Shorani sheep carcass characteristics at different ages in Elabassia Tagali, Nuba Mountains, South Kordofan State, Sudan

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ABSTRACT

Shorani sheep carcass characteristics were studied at <1, 1 and 2 years old in Elabassia Tagali area in the Nuba Mountains, South Kordofan State, Sudan in November 2002. Nine animals (three for each age group) were bought from local markets, rested, watered, fasted overnight and then slaughtered according to Islamic rituals. Slaughter weight, empty body weight (EBW) and hot carcass weight significantly ($P<0.05$) increased with increasing slaughter age. Empty body weight was lower than live body weight. Dressing percentages on live body weight and empty body weight increased with slaughter weight and were higher on EBW. Body components significantly ($P<0.05$) increased with increasing slaughter age. The percentages of all body components on EBW increased with increasing slaughter age from<1 to 1 year old and decreased at 2 years old. The percentages of muscles and bones significantly ($P<0.05$) increased with increasing the slaughter weight from<1 to 1 year old and then decreased. Fat percentages significantly ($P<0.05$) increased with slaughter age. Muscle: bone ratio significantly ($P<0.05$) increased with slaughter age to 1 year old and decreased at 2 years old. Muscle: fat ratio significantly ($P<0.05$) decreased with slaughter age.

INTRODUCTION

Sheep production is extremely important in the Sudan due to the high population, wide distribution and socio-economic roles (Ministry of Animal Resources and Fisheries, 2004). Sheep exports are soaring due to high quality and animals depend on rangelands and no growth promoters or feed additives, especially of animal origin which threaten human and livestock health are used.

There are many types of sheep in the Sudan and different methods are adopted in their classification. They were classified according to the type of the tail (Mason and Maule, 1960), tail length: height at withers and ecotypes (Devendra and Mc Leroy, 1982). Ecotypes are associated with tribes and their boundaries and were adopted because Sudanese sheep are not improved to be breeds according to western standards. They were classified into five main ecotypes and three fused ones. Desert is the main sheep ecotype and export sheep with many subtypes and its blood is increasing in other ecotypes as it is preferred in the market. Nilotic ecotypes are found in Southern Sudan, contact areas and in Nuba Mountains. Shorani sheep is a cross between Desert and Nilotic sheep in Nuba Mountains and there is no available information on its phenotypes, husbandry, performance and carcass characteristics in traditional areas. Consequently, this study was conducted in Elabassia Tagali area in the Nuba Mountains to furnish this information.

MATERIALS AND METHODS

The study was conducted in Elabassia Tagali in Rashad Province in South Kordofan State, Sudan. It is located between latitudes 11°30́ and 12° 45́ N and longitudes 30° 30́ and 32° 04 E and 600-15000 masl (Survey Department, Elabassia Tagali, 2002). The soil is sandy in the west and clay in the east. Mean minimum and maximum temperatures are 17 and 43°C, respectively with a peak in May. Annual rainfall is 500-700 mm and is from April to October. Relative humidity is 35-75%. Vegetation is determined by rainfall, soil, topography and feed quantity and quality vary with seasons with a peak in autumn and serious shortages in the dry season. Animal production is important in the area with about 0.5 million sheep depending mainly on natural pastures and crop residues.

Animals

Nine Shorani males were bought from Elabassia Tagali and Tabassa markets at <1, 1 and 2 years with three animals in each age group in a completely randomized design. Age was estimated using the lower jaw incisors as described by Devendra and Mc Leroy (1982).The animals were rested, watered, fasted over night and slaughtered according to Islamic rituals in the second day. They were weighed before slaughter and blood

was collected in plastic containers and weighed. The head, legs and skin were removed and weighed. The carcass was opened, eviscerated and the lungs, heart, spleen, liver and alimentary tract were removed and weighed separately. The alimentary tract was evacuated, washed and reweighed. The hot carcass was weighed with the kidneys and renal fats intact. Each carcass was dissected into bones, muscles and fat and were then weighed separately.

Calculations and statistical analysis

Empty body weight (EBW) was calculated for each animal by subtracting the gut fill from live body weight. Body components for each animal were calculated as percentages of EBW (Khalifa, 2002). Dressing percentages were calculated on live body weight and EBW basis (Khalifa, 2002). Muscles, bones and fat weights were expressed as percentages of EBW for each animal. Muscle: bone and muscle: fat ratios were calculated for each animal.

