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EVALUATION OF SINDH GOAT BREEDS PERFORMANCES FOR BODY MEASUREMENTS, BODY WEIGHT, PRODUCTIVE AND REPRODUCTIVE TRAITS

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ABSTRACT

Sindh province is harbor of maximum number of goat breeds in Pakistan. However, information is limited to basic on indigenous breeds of the province. Therefore, current study was designed to investigate body weight, body measurements, productive and reproductive performances of ten goat breeds. A survey was carried out in breeding tracts of Kamori, Tapri, Bugi-Tori, Pateri, Kachan, Jattan, Lohri, Chappar, Barri, and Thari. Data for 395 animals were collected and arranged according to age class, sex and breed while analyzed using Mixed Model by REML methodology in R program to investigate the effects of breed, sex and age on body measurements and body weight whereas data on productive and reproductive performance were analyzed using basic statistic tools in R program. Overall, breeds differed for live body weight, heart girth, body length, body height and chest length ($P \leq 0.05$) except for pubic bone length ($P \leq 0.05$). Kamori had the highest mean body weight of 67.58±1.41 Kg. There was a significant difference among age class for all the body measurement and body weight ($P \leq 0.05$). The highest birth weight and weaning weight were observed in Pateri (2.90±0.11 Kg) and Kachan (16.0±0.50 Kg), respectively. Moreover, the highest weaning age was in Bugi-Tori (8.0±0.14 months) while highest milk yield was in Kamori (3.50±0.90 Kg per day). Minimum age at first heat was in Pateri (7.50±0.50 months) while maximum twining percentage at first kidding was in Chappar (25.0±1.25%). Tapri had lowest service period of 2.64±0.17 months. Kamori was found favorite animal as mutton breed for launching selection program for meat production.

Key words: Sindh, goats, body weight, reproductive performance, productive performance

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INTRODUCTION

Pakistan is an agriculture country where rural communities have less agricultural land holdings or no land thus, masses have adopted the profession of goat farming as an additional source of income which is also helpful to alleviate poverty. Thus, goat keeping plays an important role in the livelihood of low-income rural community (Webb and Mamabolo, 2005, Nguluma *et al.,* 2022). Goats are also an important source of meat, milk and fiber by converting low quality feed to high quality food for human particularly meat (Gawat *et al.,* 2023).

Goats are regarded fastest growing farm animal in Pakistan due to the fact that goats are the most fertile species among domestic animals and their conception rate is in the range of 90 % (Ince, 2010, Agossou and Koluman, 2018). Current goat population is 80.3 million (GOP, 2021). There are 34 goat breeds in Pakistan and Teddi, Beetal and Kamori are the most populated breeds. Adult body weight may range 20 to 70 Kg among Pakistani goat breeds (Moaeen-ud-Din, 2020).

Goat raising is a low input activity. Moreover, goats are quite diversified in term of morphological characteristics within breeds, performance of growth, traits of fertility and health & fitness traits. There are mainly four systems of goat raising in Pakistan viz. Nomadic, Transhumant, Sedentary flocks and Household. (Khan *et al.,* 2008). Mutton and live animal are being exported nowadays. Major constraints in rearing goats are disease attack, shortage of finance & credit and veterinary and extension services.

It's obvious that goat is the source of food items of high biological value and it is important source of supplying animal protein for ever increasing human population due to better fertility, prolificacy and short generation interval. Knowledge of its production potential under local climate condition is vital for its improvement by applying the modern scientific knowledge gathered through research. Despite its

significant contribution in meeting the shortage of meat, no systematic research has been conducted on its productive and reproductive potential (Moaeen-ud-Din, 2020).

There have been previous studies in the country on body weight and morphometric measurements for some prominent breeds of the country i.e., Beetal (Eyduran *et al.,* 2013, Waheed *et al.,* 2020), Teddi, Beetal and Crossbred (Moaeen-ud-Din *et al.,* 2006). This information has been used to predict body weight from morphometric measurements of aforementioned breeds in Pakistan. However, Sindh province of Pakistan is the richest in term of goat diversity in the country. There are ten prominent goat breeds in Sindh viz. Kamori, Tapri, Bugi-Tori, Pateri, Kachan, Jattan, Lohri, Chappar, Barri, and Thari. These goat breeds suit the local climate of the province. Review of literature suggested limited availability of data on genetic and phenotypic characteristics of these breeds along with unavailability of documented literature on morphometrics, productive and reproductive traits. The main objective of the current study was to fill this gap of information regarding data on morphometrics, productive and reproductive traits in the province.

