

PRELIMINARY INDICATORS OF GROWTH, CARCASS AND ECONOMIC TRAITS OF YEARLING OSSIMI AND BARKI LAMBS

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SUMMARY

The present study was conducted using 14 lambs of Ossimi (O) and Barki (B) (n=7 each) to compare growth and carcass characteristics as well as some economic indicators. Starting age of the experimental lambs was 6 months with initial body weight (BW) of 24.4 and 24.0 kg for O and B, respectively. The experimental period lasted for 6 months and ended when lambs reached 12 months of age. Lambs were fed according to their live body weight on concentrate feed mixture and rice straw. Monthly weighing was carried out to determine average daily gain (ADG) and total gain. At the end of the experiment four lambs per breed were slaughtered to determine carcass weight. The Longissimus lumbarum (L. lumbarum) at the 9th, 10th and 11th ribs (rib cut) muscle was separated from the carcass to determine chemical composition, area (cm²) of L. lumbarum, physical components of rib cut and dressing%.

At 12 months old Barki lambs had higher BW (+ 4 kg) compared with Ossimi. ADG throughout the experimental period were 130 ± 0.02 and 153 ± 0.01 gm for Ossimi and Barki lambs, respectively. Barki lambs had nonsignificant higher dressing percentage (52.2 ± 1.2) compared to Ossimi (50.5 ± 2.4), and lower total fat percentage (- 5%). No significant difference was observed between chemical composition of meat of the two breeds except fat which was higher (P<0.05) in Ossimi lambs. Economic indicators showed that cost of feeding to produce 1 kg gain was less (P<0.05) in Barki (L.E 9.4) than in Ossimi (L.E. 11.2), in addition to nonsignificant increase of benefit/cost ratio of Barki (1.57) than of Ossimi (1.47).

In conclusion growth traits and economic indicators during the growth period from 6 to 12 months old were better in Barki lambs compared to Ossimi.

Keywords: *Barki, Ossimi, lambs, age, growth, carcass traits, chemical composition, economic indicators*

INTRODUCTION

Mutton represents the second source of red meat in Egypt. Under different production systems, cost of producing 1 kg gain is extremely dependent on the genotype and age of fattening. Fattening lambs for 6 months (from 6 to 12 months old) is the common system applied under Egyptian conditions.

Many trials were conducted to describe the growth features of the Egyptian native breeds of sheep at different ages (Darwish *et al.*, 1973, Swidan *et al.*, 1979; Aboul-

Naga *et al.*, 1980, Hassan and El-Feel, 1991 and Awadalla *et al.*, 1997 and Amal-El-Asheeri *et al.*, 2006). Research work on the growth of lambs between 6 – 12 months of age were carried out by Hassan and El-Feel (1991) and Amal-El-Asheeri *et al.* (2006) on Ossimi and by Shehata *et al.* (1973), Galal *et al.* (1975), Mokhtar *et al.* (1991) and Sami and Shehata (2006) on Barki breed.

Carcass traits of Rahmani and Ossimi lambs, at 12 months, were intensively studied (Hassan and El-Feel, 1991, Hassan, 1993, Awadalla *et al.*, 1997 and Hafez *et al.*, 2007).

Limited trials were conducted to calculate the economic benefit of fattening Rahmani lambs from 6 to 12 old (Awadalla *et al.*, 1997), while Ahmed (2008 a & b) studied the farm budget of Barki ewes in relation to breeding season and production system. Up to the knowledge of the authors no data are available on economic merits of fattening Ossimi and Barki lambs between 6 and 12 months old.

The present study aimed therefore at comparing the growth traits and cost of producing 1 kg gain of Ossimi and Barki lambs fattened from 6 to 12 months of age.

MATERIALS AND METHODS

Animals and management

The present study was carried out in the experimental farm of the Faculty of Agriculture, Cairo University, Giza, Egypt during the period from May to November, 2006. A total of 14 lambs of Ossimi (O) and Barki (B) (n= 7 each) were used to compare growth traits, carcass characteristics and economic indicators of the studied breeds during the period from 6 to 12 months old. At the beginning of the experiment the initial body weight of the Ossimi and Barki lambs was similar being 24.4 ± 3.7 and 24.0 ± 1.3 kg, respectively. Lambs were housed in semi- shaded open pens and fed in groups on concentrate feed mixture (55% yellow corn, 20% wheat brane, 10% cottonseed cake, 10% soybean cake, 2% lime stone, 1.5% common salt, 1% minerals mixture, 0.4% sodium bicarbonate and 0.1% AD3E vitamins) and rice straw according to their live body weight (NRC, 1985). Lambs were fed in groups with an average daily feed ration 0.83 kg concentrate feed mixture and 0.5 kg rice straw allowances. Drinking water and mineral blocks were made available all the daytime. Animals were weighed at monthly intervals (± 3 d) after 12 hrs fasting period to determine body weight (BW). Average daily gain (ADG) and weight gain were estimated as growth traits.