Data were subjected to analysis of variance using SPSS computer program. Means were separated using Duncan's Multiple Range Test at 5% level of significance.

RESULTS

Table 1 shows Shorani sheep carcass characteristics at different ages. Slaughter weight, EBW and hot carcass weight were significantly (P<0.05) increased with increasing the slaughter age. Empty body weight was lower than live body weight. Dressing percentages on live body weight and EBW were increased with increasing the slaughter weight and were higher on EBW.

Table 2 shows that Shorani body components weights were significantly (P<0.05) increased with increasing the slaughter age. The percentages of all body components on EBW increased with increasing slaughter age from <1 to 1 year old and then decreased at 2 years old.

Table 3 shows Shorani sheep carcass composition at different ages. The percentages of muscles and bones significantly (P<0.05) increased by increasing the slaughter weight from<1 to 1 year old and slightly decreased at 2 years old. Fat percentages significantly (P<0.05) increased with increasing the slaughter age. Muscle: bone ratio significantly (P<0.05)
increasing slaughter age to 1 year old and increased with decreased at 2 years old. Muscle: fat ratio significantly (P<0.05) decreased with increasing the slaughter age.

Table1. Shorani sheep carcass characteristics at different ages in Elabassia Tagali area in the Nuba Mountains, South Kordofan State, Sudan.

Parameters	Slaughter age (years)		
	<1	1	2
Slaughter weight (kg)	21.17± 1.2[a]	38.33±1.77[b]	43.67±0.66[c]
EBW (kg)	18.50±0.76[a]	36.33±1.68[b]	41.17±0.76[c]
HCW (kg)	09.00±1.32[a]	19.00±2.36[b]	21.33±1.56[c]
Dressing percentages:			
Live body weight	41.13±3.75[a]	47.25±4.68[b]	48.71±3.43[c]
EBW	47.81±5.02[a]	8.59±0.62[b]	51.70±3.55[c]

Means in each row with different letters are significantly different at P<0.05.
EBW = Empty body weight; HCW = Hot carcass weight.

Table 2. Shorani sheep body components at different ages in Elabassia Tagali area in the Nuba Mountains, South Kordofan State, Sudan.

Parameters	Weight (kg)			Percent of empty body weight		
	Slaughter age (years)			Slaughter age (years)		
	<1	1	2	<1	1	2
Blood	1.17±0.08[a]	1.57±0.08[b]	2.01±0.08[c]	6.63±0.03[a]	4.13±0.25[b]	4.59±0.03[c]
Feet	0.59±0.06[a]	0.82±0.06[b]	1.05±0.06[c]	3.02±0.25[a]	2.25±0.05[b]	2.55±0.67[c]
Skin	1.58±0.15[a]	2.18±0.14[b]	2.52±0.06[c]	8.21±0.63[a]	6.16±0.26[b]	5.59±0.03[c]
Head	1.40±0.23[a]	2.07±0.22[b]	2.21±0.23[c]	7.73±0.47[a]	5.73±0.43[b]	5.36±0.12c
Liver	0.53±0.01[a]	0.82±0.02[b]	099±0.03[c]	2.67±0.02[a]	2.25±0.05[b]	2.47±0.03[c]
Alimentary tract	2.98±0.45[a]	6.10±0.44[b]	8.22±0.44[c]	16.65±4.76[a]	17.67±3.16[b]	20.23±2.27[c]
Kidneys	0.72±0.02[a]	0.52±0.02[b]	0.82±0.02[c]	1.47±0.02[a]	1.44±0.66[b]	1.77±0.17[c]

Means in each row with different letters are significantly different at P<0.05.

Table 3. Shorani sheep carcass composition at different ages in Elabassia Tagali area in the Nuba Mountains, South Kordofan State, Sudan.

Parameters	Slaughter age (years)		
	<1	1	2
Muscles	63.46±0.37[a]	72.66±1.62[b]	72.48±0.63[b]
Bones	27.95±1.46[a]	18.57±1.26[b]	17.47±0.54[b]
Fat	05.61±1.16[a]	06.83±0.37[b]	09.08±0.27[c]
Muscle: bone	02.87±0.14[a]	03.91±0.54[b]	04.72±0.27[c]
Muscle: fat	11.31±3.20[a]	10.64±0.37[b]	07.98±0.31[c]

Means in each row with different letters are significantly different at P<0.05.

