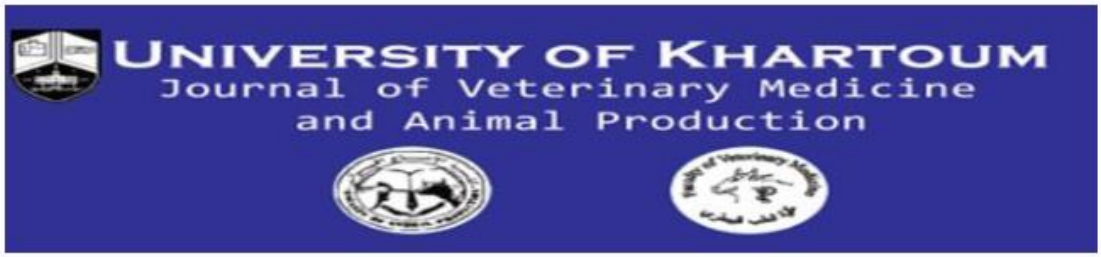
U. of K. J. Vet. Med. Anim. Prod., Vol. 7, Issue 1 (2016) p 43-49

ISSN: 24345



Body measurements of Sudan desert sheep lambs fed urea ensiled groundnut hulls and molasses under range conditions

Abdelbagi Ballal Ahmed[1]*, Ikhlas Ahmed Nour[2]; Ibrahim Musa Tibin[3]; Omer Mustafa[4]

[1] Department of Animal Production, Faculty of Veterinary Science, University of West Kordofan
[2,] Institute for Studies and Promotion of Animal Exports, University of Khartoum
[3] Department of Meat Production , Faculty of Animal Production, University of Khartoum
[4] Ministry of Animal Resources and Fisheries, El-Nuhood, North Kordofan state, Desert sheep research station Sudan
*Email: abdelbagib@gmail.com

Abstract

The study was conducted to evaluate the effect of feeding urea-treated groundnut hulls (silage) and molasses on body measurements of Hammari desert sheep lambs, at Elnuhood Desert Sheep Research Station, North Kordofan State, to meet the feed shortage during summer. The duration of the experiment was ninety days. Sixty desert sheep lambs (thirty males + thirty females) of 6 months age and 23.4 kg average live weights were divided into three equal groups (A, B and C). Groundnut hulls treated with 5 % urea was ensiled for 30 days. The lambs were fed a ration containing 77% silage and 23% molasses in addition to natural pasture grazing. Group A was offered 400gm silage and 120 gm molasses per day, group B was offered 200 gm silage and 60 gm molasses per day and group C (the control) was left to graze the natural pasture without supplementation. The effects of feeding management and sex were determined**.** The result revealed that, the slaughter weights were not significantly different among the treatments, group A gave the highest weight (26.25kg) followed by group B (23.69kg) while group C had the lowest weight (22.25kg). The body measurements were not significantly different among the supplemented groups except the heart girth which was significantly higher in group A (68.9cm) compared with group B (67.1cm) and the control, group C (67.4cm). Males had significantly ($p<0.05$) larger head length, neck length, height at wither and body length than females. Height at wither, heart girth and body length were positively correlated with body weight. The study indicated feeding 400g silage and120g molasses per day can be used as maintenance supplementation for desert sheep lambs during summer under range conditions.

