and forehead is straight. The udder is mostly bowl in shape, teat are cylindrical shape and milk vein mostly in small size.

References

- Chavhan TM, Zinjarde RM, Bhavana R Wankhade, Motghare AB. Morphological characteristics and productive performance of Kathani cattle in Goregaon tahsil of Gondia district. The Pharma Innovation J. 2022;SP-11(7):3841-3844.
- Gandhi RS, Arjava Sharma. Conservation of livestock diversity in India under current scenario. Indian Dairyman. 2016;68(2):102-107.
- Groeneveld LF, Lenstra JA, Eding H, Toro MA, Scherf B, Pilling D. Genetic diversity in farm animals– A review. Anim. Genet. 2010;41:6-31.
- Niranjan SK. Status and diversity of dairy animal in India. Genetic evaluation and multiplication of superior germplasm for genetic improvement in livestock; c2016. p. 133-141.
- Sonavale KP, Shaikh MR, Kadam MM, Pokharkar VG. Livestock sector in India, a critical analysis. Asian J. Agril. Extn, Econ & Socio. 2020;38(1):51-62.
- Yadav RB. Morphological characteristics of Kathani cattle in Mul tahsil of Chandrapur district. M.Sc. Thesis (Unpub.) Dr. PDKV, Akola (MS); c2021.
- Afriat S, Sastry MV, Tintner B. The Consequences of Diversity in Federal Evaluation Studies, Russell Sage Founda-tion, 208 pp. Hard Cover, \$8.95. Bever, Thomas G., Katz, Jerrold, and Langendoen, O. Terence, An Integrated Theory of Linguistic Ability, Thomas Y. Crowell Co., 1976. Brams, Paradoxes in Politics, The Free Press, New York, 1976, § 695. Theory and Decision. 1976;7:335-336.
- Snedecor OW, Cochran WO. Statistical methods, 6th edn. Iowa State University Press; c1967.
- Amble VN. Statistical methods in animal sciences; c1975.