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Morphometric attributes of Bareilly desi pigs

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Abstract

Morphometric attributes helps in the characterization of many species of animals besides other characterization strategies viz. phenotypic attributes and molecular techniques like micro-satellite based genetic diversity. The present investigation was undertaken in six tehsils of Bareilly district in Uttar Pradesh to evaluate the morphometric attributes of Desi pigs for the first time ever. The breeding tract of this precious germ-plasm are Bareilly region, Shahjahanpur, Pilibhit, Lucknow and Sitapur of Uttar Pradesh. A total of 632 Desi pigs were selected for the study. Field level investigation on morphometric, of native pigs was done using a relevant proforma. The results revealed that the mean adult body weight was 53.10 ± 0.47 kg and 53.50 ± 0.40 kg for males and females, respectively. Highly significant ($P \leq 0.001$) morphometric differences were observed amongst the five age groups 0-3, 3-6, 6-12, 12-18 and 18-24 months, respectively but within the same age group much significant differences were not observed. These recorded traits are very much useful to characterize desi pigs of Bareilly district and also useful in the selection of breeding stock for future parents. Based on this study, most of the parameters were comparable with other recognized indigenous pig.

Keywords: Morphometric, attributes, Desi pigs, characterize, indigenous pig

Introduction

Pig farming is one of the most important occupations of rural farmers. It serves as an insurance coverage. It also generates employment opportunity to the educated unemployed youth. Majority of pig in India belongs to non-descript class but they have rich genetic potential for further improvement. Unfortunately, studies on morphometric attributes of these non-descript pig breeds are rather scanty. They continue to thrive under poor management in a harsh climatic condition^[1, 15]. As there is no planned breeding program for indigenous pigs, the native pig population is decreasing gradually. Still, these native types represent a valuable component of local genetic resources^[15]. These desi pigs are very much suited to low input production system which thereby help in livelihood and sustainable pig farming. The characterization of these desi pigs on the basis of morphometric attributes besides phenotypic^[2], productive and reproductive performances^[3] and molecular characterization will be very useful in the selection of breeding stock for future parents to enhance the selection of this Desi pig to increase population in their native tract. There has been no thorough investigation carried out previously to study morphometric attributes of Desi pig of Bareilly District (Uttar Pradesh). Hence, keeping in view of the above facts, the present study was carried out to elucidate important morphometric attributes of Desi pig of Bareilly District (Uttar Pradesh).

Materials and Methods

The present study was undertaken in six tehsils of Bareilly district in Uttar Pradesh to evaluate the morphometric attributes of desi pigs. A total of 632 Desi pigs including piglets, grower and adults were selected from Bareilly, Nawabganj, Aonla, Faridpur, Baheri and Meerganj of Bareilly district for the study. Field level investigation on morphometric attributes of these desi pigs was done using a relevant proforma. Data was collected: from July'2015 to Jan'2016 through field suited questionnaires. The morphometric traits of desi pigs that were measured were body weight, body length, chest girth, length from ear to tail, height at withers, height at loin region, head length, width of head, ear length, hair length, tail length and number of pair of teats.

All the morphometric attributes mentioned above were recorded using measuring tape in cm except body weight and number of pair of teats (Table no. 1). Body weight of piglets and adults were recorded using a weighing scale (Spring Balance). Body length was estimated by measuring the distance between points of shoulder to pin bone. Height at wither was considered as the vertical distance between the ground and the point of wither. Chest girth was considered as the largest circumference of the body immediately behind the shoulder. Ear length from base of the ear to the base of the tail. It is the vertical distance between the surface and the point of wither. Height at loin region is considered as the vertical distance between the surface and the loin region. Head length was measured from the distance between snout and forehead of pig while head width was measured from the distance between two eyes. The distance between the base and the tip of the pinna was considered as the ear length. Hair of shoulder or bristle length was measured from base of the hair to its tip. Tail length was taken as the distance between the base and the end of the tail. Pair of teats was recorded by visual observation.

Statistical analysis

The data pertaining to morphometric attributes were analysed using S.A.S Vs 9.3 software to obtain their descriptive statistics.

Results & Discussions

For morphological characterization, body measurements of the above mentioned number of desi pigs were taken. Morphometric traits of the desi pigs were measured in five age groups as 0-3, 3-6, 6-12, 12-18 and 18-24 months. Means along with standard errors (SE) of different morphometric characters for adult desi pigs (6-12 months) along with their level of significance are presented in the tabular form in Table(1).

