INFLUENCE OF CANNON BONE CIRCUMFERENCE ON SOME BODY SIZE TRAITS IN RAKHSHANI SHEEP BREED OF BALUCHISTAN (PAKISTAN)

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خلاصہ

8ماہ کی عمر کے 80 جانور جن میں رخشانی بھیڑوں کے 40نر اور 40مادہ شامل ہیں پیر کانی بھیڑوں کے فارم ضلع نصیر آباد، بلوچستان سے تصادفی طور پر منتخب کیے گئے۔ نتائج سے ظاہر ہوا کہ رخشانی رام میں توپ کی ہڈیوں کا اوسط طواف 8.05±0.20 سینٹی میٹر اور ایو میں 7.53±0.11 سینٹی میٹر تھا، جو رخشانی نسل کے نر اور مادہ کے درمیان شماریاتی لحاظ سے اہم ہے۔ جسمانی وزن مردوں میں زیادہ (P <0.05) تھا جو 27.08 ± 0.64 کلو گرام اور خواتین میں 23.91 ± 0.38 کلو گرام تھا۔ جسم کی اوسط اونچائی 65.47 ± 0.82 اور 59.98 ± 0.58 سینٹی میٹر مینڈھے اور بھیڑ میں تھی، جو کہ بھیڑ کے مقابلے میں مینڈھوں میں نمایاں طور پر زیادہ تھی۔ جسم کی لمبائی 69.89 ± 0.54 سینٹی میٹر اور 63.37 ± 0.84 سینٹی میٹر مینڈھے اور بھیڑ کے طور پر دیکھی گئی۔ رخشانی مینڈھوں کے جسم کی لمبائی بھیڑ کے مقابلے میں بڑی (P <0.05) ہوتی ہے۔ توپ کی ہڈی کا طواف رخشانی بھیڑوں کے جسمانی وزن، جسمانی قد اور جسم کی لمبائی (P <0.05) پر مضبوط مثبت اثر ڈالتا ہے۔ جسم کے وزن، جسم کی اونچائی، جسم کی لمبائی کے لیے توپ کی ہڈی کے طواف کا جینیاتی تعلق مرد کے لیے 0.657 ،0.830، 0.783، اور جسمانی وزن کے لیے، جسم کی اونچائی 0.725 ، 0.639 تھی جب کہ جسم کی اونچائی اور جسم کی لمبائی 0.895 کے لیے۔ تاہم، خواتین کے لیے یہ 0.597 ،0.810، 0.699 توپ کی ہڈی کا طواف بمقابلہ جسمانی وزن، جسمانی اونچائی اور جسم کی لمبائی کے درمیان تھا، اور جسمانی وزن بمقابلہ جسمانی اونچائی، جسم کی لمبائی 0.675 ،0.619، جب کہ جسمانی اونچائی بمقابلہ جسمانی لمبائی کے لیے، یہ تھی۔ 0.798۔ آخر میں، رخشانی مینڈھوں کی توپ کی ہڈیوں کا طواف نمایاں طور پر زیادہ ہوتا ہے اور یہ بلوچستان کی رخشانی بھیڑوں کی نسل کے جسمانی وزن، جسم کی اونچائی اور جسم کی لمبائی پر نمایاں اثر ڈالتا ہے.

Abstract

8-month-old, 80 animals, including 40 males and 40 females of Rakhshani sheep were randomly selected from Pirkani sheep farm district, Naseerabad, Baluchistan. The results showed that the average cannon bone circumference in Rakhshani ram was 8.05±0.20 cm and in ewe was 7.53±0.11 cm, statistically significant between male and female of Rakhshani breed. The body weight was higher (P<0.05) in male which was 27.08±0.64 kg and in female 23.91±0.38 kg. The average body height was 65.47±0.82 and 59.98±0.58 cm in rams and ewes, which was significantly higher in rams (male) as compared to ewes (female). The body length was observed as 69.89±0.54 cm and 63.37±0.84 cm in rams and ewes. Rakhshani rams have larger (P<0.05) body length compared to ewes. The cannon bone circumference has strong positive influence on body weight, body height and body length of Rakhshani sheep (P<0.05). The genetic correlation of cannon bone circumference for body weight, body height, body length for male was 0.657, 0.830, 0.783, and for body weight, body height 0.725, 0.639 whereas for body height and body length 0.895. However, for female it was 0.597, 0.810, 0.699 in between cannon bone circumference vs. body weight, body height and body length, and for body weight vs. body height, body length 0.675, 0.619, whereas for body height vs. body length, it was 0.798. In conclusion, the Rakhshani rams have significantly higher cannon bone circumference and has significant influence on body weight, body height and body length of Rakhshani sheep breed of Baluchistan.

