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A Comparative Study on Body Measurements and Carcass Characteristics in Egyptian Sheep and Goats

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ABSTRACT

Ten males of each of Barki lambs and Zaraibi kids, fattened up to 12 months old, were used to investigate the influence of species on body measurements and carcass traits. Relationships between body weight and carcass traits with body measurements were also examined. Heart girth and paunch girth of Barki lambs were significantly ($p<0.05$) higher than those of Zaraibi kids. Barki lambs achieved significantly ($p<0.05$) heavier weights of heart, liver, kidneys, spleen, lung and trachea than those of Zaraibi male kids. Hot carcass weight was significantly ($p<0.01$) higher in Barki lambs (20.2 kg) than Zaraibi kids (11.1 kg). Dressing percentage of Barki carcasses (50.4%) was significantly ($p<0.05$) higher than that of Zaraibi ones (47.7%). Meanwhile, the left side cold carcass weight of Barki lambs significantly ($p<0.05$) excelled that of Zaraibi kids (10.3 vs. 5.4 kg). Accordingly, weights of carcass cuts (round, loin, thoracic region, shoulder and neck) were significantly ($p<0.01$) heavier in Barki carcasses compared to Zaraibi ones. However, carcasses of Zaraibi kids produced significantly ($p<0.05$) lower total fat stores (1101.0 g) than that of Barki lambs (2377.0 g). *Longissimus dorsi* area of Barki carcass significantly ($p<0.05$) excelled (14.5 cm^2) that of Zaraibi ones (8.0 cm^2). On the other hand, each of fasted body, carcass cuts and total fat stores weights, except paunch girth, of Barki lambs were not significantly correlated with any parameter of body measurements. Whereas, no correlation coefficient was found between any weight of Zaraibi carcass and either body length or height at withers. Additionally, dressing percentage of Zaraibi kids was positively and significantly ($p<0.01$) correlated with only heart girth. In the meantime, total fat stores weight of Zaraibi carcass was positively and significantly ($p<0.05$) correlated with each of heart girth ($r = 0.73$) and paunch girth ($r = 0.67$). In view of the previous results it could be concluded that positive and significant correlations were found between paunch girth and body weight of Egyptian sheep and goats. Accordingly, paunch measuring could be used to estimate body weight under field conditions. Additionally, heart girth and round circumference can be used to predict body weight as well as hot carcass weight.

Key words: Barki, Zaraibi, body measurements, carcass traits, internal offals, carcass cuts, *Longissimus dorsi* area

INTRODUCTION

In Egypt, sheep and goat population is rapidly increasing even more than that of cattle. During the period from 2007 to 2008, cattle numbers increased by 1.8% while sheep and goat numbers increased by 2.9% (FAO, 2013). That situation arises mainly from the increasing demand of mutton and chevion. Zaraibi goat breed is considered a promising meat and milk producing goat breed. On the other side, Barki mutton is generally preferred by many local consumers because of its comparatively low fat tail (1.4 vs. 3.9 and 2.5 kg for Ossimi and Rahmani native breeds, respectively, (Abdel-Moneim, 2009a), as well as its delicious taste. This study was designed to compare between body measurements and carcass traits of Barki male lambs and Zaraibi kids at slaughter age (12 months). Meanwhile, correlation coefficients between fasted body weight and carcass traits with body measurements were also estimated.

MATERIALS AND METHODS

Animals and management: Two equal groups of Barki lambs and Zaraibi kids (n = 10 each), born in small ruminants farm of Cairo University during 4 weeks of autumn 2008 were used. Youngs of each species were kept with their mothers in a separate semi-open (4×5 m) pen attached with a (5×8 m) yard. Lambs and kids were weaned at 3 months of age and their mothers were moved out of the pen. Youngs were weighed every 2 weeks after over night fasting. Free access to water and mineral blocks were available.

