

Carcass Characteristics of Tagger Goat Male and Female Kids in Eldaleng Area, South Kordufan State, Sudan

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Abstract: Tagger goats are promising meat breed with excellent conformation and meat quality in Nuba Mountains, but are neglected. The objectives of this study were to study carcass characteristics, body components and wholesale cuts of male and female Tagger kids of about six months old in Eldaleng area, South Kordufan State, Sudan. There were no significant differences between males and females in body components except for heads and skins ($P \leq 0.05$). The Slaughter, empty body, hot carcass weights and dressing percentages on live and empty body weight bases were heavier in males compared to females and were highly significantly ($P \leq 0.01$) affected by sex, with no significant differences between sexes in slaughter weight and dressing percentage on empty body weight basis. Carcass muscle and fat percentages were significantly higher in males, while carcass bone percentage was significantly higher in females ($P \leq 0.05$). Muscle: bone ratio was highly significantly ($P \leq 0.01$) higher in males than females and muscle: fat ratio was higher in females with no significant difference. Carcasses were split into six wholesale cuts and best end of neck and breast were significantly ($P \leq 0.05$) higher in males than females.

Keywords: Tagger goats, sex, carcass characteristics, meat.

Introduction

Goats are widely distributed in the tropics and sub-tropics due to their adaptation to a variety of environments. Their inherent characteristics such as wide-range of feed habits, preference for browsing and resistance to dehydration enable them to survive and perform better than other animals under harsh conditions, especially dry tropics. Dwarf goats thrive throughout the humid tropics and are probably well adapted to humid environments (Devendra and Burns, 1983).

The international demand for goat meat is increasing due to its high nutritive value, and low fat and cholesterol. Goat meat is preferred in Arabian Gulf countries, Middle East, Southeast Asia, Africa and Latin Amer-

ica (Devendra and Owen, 1987). In Sudan, goats are important animals due to the high population of about 42 millions forming 31% of ruminants in the country, producing 1.29 and 0.14 million tons of milk and meat, respectively (Ministry of Animal Wealth, Sudan, 2004), their annual increase in the population is the highest among farm animals. Improving goat meat and increasing its production will increase the local consumption and exports.

There are many goat breeds in Sudan mainly reared in traditional systems with low inputs and outputs, and Desert and Tagger are considered meat breeds (Devendra and Owen, 1987). Desert goat has superior meat quality due to high tenderness and juiciness,

but has poor conformation. Tagger are dwarf, compact, has good meat quality and well adapted to harsh environments, they are preferred for meat than sheep and cattle in Nuba Mountains due to high meat quality and good conformation. Information on Tagger carcass characteristics is scarce and it was studied in Rashad area (Elbukhary, 1998). Consequently, this study was conducted to furnish information on Tagger carcass characteristics in Eldaleng area.

Materials and Methods

Study area

This study was conducted in Eldaleng area, South Kordufan State, Sudan, which is located between latitudes 11° 12' and 12° 45', North and longitudes 29° 15' and 30° 45' East. It is about 2000-5000 feet above sea level in the Savannah zone with 400-700 mm annual rainfall and may reach 1700 mm in the south. Temperature is 17- 43°C with a peak in May. It rains in summer (April to October) due to southwestern humid winds; Relative humidity varies from 35% in summer to 75% in autumn (Bunderson, 1985).

Experimental animals

Six male and female Tagger kids about six months old, weighing around 12.3 kg were bought from the owners in Eldaleng area. They were fasted overnight and weighed in the next morning.

Slaughtering and processing procedure

Animals slaughtered according to Islamic rituals. The heads and feet were removed and weighed and the animals were skinned and eviscerated. The lungs, heart, liver, spleen, kidneys, stomach, small intestines and omental and mesenteric fats were separated and weighed. The carcasses were weighed with the kidneys intact to determine the hot carcass weight (HCW). The stomach and intestines were emptied, washed and

weighed. The empty body weight (EBW) was calculated by subtracting the gutfill weight from live weight. Body components weights were expressed as percentages of EBW. Dressing percentages were calculated on both LBW and EBW bases.

The carcass was then split into right and left sides along the vertebral column using a saw. The left side was split into six wholesale cuts as described by MLC (1967) and the cuts were separately weighed. The weight of each cut was expressed as a percentage of HCW. The cuts were dissected into muscles, bones and fat and weighed separately. Total carcass muscle, bone and fat and muscle: bone and muscle: fat ratios were determined.

Statistical Analysis

Means and standard errors were calculated for different traits and student's t-test was used to compare males with females (Snedecor and Cochran, 1980).

Results

Table (1) shows males and females Tagger kids body components. All body components were heavier in males than females, except the liver and omental and mesenteric fats which were similar in males and females. The percentages of spleens were equal in both sexes. Males had higher percentages of skins, kidneys and small intestines. The percentages of heads, legs, lungs, hearts, livers, stomachs and omental and mesenteric fats were higher in females than males. However, there were no significant differences between sexes in body components except for heads and skins ($p \leq 0.05$).