Key words: groundnut silage, range, desert lamb, body measurements

المستخلص

أجريت هذه الدراسة لتقييم تاثير التغذية علي قشر الفول السوداني المعامل باليوريا (سيلاج) و المولاس علي قياسات جسم حملان الضأن الحمري الصحراوي بمحطة ابحاث الضان الصحراوي - النهود - ولاية شمال كردفان من اجل سد الفجوه الغذائية في الصيف . فترة التجربه 90 يوم. شمل البحث ستين حملاً من الضأن الحمري (30 ذكور + 30 إناث)، في عمر 6 اشهر ومتوسط وزنها الحي 23.4 كيلو جرام، قسم القطيع عشوائياً لثلاث مجموعات متساوية (أ ،ب ،ج). تم عمل سيلاج لمدة 30 يوم من قشرة الفول السوداني المعاملة باليوريا بنسبة 5%. غذيت الحملان بعليقة تحتوي علي 77% سيلاج و23% مولاس بالاضافة الي الرعي في المرعي الطبيعي. المجموعة (أ) أعطيت 400 جم من السيلاج و120جم من المولاس في اليوم بينما أعطيت المجموعة (ب) 200 جم من السيلاج و60 جم من المولاس في اليوم اما المجموعة (ج) مجموعة الشاهد تركت تتغذي علي المرعي الطبيعي بدون تغذية اضافية .تم تحديد تاثير الادارة التغذوية والجنس. اظهرت النتائج انه لا توجد فروق معنوية في الاوزان عند الذبيح بين المجموعات الغذائية ولكن المجموعة (أ) اعطت اعلي اوزان (26.25كجم) تليها المجموعة (ب - 23.69كجم) اما المجموعة (ج) مجموعة الشاهد فقد اعطت اقل اوزان (22.25كجم). لم تظهر الدراسة أي فروق معنوية في قياسات الجسم بين المجموعات التي اعطيت تغذيه اضافيه ما عدا محيط الصدر الذي كان اعلي معنويا في المجموعة أ (68.9 سم) بالمقارنه مع المجموعة ب (67.1 سم) والمجموعة ج (67.4 سم) مجموعة الشاهد .هنالك فروقات معنويه بين الذكور والاناث حيث كان طول الراس والرقبه والارتفاع عند الغارب وطول الجسم أعلي($P<0.05$) معنوياً عند الذكور. كما وجدت إرتباطات موجبة بين الإرتفاع عند الغارب و محيط الصدر وطول الجسم. اظهرت

الدراسه ان تغذية 400 جم من السيلاج و120جم من المولاس .اثبتت الدراسة أنه يمكن استخدام 400 جم من السيلاج و 120 جم من المولاس يوميا كتغذية ادامة تكميلية لحملان الضان الصحراوي خلال فصل الصيف تحت ظروف المرعي الطبيعي.

Introduction

Sudan is characterized by vast areas of range and arable land estimated as 280 million fedans, which is either rain-fed or irrigated. The country has a large population of livestock estimated to be 103 million head (MARF, 2010). Over 60% of the estimated figure of sheep (39.1milliom) is desert sheep which are well known for production of good quality meat for local consumption and export. Feed resources available in Kordofan states are mixture of thorny trees, herbs, grasses, agricultural residues (Groundnut hay, sesame stalk and sorghum straw) and agro-industrial by-products (oil seed cakes, groundnut hulls and wheat bran (Yehia, 2002). The nutrient content of these pastures varies greatly during the year especially in the dry season when the nutritive values decline sharply and became inadequate for sheep which adversely affect animal productivity (ElHag, 1992). Body measurements of live animals have used extensively for experimental work and in practices as predictor of animal live weight on field bases where no easy access to weighing instrument. The ability of the producers and buyers to relate the live animals' measurement to growth characteristics is essential for optimum production and value-based trading system. Age significantly ($P<0.05$) influence body weight and all the other linear body measurements in all age groups considered. In male and female goats of 0 -1 and 1 - 2 years, sex significantly ($P<0.05$) influenced body weights and body linear measurements with the female consistently showing superiority. Regression analysis showed that body weights could be predicted accurately from heart girth, sacral pelvic width, body length, wither height and rump height (Samuel and Salako, 2008). Mohmed (2004) found that, the measurement of height at wither, body length and back length were significantly greater in ram than in ewe lambs, their values were 78 cm and 75 cm, 73.8 cm and 66.4 cm, and 100.9cm and 92.7 cm respectively, for male and female. Musa et al. (2005) reported that, the average body length, heart girth, height at wither and chest depth for rams were 64.87, 86.59, 82.65 and 43.43 cm and those for ewe were 61.87, 83.1, 76.97 and 41.12 cm, respectively.