Feeding: From 3 weeks of age up to weaning, lambs and kids suckled their mothers freely. A green fodders, Egyptian clover (*Trifolium alexandrinum*), was available all the time to both youngs and dams. An average allowance of 100 g/head/day of a ground grain mixture (35% yellow corn, 35% barley and 30% soybean meal) was given as a creep feeding. Mothers were fed on 500 g/head/day of concentrate feed mixture (40% yellow corn, 30% decorticated cotton seed meal, 25% wheat bran, 3% limestone, 1% sodium chloride and 1% common salt). After weaning till slaughter at one year of age, youngs were fed according to their live body weight and a daily routine of farm NRC (1981, 1985) on Concentrate Feed Mixture (CFM) consisted of (65% yellow corn, 10% cotton seed meal, 5% soybean meal,15% wheat bran, 2% limestone,1.5% common salt, 1% minerals mixture and 0.5% sodium bicarbonate). Final 2 months before slaughter as suggested Gaili and Ali (1985), both lamb and kid received daily about 800 and 500 g of CFM during the first month, respectively. While, in the second month, they were received daily about 1200 and 650 g of CFM, in the same order. In addition, lambs and kids were fed *ad libitum* on Egyptian clover (*Trifolium alexandrinum*). When green roughage was not available, clover hay was given, in average 425 g for lamb and 250 g for kid during the last 2 months before slaughter.

Experimental procedure: At 12 months of age, lambs and kids were fasted for about 18 h before slaughtering. Pre-slaughtering body weight and body measurements were recorded just before bleeding. Body measurements were estimated using a measuring tape.

The following body measurements were estimated:

Body length: Distance between the point of shoulder and pinbone.

Height at withers: Vertical distance from withers to the floor.

Heart girth: Circumference of the body just behind the forelegs.

Paunch girth: Circumference of the body just before the hinleges.

Round circumference: Circumference of the round just under the body floor.

Antemortem and postmortem examination of live sheep and goats and their carcasses did not show any marked abnormality. Each carcass was deskinned and decapitated. External offals (head, skin and feet) were removed. Internal offals (heart, lung and trachea, liver, kidneys, spleen and testis) were separated from dressed carcass and weighed. Also, full digestive tract was removed. Heart, kidneys and gut fats were separated and weighed. Carcasses were weighed hot (about 1 h after slaughtering). Fat-tail was removed from lambs carcasses and weighed. Each dressed carcass was then longitudinally split into approximately two equal halves. Carcass measurements were taken on the left half side as suggested by Hadjipanayiotou and Koumas (1994), Sen *et al.* (2004), Abdel-Moneim (2009a, b) and Liméa *et al.* (2010). These measurements were carcass width at the 3rd rib and at the 7th rib, round length, round circumference, loin length and carcass length. Carcass measurements were taken using a measuring tape to nearest 0.5 cm. The left side of carcass was then cooled at 4°C for 24 h. The chilled half of each carcass was weighed and divided into six cuts according to Atti and Ben Hamouda (2004) and Abdel-Moneim (2009a, b). These carcass cuts were round, loin, shoulder, neck, flank and thoracic region (ribs and brisket). Dressing percentage, based on pre-slaughter body weight, was calculated. *Longissimus dorsi* area at 10th rib was measured in cm^2 using a digital planimeter (El-Gallad *et al.*, 1988; Abdel-Moneim, 2009a). The 10th rib cut was separated into its physical components (lean meat, fat and bone) and weighed separately. Body weight at slaughtering (12 months of age) averaged 40.2 and 23.3 kg for Barki lambs and Zaraibi kids, respectively.

Statistical analysis: The SAS statistical package (SAS, 2004) was utilized for data analysis. Data of body measurements of Barki ram lambs and Zaraibi male kids and their carcass characteristics were analyzed using the following model:

$$Y_{ij} = \mu + S_i + e_{ij}$$

where:

Y_{ij} = Experimental observation

μ = Overall mean

S_i = Fixed effect of species (i = 1: Barki ram lamb and 2: Zaraibi male kid)

e_{ij} = Random error and was assumed as NID (0, σ_e^2)

Significant differences among means were detected using Duncan's Multiple Range Test. Simple correlation coefficients between body measurements and weights of body and carcass traits, for each species, were calculated and tested for significance.