DISCUSSION

The increased Shorani slaughter weight with increasing slaughter age was reported by many workers (Ali, 2003; Elimam *et al*., 2012). The significant increase in EBW and hot carcass weight with increasing slaughter age was similar to that in Desert sheep (Mansour *et al*., 1988; Elimam *et al*., 2012). The lower EBW than live body weight was reported by many workers (Khalifa, 2002; Elimam *et al*., 2012). Shorani had higher slaughter weight, EBW and hot carcass weight than those in Garag in Um Hani area (Elimam *et al*., 2012) and this could be due to genetic and/ or environmental factors.

Shorani increased dressing percentages with age were also reported by Palsson and Verges (1952) and were due to the increased body weight with age The higher dressing percentages on EBW than live body weight were reported by many workers (Khalifa, 2002; Elimam and Babikir, 2011; Elimam *et al*., 2012). Dressing percentages were lower than those in Desert sheep fed blood meal (Mansour *et al*., 1988) and higher than those in Hejazi sheep (Payne, 1990). At 1 and 2 years old, Shorani dressing percentages were higher than those in Ashgar and Wattish in Elhuda Research Station (Elkarim and Owen, 1987), Meidob sheep (Mc Leroy, 1961) and Zagawa and North Riverine sheep (Devendra and Mc Leroy, 1982). It was generally within the range for Desert sheep and tropical breeds (Payne, 1990). The variations in dressing percentages among Sudanese sheep types may be genetical and or nutritional. It was found

that nutrition had marked effects on sheep dressing percentages in the Sudan (Mansour *et al*., 1988).

Shorani increased body components with increasing slaughter age were also found in Garag sheep in Kenana Sugar Company area (Khalifa, 2002) and in Um Hani area (Elimam *et al*., 2012).

Shorani had higher muscles percentages and low fat percentages than Desert sheep (Mansour *et al*., 1988). Shorani low fat could be genetical and/ or nutritional. The increased fat with age in Shorani was also reported in Desert sheep (Gaili *et al*., 1972) and Garag sheep in Um Hani area (Elimam *et al*., 2012). The increased fat with increasing slaughter age postulated that animals should be slaughtered at young ages when fat is not desired. Shorani bone percentages were higher at <1 year and lower after this age than those in Desert sheep fed blood meal (Mansour *et al*., 1988). Muscle: bone ratio was lower at <1 year old and higher after that than in Desert sheep (Mansour *et al*., 1988). Muscle: fat ratio was higher than that in Desert sheep and their crosses in Elhuda (Elhassan,1996).

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صفات ذبيحة أغنام الشوراني في منطقة العباسية تقلي في جبال النوبة، ولاية جنوب كردفان، السودان

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الخلاصة

تمت دراسة صفات ذبيحة أغنام الشوراني بأعمار أقل من عام ، عام وعامين في منطقة العباسية تقلي قي جبال النوبة في ولاية جنوب كردفان في السودان في نوفمبر 2002م. أشتريت 9 حيوانات (3 في كل مجموعة عمرية) من الأسواق المحلية ، واريحت وسقيت ماء وصومت ليلا ثم ذبحت بالطريقة الإسلامية. زاد وزن الذبح والوزن الفارغ ووزن الذبيحة الساخنة معنويا بزيادة عمر الذبيح. وكان الوزن الفارغ أقل من الوزن الحي للحيوانات. زادت نسب التصافي على أساس الوزن الحي والوزن الفارغ بزيادة عمر الذبيح وكانت أعلى على أساس الوزن الفارغ. زادت أوزان مكونات الجسم الثانوية بزيادة عمر الذبيح. وزادت النسب المئوية لكل مكونات الجسم الثانوية على أساس الوزن الفارغ بزيادة عمر الذبيح من أقل من عمر عام إلى عمر عام وانخفضت بعمر عامين. زادت النسب المئوية للعضلات والعظام معنويا بزيادة عمر الذبيح من أقل من عمر عام إلى عمر عام ثم انخفضت. زادت النسب المئوية للشحم معنويا بزيادة عمر الذبيح. زادت العضلات : العظام معنويا بزيادة عمر الذبيح إلى عمر عام ثم انخفضت بعمر عامين. وزادت العضلات : الشحم معنويا بزيادة عمر الذبيح.