Average linear body measurements of Hammari subtype lambs of 6 months of age were 75.9, 77.3, 52.4, 40.8, 31.9, 19.4, 25.0 and 58.3 cm for highest wither height, heart girth, body length, chest depth, head length, ear length, neck length and tail length, respectively (Salah, 2011). Mohamed (2003) recorded a positive correlation between body weights and both heart girth and height at wither for desert sheep subecotype hammari and Kabashi lambs. Musa (2010) studied the effect of sex and management system on live body measurement and found a positive correlation between heart girth and bodyweight.

The objective of this study is to evaluate the effect of feeding urea-treated groundnut hulls (silage) and molasses on body measurements of Hammari desert sheep lambs to meet the feed shortage during summer

Materials and methods

Study area

This study was conducted at Elnuhood Desert Sheep Research Station, 12 kilometers East of Elnuhood town, North Kordofan State. The experiment continued for ninety days in dry summer season (March- May 2010).

Experimental diets

The experimental diet was composed of 77% urea treated groundnut hulls silage and 23 % molasses. Three feeding groups, according to the amount of silage and molasses offered to the experimental animal, were used (Table 1).

Ensilage procedure

A pit of 4×2×1 meters length, width and depth was dug and lined by plastic sheet. Urea was dissolved in water and added to the crushed groundnut hulls as a 5% of the crushed groundnut hulls weight. The ensiled material was manually compressed layer by layer and covered with plastic sheet and approximately 20 centimeters layer of soil. After 30 days, the silo was opened, exposed to the sunlight so as to reduce the moisture and finally the silage

were ready for use, the chemical compositions were shown in Figure 1.

Table 1: Ingredients of the experimental diets

Feeding groups	Supplemented feed/ animal	
	*UEGH(gm)	Molasses (gm
Group (A)	400	120
Group (B)	200	60
Group (C) control (natural grazing)	00	00

***UEGH: urea-ensiled groundnut hulls

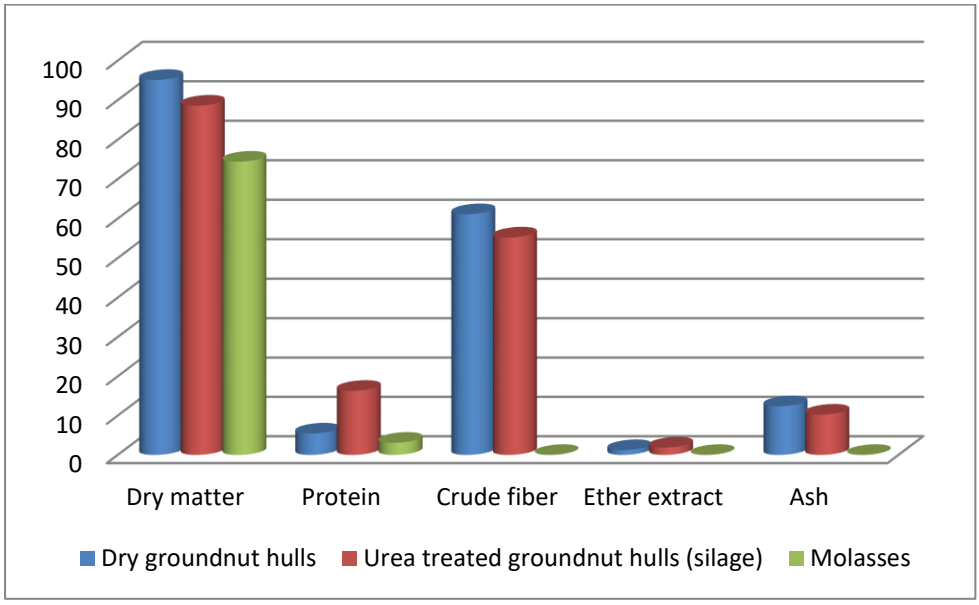


Figure 1: Experimental feed proximate chemical composition (%)

Experimental animals

Sixty desert sheep lambs (thirty males + thirty females) of 6 months age and 23.4 kg average live weights were used for the study. The lambs were divided randomly into three equal groups of twenty lambs (10 males+10 females) for each according to the experimental feed offered (A, B and C). The lambs were given experimental diet for fifteen days adaptation period, during this period the animals were treated with Ivomec against external and internal parasites, dipped in diluted Cypermethrine and provided with salt lick plus vitamins (VITADIN).All the animals were kept in the same area and grazed together in the yard of the of the station during the whole night and apart of the day, at 10:00 o'clock a.m. The lambs were kept in shades for rest and lunching of experimental feed, then set to graze at 6:00 o'clock p.m. (traditional grazing system in the area).