Carcass traits

At the end of the experiment four lambs per breed were selected randomly to be slaughtered at the experimental abattoir of the Faculty of Agriculture, Cairo University, Giza, Egypt. Eighteen hours before slaughter, according to Halal Rules, lambs were prevented from feed. After bleeding, carcass was skinned and eviscerated before weighing and afterwards it was sectioned down through the vertebral column to right and left sides. The *Longissimus lumbarum* (*L. lumbarum*) muscle at the 9th, 10th and 11th ribs (rib cut) was separated from the right side of the carcass to be used for chemical analysis (AOAC, 2000). Area (cm²) of the fresh sections of *L. lumbarum* muscle (between the 8th and 9th ribs) was measured by a planimeter, and physical components (lean, fat and bone tissues) of rib cut were recorded in addition to dressing percentage (hot carcass weight divided by the BW at slaughter multiplied

by 100) were determined as carcass traits. The total fat is the sum of kidney, heart, mesenteric and tail fat weights is also recorded.

Economic indicators

Assuming that the cost of labor, veterinary care and produced manure were equal in both breeds, revenue per cycle, benefit / cost ratio and cost of feeding for producing 1 kg gain were calculated as economic indicators.

Technical coefficients

Based on the prices of the year 2006 the following prices were assigned to calculate the economic indicators;

1. Price of concentrate feed mixture = L.E. 1650/ton
2. Price of rice straw = L.E. 120 / ton
3. Price of purchasing 1 kg live BW = L.E. 21 for Ossimi and 22 for Barki
4. Price of selling 1 kg live BW = L.E. 21 for Ossimi and 22 for Barki

Calculations

The economic indicators were calculated as:

- Total variable cost (L.E) = Feeding cost + Purchasing price
- Revenue (L.E) = Total outputs – Total variable cost
- Cost of feeding to produce 1 kg gain (L.E) = feeding cost / total gain
- Return per cycle percent= Revenue / Total variable cost
- Dressing % = Carcass weight / slaughter BW multiplied by 100

Statistical analysis

Data were statistically analyzed using the general linear model procedure of SAS (2001). Data in percentages were transformed to the arcsine square-root in order to normalize the distribution and carry out the statistical analysis. The following model was adopted:

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

Where;

Y_{ij} = the measured trait

μ = the overall mean

B_i = Breed (B= 1,2; 1= Ossimi and 2= Barki)

e_{ij} = random error assumed to be randomly distributed $(0, \sigma^2)$

RESULTS

Growth Traits

Up to 8 months old there was no difference of BW of the two studied breeds. Starting from the 8th month the Barki lambs grew faster than the Ossimi lambs showing an insignificant BW increase of 4 kg at the 12th month old (Figure 1). Ossimi lambs recorded slightly lower increase in its BW relative to the initial BW (57 %) vs. Barki lambs (58 %). This can be attributed to the higher ADG of Barki by about 23 g/day compared to Ossimi lambs (Table 1).

Table 1. Growth and carcass traits (Mean \pm SE) of Ossimi and Barki lambs during the period from 6 to 12 months old (n= 7 per breed)

Item	Ossimi	Barki
ADG (gm)	130.0 \pm 0.02	153.0 \pm 0.01
IBW (kg)	24.4 \pm 3.7	24.0 \pm 1.3
FBW (kg)	48.1 \pm 3.8	52.0 \pm 1.5
Total gain (kg)	23.8 ^b \pm 1.3	28.0 ^a \pm 1.1
Carcass weight (kg)	24.1 \pm 4.6	27.3 \pm 1.9
Dressing (%)	50.5 \pm 2.4	52.2 \pm 1.2
Rib cut components (%)		
- Lean	50.4 \pm 2.4	47.7 \pm 0.6
- Fat	23.7 \pm 4.2	28.6 \pm 1.4
- Bone	25.3 \pm 1.8	22.7 \pm 0.9
Eye muscle area (cm ²)	20.3 \pm 2.7	22.7 \pm 1.9
Tail fat (kg)	3.4 \pm 1.1	2.4 \pm 0.8
Total fat (%)	13.5 \pm 1.7	8.5 \pm 2.2

Means within the same row with different superscript letters are significantly different at (P<0.05)