RESULTS AND DISCUSSION

Pre-slaughtering body measurements: Significant differences in body length, height at withers, heart girth, paunch girth and round circumference before slaughtering were found between the two species (Table 1). The height at withers of Barki yearlings was significantly

Table 1: Effect of species on body measurements (cm) before slaughtering

	Species						
	Sheep			Goats			
Traits	N	$\bar{x}$	SE	N	$\bar{x}$	SE	Level of significance
Body length	10	70.6^a	0.92	10	65.0^b	0.92	**
Height at withers	10	67.9^a	0.76	10	64.6^b	0.76	*
Heart girth	10	80.9^a	1.03	10	63.4^b	1.03	**
Paunch girth	10	93.5^a	0.91	10	65.0^b	0.91	**
Round circumference	10	34.7^a	0.68	10	25.7^b	0.68	**

Within species, means of each trait not followed by the same letter differ significantly from each other ($p<0.05$), *$p<0.05$, **$p<0.01$

($p<0.05$) higher (67.9 cm) than that of Zaraibi kids (64.6 cm) (Table 1). Body length and round circumference were significantly less (Table 1) for Zaraibi kids and paunch girth and heart girth were significantly higher for Barki lambs.

Weight of some internal offals and weight of fat stores: Differences between Barki lambs and Zaraibi kids in all studied internal edible offals weights, except testis weight were significant ($p<0.01$) (Table 2). In accordance to our results, El-Khidir *et al.* (1998) found that differences in some internal offals such as liver, lung, diaphragm and trachea, spleen and kidneys of Sudanese desert lambs and kids were significant ($p<0.05$). While, no significant differences were found in testis. However, no significant difference in heart weight between Indian lambs and kids was observed by Sen *et al.* (2004).

It is interesting that no significant differences existed between all fat stores of the studied lambs and kids, with the exception of mesentric fat weight which was significantly ($p<0.01$) higher in sheep presumbly due to its comparatively longer length (Table 3). Our results receive confirmity from Sen *et al.* (2004) who found that Indian lambs deposited relatively more ($p<0.05$) depot (non-carcass) fat than that of Indian kids. However, different results were reported by El-Khidir *et al.* (1998) as they found that mesentric fat weight was greater ($p<0.05$) in total fat stores of Sudanese desert kids than that of lambs.

Table 2: Effect of species on weight of some internal edible offals (g)

	Species						
	Sheep			Goats			
Traits	N	$\bar{x}$	SE	N	$\bar{x}$	SE	Level of significance
Heart	10	148.5^a	5.46	10	97.5^b	5.46	**
Liver	10	652.0^a	18.71	10	384.0^b	18.71	**
Kidneys	10	98.0^a	3.88	10	60.0^b	3.88	**
Spleen	10	47.5^a	2.54	10	25.0^b	2.54	**
Lung and trachea	10	510.0^a	20.24	10	274.5^b	20.24	**
Testis	10	236.0^a	19.84	10	195.5^a	19.84	ns

Within species, means of each trait not followed by the same letter differ significantly from each other ($p<0.05$), ns: Not-significant, **$p<0.01$

Table 3: Effect of species on weight of fat stores (g)

	Species						
	Sheep			Goats			
Traits	N	$\bar{x}$	SE	N	$\bar{x}$	SE	Level of significance
Omental fat	10	397.0^a	42.05	10	469.0^a	42.05	ns
Mesentric fat	10	630.0^a	53.85	10	370.0^b	53.85	**
Kidneys fat	10	187.5^a	22.89	10	210.5^a	22.89	ns
Heart fat	10	51.5^a	5.11	10	51.5^a	5.11	ns
Total internal fat store	10	1266.0^a	98.52	10	1101.0^a	98.52	ns
Total fat stores (1)	10	2377.0^a	100.08	10	1101.0^b	100.08	**