MATERIALS AND METHODS

Study area: This study was conducted in Sindh province. The geographic and ecological diversity of Sindh has given birth to variety of habitats and ecosystems. Costal and marine ecosystem, forests, fresh and brackish wetlands, main river course, desert and irrigated landscapes are the major ecosystem of Sindh. Coastal ecosystem includes Indus delta and river Indus and associated wetlands in the lower Indus Basin are considered the most critical ecosystem of Pakistan. Sindh province ranks third in term of geographical area of Pakistan. It expands, about 579 km from north towards south and averaging 281 km from east towards west. It has territorial area of 140,915 square kilometers (54,408 sq. mi) of Pakistan. This province is home to livestock as local climate is suitable for indigenous livestock population. In this survey ten indigenous goat breeds were studied in Hyderabad, Matiyari, Hala, Methi, Umer Kot, Tharparkar, Thatha, Badin, Dadu, and Mirpur Khas districts of the province.

Data collection and analysis: Data on ten goat breeds viz. Kamori, Tapri, Bugi-Tori, Pateri, Kachan, Jattan, Lohri, Chappar, Barri, and Thari were collected through a survey and body measurements and weight were recorded. Body measurements viz. heart girth (HG) was measurement of the circumference of the chest in cm, body height (H) was from front feet to the shoulder-blades height in cm, body length (L) was from the tip of sternum to the base of tail in cm, chest length (CL) was between chest bones in cm while pubic bone (PB) was between pubic bones in cm measured with measuring tape (Samuel and Salako, 2008). A total 395 animals were recorded in the study whereas a survey from 10 different farmers of each breed was carried out for productive and reproductive traits. There were 346 females and 49 male goats. Breed wise strength of the animals were: Kamori (48), Tapri (41), Bugi-Tori (46), Pateri (40), Kachan (31), Jattan (35), Lohri (32), Chappar (42), Barri (40) and Thari (40). Total eight age groups (i. 1-6 months, ii. 7-12 months, iii. 13-18 months, iv. 19-24 months, v. 25-36 months, vi. 37-48 months, vii. 49-60 months and viii. > 60 Months) were designated and data were arranged according to age, sex and breed and analyzed using Mixed Model by REML methodology in R program to investigate the effect of breed, sex and age on body measurements and body weight whereas data on productive and reproductive performances were analyzed using basic statistic tools in R program.

RESULTS

The results of 395 goats analyzed showed a significant effect of age, sex and breed on body measurements and body weight. The highest body weight was observed in age class 8 viz. 61.99 ± 2.05 Kg. There seems to be gradual increase in weight with the age and significant among age groups ($P \leq 0.05$; Table 1). Heart girth is the highest in age class 8 that is 90.40 ± 1.63 cm. Heart girth increased gradually and significantly with age in ascending order. The third body measurement was wither height that was recorded highest in age class 8 (86.81±1.60) that also increased significantly among age classes (Table 1). There was non-significant difference in terms of body length to age class 4 & 5 and 6 & 7 (Table 1); however, body length was recorded highest in age class 8 that was 77.65±1.48. The last body measurement was chest length and it was observed statistically similar between age group 7 and 8 viz. 22.44 ± 0.51 and 22.69 ± 0.58 cm, respectively.

Breed's effect on body measurement and body weight were evaluated where breed had a significant effect on body measurements and body weight given in Table 2. Kamori had highest body weight (adult) compared to other goat breeds (67.58 ± 1.41 Kg) and lowest body weight was recorded in Thari (33.94 ± 1.45 Kg) whereas a significant effect of breed had on body weight ($P \leq 0.05$). The highest heart girth in Kamori was 89.76 ± 1.12 cm. However, the lowest was recorded in Chappar breed (66.87 ± 1.18 cm). There was non-significant ($P > 0.05$) difference between Tapri and Bugi-Tori in term of average heart girth measurement (77.74 ± 1.22 and 77.02 ± 1.06 cm respectively). Breed had also significant effect on body height where Kamori breed was recorded tallest among all breeds (88.17 ± 1.10 cm) whereas Chappar had the lowest body height (64.57 ±