Body measurements

Body measurements were carried out every two weeks by measuring tape according to Owen *et al.* (1977). All measurements were taken in the morning before the animals were fed. Each dimension taken was recorded in centimeter while the weight was recorded in kilogram. The data collected on each animal were analyzed using the General Linear Model Procedure (PROC GLM) of SAS (1999) to evaluate the significance of sources of variation affecting measurements of each animal. The interrelationship of body weights and linear body measurements were estimated by simple correlation and regression (Steel and Torrie, 1980).

Results and discussion

Statistical analyses reveals that the interaction between the feed supplementation treatments and the lambs sex was not significant (P>0.05)

therefore the results were taken from the means of the two main effects.

Effects of the three experimental treatments on linear body measurements of live animals are shown in Figure 2. Ear length, head length, neck length, tail length, height at withers, heart girth and body length. The data revealed no significant differences between treatment groups with exception of heart girth which was significantly ($P<0.05$) higher in animals in group (A) than that in group (B) and (C).

Effect of sex on body measurements are shown in Figure 3. Male had significantly ($P<0.05$) greater head length, neck length, height at wither, heart girth and significantly ($P<0.01$) greater body length than those of females. Ear length and tail length were not significantly different, but males had got the superior values than that of females.

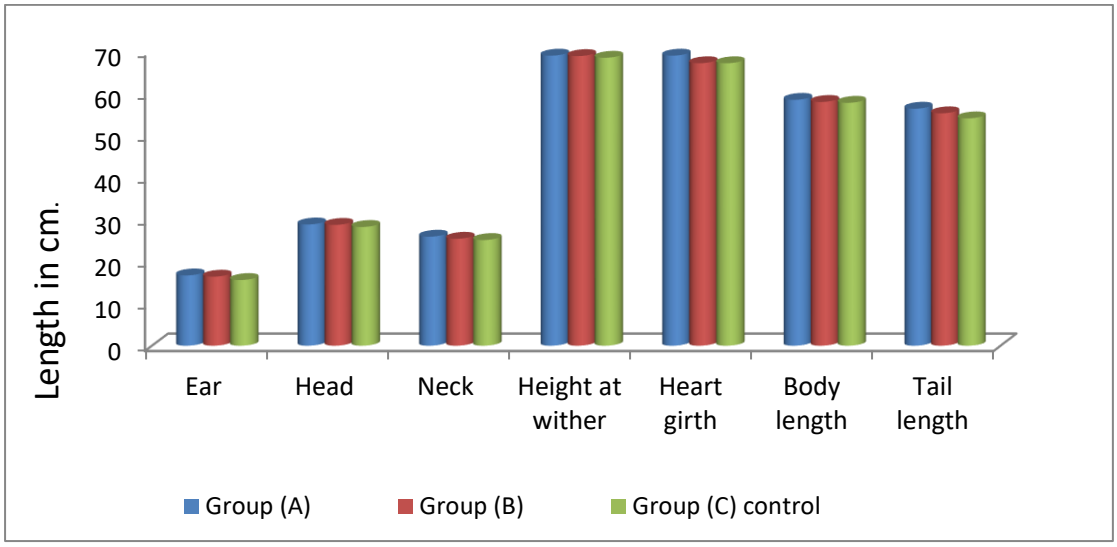


Figure 2: Effect of feeding urea-treated groundnut hulls (silage) and molasses on linear body measurements of desert sheep (Hammari) lambs