Within species, means of each trait not followed by the same letter differ significantly from each other ($p<0.05$), ns: Not-significant, **$p<0.01$, (1)Fat-tail-weight included

Carcass weight and measurements: Hot carcass weight, dressing percentage and carcass measurements except loin length were significantly higher for Barki lambs than Zaraibi kids (Table 4). These results receive confirmity from previous ones. Sen *et al.* (2004) found that Indian yearling sheep had higher ($p<0.05$) hot carcass weight (14.9 kg) than Indian male goats (10.1 kg). The comparatively higher dressing percentage of Barki lambs might arise from inclusion of the fat-tail (1.1 kg, Table 4), in one side and to the heavier fat content of the carcass on the other. These findings are in harmony with the observations reported by Tshabalala *et al.* (2003) on Dorper and Damara sheep as compared to Boer and Indigenous goats. The higher dressing percentages of Dorper and Damara sheep were associated with significantly heavier carcasses ($p<0.05$) compared to the goats. These heavier sheep carcasses contained significantly ($p<0.05$) more fat, which partly explains the higher ($p<0.05$) dressing percentages obtained for Dorper and Damara sheep than goats. In the meantime, Sen *et al.* (2004) reported that Indian yearling sheep had higher ($p<0.05$) dressing percentage (52.1%) than Indian male (49%) goats. The lowest dressing percentage of goats might be attributed to higher moisture content and less fat percentage in chevon than mutton. Similar result was obtained by Gaili and Ali (1985) who reported that Sudanese desert sheep had significantly ($p<0.01$) heavier carcasses than Sudanese desert goats at an equally adjusted empty body weight. This might imply that Sudanese sheep had a higher dressing percentage than Sudanese goats. The authors also found that Sudanese goats had less ($p<0.05$) carcass fat but tended to have more carcass bone than Sudanese sheep. The same trend was observed by Hogg *et al.* (1992) in New Zealand goats and Tshabalala *et al.* (2003) in Boer and Indigenous goats compared to New Zealand, Dorper and Damara sheep. The soft tissue (fat and muscle) of goats contained more moisture and minerals than sheep, while sheep had more fat. On the other hand, Sen *et al.* (2004) showed that Indian goat meat had significantly ($p<0.001$) more moisture (74.2%) and less fat (3.2%) than Indian sheep meat (68.9 and 8.5%, respectively). Contrarily, El-Khidir *et al.* (1998) reported that Sudanese desert goats had significantly greater carcass weight and dressing percentage than Sudanese sheep. Concerning carcass measurements, results showed no significant differences between sheep and goats in loin length (Table 4). Carcass length, carcass width at shoulder at 3rd rib, carcass width at loin at 7th rib and round length and circumference were all significantly ($p<0.01$) higher in Barki lambs than in Zaraibi kids (Table 4).

Table 4: Effect of species on carcass weight (kg) and carcass measurements (cm)

	Species						
	Sheep			Goats			
Traits	N	$\bar{x}$	SE	N	$\bar{x}$	SE	Level of significance
Hot carcass weight (1)	10	20.2^a	0.44	10	11.1^b	0.44	**
Dreesing (%) (2)	10	50.4^a	0.77	10	47.7^b	0.77	*
Carcass length from shoulder to round	10	80.1^a	0.68	10	68.1^b	0.68	**
Carcass width at 3rd rib	10	17.9^a	0.36	10	14.2^b	0.36	**
Carcass width at 7th rib	10	21.8^a	0.47	10	18.7^b	0.47	**
Loin length	10	19.2^a	0.26	10	18.6^a	0.26	ns
Round length	10	32.1^a	0.72	10	40.3^b	0.72	**
Round circumference	10	35.5^a	0.68	10	25.5^b	0.68	**

Within species, means of each trait not followed by the same letter differ significantly from each other ($p<0.05$), ns: Not-significant, *$p<0.05$, **$p<0.01$ (1), (2)Fat-tail weight included