1.16 cm). The highest body length was recorded in Kamori goat breed (78.65 ± 1.02 cm) whereas Kachan and Lohri had similar body lengths (65.92 ± 1.16 and 65.78 ± 1.16 cm, respectively). Thari and Chappar had also similar body length viz. 61.09 ± 1.07 and 61.22 ± 1.05 cm respectively. Pubic bone measurement was almost equal in all breeds thus breed had no significant effect on pubic bone measurement (P = 0.2759). Breed had significant effect on chest length whereas highest chest length was recorded in Kamori goat (23.05 ± 0.40 cm) while lowest chest length was recorded in Thari goat (17.77 ± 0.41cm). Tapri, Lohri and Bugi-Tori had almost similar measurement of chest length (19.69 ± 0.38, 19.13 ± 0.45 and 19.69 ± 0.38 cm respectively). Kachan and Jattan had also similar chest length measurements (18.07 ± 0.45 and 18.62 ± 0.43 cm respectively).

In this study data of overall 346 female and 49 male goats were analyzed. There was a significant effect of sex on body weight (Table 3) where males were heavier than female (P ≤ 0.05). The mean body weight of bucks was 47.53 ± 1.29 Kg while for doe was 39.10 ± 0.49 Kg. However, there was non-significant difference of heart girth measurement between both sexes which were 77.15 ± 1.02 cm and 75.15 ± 0.39 cm, respectively. Similar case was for body height (78.25 ± 1.00 cm vs 74.75 ± 0.38 cm for male and female goats, respectively). Similarly, statistically non-significant were the results for pubic bone measurement (9.54 ± 0.84 cm vs 10.9 ± 0.32 cm), chest length measurement (19.61 ± 0.36 cm vs 18.74 ± 0.14 cm) for male and female, respectively.

Results about reproductive traits (Table 4) showed that age at first heat was significantly lower in Pateri (7.50 ± 50 months). The highest age at first heat was observed in Barri (15.80±0.50 months) followed by Thari goats (13.94 ± 0.40 months). In terms of age at first kidding; Pateri was the first to kid (12.50 ± 0.54 months) followed by Tapri and Bugi-Tori (16.45 ± 0.52 and 16.60 ± 0.54 months, respectively) while Barri was last to kid (22.10 ± 0.54 months).

None of the farmers reported the phenomenon of repeat breeding for goat breeds in Sindh indicating that the goats would get conceived after single service. Twinning at first and second kidding ranged from 10 to 30% for all goat breeds. However, the results for twining percentage at first and second kidding were 26.37 ± 19.08 and 39.47 ± 21.45 %, respectively.

Birth weight of all goat breeds remained around 2 Kg with Pateri having highest birth weight (2.90±0.11 Kg) and Chappar having lowest birth weight. Weaning weight was the highest for Kachan breed (16.0 ± 0.50 Kg) followed by Kamori and Bugi-Tori. However, due to different weaning ages, such a comparison makes little statistical and biological sense (Table 5).

Weaning age of all goat breeds ranged from approximately 3 (Thari and Tapri) to 8 (Bugi-Tori) months indicating different weaning practices for different goat breeds.The highest daily milk yield was observed in Tapri and Kamori (3.54±0.90 and 3.50±0.90 Kg, respectively) followed by Pateri (2.90±0.90 Kg), Bugi-Tori, Kachan, Jattan (2.00 Kg) and, Lohri, Chappar, Barri and Thari (about 1 Kg).

Table 1: Effect of Age on Various Body measurements and body weight in Sindh goat breeds

