

Some Reproductive Performance of Sudan Female Taggar Goats in Delleng Locality, South Kordofan State, Sudan

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ABSTRACT

This study was conducted in Delleng Locality, South Kordofan State, to study some productive traits and external body measurement of female. The data collected randomly by distributing 50 questionnaires to breeders and personal interviews. Descriptive analysis used to analyze the data. The results showed the main purpose of raising females is dual purpose (milk and meat), the litre size was twine. The weights of female were 20.2, 22.9 and 24.6Kg at first, second and third kidding respectively. The measurements were 63.7, 59.3, 63.3 and 58.6Cm represent for belly girth, body length; heart girth and height at wither for female at first kidding respectively. The measurements were 76.0, 67.4, 70.9 and 63.6Cm it was representing the belly girth, body length; heart girth and height at wither for female at third kidding respectively. The results revealed there was significant correlation ($r=0.90$) between weight of female at the first and second kidding and external body measurements (belly girth, body length, heart girth and height at wither). The study recommended that the average weight of females were 20.2, 22.9 and 24.6Kg at the first, second and third kidding respectively. There is significant ($P<0.05$) correlation between weight of females and some external body measurement.

Keywords: Female Mountain Goats, Body Weight, Measurements

INTRODUCTION

Sudan rank first to third among all African countries, the total numbers are estimated to 105 million heads distributed as follows sheep 39.8 million, goats 31 million, cattle 30.1 million; and camels 4.7 million (US Agency for international Development 2022) [1]. Goats are valuable livestock in arid and semi-arid zones, especially adapted to harsh environment. Goat is very important in rural economy and nutrition and has potentially of using as a tool for poverty reduction in Sudan. The main local goat breeds in Sudan are the Nubian, the Sahrawi, the Taggar or Jabaly, along with some local hybrid with European breeds. The Sudanese Taggar goats, its meat breed and its production associate with the performance commence from birth weight up to weaning time. The Taggar or Jabaly goats live in southern Kordofan State in Nubian mountains, Jebal Marra and southern hills of the Red Sea. It comprises 4.5% of Sudanese goat

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population, small in size, short leg and neck; both sexes have horn, crest and beard. Body hair is short with black line on the back and sides of the face. Goats are raised in Sudan under the stable system or under the nomadic system. Goats were depending on their feeding needs mainly by eating available vegetation, and rarely received any supplements. Birth weight and growth of kids until weaning, together with reproduction characteristics are reliable indicators of the breed efficiency in the production of meat and they mostly under the influence of feeding condition.

MATERIALS AND METHODS

Study Area

This study was conducted in Deleng area (longitudes 12.02 N, latitudes 29.39 E) southern Kordofan State.

Data Collection

Information was gathered through a questionnaire. Fifty questionnaires were distributed randomly to the goat's owners and personal interview.

Feeding and Housing of Goats

Goats are raised in Sudan under the stable system or under the nomadic system. Goats were depending on their feeding needs mainly by eating available vegetation, and rarely received any supplements. The female taggar goats were housed collectively in pens beside the farmer house without shed at the night, the size of the flock between 10-15 heads, at 7:00 a.m the flock were feed on range until sunset. Usually the milking manually at the morning.

External body measurements

External body measurements were measured by trained labour according to the method of Ravimurugan, et al., (2007) [2]. Measuring was done at the morning before gazing and drinking water, following overnight fast. Using metric tape

The heart girth

Was measured around the circumference of the chest just behind the forelegs and along the xiphoid depression

The body length

Was measured from the first thoracic spinal process to the base of the tail.

Bely girth

Was measured body circumference around the chest just behind the elbow joint.

Height at wither

Measured the distance from the base of hoof to the highest point of wither.

Live body weight

Live body weight of each female was carried out at the morning before grazing and drinking water, following overnight fast, with a 50Kg spring scale, by trained labor.

Statistical Analysis

The information was analyzed by descriptive analysis and correlation coefficient between weight and some external body measurements.