Carcass cuts and eye muscle (*Longissimus dorsi*) area: Table 5 shows that weight of the left side cold carcass of Barki lambs significantly ($p<0.05$) excelled that of Zaraibi kids (10.3 vs. 5.4 kg). However, in another study (El-Khidir *et al.*, 1998) the situation was reversed as cold carcass side weight of Sudanese goats was significantly ($p<0.01$) heavier than that of Sudanese sheep. All carcass cuts weights, except flank weight were markedly and significantly ($p<0.01$) heavier in Barki lambs than Zaraibi kids (Table 5). Weight of flank cut was heavier for Zaraibi kids but did not reach significant level (Table 5). In other sheep and goats breeds (Indian breeds), Sen *et al.* (2004) reported that neck and shoulder portion was heavier ($p<0.01$) in goats than sheep (26.2 vs. 22.9%) but difference for wholesale cuts, except neck and shoulder, as a percentage of chilled half carcass tended to be small and non-significant. Concerning eye muscle (*Longissimus dorsi*) area and its components, it is apparent (Table 6) that Barki lambs significantly ($p<0.05$) excelled Zaraibi kids in area of eye muscle (14.5 vs. 8.0 cm^2). This could be due to their higher pre-slaughter weight as longer carcass invariably have greater eye muscle area. Similar result was arrived at for Indian

Table 5: Effect of species on weight of carcass cuts (kg)

	Species						
	Sheep			Goats			
Traits	N	$\bar{x}$	SE	N	$\bar{x}$	SE	Level of significance
Cold carcass left side weight [(1)]	10	10.3^a	0.31	10	5.4^b	0.31	**
Round weight	10	2.6^a	0.06	10	1.4^b	0.06	**
Loin weight	10	1.4^a	0.04	10	0.6^b	0.04	**
Thoracic region (ribs and brisket) weight	10	2.6^a	0.09	10	1.5^b	0.09	**
Shoulder weight	10	1.8^a	0.04	10	1.1^b	0.04	**
Neck weight	10	1.1^a	0.07	10	0.6^b	0.07	**
Flank weight	10	0.8^a	0.29	10	0.2^a	0.29	ns

Within species, means of each trait not followed by the same letter differ significantly from each other ($p<0.05$), ns: Not-significant, **$p<0.01$ [(1)]Fat-tail weight removed

Table 6: Effect of species on *Longissimus dorsi* area (cm^2) and components of eye muscle

	Species						
	Sheep			Goats			
Traits	N	$\bar{x}$	SE	N	$\bar{x}$	SE	Level of significance
Longissimus dorsi area at 10^{th} rib	10	14.5^a	0.65	10	8.0^b	0.65	**
Eye muscle components (g)							
Lean weight	10	82.5^a	2.69	10	30.7^b	2.69	**
Fat weight	10	33.8^a	3.08	10	9.4^b	3.08	**
Bone weight	10	30.1^a	2.25	10	17.5^b	2.25	**
Eye muscle components (%)							
Lean	10	57.1^a	2.63	10	54.0^a	2.63	ns
Fat	10	22.4^a	1.97	10	16.4^b	1.97	*
Bone	10	20.5^a	1.73	10	29.6^b	1.73	**
Ratio							
Lean:fat	10	3.1^a	0.60	10	3.8^a	0.60	ns
Lean:bone	10	3.0^a	0.38	10	2.1^a	0.38	ns
Fat:bone	10	1.2^a	0.11	10	0.6^b	0.11	**

Within species, means of each trait not followed by the same letter differ significantly from each other ($p<0.05$), ns: Not significant, *$p<0.5$, **$p<0.01$

sheep and goats by Sen *et al.* (2004). In view of the greater eye muscle area of Barki lambs, weights of lean, fat and bone were heavier (Table 6). But the difference did not reach a significant level for lean (Table 6). However, Shehata and Mokhtar (2005) reported that lean meat percentage in eye muscle of Baladi male kids was higher than that of Barki ram lambs (57.7 vs. 52.1%). Meanwhile, fat percentage in Baladi kids was lower than that of Barki lambs (18.9 vs. 28.6%). On the other hand, it appears (Table 6) that species of animal exerted a highly significant ($p<0.01$) effect on fat: bone ratio. *Longissimus dorsi* muscle of Barki lambs significantly ($p<0.05$) excelled Zaraibi kids in fat: bone ratio (1.2 vs. 0.6). Meanwhile, there were no significant differences in lean: fat and lean: bone ratios of Barki lambs and Zaraibi kids (Table 6). Similar finding was observed by Shehata and Mokhtar (2005) on Barki lambs and Baladi kids.