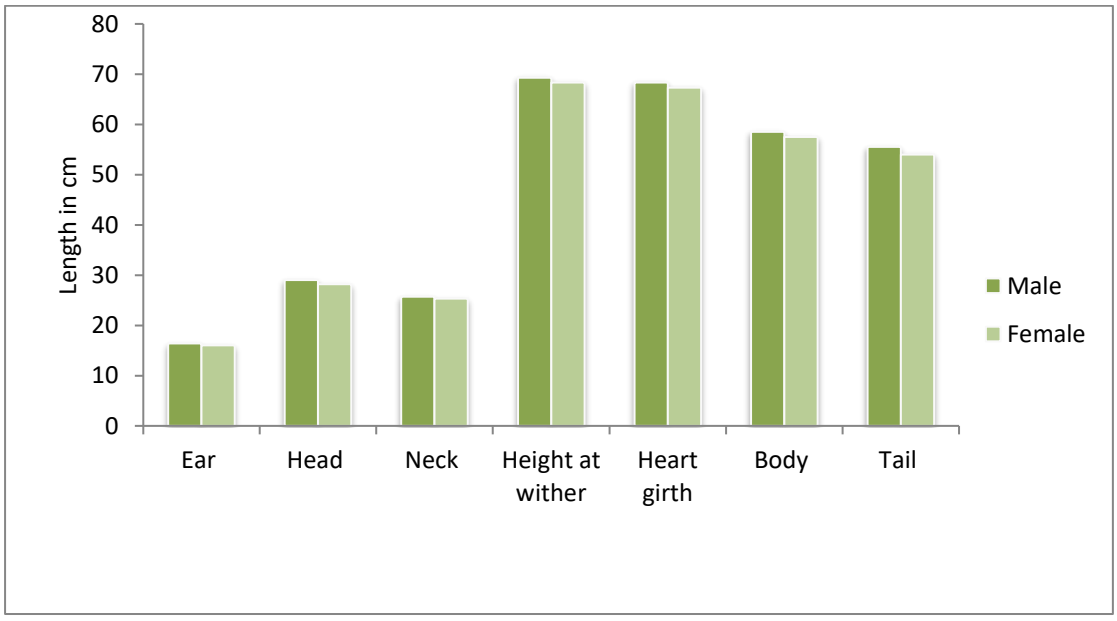


Figure 3: Effect of sex on linear body measurements of desert sheep (Hammari) lambs

Correlation

Correlation coefficients between body weight and different body measurements are given in Table 2. Height at wither, heart girth and body length were positively correlated with the body weight ($r=0.62$, $P<0.001$), ($r= 0.82$, $P<0.001$)

and (r= 0.71, P<0.001), respectively. Other linear body measurements did not show positive correlation with body weight.

The equations generated using the Linear Model:

Simple regression: Y = a + b X

Y = weight of animal (kg)

a = Intercept, (constant).

b = Slope, the regression coefficient the change in Y per unit change in x.

X= body measurements. (cm)

(i) Independent Variable = Body length

Body weight = - 20.193+0.830 Body length (R^2= 0.507)

(ii) Independent Variable= Height at withers

Body weight = - 18.698 +0.687 Height at withers (R^2= 0.382)

(iii) Independent Variable = Heart girth

Body weight = – 36.543 +0.928 Heart girth (R^2= 0.670)