RESULTS

Purpose of raising Sudan Taggar (Mountain) goats

The results showed that 39 of respondents representing 78% of respondents raise females for the dual purpose (milk and meat), while 7 of respondents, representing 14% raise them for milk production and four of respondents representing 8% raise them for meat production (table 1).

Litre size of Sudan female Taggar (Mountain) goats

33 of respondents representing 66% of respondents reported that the litre size is twine, while 16 of respondents representing 32% claimed that the lire size is single and one of respondents representing 2% showed that the litre size is triple (table 2).

Live weights of females and some external body measurements of Sudan Taggar (Mountain) goats

The respondents reported that the female weights were 20.2, 22.9 and 24.6Kg for the first, second and third kidding respectively. The belly girth length is 68.3, 72.4 and 76.0 Cm for the females at the first, second and third kidding respectively. The heart girth length is 63.7, 66.7 and 70.9 Cm for the females at the first, second and third kidding respectively. The height at wither length is 58.6, 60.7 and 63.6Cm for the females at the first, second and third kidding respectively. The body length is 59.3, 62.3 and 67.4 Cm for the females at the first, second and third kidding respectively (table 3).

Correlation co efficient between live weight of female at first kidding and some external body measurements of Sudan female Mountain goats

The study explained correlation co efficient between weights of female at first kidding and some external body measurements of Sudan female Mountain goats(table 4). There was positive and higher correlation co efficient between body length and belly girth ($r= 0.34$), heart girth and belly girth ($r = 0.74$), heart girth and body length ($r= 0.73$), height at wither and body length ($r = 0.73$) and height at wither and heart girth ($r = 0.37$).

Correlation co efficient between live weight of female at second kidding and some external body measurements of Sudan female Mountain goats

The study explained the correlation co efficient between weight of female at second kidding and some external body measurements of Sudan female Mountain goats (table 5). There was positive and higher correlation co efficient between body length and belly girth ($r=0.3$), heart girth and belly girth ($r=0.4$), heart girth and body length ($r=0.3$), height at wither and body length ($r=0.5$) and height at wither and heart girth ($r=0.3$).

Correlation co efficient between live weight of female at third kidding and some external body measurements of Sudan female Mountain goats

The study explained correlation co efficient between weight of female at first kidding and some external body measurements of Sudan female Mountain goats (table 6). There was positive and higher correlation co efficient between body length and belly girth ($r=0.3$), heart girth and belly girth ($r=0.7$), heart girth and body length ($r=0.3$), height at wither and body length ($r=0.6$).

Purpose of raising Sudan Taggar (Mountain) goats

The main purpose of raising Sudan Taggar (Mountain) goats for dual purpose (milk and meat). This result was in disagreement with classification of local breed which classified Sudan Taggar (mountain goat) as meat breed. May be the nature of mountainous region rich in nutritional resources, made the female parent produce relatively large quantities of milk besides increasing the daily weight gain (meat production)

Litre size of Sudan female Taggar (Mountain) goats

Litre size of Sudan female Taggar (Mountain) goats is twine. This result was in line with findings of de lima et al.,(2020) [3] who claimed that the average litter size in goats varies 1.30-2.37. May be the nature of mountainous region rich in nutritional resources, and there is availability of edible shrubs and trees.

Live weights of females, weaning and some external body measurements of Sudan female Taggar (Mountain) goats

Weights of females, of weaning and external body measurements were shown in table, 4-3. Female's weights were 20.2, 22.9 and 24.6 Kg for first, second and third kidding respectively. This result was in disagreement with finding of TNAU Agritech Portal [4] who reported that an adult female weighs between 25-35 Kg. In tropical areas grazing alone might not be sufficient for gaining optimum live weight, therefore scavenging can be supplemented with minimum

level of concentrates as source of protein or energy than level of production can be increased at minimum cost (Kabir et al., 2002) [5] Adult body weight showed great variation among different goat breeds and environments. The differences may be due to the types of breed in different studies and may be due to the nature of mountainous region rich in nutritional resources.