Relationships among body measurements, body weight and carcass traits of Barki lambs and Zaraibi kids: Data in Table 7 show that fasted body weight of Barki lambs was positively correlated with paunch girth. Meanwhile, positive and significant correlation coefficient was found between shoulder weight and paunch girth. This result partly agrees with that of Younas *et al.* (2013) who found that body weight of Hissardale sheep was positively and significantly correlated with all body measurements. The authors also indicated that body measurements can be used for estimation of body weight of animals in the field where scales are not usually available. It may be used as selection criteria as well. No consistent pattern of correlation coefficients was found among other traits studied (Table 7). Similar result was obtained for Red Karaman lambs by Yaprak *et al.* (2008) and Abdel-Moneim (2009b) for Barki lambs, both reported that height at withers, body length and heart girth circumference were not significantly correlated with dressing percentage. By contrast, Lavvaf *et al.* (2012) observed that chest girth and rump width were suitable factor for predicting hot carcass weight in each of Afshari and Zandi sheep, respectively.

As for Zaraibi kids, Table 8, fasted body weight as well as hot carcass weight were positively correlated with heart girth, paunch girth and round circumference. This result partly agrees with that of Rahman (2007) who found positive and significant ($p<0.01$) correlation coefficients between live body weight in 12 months old Black Bengal goats and each of body length, withers height and heart girth. On the other hand, shoulder weight and *Longissimus dorsi* area were positively correlated with heart girth, paunch girth and round circumference (Table 8). Neck weight and thoracic region were found to be positively correlated with both heart girth and paunch girth. Moreover, loin weight of Zaraibi carcasses was positively and significantly associated with round circumference (Table 8). But dissimilar result was reported by Abdel-Moneim (2009b) who stated that only round circumference of Barki ram lombs was positively and significantly ($p<0.05$) correlated with neck weight. It is stricking that no correlation coefficients was found between any weight of the studied traits and either body length or height at withers (Table 8). Contrarily, Attah *et al.* (2004) showed that empty body weight of both Red Sokoto and West African Dwarf yearling goats was positively and significantly ($p<0.05$) correlated with each of height at withers and height at pelvis. Additionally, dressing percentage of Zaraibi kids was found to be positively correlated with only heart girth (Table 8). Similarly, Attah *et al.* (2004) reported that chest girth of Red Sokoto and West African Dwarf goats was positively and significantly ($p<0.01$) correlated with dressing percentage. Accordingly, it may be suggested to use heart girth as an indication of dressing percentage when selecting for higher dressing percentage. Furthermore it could be seen from Table 8 that total fat stores weight of carcass were positively and significantly ($p<0.05$)

Table 7: Correlation coefficients between body measurements, body weight and carcass traits of Barki lambs

	Body weight and carcass traits										
Body measurements	Fasted body weight	Hot carcass weight	Dressing (%)	Round weight	Loin weight	Thoracic region (ribs and brisket) weight	Shoulder weight	Neck weight	Flank weight	*L. dorsi* area at 10th rib	Total fat stores weight
Body length (BL)	0.34	0.21	-0.06	0.25	0.51	0.51	0.50	0.21	-0.44	-0.15	-0.16
Height at withers (HW)	0.05	-0.11	-0.21	0.24	-0.28	-0.13	-0.08	-0.08	0.001	-0.18	0.38
Heart girth (HG)	0.58	0.33	-0.13	0.15	0.59	0.40	0.49	-0.34	0.06	0.43	0.01
Paunch girth (PG)	0.67*	0.25	-0.35	-0.09	0.26	0.05	0.65*	-0.40	0.42	0.41	-0.28
Round circumference (RC)	-0.11	-0.01	0.11	0.35	0.36	-0.26	-0.38	-0.02	-0.15	-0.19	0.51