Traits	Age classes								P value
	Age Class 1 (1-6Month, N=39)	Age Class 2 (7-12 Months, N=68)	Age Class 3 (13-18 Months, N=61)	Age Class 4 (19-24 Months, N=56)	Age Class 5 (25-36 Months, N=84)	Age Class 6 (37-48 Months, N=39)	Age Class 7 (49-60 Months, N=27)	Age Class 8 (>60 Months, N=21)	
Weight (kg)	13.33±1.40^{a}	30.99±1.10^{b}	38.63±1.26^{c}	44.35±1.30^{d}	48.19±1.07^{e}	52.73±1.55^{f}	56.24±1.80^{g}	61.99±2.05^{h}	< 0.0001
Heart girth (cm)	47.79±1.12^{a}	67.29±0.88^{b}	73.08±1.00^{c}	78.84±1.03^{d}	80.87±0.85^{e}	83.78±1.24^{f}	87.14±1.43^{g}	90.40±1.63^{h}	< 0.0001
Height (cm)	52.64±1.09^{a}	69.37±0.86^{b}	75.60±1.00^{c}	78.69±1.01^{d}	81.26±0.83^{e}	83.47±1.20^{e}	84.16±1.40^{e}	86.81±1.60^{f}	< 0.0001
Body length (cm)	43.27±1.02^{a}	59.69±0.80^{b}	65.50±0.91^{c}	69.37±0.94^{d}	71.46±0.78^{d}	74.23±1.12^{e}	74.71±1.30^{e}	77.65±1.48^{f}	< 0.0001
Pubic bone (cm)	8.19±0.91^{a}	10.19±0.72^{b}	10.01±0.82^{b}	10.54±0.85^{b}	10.97±0.69^{b}	10.77±1.01^{b}	10.82±1.17^{b}	10.64±1.34^{b}	0.3855
Chest length (cm)	11.98±0.40^{a}	16.58±0.31^{b}	18.37±0.35^{c}	19.14±0.37^{cd}	20.39±0.30^{cd}	21.81±0.44^{cde}	22.44±0.51^{def}	22.69±0.58^{def}	< 0.0001

Different superscripts in a row show significance (P < 0.05)

Table 2: Effect of breed on various body measurements and body weight in Sindh goats breeds

Traits	Kamori (N=48)	Tapri, (N=41)	Bugi-Tori, (N=46)	Pateri (N=40)	Kachan (N=31)	Jattan (N=35)	Lohri (N=32)	Chappar (N=42)	Barri (N=40)	Thari (N=40)	P value
Weight (kg)	67.58±1.41^{a}	39.33±1.55^{b}	44.13±1.33^{c}	50.01±1.50^{d}	42.50±1.60^{e}	38.63±1.51^{f}	35.41±1.60^{g}	38.03±1.49^{f}	43.50±1.60^{e}	33.94±1.45^{g}	< 0.0001
Heart girth (cm)	89.76±1.12^{a}	77.74±1.22^{b}	77.02±1.06^{b}	82.39±1.19^{e}	73.73±1.28^{d}	71.78±1.20^{d}	75.05±1.28^{e}	66.87±1.18f	76.64±1.30^{e}	70.53±1.15^{d}	< 0.0001
Height (cm)	88.17±1.10^{a}	73.15±1.20^{b}	78.98±1.03^{c}	82.83±1.16^{d}	75.73±1.24^{e}	76.67±1.17^{e}	78.42±1.25^{c}	64.57±1.16^{f}	72.28±1.23^{b}	74.17±1.12^{b}	< 0.0001
Body length (cm)	78.65±1.02^{a}	66.98±1.11^{b}	68.37±1.00^{c}	72.53±1.08^{d}	65.92±1.16^{b}	63.92±1.09^{e}	65.78±1.16^{b}	61.09±1.07^{e}	65.38±1.15^{b}	61.22±1.05^{e}	< 0.0001
Pubic bone (cm)	10.97±0.92^{a}	9.23±1.01^{a}	10.452±0.8^{a}	10.37±0.97^{a}	10.29±1.04^{a}	11.83±0.98^{a}	11.95±1.04^{a}	8.95±0.97^{a}	9.32±1.04^{a}	9.33±0.94^{a}	0.2759
Chest length (cm)	23.05±0.40^{a}	19.43±0.44^{b}	19.69±0.38^{b}	21.13±0.42^{a}	18.07±0.45^{b}	18.62±0.43^{b}	19.13±0.45^{b}	16.48±0.42^{c}	18.36±0.45^{b}	17.77±0.4^{d}	< 0.0001

Different superscripts in a row show significance (P < 0.05).

