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ECONOMIC RETEURN OF FATTENING BALADI AND BUFFALO CALVES UNDER PREVAILING SYSTEM IN EGYPT

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ABSTRACT

Thirty calves of Baladi and Buffalo (n=15/genotype) were used in this work to study daily gain, feed conversion and economic efficiency of both genotypes. Calves were purchased from local market with body weight of 229 – 238 kg. Calves were kept tied in a semi open yard and fed on concentrate feed mixture and rice straw throughout the fattening period. Initial body weight of Baladi and buffalo calves was similar averaging 231.4 ± 1.9 and 232.6 ± 1.0 kg, respectively. Calves were allowed to grow up to the final body weight of 400 kg. Calves were weighed monthly to record the body weight and determine feed requirements of each animal. Growth curve, average daily gain (ADG) and total weight gain were recorded as growth traits, while fattening period, cost of producing one kg gain, cost of producing one kg meat were calculated as economic parameters.

Growth curve of the two studied genotypes indicated no significant difference between Baladi and Buffalo calves within the first three months of fattening period. Afterward body weight of Baladi calves increased significantly ($P< 0.001$) compared to buffaloes. Baladi and Buffalo calves reached the target final body weight (398.9 ± 2.6 kg and 400.3 ± 1.5 kg, respectively). Fattening period of buffalo calves (252.7 ± 5.7 day) was significantly ($P<0.0001$) longer than that of Baladi (185.7 ± 7.4 day) by about 67 day. This is due to the higher ($P<0.0001$) ADG of Baladi (0.93 kg) compared to buffaloes (0.67 kg) by about 38.8 %.

Total running costs of fattening buffalo calves significantly ($P<0.0001$) increased than that of Baladi ones by about 35.9 %. Feed conversion rate of buffalo calves (13.1 kg dry matter) is significantly (37.9 %, $P<0.0001$) higher than of Baladi calves (9.5 kg) to reach to the target body weight of 400 kg. Cost of producing one kg weight gain in buffalo calves (LE 15.4) is higher than that of Baladi calves (LE 11.2). The corresponding cost of producing one kg meat was LE 23.8 and 35.9 for Baladi and buffalo calves, respectively.

In conclusion fattening of buffalo calves between 230 to 400 kg is less feasible compared to Baladi calves, due to high cost of producing one kg gain and one kg meat.

Keywords:Buffalo, Baladi, daily gain, feed conversion, economic parameters

INTRODUCTION

National demand of red meat in Egypt is more than the national production. To bridge of the gap, the Egyptian government nowadays encourages the producers to fatten buffalo male calves instead of slaughtering them on young ages as veal. Contribution of buffaloes in local red meat production is less than that of Baladi calves, however the population of both genotypes is almost equal (MALR, 2006). National veal production project of buffaloes in Egypt comprise two phases, the first ended when

claves body weight reached about 230- 250 kg, while the second started after phase one and continued up to 400-450 kg.

Growth features of buffaloes were affected by genotype and age (Gigli *et al.*, 1993; Ashour *et al.*, 2000 and Ahmed *et al.*, 2004), sex (El-Feel *et al.*, 1993), body conformation (Shahin, 2003) and feeding (Mehrez *et al.*, 1993 and Sadek *et al.*, 1993a). Previous studies indicated that average daily gain of buffaloes ranged between 0.433 and 0.780 kg (El-Feel *et al.*, 1993, Gigli *et al.*, 1993, Omar *et al.*, 1993, Sadek *et al.*, 1993a, Mehrez *et al.*, 1993 and Afzal *et al.*, 2009). On the other hand, average daily gain of Baladi was reported to be higher than that of buffaloes with a range of 0.6 – 1.3 kg (Omar *et al.*. 1993; Sadek *et al.* 1993b; El-Bedawy *et al.*, 1996, Alsheikh *et al.* 2004 and El-Bedawy *et al.*, 2004, El-Asheeri, 2008 and El-Asheeri *et al.*, 2008).