*p<0.05

Table 8: Correlation coefficients between body measurements, body weight and carcass traits of Zaraibi kids

	Body weight and carcass traits										
Body measurements	Fasted body weight	Hot carcass weight	Dressing (%)	Round weight	Loin weight	Thoracic region (ribs and brisket) weight	Shoulder weight	Neck weight	Flank weight	*L. dorsi* area at 10th rib	Total fat stores weight
Body length (BL)	0.50	0.41	0.07	0.19	-0.11	0.23	0.16	0.24	-0.07	0.35	0.26
Height at withers (HW)	0.40	0.41	0.27	-0.34	0.11	0.52	0.41	0.53	0.02	0.33	0.38
Heart girth (HG)	0.82**	0.91**	0.82**	0.53	0.33	0.81*	0.76*	0.77*	0.30	0.80*	0.73*
Paunch girth (PG)	0.91**	0.89**	0.53	0.49	0.42	0.75*	0.86**	0.63*	0.33	0.81*	0.67*
Round circumference (RC)	0.71*	0.76*	0.60	0.49	0.66*	0.59	0.73*	0.47	0.44	0.84**	0.45

*p<0.05, **p<0.01

correlated with each of heart girth (r = 0.73) and paunch girth (r = 0.67). In view of the attained results it could be suggested that paunch girth and heart girth were significantly highest for Barki lambs. However, body length and round circumference were significantly less for Zaraibi kids. Differences between Barki lambs and Zaraibi kids in all studied internal edible offals weight, except testis weight, were significant. Hot carcass weight, dressing percentage and carcass measurements except loin length were significantly higher for Barki lambs than Zaraibi kids. All carcass cuts weight, except flank weight, were markedly and significantly heavier in Barki lambs than Zaraibi kids. Eye muscle (*Longissimus dosri*) area and its components (lean, fat and bone) of Barki lambs excelled that of Zaraibi kids.

On the other side, it could be observed that fasted body and shoulder weights of Barki lambs were positively and significantly correlated with only paunch girth. However, in Zaraibi kids, *Longissimus dorsi* area, total fat stores, fasted body, shoulder, neck and thoracic region weights were positively correlated with both heart girth and paunch girth. Additionally, dressing percentage of Zaraibi kids was positively correlated with heart girth.

CONCLUSION

The obtained results revealed significant differences between Barki lambs and Zaraibi kids in all body measurements, weight of internal offals (except testis), carcass weight, dressing percentage, carcass cuts weight (except flank weight) in favour of Barki lambs. Consequently it might be recommended to raise Barki lambs for meat production rather than Zaraibi kids. Zaraibi breed is considered the best milk producing goat breed in Egypt. Hence it seems reasonable to genetically improve its potentialities towards milk production. Our results also showed that although eye muscle area and components were significantly higher in Barki lambs, no significant species differences were observed in lean or lean to fat or lean to bone. The might reflect similarity in qualitative traits of meat of Barki and Zaraibi breeds. On the other side, the study indicated significant and positive correlations between paunch girth and body weight of both species. Accordingly, paunch measuring could be used to estimate body weight under field conditions. Additionally, heart girth and round circumference can be used to predict body weight as well as hot carcass weight.

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REFERENCES

Abdel-Moneim, A.Y., 2009a. Body and carcass characteristics of Ossimi, Barki and Rahmani ram lambs raised under intensive production system. Egypt. J. Sheep Goat. Sci., 4: 1-16.

Abdel-Moneim, A.Y., 2009b. Use of live body measurements for prediction of body and carcass cuts weights in three Egyptian breeds of sheep. Egypt. J. Sheep Goat. Sci., 4: 17-32.

