

Body Measurements of West African Sheep in Sudan

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Abstract: A two phase study was conducted using a total of forty-five West African Sheep lambs. The first phase was from birth to one year of age and the second phase was from one year to four years of age. The lambs were grouped using their dental arrangements at the upper and lower jaws, respectively. Their body measurements were carried out at both the experimental and field levels. Body length, heart girth, height at withers and chest depth were measured. Experimental lambs were taken at birth, weaning, one year age and adult animals at one to four years of age. The effect of sex and birth type was investigated. Similarly, the same measurements were taken for the surveyed animals from birth to one-month of age and for adult animals. The study indicated that surveyed animals exceeded experimental animals in all the body measurements taken.

Key words: Body measurements, west african sheep, sudan

INTRODUCTION

Estimation of the relationship between body measurements in sheep may help to provide means for predicting traits which are not normally and easily measured under field conditions^[1]. The sex of animal had a significant effect on weight, height at withers, body length and chest girth at 4 permanent incisors stage^[2]. A decade ago Babiker and Mohamed^[3] found that desert sheep were significantly ($p < 0.01$) higher at withers (84vs71-cm) than other breeds and had significantly ($p < 0.05$) deeper chests (37vs34-cm) than the Australian Merino sheep. Phenotypic correlation of body weight with height at withers and chest girth ranged from 0.76 ± 0.04 to 0.88 ± 0.03 and regression of body weight on height at withers and chest girth ranged from 0.63 ± 0.02 to 0.98 ± 0.05 -cm^[2]. There were highly significant ($p < 0.01$) regression coefficients of the remaining live body measurements on age in Shugor, Dubasi and Watish sheep, respectively^[1]. The intra-class correlation coefficients estimated at 6 months of age were 0.87 for body length and 0.86 for chest depth^[4]. The objective of the present study was to estimate body measurements of lambs during their first year of age and for the adult rams and ewes after a year.

MATERIALS AND METHODS

This study was conducted at University of Nyala, research farm, Western Sudan, from January, 2000 to

October, 2002. Sheep flocks and their management was reported elsewhere by^[5]. Measurements taken included body length (from the tip of the scapular to the pin-bone), heart girth (the circumference of the chest), chest depth (between breast and withers) and height at withers (from the highest point on the dorsum of the animal to the ground surface at the level of the front feet). All measurements were taken using a linear tape and a herd measuring stick. Body measurements were determined shortly after birth and at two weeks interval during pre-weaning and monthly at post-weaning periods until one year of age. Surveyed animals (lambs) were from one to four weeks old, while adults were from one to four years of age, respectively.

RESULTS

The average body length, heart girth, height at withers and chest depth for experimental animals was estimated at birth for male and female lambs. Also, birth type effects on body measurements were considered and the generated results of these are presented in Table 1. A similar measurements were taken at weaning and the generated resulted is shown in Table 2, respectively. The post-weaning weight for lambs at 6, 9 and 12-months of age were estimated. Male lambs were heavier than females during the year in all the measurements taken. Similarly, body measurements were estimated and results obtained are presented in Table 3. The overall measurements for

Table 1: Body measurements at birth, body length (B. L), heart girth (H. G), height at withers (H) and chest depth (D) of lambs in Western Sudan

Sexes	Type	No	B.L (cm)	H.G (cm)	H (cm)	D (cm)
Male single		8	26.00±3.00	33.00±1.00	36.75±0.00	13.50±1.50
	Twin	4	25.50±1.10	31.25±0.80	37.00±2.50	14.00±0.70
Total	12		25.67±1.97	31.83±1.20	36.92±2.46	13.87±1.99
Female single		6	24.50±1.50	31.25±2.30	36.25±1.90	13.87±1.40
	Twin	5	26.80±1.70	32.30±1.10	36.90±1.02	14.20±1.10
Total	11		25.78±1.99	31.78±1.83	36.61±1.52	14.20±1.10

Table 2: Body measurements at weaning, body length (B.L), heart girth (H.G), height at withers (H) and chest depth (D) of lambs in Western Sudan

Sexes	Type	No	B.L (cm)	H.G (cm)	H (cm)	D (cm)
Male single		13	42.50±5.30	54.15±5.70	58.30±5.90	26.53±3.10
	Twins	1	38.50±0.00	45.50±0.00	51.00±0.000	22.50±0.00
Overall		14	42.39±5.30	53.54±5.90	57.79±6.00	26.30±3.24
Female single		8	45.44±6.34	57.68±7.69	60.10±7.13	28.13±4.20
	Twins	5	36.88±3.79	47.94±3.60	51.40±4.00	23.50±1.34
Overall		13	42.15±6.86	53.90±7.45	56.75±7.45	26.35±4.10

Table 3: Body weight and other measurements of lambs during the experiment

Sexes	Ages (months)				
	0	3	6	9	12
	M/F	M/F	M/F	M/F	M/F
No.	12/11	14/13	14/13	12/11	12/11
Body weight (kg)	3.18/2.70	11.60/9.97	13.27/13.86	20.14/18.90	27.53/25.13
Body length (cm)	25.67/25.80	42.39/42.15	45.91/46.13	47.56/46.25	56.14/55.13
Heart girth (cm)	31.83/31.78	53.54/53.90	54.77/56.00	58.37/58.30	73.00/70.75
Height (cm)	36.92/36.61	57.79/56.75	62.18/61.25	65.06/63.56	72.86/70.04
Chest depth (cm)	13.87/14.20	26.30/26.35	28.45/28.88	30.86/30.19	37.36/36.38

*M and F, represents sex notations

adult rams were 65.20±2.93, 82.80±3.09, 80.68±3.10 and 38.90±4.55, respectively. Similarly, for adult ewes they were 58.54±3.17, 74.40±9.69, 72.64±3.15 and 29.51±2.47-cm, respectively (Table 4).