Keywords: Cannon bone, Circumference, Body size, Rakhshani, Baluchistan

Introduction

Pakistan is rich in livestock resources. This sector contributes about 14 % to national GDP with an annual increase of 3.26 %. Animal husbandry is a significant economic activity of the people living in rural areas of the country. Pakistan is the home of nearly 210 million of ruminants, out of which, 110 million are small ruminants (Kaleri *et al.,* 2023 & Raza *et al.,* 2017). Sheep population is about 31 million which contribute about 42 tonnes of milk, 15 million of skins and 48 tonnes of wool annually. The annual mutton production of the country is about 782 tonnes Economic survey of Pakistan, 2022, (Kaleri *et al.,* 2023). Pakistan is bestowed with different kinds of animal genetic resources. It is thought that this region is one of the centers of livestock domestication in the world. In Pakistan, the small ruminant flock owners are usually small-scale farmers. Sheep (*Ovis aries*) is one of the first food animals to be domesticated for meat, milk, fleece, skin, and dairy products. It is easy to kept, raised, and slaughtered whenever meat is needed (Safi *et al*., 2017. The global share of sheep meat is about 9 million metric tonnes annually, and it constitutes nearly 1.3% of the total milk production in the world. Harnai sheep breed is fat tailed and is commonly raised in Loralai, Harnai, Ziarat and Sanjawi district of Baluchistan province (Kaleri *et al.,* 2018 and Qadir *et al*., 2017). Live body weight is very crucial for determining number of characteristics of farm animals. Body measurements such as body length, heart girth, cannon bone perimeter are used to predict live body weight of farm animals. It is an easier, faster, cost effective and practical method for live weight estimation of animals (Mohammad *et al*., 2012; Pesmen & Yardimci, 2008; Sun *et al*., 2020).

Methodology

Experimental design

A total of 80 animals were randomly selected from langove sheep farm and pirkani sheep farm district Naseerabad. Out of these 40 were male animals and 40 female. The age of selected animals were 8 months and was determined using dental formula as suggested by Sun *et al*. (2020). The Rakhshani breed animals were divided into two groups A and B. The information was collected regarding body weight in kilograms (kg), whereas the cannon bone circumference of front limb, body height and body length were measured in centimeters (cm).

Statistical Analyses

The data was managed using MS Excel. All the data is presented as mean ± s.e. The means of cannon bone circumference, body weight, body height and body length of Rakhshani rams and ewes were analyzed using independent t-test through SPSS (version 20.0, IBM Corp, Armonk, NY). On completion of the study, the data was tabulated and statistically analyzed using computer software named Student Edition of Statistics (SXW), Version 8.1 (Copyright 2005, Analytical Software, USA). The genetic correlation among cannon bone circumference and body size traits of Rakhshani breed were analyzed using method as recommended by Becker (1985).

Results and Discussion

Cannon bone circumference

The findings of our study showed that there was a significant difference between the cannon bone circumferences on the basis of sex of Rakhshani sheep breed. The Rakhshani ram has higher ($P<0.05$) cannon bone circumference as compared to ewe. The results showed that the there is a significant difference in cannon bone circumference, body weight, body height and body length between ram and ewe of Rakhshani sheep and there is strong positive correlation present between cannon bone circumference and body weight, body height and body length. Balochistan is the home of about half (48%) of the total sheep population of the country. Most common native sheep breeds in Balochistan are Balochi, Beverick, Harnai and Rakhshani. All four are fat tailed breeds (Rafeeq *et al*., 2010). Among all, Rakhshani sheep is medium in size, mostly propagated for meat purpose. The adult Rakhshani ram weight is 32 kg while ewe weight is about 28 kg (Khan *et al*., 2007). Rakhshani has low birth weight compared to other local breeds of Balochistan (Baloch *et al*., 2011).