Table (2) shows Tagger kids' carcass characteristics. Slaughter weight and dressing percentage on live body weight basis were heavier in males than females, with no significant differences. Empty body weight, hot carcass weight and dressing percentage

on empty body weight basis were highly significantly ($p \leq 0.01$) heavier in males. Carcass muscles and fat were significantly ($p \leq 0.05$) heavier in males while carcass bone was significantly ($p \leq 0.05$) heavier in females. Muscle: bone ratio was significantly ($p \leq 0.01$) higher in males, while muscle: fat ratio was higher in females with no significant difference.

Table (3) shows wholesale cuts in male and female Tagger kids. The percentages of leg and chump, single short forequarter, loin and neck on hot carcass weight were higher in females than males, but not significant. However, males had significantly ($p \leq 0.05$) higher best end of neck and breast.

Discussion

The heavier body components in Tagger males than females in Eldaleng area were similar to those reported for the same breed in Rashad area (Elbukhary, 1998). However, Hassaballa (1996) found that heads, skin and feet were heavier in Desert males than females and livers, skin, alimentary tract, omental and mesenteric fats were higher in females. The variations within Tagger and between Tagger and Desert could be mainly genetic and / or nutritional. Similar non significant sex effects on body components were reported for Tagger in Rashad area (Elbukhary, 1998) and Desert goats (Hassaballa, 1996). In addition, no significant differences were reported between entire and castrated Nubian kids (Yassin 1994). The percentages of skin and feet were higher and that for the head, alimentary tract, red offals and omental and mesenteric fats were lower than Tagger in Rashad area (Elbukhary, 1998). The percentages of head, skin, feet, liver, spleen, heart and kidneys were generally heavier than Desert and Nubian goats (Yassin, 1994; Bello and Babiker, 1988). The lungs, omental and mesenteric fats percentages were lower and in the alimentary tract was similar to Desert

goat (Hassaballa, 1996; Elkhidir, 1989; Bello and Babiker, 1988) and Nubian goats (Yassin, 1994).

The differences in Tagger males and females carcass characteristics were similar to those for Tagger in Rashad (Elbukhary, 1998) and Desert goat (Hassaballa, 1996). It could be due to feed intake, metabolism sex hormones (Devendra and Burns, 1983). Tagger dressing percentages were higher for males and females than that of Rashad area and lower than Desert goats and their crosses (Bello and Babiker, 1988 and Elkhidir, 1989). Therefore, more emphasis should be directed towards improving it.

The higher muscles in male carcasses may be due to testosterone enhances protein deposition (Devendra and Burns, 1983). The significant differences between sexes in muscle, bone and fat percentages were different from the insignificant ones in Rashad area (Elbukhary, 1998). It is interesting that although Tagger goats in this study had less slaughter weight than in Rashad area, they had generally higher muscle, lower fat and the bone percentages were close in the two studies. Males and females were significantly different in percentages of muscle and fat in Desert goats (Hassaballa, 1996). Nubian goats muscle and fat percentages were also affected by sex (Yassin, 1994).

Tagger goats had higher muscle and lower bone and fat than Desert (Bello and Babiker, 1988). The lower fat in Tagger carcass compared to other breeds suggesting it is a valuable choice in world with an increasing demand for low-fat meat (Elimam, 2011).

Muscle to fat ratio was higher in Eldaleng than in Rashad for both sexes. Muscle to bone ratio was higher in females and lower in males than in Rashad area (Elbukhary, 1998) and Desert goats had lower muscle: fat and muscle: bone (Elkhidir, 1989 and Hassaballa, 1996). Muscle: bone reported was higher than in Nubian goats (Yassin,

1994). This showed breed and sex differences in carcass characteristics.

The variations between Tagger males and females in wholesale cuts confirmed the results in Tagger of Rashad area (Elbukhary, 1998). However, no significant sex differences in best end of neck and breast were found in Rashad area. In Desert goat sex significantly affected single short forequarter, loin and breast (Hassaballa, 1996). No significant differences were found between intact and castrated Nubian kids except for best end of neck (Yassin, 1994). These results reflected that sex had different effects on whole sale cuts percentages in different breeds. However, more precise research is required to establish this effect.

Wholesale cuts in Eldaleng area were lighter than in Rashad area (Elbukhary, 1998), except single short forequarter and neck in both sexes and breast in females. Tagger had lower percentages of whole sale cuts compared to Desert goats, except the neck for both sexes and leg and chump in males (Elkhidir, 1989 and Hassaballa, 1996). They were relatively higher than Desert goats and their crosses, except for single short forequarter (Bello and Babiker, 1988). The percentages of different cuts were higher than intact and castrated Nubian kids (Yassin, 1994) reflecting the potential of this type for meat production.