For surveyed animals, body measurements of 15 lambs (for each group) at one, two, three and four weeks of age were estimated. These included body length, heart girth, height at withers and chest depth and the results obtained are presented in (Table 5).

The average body length, heart girth, height at withers and chest depth of rams estimated were 64.17±6.00, 86.59±9.61, 82.65±7.81 and 43.43±8.10-cm, while for ewes, the corresponding estimates were 61.87±4.88, 83.10±6.79, 76.97±10.10 and 41.12±5.63-cm, respectively (Table 6).

DISCUSSION

The body measurements were found to be similar in both males and females at birth and at weaning, respectively. This may be due to the small sample size of lambs at birth and at weaning used to estimate the body measurements. The strains of West African Sheep in this study had lower body length and heart girth than Muzaffarnagari breed in India at birth and at weaning^[6], but the strains of West African Dwarf Sheep were found

to be higher at withers than Muzaffarnagari at birth and at weaning. In contrast, (Mansoure *et al.*,^[7] and Mehta *et al.*,^[2]) found that sex and type of birth influenced body measurements. Recently, Abdalla^[8] inferred that there were no differences in body measurements between males and females from birth to one-year-old, but found that twin born lambs have lower estimates than single born lamb.

Also body measurements of rams and ewes for experimental and surveyed studies were estimated. These estimates were higher in rams than in ewes. They were found to be higher in adult rams and ewes than in younger rams and ewes. In agreement with the present study, Mehta *et al.*^[9] indicated that sex of the animal had a significant effect on body weight, height at withers, body length and chest girth at 4 pairs of permanent incisors teeth age stage. These estimates were more than those reported by^[11] for Shugor, Dubasi and Watish Sheep and it was less than that reported by^[10] for Hammari sheep. The phenotypic correlations of body weight with height at withers and chest girth ranged from 0.76±0.04 to 0.88±0.03 cm^[2]. The regression coefficients between the remaining live measurements and age in Shugor, Dubasi and Watish were highly significant^[1]. This investigation revealed that surveyed animals (sheep) exceed the experimental ones in all the body measurements.

Table 4: Body measurements of rams and ewes, Body Length (B.L), Heart Girth (H.G), height at withers (H) and chest depth (D)

Sexes	Age	Group No	B.L (cm)	H.G (cm)	H (cm)	D (cm)
Ram	1 Pair	2	63.50±1.50	78.00±1.00	78.00±3.00	31.15±0.35
	2 Pairs	5	64.20±2.86	83.60±2.80	80.66±3.22	40.14±3.17
	3 Pairs	3	68.00±1.41	84.67±0.47	83.50±1.22	42.00±0.00
Overall		10	65.20±2.93	82.80±3.19	80.68±3.09	38.90±4.55
Ewe	1 Pair	29	57.58±2.78	74.78±3.80	71.99±3.80	29.45±2.10
	2 Pairs	22	59.55±2.81	76.06±4.56	72.91±3.66	29.57±2.84
	3 Pairs	4	61.37±3.63	78.65±3.50	74.25±1.48	28.78±1.00
Overall		55	58.54±3.17	74.40±9.69	72.64±3.15	29.51±2.47

Table 5: Body measurement (Body Length (B.L), Heart Girth (H.G), Height at withers (H) and chest Depth (D)) of lambs in Western Sudan

Age (wks)	B.L (cm)	H.G (cm)	H (cm)	D (cm)
1	28.40±1.68	35.48±2.40	42.65±2.64	19.69±2.02
2	32.50±2.61	39.78±0.00	46.40±2.85	21.59±1.45
3	35.68±1.39	44.39±0.00	50.10±1.86	23.56±1.10
4	37.67±1.78	48.50±2.95	52.85±2.50	25.75±1.20

Table 6: Body measurements, Body Length (B.L), Heart Girth (H.G), Height at withers (H) and chest Depth (D)) of rams and ewes in Western Sudan

Sexes	Age group	No	B.L (cm)	H.G (cm)	H(cm)	D (cm)
Ram	1 Pair	19	59.53±4.40	78.70±5.80	77.16±5.95	40.89±3.89
	2 Pairs	11	67.73± 3.65	91.73±5.50	86.50±4.00	45.90±3.20
	3 Pairs	10	69.10±3.81	95.90±6.19	89.70±5.92	49.78±3.20
Overall		40	64.17±6.00	86.59±9.61	82.65±7.81	43.43±8.10
Ewe	1 Pair	34	59.10±4.50	78.44±4.50	75.40±4.11	39.73±2.26
	2 Pairs	9	63.00±3.10	85.40±4.10	80.67±3.00	42.00±1.80
	3 Pairs	20	64.80±2.70	88.00±4.99	80.04±5.56	43.80±3.10
	4 Pairs	4	67.75±3.80	93.00±4.58	83.50±4.50	46.50±2.29
Overall		67	61.81±4.88	83.10±6.79	76.97±10.10	41.12±5.63

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