Body weight

In the present study, the average body weight of the desi pigs of Bareilly district at age groups of 0-3, 3-6, 6-12, 12-18 and 18-24 months, irrespective of sex were found to be 7.84 ± 0.23 , 22.04 ± 0.55 , 46.07 ± 0.33 , 53.35 ± 0.30 and 57.09 ± 0.74 kg, respectively. Similarly, the respective average body weights (kg) of Black pig at birth, and 1, 2, 3, 4, 5, 6, 7, and 8 weeks of age were 1.12 ± 0.02 , 2.03 ± 0.02 , 2.97 ± 0.02 , 4.04 ± 0.03 , 5.14 ± 0.05 , 6.12 ± 0.15 , 7.20 ± 0.05 , 8.26 ± 0.05 and 9.44 ± 0.07 kg, respectively [9]. In contrast to the above findings, the average body weight of the Mali piglet, gilt, sow and boar were 39.9 ± 0.2 , 65.6 ± 0.5 , 66.7 ± 0.7 , 67.3 ± 1.5 kg, respectively [4]. Naga local male and females pigs have a mean live body weight of 19.9 ± 6.10 kg (range 9-32 kg) and 20.1 ± 6.08 kg (8-37 kg), respectively [1]. The average body weight of new born Wuzhishan piglets was 0.3-0.4 kg, 15-16 kg at 6 month, 35 kg at 2 years old [5]. Likewise, the average body weight of pig at 8 months was 48.50 ± 5.30 and 46.30 ± 6.10 kg for males and females, respectively [8]. The average body weight of the Lithuanian indigenous pig at 8 months of age was 89.5 ± 1.0 kg [16]. Village pig in Sri Lanka had average body weight of 50.62 ± 1.92 kg [15]. The average body weight of the Mangalista pig at 2.5 years of age was 115.45 ± 1.3 kg [11]. So there is differences in body weight amongst the different desi pig breeds. It might be due to different feeding habits, nutrition, management, genetic and environment.

Body length

In the present study, the average body length of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 30.73 ± 0.69 , 54.32 ± 0.68 , 61.36 ± 0.62 , 69.10 ± 0.57 and 71.10 ± 0.77 , respectively. Whereas, the average body length of the Mali piglet, gilt, sow and boar were 39.9 ± 0.2 , 65.6 ± 0.5 , 66.7 ± 0.7 , 67.3 ± 1.5 cm, respectively [4]. In contrast to the present findings, the average body length of of adult Ghungro and Niang Megha pig were 124.28 ± 2.40 cm and 90.15 ± 1.86 cm respectively [13, 14]. The body length of adult indigenous pig of Bangladesh (7–24 months) ranged from 47–67 cm for males and 46–63 cm for females [12]. The average body length of the Lithuanian indigenous pig at 8 months of age was 114.5 ± 0.9 cm [16]. Likewise, the average body length of the Mangalista pig at 2.5 years of age was 108 ± 1.70 cm [11]. These differences might be due to their genetic make-up and environment.

Chest girth

The average chest girth of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 39.32 ± 0.86 , 64.89 ± 0.73 , 73.83 ± 0.49 , 86.42 ± 0.63 and 88.80 ± 0.86 , respectively. But, the average girth size of the Mali piglet, gilt, sow and boar were 40.6 ± 0.1 , 118.0 ± 0.6 , 120.0 ± 0.2 , 120.0 ± 0.4 cm, respectively [4]. Similarly, the average girth size of the adult village pig in Sri Lanka was 71.36 ± 10.09 cm [15]. The average chest girth for the adult male and female pigs was 82.8 ± 1.7 and 81.3 ± 1.7 cm, respectively [12]. But, the average girth size of the Lithuanian indigenous pig at 8 months of age was 107.5 ± 0.8 cm [16] whereas for Mangalista pig at 2.5 years of age, it was 117 ± 0.30 cm [8].