Table 3: Effect of Sex on various body measurements and body weight in Sindh goat breeds

Traits	Sex		
	Male (N=49)	Female (N=346)	P value
Weight (kg)	47.53±1.29	39.10±0.49	< 0.0001
Heart girth (cm)	77.15±1.02	75.15±0.39	0.0600
Height (cm)	78.25±1.00	74.75±0.38	0.0009
Body length (cm)	67.52±1.00	66.45±0.36	0.02733
Pubic bone (cm)	9.54±0.84	10.9±0.32	0.0972
Chest length (cm)	19.61±0.36	18.74±0.14	0.0219

Significance at P ≤ 0.05

Table 4: Effect of breed on reproductive traits in Sindh Goat

Traits	Kamori (N=10)	Tapri (N=11)	Bugi-Tori (N=10)	Pateri (N=10)	Kachan (N=10)	Jattan (N=10)	Lohri (N=10)	Chappar (N=10)	Barri (N=10)	Thari (N=16)	P value
Age at 1st heat(months)	11.80±0.50^{a}	11.45±0.48^{a}	11.60±0.50^{a}	7.50±0.50^{d}	12.0±0.50^{a}	12.0±0.50^{a}	12.0±0.50^{a}	12.0±0.50^{a}	15.80±0.50^{b}	13.94±0.40^{c}	<0.0001
Age at 1st kidding (months)	16.80±0.54^{a}	16.45±0.52^{a}	16.60±0.54^{a}	12.50±0.54^{d}	17.80±0.54^{a}	18.0±0.54^{b}	18.0±0.54^{b}	17.70±0.54^{a}	22.10±0.54^{c}	18.94±0.42^{b}	<0.0001
Kidding interval (months)	8.30±0.16^{a}	6.54±0.15^{b}	7.30±0.16^{a}	8.20±0.16^{a}	5.20±0.16^{c}	5.0±0.16^{c}	8.0±0.16^{a}	9.30±0.16^{a}	7.50±0.16^{a}	10.37±0.12^{d}	<0.0001
Service period (months)	3.30±0.18^{a}	2.64±0.17^{a}	4.10±0.18^{a}	3.50±0.18^{a}	6.0±0.18^{b}	6.0±0.18^{b}	7.0±0.18^{b}	6.7±0.118^{b}	6.50±0.18^{b}	5.37±0.14^{b}	<0.0001
NS	1.0±0^{a}	1.0±0^{a}	1.0±0^{a}	1.0±0^{a}	1.0±0^{a}	1.0±0^{a}	1.0±0^{a}	1.0±0^{a}	1.0±0^{a}	1.0±0^{a}	Non-Sig
Twining at 1st kidding %	23.0±1.25^{a}	22.73±1.19^{a}	20.0±1.25^{a}	20.0±1.25^{a}	21.0±1.25^{a}	20.0±1.25^{a}	20.0±1.25^{a}	25.0±1.25^{b}	17.50±1.25^{c}	14.37±1.00^{d}	<0.0001
Twining at 2nd kidding %	21.30±3.31^{a}	24.45±3.16^{b}	29.40±3.31^{c}	26.50±3.3^{b}	29.50±3.3^{c}	19.0±3.31^{a}	26.50±3.31^{a}	23.40±3.31^{a}	31.50±3.31^{a}	10.0±2.62^{a}	<0.0001

Different superscripts in a row show significance ($P < 0.05$)

Table 5: Effect of breed on productive traits in Sindh Goats

Traits	Kamori (N=10)	Tapri (N=11)	Bugi-Tori (N=10)	Pateri (N=10)	Kachan (N=10)	Jattan (N=10)	Lohri (N=10)	Chappar (N=10)	Barri (N=10)	Thari (N=16)	P value
Birth weight (Kg)	2.40±0.11^{a}	2.0±0.11^{a}	2.0±0.11^{a}	2.90±0.11^{b}	2.80±0.11^{b}	2.0±0.11^{a}	2.00±0.11^{a}	1.000±0.11^{c}	2.4±0.11^{a}	2.62±0.08^{b}	<0.0001
Lactation length (months)	6.70±0.26^{a}	2.27±0.26^{b}	7.50±0.27^{a}	3.30±0.27^{b}	4.00±0.27^{c}	4.70±0.27^{c}	5.10±0.27^{a}	6.40±0.27^{a}	5.50±0.27^{a}	2.62±0.21^{b}	<0.0001
Milk production per day (kg)	3.50±0.90^{a}	3.54±0.90^{a}	2.0±0.90^{ab}	2.90±0.90^{ab}	2.0±0.90^{ab}	2.0±0.90^{ab}	1.00±0.90^{c}	1.30±0.90^{c}	1.0±0.90^{c}	1.00±0.07^{c}	<0.0001
Weaning age (months)	4.30±0.14^{a}	3.54±0.13^{a}	8.0±0.14^{b}	5.10±0.14^{b}	4.80±0.14^{a}	4.0±0.14^{a}	6.0±0.14^{b}	5.40±0.14^{b}	4.50±0.14^{a}	3.0±0.11^{a}	<0.0001
Weaning weight (kg)	15.0±0.50^{a}	13.36±0.48^{b}	14.70±0.5^{c}	12.90±0.50^{b}	16.0±0.50^{d}	12.0±0.50^{b}	11.60±0.50^{b}	11.20±0.50^{b}	11.40±0.50^{b}	11.19±0.40^{b}	<0.0001
Average daily Pre-weaning growth rate (g/ day)	114.75	124.14	60.44	83.20	109.65	98.68	63.60	68.23	83.33	122.70	