The study claimed that the belly girth was 68.3, 72, 4, 76.0 Cm for first second and third kidding respectively table, 4-3. This result with disagreement with finding of ICAR-CCARI [6] who reported that the average belly girth of female between 71-73 Cm and was in disagree with finding of Mudalal (2018) [7] who said that the belly girth of kid of Desert goat was ranged between 51-52 Cm. May be these differences due to different in age and environmental factors and sex of birth. The body length was 59.3, 62, 3, 67, 4 Cm for first second and third kidding respectively table, 4-3. This result was not in line with finding of Mudalal (2018) [7] who stated that the body length was ranged between 55.8 and 58 Cm and was not in line with finding of Dimension com[8] who pointed that the body length between 41-60 Cm . May be the reason for that difference due to differences between age in the two studies and nutrition and management system and breeds. This study exposed that the heart girth was 63.7, 66.7 and 70.9 Cm for first second and third kidding respectively table, 4-3. This result with disagreement with finding of Mudalal (2018) [7] who said that the heart girth was 52Cm and was not in line with the finding of Core [9] who reported that the heart girth of West African Dwarf 18, 21.8, 25 and 26 Cm. this variation may be due to differences between age in the two studies, nutrition, management systems and the breed type. This study revealed that the height wither was 58.6, 60.7 and 63.6 Cm for first second and third kidding respectively table, 4-3. This result was differ from the finding of Core [9] who reported that the height at wither was 15.7 and 18.2 Cm for West African Dwarf. May be the reason for that difference due to differences between age in the two studies, nutrition, management systems and breed type.

Correlation co efficient between live weight of female at first kidding and some external body measurements of Sudan female Mountain goats

There was positive and higher correlation co efficient between body length and belly girth ($r=0.34$), heart girth and belly girth ($r=0.74$), heart girth and body length ($r=0.73$), height at wither and body length ($r=0.73$) and height at wither and heart girth ($r=0.37$). These results were in line with finding of Mudalal (2012) [10] who stated that there was positive and strong correlation ($r=0.37, 0.84, 0.84$ and 0.85) between (slaughter weight and body length)and between (slaughter weight and belly girth) and (slaughter

weight and height at wither) and between (slaughter weight and heart girth) respectively and in line with finding of Babikir (2020) [11] who pointed that there was positive and strong correlation in Hammari lamb ($r = 0.96, 0.97$ and 0.71) between (slaughter weight and belly girth) and (slaughter weight and body length) and between (slaughter weight and heart girth) and in line with Worku (2019) [12] who said that body weight had highest correlation coefficient with heart girth around the chest under the some farmers feeding conditions for Arsi Bale sheep.

Correlation co efficient between live weight of female at second kidding and some external body measurements of Sudan female Mountain goats

There was positive and higher correlation co efficient between body length and belly girth ($r=0.3$), heart girth and belly girth ($r=0.4$), heart girth and body length ($r=0.3$), height at wither and body length ($r=0.5$) and height at wither and heart girth ($r=0.3$). this results were in line with finding of Mudalal (2012) [10] who stated that there was positive and strong correlation ($r=0.37, 0.84, 0.84$ and 0.85) between (slaughter weight and body length)and between (slaughter weight and belly girth) and (slaughter weight and height at wither) and between (slaughter weight and heart girth) respectively and in line with finding of Babikir (2020) [11] who pointed that there was positive and strong correlation in Hammari lamb ($r= 0.96, 0.97$ and 0.71) between (slaughter weight and belly girth) and (slaughter weight and body

length) and between (slaughter weight and heart girth) respectively and in line with Worku (2019) [12] who said that body weight had highest correlation coefficient with heart girth around the chest under the some farmers feeding conditions for Arsi Bale sheep.