Attah, S., A.O. Okubanjo, A.B. Omojola and A.O.K. Adesehinwa, 2004. Body and carcass linear measurements of goats slaughtered at different weights. Livest. Res. Rural Dev., Vol 16.

Atti, N. and M. Ben Hamouda, 2004. Relationships among carcass composition and tail measurements in fat-tailed Barbarine sheep. Small Rumin. Res., 53: 151-155.

El-Gallad, T.T., S.M. Allam, E.A. Gihad and T.M. El-Bedawy, 1988. Effect of energy intake and roughage ratio on the performance of Egyptian Nubian (Zaraibi) kids from weaning to one year of age. Small Rumin. Res., 1: 343-353.

El-Khidir, I.A., S.A. Babiker and S.A. Shafie, 1998. Comparative feedlot performance and carcass characteristics of Sudanese desert sheep and goats. Small Rumin. Res., 30: 147-151.

FAO, 2013. FAO Production Yearbook. FAO Statistics Division, Food and Agriculture Organization of the United Nations, Rome, Italy.

Gaili, E.S.E. and A.E. Ali, 1985. Meat from Sudan desert sheep and goats: Part 1-Carcass yield, offals and distribution of carcass tissues. Meat Sci., 13: 217-227.

Hadjipanayiotou, M. and A. Koumas, 1994. Carcass characteristics of equally mature Chios lambs and Damascus kids. Small Rumin. Res., 13: 71-77.

Hogg, B.W., G.J.K. Mercer, B.J. Mortimer, A.H. Kirton and D.M. Duganzich, 1992. Carcass and meat quality attributes of commercial goats in New Zealand. Small Rumin. Res., 8: 243-256.

Lavvaf, A., A. Noshari and T. Farahvash, 2012. Evaluation of the relationship between body measurements and carcass traits of finishing Afshari and Zandi rams. Asian J. Anim. Vet. Adv., 7: 187-192.

Liméa, L., B. Bocage, R. Arquet, M. Mahieu and G. Alexandre, 2010. Carcass conformation and cut composition of Creole goat from Guadeloupe. Trop. Anim. Health Prod., 42: 507-514.

NRC, 1981. Nutrient Requirements of Domestic Animals. Nutrient Requirements of Goats: Angora, Dairy and Meat Goats in Temperate and Tropical Countries. National Academy of Sciences. Natio nal Research Council, Washington D.C., USA.

NRC, 1985. Nutrient requirements of sheep (6^{th} revised ed.). National Academy of Sciences. National Research Council, Washington D.C., USA.

Rahman, M.F., 2007. Prediction of carcass weight from the body characteristics of Black Bengal goats. Int. J. Agric. Biol., 9: 431-434.

SAS, 2004. SAS User's Guide: Statistics. SAS Inst. Inc., Cary, N.C., USA.

Sen, A.R., A. Santra and S.A. Karim, 2004. Carcass yield, composition and meat quality attributes of sheep and goat under semiarid conditions. Meat Sci., 66: 757-763.

Shehata, M.F. and M.M. Mokhtar, 2005. Growth performance and carcass characteristics of growing Barki lambs and Baladi goat kids fed halophytic forages. J. Agric. Sci. Mansoura Univ., 30: 1889-1898.

Tshabalala, P.A., P.E. Strydom, E.C. Webb and H.L. de Kock, 2003. Meat quality of designated South African indigenous goat and sheep breeds. Meat Sci., 65: 563-570.

Yaprak, M., F. Koycegiz, M. Kutluca, E. Emsen and H.W. Ockerman, 2008. Canonical correlation analysis of body measurements, growth performance and carcass traits of Red Karaman lambs. J. Anim. Vet. Adv., 7: 130-136.

Younas, U., M. Abdullah, J.A. Bhatti, T.N. Pasha, N. Ahmad, M. Nasir and A. Hussain, 2013. Inter-relationship of body weight with linear body measurements in Hissardale sheep at different stages of life. J. Anim. Plant Sci., 23: 40-44.