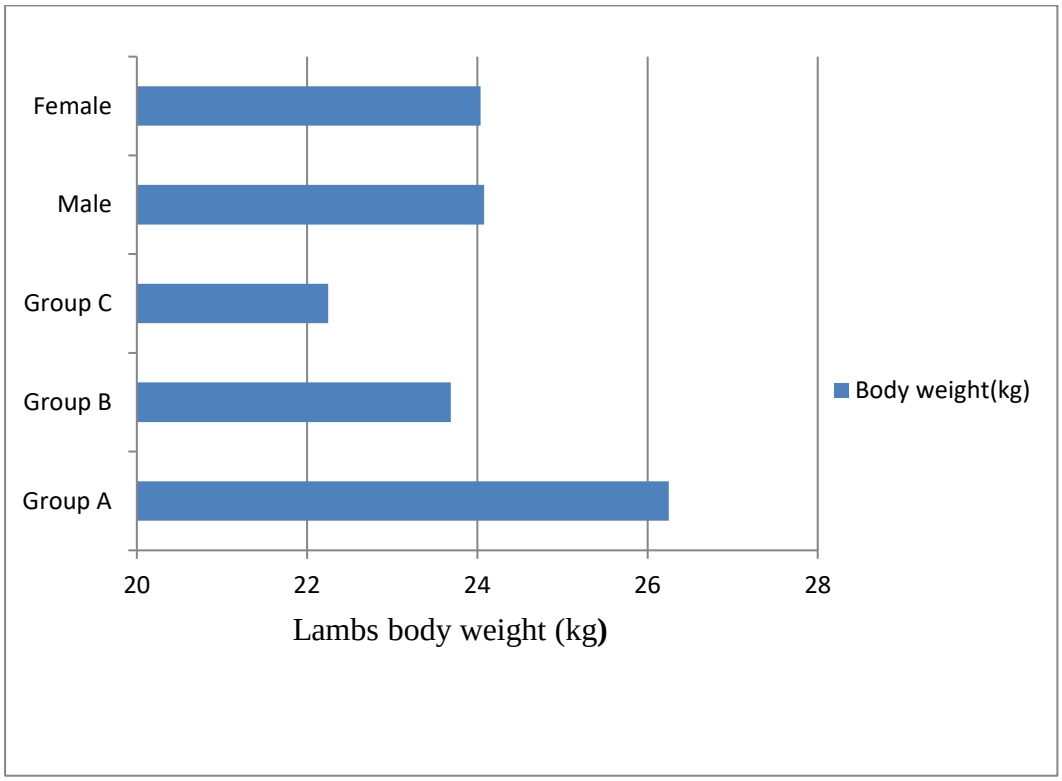


Figure 4: Effect of feed supplementation and sex on desert sheep lambs body weight during summer under range conditions

Table 2: Simple regression models for predicting overall growth from linear body measurements in desert sheep (Hammari) lambs under range conditions

Dependent (Y)	Independent (X)	Regression equation	S.E	R^2 values
BDW	Heart girth (HT)	– 36.54 +0.93X	2.2	0.67
BDW	Body length (L)	- 20.19+0.83X	2.7	0.57
BDW	Height at wither (HW)	- 18.68 +0.69X	3.0	0.51
BDW	Head length (HL)	4.13 +0.92X	3.2	0.32
BDW	Ear length (EL)	20.21 +0.58	3.8	0.04
BDW	Neck length (NL)	4.92 +1.1 X	3.4	0.22
BDW	Tail length (TL)	10.78 +0.24	3.3	0.22

BDW = Body weight, HT = Heart girth, L = Body length, HW = Height at wither, Head length (HL) Ear length (EL), Neck length (NL), Tail length (TL)

In the present study there were no significant differences between feeding groups in linear body measurements, this finding agreed with Musa (2010) who obtained the same result in desert sheep fed on different ration with different management system. The mean measurements for ear, head, neck, height at wither, heart girth, body length and tail length were 16.2cm, 28.6 cm, 25.5 cm, 68.7 cm, 67.9 cm, 58.0and 55.2 cm respectively. Between sex groups, males had significantly ($P<0.05$) greater head length, neck length and height at wither, significantly ($P<0.01$) greater body length. These results were inferior to the finding of Abulazayim (1996) who reported that, adult desert sheep of Sudan had an average wither height of 86 cm and body weight of 47kg. The various sub ecotypes showed different measurements. This may be due to the fact that he studied the body measurements of mature sheep. The present finding is lower than that of Omer (2009) who found that, the mean value of body measurements in El Gash sheep were 19.4, 27.2 cm, 80.5, 84.5 and 59.0 cm for ear length, neck length, height at wither, heart girth and tail length respectively. This is may be due to genotypic variations in sub ecotype of the desert sheep. Also the present result is close to Mohamed (2004) who found that, the measurement of wither height, body length and back length were significantly ($P<0.01$) greater in ram than in ewe lambs. But our finding is lower than Mehta *et al*. (1995), this may be due to the fact that they used mature sheep in their experiment.