DISCUSSION

Body measurements traits play an important role in selection of goat breeds for improved body weight (Akounda *et al.,* 2023). Furthermore, farmers have selective approach regarding diversity among and within goat breeds. This selective approach is based on morphological characteristics, growth, fertility and body measurements. The worth of each trait is well known to farmers (Muhammad *et al.,* 2015).

There was a linear increase in body weight and body measurements with the age in the current study which is correspondent to increase in body mass from birth till maturity in the life of animal. Thus, an increment of body weight and body measurements among different age classes that is quite normal physiological mechanism. However, at certain age viz. mature age there is little increment of body weight until there is compensatory growth of 10-15%.

body weight and morphometric measurements have been reported previously for Pakistani breeds i.e. Beetal (Eyduran *et al.,* 2013, Waheed *et al.,* 2020), Teddi, Beetal and Crossbred (Moaeen-ud-Din *et al.,* 2006). The measurements are comparable of large breeds to large one i.e., Beetal and Kamori while small breeds to small one i.e., Tharri to Teddi. However, there could be a definite application this information for body weight prediction among these breeds.

There was a significant effect of sex on body weight that is similar to previous findings on morphometric characterization of goat breed under their local conditions. The results revealed a significant effect of sex, age and agro ecological zones ($P < 0.01$) on body weight, and various measurements of body. Our results in the current study are also similar to previous studies (Muner *et al.,* 2018, Aliyu *et al.,* 2021). The results of previous studies indicated that phenotypic characterization i.e., body weight and linear body measurements could be useful in devising efficient input system, breed preservation and conservation and might also be useful in devising enhancement strategies for exploiting genetic resources (Tsegaye *et al.,* 2013). Moreover, the findings of current study are also strengthened by previous study conducted regarding morphological characteristics of goats. The results showed a significant ($P < 0.05$) effect of sex on body length and height with the male goats being larger than the females (Hagan *et al.,* 2012). The results are similar to the findings of current study.

Results from the ten goat breeds of Sindh for productive traits are given in Table 4. Birth weight of all goat breeds hovered around 2 kg with Pateri having highest birth weight (2.90kg) and Chappar having lowest birth weight. These results can be compared with the findings of previous research (Muhammad *et al.,* 2015), reporting an average birth weight of 3.085 kg for two Beetal goat strains. However comparatively lower birth weight (2.81 ± 0.02) for 381 samples was observed in another study (Patel and Pandey, 2013) in Mehansa goat breed.

Weaning weight was highest for Kachan breed (~16 Kg) followed by Kamori and Bugi-Tori. However overall average of these results (12.13 ± 3.48 Kg) obtained from ten studied breeds can be compared with the weaning weights of Angora goats (10.8 ± 1.9 Kg) (Ahmad *et al.,* 2014).

The weaning age of all goat breeds ranged from approximately 3 (Thari and Tapri) to 8 (Bugi-Tori) months indicating different weaning practices for different goat breeds. Keeping in view the lactation length range for all goat breeds under study (approximately 2 to 7 months), it is clear that the milk of does is suckled by the kids almost throughout the lactation with little or no domestic or household use. Babati and Kongwa goat breeds had lactation lengths (~5 months) (Jackson *et al.,* 2014) comparable to those reported in the present study.

In conclusion, there appears to be substantial variations among local goat breeds of Sindh and this variation can be exploited to improve productivity of local breeds in a genetic selection program for goats. Moreover, the present study has documented some important traits i.e., morphometric measurements and body weight, productive and reproductive traits of local goat breeds of Sindh and delineated the differences among ten goat breeds for each of these traits; moreover, among breeds variation seems remarkable and could be used to construct a breeds selection index of optimum productivity and profitability.

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