Body weight, Body height and Body length (cm)

The results for body weight showed the average body weight of 8 months old Rakhshani ram was 27.08±0.64 kg and ewe 23.91±0.38kg. The ram has significantly higher weight as compared to ewe at the age of 8 months ($P< 0.05$). The results showed that the there is a significant difference in cannon bone circumference, body weight, body height and body length between ram and ewe of Rakhshani sheep and there is strong positive correlation present between cannon bone circumference and body weight, body height and body length. Balochistan is the home of about half (48%) of the total sheep population of the country. Most common native sheep breeds in Balochistan are Balochi, Beverick, Harnai and Rakhshani. All four are fat tailed breeds (Rafeeq

et al., 2010). Among all, Rakhshani sheep is medium in size, mostly propagated for meat purpose. The adult Rakhshani ram weight is 32 kg while ewe weight is about 28 kg (Khan *et al.*, 2007). Rakhshani has low birth weight compared to other local breeds of Balochistan (Baloch *et al.*, 2011). A study was conducted to analyze the productive performance of indigenous sheep breeds of Balochistan showed that the weight of a 10 months old Rakhshani is about 22 kg, body height 52 cm, body length 68 cm and chest girth about 72 cm (Rafeeq *et al.*, 2010). Cannon bone circumference is the trait that improves the capability of the animals to bear the excessive body weight, drought work, movement and to resist the wounds and injuries. In previous studies, the cannon bone circumference in Pramenka sheep was noted about 7.63 to 7.85 cm, in Bordoka sheep breed about 8.35 cm, in Sjenicka sheep about 8.95 cm, in Zeta Zuja sheep nearly 7.61 cm (Marković *et al.*, 2019), in Barind sheep breed of Bangladesh about 8.56 cm (Kaleri *et al*., 2023), (Haque *et al*., 2020) and (Kaleri *et al.*, 2023).

Genetic correlation

The results for genetic correlation of cannon bone circumference for body weight, body height, body length for male was 0.657, 0.830, 0.783, and for body weight, body height 0.725, 0.639 whereas for body height and body length 0.895. However, for female it was 0.597, 0.810, 0.699 in between cannon bone circumference vs body weight, body height and body length, and for body weight vs body height, body length 0.675, 0.619, whereas for body height vs body length, it was 0.798. The relationships correlate with animal productivity, functionality and fitness of the animal for their performance in terms of meat, milk, drought or dual purposes (Haque *et al.*, 2020). By using different body measurements and visuals, one can described the body size and shape of the animal. It is very important in livestock systems because the body size and shape of the animal is directly correlate with the production and working performance of the individual and important for selection programs (Sun *et al.,* 2020). A highly significant correlation was noted between body weight, chest girth, withers height and body length in indigenous sheep breeds of Balochistan (Mohammad *et al*., 2012).

Table 1. Body measurements of Rakhshani sheep

Parameters	Gender	Mean
Cannon bone circumference (cm)	Ram	8.05± 0.20
	Ewe	7.53± 0.11
Body weight (kg)	Ram	27.08± 0.64
	Ewe	23.91± 0.38
Body height (cm)	Ram	65.47± 0.82
	Ewe	59.98± 0.58
Body length (cm)	Ram	69.89± 0.54
	Ewe	63.37± 0.84

($P<0.05$)

Table 2. Genetic correlation of cannon bone circumference with different body size traits in Rakhshani ram

Genetic Correlation	Body weight	Body height	Body length
Cannon bone circumference	0.657*	0.830*	0.783*
Body weight		0.725*	0.639*
Body height			0.895*

*Correlation is significant at the 0.01 level P-value

Table 3. Genetic correlation of cannon bone circumference with different body size traits in Rakhshani ewe

Genetic correlation	Body weight	Body height	Body length
Cannon bone circumference	0.597*	0.810*	0.699*
Body weight		0.675*	0.619*
Body height			0.798*

*Correlation is significant at the 0.01 level P-value

Conclusion

It was observed that Rakhshani rams have significantly higher Cannon bone circumference than ewes with significant influence on body weight, body height, and body length. Whereas genetic correlation among Cannon bone circumference and other body size traits was strongly positive.

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