Correlation co efficient between live weight of female at third kidding and some external body measurements of Sudan female Mountain goats

There was positive and higher correlation co efficient between body length and belly girth ($r=0.3$), heart girth and belly girth ($r=0.7$), heart girth and body length ($r=0.3$), height at wither and body length ($r=0.6$). This results were in line with finding of Mudalal (2012) [10] who stated that there was positive and strong correlation ($r=0.37, 0.84, 0.84$ and 0.85) between (slaughter weight and body length)and between (slaughter weight and belly girth) and (slaughter weight and height at wither) and between (slaughter weight and heart girth) respectively and in line with finding of Babikir (2020) [11] who pointed that there was positive and strong correlation in Hammari lamb ($r= 0.96, 0.97$ and 0.71) between (slaughter weight and belly girth) and (slaughter weight and body length) and between (slaughter weight and heart girth) respectively and in line with Worku (2019) [12] who said that body weight had highest correlation coefficient with heart girth around the chest under the some farmers feeding conditions for Arsi Bale sheep.

Table 1: Purpose of raising Sudan Taggar (Mountain) goats.

Purpose	Frequency	Percentage
Meat	4	8
Milk	7	14
Dual purpose	39	78
Total	50	100

Table 2: Litre size of Sudan female Taggar (Mountain) goats.

Litre size	Frequency	Percentage
Single	16	32
Twine	33	66
Triple	1	2
Total	50	100

Table 3: Weights of female, weaning and some external body measurements of Sudan female Mountain goats.

Item	Group 1	Group 1	Group 1			
	First kidding	Second kidding	Third kidding	C.v	S _x	P
Female weight (Kg)	20.150 ^a	22.227 ^b	24.600 ^c	6.26	0.2553	0.0000
Belly girth (Cm)	68.333 ^a	72.353 ^b	75.800 ^c	4.82	0.6351	0.0000
Body length (Cm)	59.353 ^a	63.490 ^b	67.400 ^c	4.95	0.5726	0.0000
Heart girth (Cm)	63.693 ^a	66.930 ^b	70.900 ^c	5.28	0.6474	0.0000
Height at wither (Cm)	58.800 ^a	60.940 ^b	63.600 ^c	8.24	0.9200	0.0021

^{abc}Values in the same rows with different superscripts differ as 0.000 , $P < 0.001$ highly significant.

Table 4: Correlation co efficient between weight of female at first kidding and some external body measurements of Sudan female Mountain goats.

	BG	BL	HG
BL	0.3		
	(0.03)*		
HG	0.4	0.3	
	(0.002)**	(0.02)**	
HW	0.1	0.5	0.3
	(0.5)NS	(0.0007)***	(0.03)*

BL= body length, HG= Heart girth, HW=Height at wither, BG=Belly girth, ***, **, *significant at , $P \leq 0.001$, $P \leq 0.01$ and $P \leq 0.05$ respectively, NS non-significant

Table 5: Correlation co efficient between weight of female at second kidding and some external body measurements of Sudan female Mountain goats.

	BG	BL	HG
BL	0.3		
	(0.03)*		
HG	0.4	0.3	
	(0.002)**	(0.02)**	
HW	0.1	0.5	0.3
	(0.5)NS	(0.0007)***	(0.03)*

BL= body length, HG= Heart girth, HW=Height at wither, BG=Belly girth, ***, **, *significant at , $P \leq 0.001$, $P \leq 0.01$ and $P \leq 0.05$ respectively, NS non-significant.

Table 6: Correlation coefficient between weight of Sudan female mountain goats at third kidding and some external body measurements.

	BG	BL	HG
BL	0.3		
	(0.02)*		
HG	0.7	0.3	
	(0.000)***	(0.02)**	
HW	-0.2	0.6	0.05
	(0.9)NS	(0.000)***	(0.7)NS

BL= body length, HG= Heart girth, HW=Height at wither, BG=Belly girth, ***, **, *significant at , $P \leq 0.001$, $P \leq 0.01$ and $P \leq 0.05$ respectively, NS non-significant.

CONCLUSIONS

It was conducted that there was positive and strong correlation coefficient between external body measurements (heart girth, belly girth, height at wither and body length) except (between height at wither and belly girth) and live body weight of female at first, second and third kidding.

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Conflict of Interest

There is no conflict of interest with any financial, personal or other relationships with other people or organizations related to the material discussed in the manuscript.

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