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Table 1: Body components of Tagger kids as weights (kg) and percentage of empty body weight in Eldaleng area

Parameter	weight		%	
	Male	Female	Male	Female
Head	0.98±0.11 ^a	0.91±0.09 ^a	8.87±0.22 ^b	9.54±0.28 ^a
Skin	1.00±0.11 ^a	0.71±0.07 ^b	8.99±0.70 ^a	7.50±0.16 ^b
Legs	0.44±0.05 ^a	0.40±0.04 ^a	4.01±0.36 ^a	4.19±0.20 ^a
Lungs	0.17±0.02 ^a	0.16±0.02 ^a	1.51±0.06 ^a	1.64±0.06 ^a
Heart	0.09±0.01 ^a	0.08±0.01 ^a	0.84±0.03 ^a	0.85±0.11 ^a
Liver	0.28±0.03 ^a	0.28±0.03 ^a	2.49±0.12 ^a	2.96±0.33 ^a
Spleen	0.06±0.01 ^a	0.05±0.01 ^a	0.55±0.08 ^a	0.55±0.09 ^a
Kidneys	0.06±0.01 ^a	0.05±0.01 ^a	0.53±0.05 ^a	0.50±0.04 ^a
Stomach	0.40±0.04 ^a	0.39±0.04 ^a	3.60±0.27 ^a	4.13±0.24 ^a
Small intestine	0.23±0.03 ^a	0.20±0.02 ^a	2.10±0.21 ^a	2.05±0.08 ^a
Omental and mesenteric fats	0.13±0.01 ^a	0.13±0.01 ^a	1.15±0.23 ^a	1.39±0.09 ^a

Means followed by the same letter in each row are not significantly different at $P > 0.05$

Table 2: Slaughter weight, carcass characteristics and composition of

Tagger kids in Eldaleng area

Parameter	99	Male	Female
Slaughter weight (kg)		13.20±0.87 ^a	11.40±0.77 ^a
Empty body weight (kg)		11.08±0.69 ^a	9.52±0.47 ^b
Hot carcass weight (kg)		5.93±0.38 ^a	4.99±0.24 ^b
<u>Dressing (%)</u>			
on LBW basis		44.96±0.21 ^a	43.94±0.94 ^a
on EBW basis		53.54±0.13 ^a	52.39±0.14 ^b
Carcass muscle (%)		62.87±0.05 ^a	58.72±1.42 ^b
Carcass bone (%)		19.48±0.74 ^b	22.35±0.62 ^a
Carcass fat (%)		3.67±0.21 ^a	3.10±0.04 ^b
Muscle: bone ratio		3.24±0.13 ^a	2.63±0.11 ^b
Muscle: fat ratio		17.29±0.98 ^a	18.94±0.64 ^a

Means followed by the same letter in each row are not significantly different at P > 0.05

Table 3: Wholesale cuts (as a percentage of hot carcass weight) of Tagger kids in Eldaleng area

Item	Male	Female
Leg and chump	32.35±1.37 ^a	33.83±0.62 ^a
Single short forequarter	31.87±0.59 ^a	32.52±0.25 ^a
Loin	7.65±0.64 ^a	8.52±0.17 ^a
Best end of neck	6.49±0.29 ^a	5.57±0.16 ^b
Breast	4.32±0.14 ^a	3.68±0.20 ^b
Neck	8.53±0.63 ^a	9.26±0.25 ^a

Means followed by the same letter in each row are not significantly different at P > 0.05

خصائص ذبيحة ذكور وإناث جديان ماعز التقر بمنطقة الدلنج ، ولاية جنوب كردفان ، السودان

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المستخلص:

يعتبر الماعز الجبلي (التقر) من الحيوانات الواعدة لإنتاج اللحوم لتمييزه بالقوام الجيد مع جودة خواص اللحم ورغمًا عن ذلك تقل الدراسات حوله . هدفت هذه الدراسة لتحديد مكونات الجسم و خصائص الذبيحة والقطع التجارية لذكور وإناث هذه السلالة في عمر ستة أشهر بمنطقة الدلنج ، ولاية جنوب كردفان ، السودان. لم توجد فروقات معنوية بين الجنسين في مكونات الجسم ماعدا للرأس والجلد ($p \leq 0.05$). كانت أوزان الذبح ، الجسم الفارغ ، الذبيحة الحار و نسب التصافي على أساس الوزن الحي ووزن الجسم الفارغ أعلى في الذكور مقارنة بالإناث وكان تأثير الجنس عالي المعنوية ($p \leq 0.01$) مع عدم وجود فروق معنوية بين الجنسين لوزن الذبح ونسبة التصافي على أساس الوزن الفارغ . النسب المئوية للعضلات والدهون في الذبيحة كانت أعلى معنوياً في الذكور، بينما كانت العظام أعلى معنوياً في الإناث مقارنة بالذكور ($p \leq 0.05$). نسبة العضلات للعظام عالية المعنوية ($p \leq 0.01$) في الذكور مقارنةً بالإناث بينما نسبة العضلات للدهون أعلى في الإناث بدون فروق معنوية . قُطعت الذبائح إلى ستة قطع تجارية وكانت نهاية العنق والصدر أعلى معنوياً في الذكور ($p \leq 0.05$).