Correlations between body weight and different body measurements showed that, height at wither, heart girth and body length were positively correlated with the body weight ($r=0.62$, $P<0.001$), ($r=0.82$, $P<0.001$) and ($r=0.71$, $P<0.001$), respectively. Other body measurements did not show positive correlation with body weight. The present result is in agreement with Mohamed (2003) who reported that, in Kabashi lambs, the best relationship was found between heart girth, head and height at wither with body weight. This because we used Hammari ecotype in our study which is closely related to Kabashi subtype.

Conclusion

Feeding urea treated groundnut hulls as protein supplement and molasses as energy supplement to the desert lambs when grazing pasture during summer was very poor and scarce increased desert sheep (Hammari subtype) body weight. The amount of food offered, 400g silage and 120g molasses was enough for maintenance. Body weight could be predicted accurately from heart girth and, height at wither and body length of desert sheep lambs (Hammari subtype). Hence it was recommended to increase the daily offered urea treated groundnut hulls and molasses feed supplementation for improving the lambs' productivity thus more research is needed.

Acknowledgement

The assistance of the Elnuhood Desert Sheep Research Station, North Kurdofan State, Sudan, personnel is appreciated also their contribution in supplying the experimental animals is highly respected.

Note: A part of this research was presented in Tropentag 2014, Book of Abstracts Bridging the gap between increasing knowledge and decreasing resources Ed.: Eric Tielkes ISBN: 978-80-213-2481-7 Online-version:

References

Abulazyim, M. (1996). Animal resources and animal production in the Sudan, Second chapter, Khartoum University Press, University of Khartoum, Casting house: 63-90 (Arabic).

Elhag, M. G. (1992). Effect of chopping and wilting on tropical grass and silage quality in South Kordofan, Sudan. African Livestock Research, 2: 11-14.

MARF (2010). Ministry of Animal Resources and Fisheries in the Sudan, Estimate of Livestock Population by states, Report 2010.

Mehta, S. C.; Vij, K. P.; Joshi, K. B.; Sahai, R. and Nivarkar, E. A. (1995). Characterization and conservation of the Malpura sheep breed. Animal Genetic Resources Information. 16: 83-91.

Mohamed, A. M. A. (2003). Body measurements, performance and meat characteristics of Desert sheep. PhD. Thesis, Gesira University.

Mohamed, M. E. (2004). Meat production from ewe compared with rambs. M. Sc. Thesis. Faculty of Animal Production, University of Khartoum.

Musa, A. M. (2010). Performance, carcass characteristics and meat quality attributes of desert

sheep under range condition. M. Sc. Thesis, University of Khartoum.

Musa, H. H.; Suleiman, A. H.; Elamin, M. E. and Chen, H. G. (2005). Reproduction and production performance of Western African sheep in Sudan. J. Anim. Prod., 4: 750-754.

Omer, M. O. (2009). Productive, reproductive and carcass characterstics of Algash sheep. M. Sc. Thesis. University of Khartoum.

Owen, J. G.; Norman, G. A.; Fisher, I. I. and Forst R. A. (1977). Studies on the meat production characteristics of Botswana goats and sheep. Part I. sampling, methods and materials and measurement on the live animals. Meat Science,1: 63-69.

Salah, A, G. (2011). Effect of management and feeding supplement on performance, fertility and carcass characteristics of Sudan desert sheep raised under range condition. Ph.D. Thesis, Faculty of Animal Production, University of Khartoum.

Samuel, O.K. and Salako, A.E. (2008). Body measurement characteristics of the West Dwarf (WAD) goat in deciduous forest zone of southwestern Nigeria. Afr. J. Biotech, 7(14): 2521-2526.

SAS, (1999) Statistical Analysis System User' Guide Statistics.

Steel, R.G.D. and Torrie, J.H. (1980). Principles and Procedures of Statistics, A biometrical approach, 2nd edition, McGraw-Hill, New York, USA, pp. 20-90.

Yehia, E. A. (2002). Ecology of some herbaceous forage in North Kordofan, M.Sc. Thesis, Institute of Environmental Studies, University of Khartoum, Sudan.