Height at wither

The average height at wither of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 26.47 ± 0.59 , 43.37 ± 0.51 , 54.11 ± 0.42 , 54.20 ± 0.39 and 54.94 ± 0.48 cm, respectively. However, the average wither height of the Mali piglet, gilt, sow and boar in Tripura were 29.6 ± 0.3 , 64.3 ± 0.7 , 65.4 ± 0.3 , 65.8 ± 0.7 cm, respectively [4]. The average wither height of the male pig at 0-6, 7-12, 13-18 and 19-24 months of age were found to be 39.40 ± 1.7 , 49.31 ± 1.1 , 62.80 ± 1.9 and 65.17 ± 1.4 cm, respectively and for the female pig at 0-6, 7-12, 13-18 and 19-24 months of age were found to be 40.11 ± 1.0 , 49.72 ± 0.9 , 60.67 ± 1.3 and 60.40 ± 3.6 cm, respectively [12]. But, the average wither height of the Lithuanian indigenous pig at 8 months of age was 58.1 ± 0.3 cm [16]. In Mangalista pig, it was reported that the average wither height of the Mangalista pig at 2.5 years of age was 66.82 ± 1.3 cm [11].

Height at loin region

The average height at loin region of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 29.79 ± 0.66 , 47.63 ± 0.54 , 59.08 ± 0.46 , 59.46 ± 0.41 and 60.90 ± 0.52 cm, respectively. Similarly, the average loin height of the Mali piglet, gilt, sow and boar in Tripura were 25.2 ± 0.1 , 60.8 ± 1.0 , 60.8 ± 0.8 , 58.7 ± 1.5 cm, respectively [4]. In contrast to the present findings, it was reported that the average loin height of the male pig at 0-6, 7-12, 13-18 and 19-24 months of age were found to be 40.55 ± 1.73 , 51.47 ± 1.20 , 65.10 ± 1.98 and 67.00 ± 1.43 cm, respectively and for female pig at 0-6, 7-12,

13-18 and 19-24 months of age were found to be 41.28 ± 1.06 , 51.50 ± 0.95 , 62.67 ± 1.28 and 63.00 ± 3.64 cm, respectively [4].

Head length and width

In the present findings, the average head length of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 13.74 ± 0.27 , 19.82 ± 0.18 , 23.76 ± 0.08 , 23.24 ± 0.13 and 23.36 ± 0.20 , respectively. Also, it was found that the average head width of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 5.56 ± 0.11 , 7.56 ± 0.13 , 8.53 ± 0.05 , 8.50 ± 0.05 and 10.13 ± 0.25 cm, respectively. The average head length and width of the adult male and female village pig in Sri Lanka were 25.04 ± 0.91 , 23.57 ± 0.99 cm and 12.54 ± 0.53 , 12.14 ± 0.61 cm, respectively [15]. More or less similar findings were reported that the average head length of the male pig at 0-6, 7-12, 13-18 and 19-24 months of age were found to be 19.15 ± 0.7 , 22.62 ± 0.5 , 27.70 ± 1.2 and 28.17 ± 0.7 cm, respectively and for female pig at 0-6, 7-12, 13-18 and 19-24 months of age were found to be 19.86 ± 0.6 , 23.12 ± 0.5 , 25.56 ± 0.9 and 28.80 ± 0.5 cm, respectively [12].

Ear length

The average ear length of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 7.27 ± 0.15 , 11.75 ± 0.16 , 12.65 ± 0.08 , 14.30 ± 0.12 and 14.09 ± 0.12 cm, respectively. But, the average ear length of the Mali piglet, gilt, sow and boar in Tripura were 4.9 ± 0.1 , 8.1 ± 0.2 , 8.2 ± 0.1 , 8.5 ± 0.1 cm, respectively [4]. Contrasting result were also reported that the average ear length of Ghungroo and Niang Megha pig are 20 and 10 cm respectively [13]. Similarly, the average ear length of indigenous pig was 7-9 cm [12, 15].

Tail length

The average tail length of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 12.39 ± 0.28 , 17.64 ± 0.30 , 23.77 ± 0.18 , 22.85 ± 0.20 and 26.49 ± 0.25 cm, respectively. Similarly, The

average tail length of the Mali piglet, gilt, sow and boar in Tripura were 9.8 ± 0.11 , 23.3 ± 0.2 , 22.8 ± 0.2 , 22.6 ± 0.7 cm, respectively [4]. Also it was reported that the average tail length of Ghungroo and Niang Megha pig are 33 and 22 cm respectively [13].