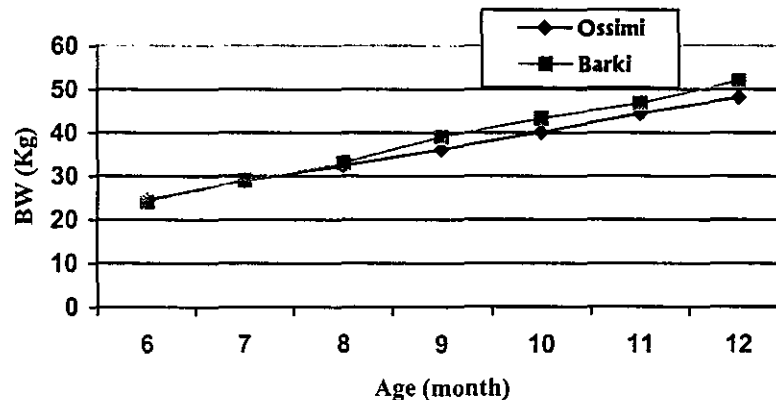


Figure 1. Growth curve of Ossimi and Barki lambs throughout the period from 6 to 12 months old

Carcass Characteristics

Barki lambs recorded higher but non-significant dressing percentage compared to Ossimi. (Table 1). As shown in the Table 1, they had larger *L. lumbarum* area, lower total fat percentage and lower tail fat. Rib cut components indicated no significant differences between the two breeds with regard to percentages of lean, fat and bone tissues.

Chemical Composition

Chemical composition indicated non-significant differences in moisture, protein and ash percentages of mutton between the two breeds, however, fat % was higher ($P<0.05$) in Ossimi than Barki lambs (Table 2).

Table 2. Chemical composition (Mean \pm S.E) of Ossimi and Barki lambs slaughtered at 12 months old (n= 4 / group) as calculated at dry matter basis

Content	Ossimi	Barki
Moisture	72.5 ^a \pm 0.7	72.8 ^a \pm 1.0
Protein	71.3 ^a \pm 2.3	72.9 ^a \pm 1.3
Fat	24.2 ^a \pm 2.3	21.3 ^b \pm 1.9
Ash	4.2 ^a \pm 0.1	4.1 ^a \pm 0.1

Means within the same row with different superscript letters are significantly different at ($P<0.05$)

Economic indicators

Results in Table 3 indicated that revenue per cycle was higher ($P<0.05$) and cost of feeding to produce 1 kg gain was lower ($P<0.05$) in Barki lambs compared to Ossimi. Moreover, benefit/ cost ratio was not-significantly higher in Barki than Ossimi.

Table 3. Economic indicators (Mean \pm S.E) of fattening Ossimi and Barki lambs up to 12 months old

Trait	Ossimi	Barki
Feeding cost (L. E)	261.2	261.2
Purchasing price (L.E)	487.3 ^a \pm 73.7	504.7 ^a \pm 26.4
Total variable cost (L.E)	748.5 ^a \pm 74.0	765.0 ^a \pm 26.0
Selling price (L.E)	1058.9 ^a \pm 83.0	1196.8 ^a \pm 34.0
Revenue (L.E)	310.4 ^b \pm 28.6	430.9 ^a \pm 23.7
Cost of feeding to produce 1kg gain (L.E)	11.2 ^a \pm 0.6	9.4 ^b \pm 0.4
Return / cycle (%)	43.2 ^a \pm 5.1	56.7 ^a \pm 3.7
Benefit/cost ratio	1.43 \pm 0.08	1.57 \pm 0.05

Means within the same row with different superscript letters are significantly different at ($P<0.05$)

GENERAL DISCUSSION

The obtained ADG (130 g, Table 1) for Ossimi lambs comes in agreement with those reported by Hassan and El- Feel (1991) and Amal- El Asheeri *et al.* (2006) ranging from 107- to 146g during the same fattening period ; 6-12 months old, dressing percentage (50.5 %, Table 1) is close to that reported by Hassan and El- Feel (1991) and Amal- El Asheeri *et al.* (2006) (48.8- 50%), when lambs were slaughtered at 12 months old.

ADG (152 g, Table 1) for Barki lambs, is close to that reported by Sami and Shehata (2006) (153 g, from 8-12 months old), while it is higher than those reported by Shehata *et al.* (1973), Galal *et al.* (1975), and Mokhtar *et al.* (1991) (55–128 g, from weaning to 12 month old. Dressing percentage found for this breed in the

present study (52.2 %, Table 1) is higher than that reported by Sami and Shehata (2006) (44.4 %), and lower than that reported by Galal *et al.* (1975) (57%).

The nonsignificant difference between the two breeds regarding moisture, protein, and ash is supported by the reports of Dawson *et al.* (2003) and Snowden and Duckett (2003) emphasizing no effect of breed on chemical composition of mutton.