Pair of teats

In the present study, the female Bareilly desi pig possessed 5-6 pairs of teats. Whereas, Ghungroo pig bears 6-8 pairs of cup type teats [13]. The average pair of teat of the indigenous female pig at 0-6, 7-12, 13-18 and 19-24 months of age was found to be 4.81 ± 0.06 , 5, 5.06 ± 0.05 and 6 pairs, respectively [12]. Higher no. of pairs of teats than the present findings were also reported [6, 13, 15, 17]. Variation in number of teats among pigs is also a widely used criterion in morphological diversity studies. The native pigs in different regions of Bangladesh, showed teat pattern which ranged from four to six pairs, a pattern of five pairs was most frequent in all the populations examined [17] whereas the total teat number of Duroc, Landrace and Yorkshire pigs were 12.5, 15 and 14, respectively [6]. Village pig in Sri Lanka also showed average pair of teats of female pig was 6.71 ± 4.46 [15] whereas Ghungroo pig bears 6-8 pairs of cup type teats [13]. Likewise, the average pair of teat of the indigenous female pig at 0-6, 7-12, 13-18 and 19-24 months of age was found to be 4.81 ± 0.06 , 5, 5.06 ± 0.05 and 6 pairs, respectively [12].

Bristle length

The average bristle length of the desi pigs of Bareilly district at 0-3, 3-6, 6-12, 12-18 and 18-24 months of age, irrespective of sex were found to be 4.34 ± 0.09 , 6.56 ± 0.18 , 8.36 ± 0.05 , 10.08 ± 0.10 and 10.33 ± 0.10 cm, respectively. The length of fibre (6.83 and 19.70 cm), with shortest and longest fibre length in Duroc and Niang Megha breeds respectively [7]. The mean weight of individual fibre ranged from 2.06 to 5.06 mg [7]. Local indigenous pigs have long bristles (5-7 inches) with diameters of 210-320 μ m (Animal Production Division, ICAR-Barapani, 2013). The bristle length of Niang-Megha pig (50-100g/adult of about one year of age varies from 5-10 cms [13]

Table 1: Morphometric attributes of adult Desi pigs (6-12 months) of Bareilly district (UP)

Characters	Male (n=65) Mean \pm SE	Female (n=125) Mean \pm SE ($P \leq 0.05$)	Average (Mean \pm SE)
Body weight (kg)	45.85 \pm 1.13	47.89 \pm 1.08	46.47 \pm 1.02
Body length (cm)	57.89 \pm 1.01a	64.16 \pm 1.36b	61.02 \pm 3.13
Chest girth (cm)	70.08 \pm 1.21	76.38 \pm 2.50	73.23 \pm 3.15
Paunch girth (cm)	73.51 \pm 1.08a	80.53 \pm 1.19b	77.02 \pm 3.51
Length from ear to tail (cm)	69.03 \pm 1.04a	75.57 \pm 1.35b	72.30 \pm 3.27
Height at wither (cm)	47.21 \pm 1.01	56.54 \pm 1.06	51.88 \pm 4.67
Height at loin region (cm)	52.10 \pm 1.06a	60.15 \pm 1.25b	56.12 \pm 4.03
Head Length (cm)	23.10 \pm 0.26a	24.09 \pm 0.27b	23.59 \pm 0.49
Head width (cm)	7.98 \pm 0.17a	8.68 \pm 0.18b	8.33 \pm 0.35
Ear length (cm)	12.34 \pm 0.27	12.71 \pm 0.13	12.53 \pm 0.18
Tail length (cm)	23.44 \pm 0.37a	24.23 \pm 0.26b	23.83 \pm 0.39
Bristle length (cm)	8.12 \pm 0.19	8.22 \pm 0.17	8.17 \pm 0.047
Hair length (cm)	4.49 \pm 0.17	4.93 \pm 0.12	4.71 \pm 0.22
Pair of teats (n)		5.23 \pm 0.05	

Figures with different superscripts are significant ($P \leq 0.05$) to each other between male and female of same age group, same superscripts means no significance, n=no. of animals

Conclusion

Desi pigs of Bareilly District have the high potential to be developed in order to contribute a valuable source of nutrition like protein, vitamins, minerals and secondary income source to the pig rearers. The important traits of these Bareilly Desi

like early sexual maturity, disease resistant, hardiness, adaptability to harsh climatic and managerial conditions and requirement of low input makes these precious Desi pig farming a profitable enterprise. In the present scenario, this desi pig breed is on the verge of extinction. So, its

characterization is the need of the hour. In this context, the morphometric attributes are given special attention besides phenotypic and molecular characterization. The analyses of these attributes will be very useful in the selection of future breeding stock and also as an important step towards conservation of these genetically rich Bareilly Desi pigs.

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