The comparison between Ossimi and Barki lambs with regard to growth and economic indicators revealed that fattening Barki lambs during the period from 6 to 12 months old may have a relative advantage compared to Ossimi. This conclusion is based on the significant increase ($P < 0.05$) in total gain (17.7 %) and low cost of feeding to produce 1 kg gain (-16.1 %) found for the former breed. The non-significant increase in ADG (17.7 %), and benefit/cost ratio (9.8%) of Barki lambs also support this conclusion (Figure 2).

The non-significant increase in dressing percentage (3.4 %), lower percent of total fat (37.0%), low tail fat weight (-29.4 %) and the lower percent of inter-muscular fat as obtained from the chemical analysis (-12 %) may provide an evidence for the better quality of Barki carcass relative to Ossimi.

The small number of the experimental animals used in the present study may be a real cause for the missing of the significance in many traits. Repeating the experiment using larger number may help in reaching at more indicative results and more reliable technical coefficients.

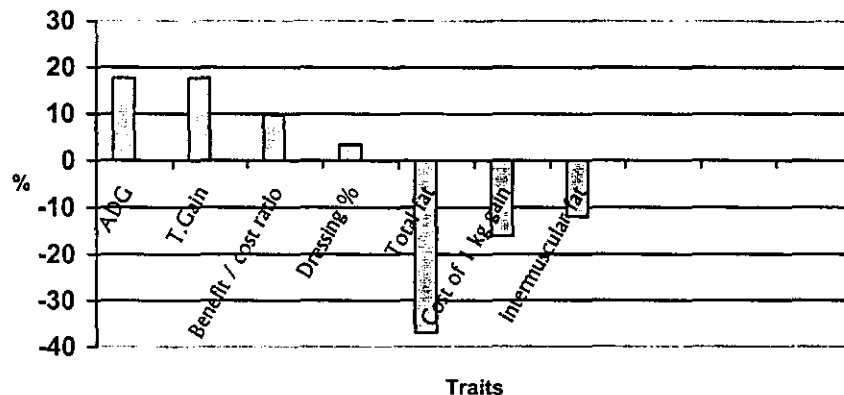


Figure 2. Growth, carcass and economical traits of Barki lambs relative to Ossimi (difference between 2 breeds/ value of trait of Ossimi X 100)

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مؤشرات أولية عن صفات النمو و الذبيحة والخصائص الاقتصادية لحملان الأوسيمي والبرقي عند عمر سنة

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أجريت هذه الدراسة علي 14 حمل من الأوسيمي والبرقي (7 حملان لكل سلالة) لمقارنة خصائص النمو والذبيحة وبعض المؤشرات الاقتصادية خلال الفترة من 6 - 12 شهر من العمر. بدأت التجربة وكان متوسط وزن الحملان 24.4 ± 3.7 للأوسيمي مقابل 24.0 ± 1.3 كجم للبرقي. تم تغذية الحملان طبقا للوزن الحي علي مخلوط علف مركز وقش الأرز وتم وزن الحملان شهريا لتقدير متوسط الزيادة اليومية وإجمالي الزيادة في الوزن خلال فترة التجربة. في نهاية التجربة تم ذبح 4 حملان من كل نوع لتقدير نسبة التصافي، كما تم فصل العضلة العينية عند الضلوع 9، 10، 11 لتقدير التركيب الكيماوي ومساحة العضلة العينية والمكونات الطبيعية (لحم - عظم - دهن) للعضلة العينية.

أشارت النتائج إلي أن وزن الذبح كان أعلى في حملان البرقي عنها في الأوسيمي بحوالي 4 كجم، وكان متوسط الزيادة اليومية خلال فترة التجربة 0.02 ± 130 مقابل 0.01 ± 153.0 جم للأوسيمي والبرقي علي التوالي. سجلت حملان البرقي زيادة غير معنوية في نسبة التصافي (52.2 ± 1.2 %) مقارنة بالأوسيمي (50.5 ± 2.4 %). كما سجلت انخفاضا في نسبة الدهن الكلي في الذبيحة بمقدار 5%. لم يلاحظ أي فرق معنوي في التركيب الكيماوي للحوم السلالتين فيما عدا نسبة الدهن التي كانت أعلى ($P < 0.05$) في حملان الأوسيمي. أظهرت المؤشرات الاقتصادية انخفاض معنوي ($P < 0.05$) في تكلفة التغذية لإنتاج 1 كجم زيادة في الوزن الحي للبرقي (9.4 جنية) عن الأوسيمي (11.2 جنية) بالإضافة إلي زيادة نسبة العائد/ المصروفات بنسبة حوالي 10 % اعتمادا علي حساب تكاليف التغذية.

ومن التجربة يمكن استنتاج أن صفات النمو والمؤشرات الاقتصادية لحملان البرقي خلال الفترة من 6-12 شهر من العمر كانت أفضل منها في حملان الأوسيمي.