Dressing and boneless meat percentages were studied in buffalo calves and Baladi cattle as economic indicators. In buffaloes dressing and boneless meat percentages have a range of 54.7 - 57.8 % and 42.7 – 44.2%, respectively, relative to body weight (El-Feel *et al.*, 1993, Sadek *et al.*, 1993b and El-Kholy *et al.*, 1997). The corresponding values of Baladi calves were 56 – 58 %, and 46 and 48%, respectively as reported by Sadek *et al.* (1993b); El-Bedawy *et al.* (1996 & 2004); and El- Asheeri *et al.* (2008).

Limited studies were conducted to calculate the economics of fattening buffalo calves in different ages (Mehrez *et al.*, 1993 and Omar *et al.*, 1993), but rare data are available to compare quantitatively the economic traits of fattening buffalo calves under the phases of veal production project in Egypt.

The present study was conducted to study the feasibility of fattening buffalo calves relative to Baladi ones with initial body weight of 230 kg, up to the recommended marketing weight of 400 kg, simulating the second phase of national veal production project in Egypt.

MATERIALS AND METHODS

Animals and management

This work was conducted in the Agricultural Experiments Station, Faculty of Agriculture, Cairo University to study the growth and economic efficiency of fattening Baladi and Buffalo calves. Thirty males of Baladi and Buffalo (n=15 each) were used in this study. Calves were purchased from local market in October, 2008 with body weight of 229 – 238 kg. Upon purchasing calves were treated against internal and external parasites. Animals were kept tied in a semi open yard throughout the fattening period. Claves were watered twice daily and fed individually according to the recommended allowances of Ghoneim (1964) on concentrate feed mixture (14% protein) and rice straw.

Initial body weight of Baladi and Buffalo calves has no significant difference between the two groups. Calves were weighed monthly to plot the growth curve and to determine the monthly feed requirements of each animal till reaching the final body weight of 400 kg.

Slaughtering procedure

Out of the experimental animals, five calves from each genotype were slaughtered according to Islamic rules at 400 kg .Dressing percentage was determined by dividing the hot carcass weight over slaughter weight multiplied by 100. After removing bones from each carcass, the rest is the boneless meat which was divided over slaughter body weight multiplied by 100and to calculate boneless meat percentage.

Growth traits and economic parameters

The growth traits in this study were final body weight, fattening period, total weight gain, and average daily gain as well as growth curve for Baladi and buffalo calves. The economic efficiency was calculated as follows:

- Total running cost (LE)= Costs of (feeding + labor + veterinary care + miscellaneous)
- Cost of producing one kg gain (LE) = Total running cost / total gain (Omar *et al.*, 1993)
- Cost of producing one kg meat= Total running costs / (Total gain of boneless meat).

The following list price of year 2008 in Egyptian pound (LE.):

- Concentrate feed mixture = LE 1450 / ton.
- Rice straw = LE 130 / ton.
- Cost of veterinary care = LE 50 / animal/ year.
- Cost of casual labor = LE 20 /50 head/ day.
- Miscellaneous = LE 10/ head / cycle.

Statistical analysis

Data were statistically analyzed as one way analysis of variance according to SAS (2001). The model used was as follows:

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

Y_{ij}= observation

μ = overall mean

B_i = the effect of i^{th} genotype, i= 1,2 (1= buffalo calves and 2 = Baladi calves).

e_{ij} = the experimental error

RESULTS AND DISCUSSION

Growth traits

Figure (1) indicated superiority of Baladi calves in body weight relative to buffalo ones during the fattening period (from 230 to 400 kg). Difference in body weight was not significant between the two genotypes up to the third month of the fattening period. Afterward body weight of Baladi showed significant increase compared to buffalo calves. However, the final weight and total gain were similar in both genotypes by the end of the experiment. Fattening period was significantly ($P<0.0001$) shorter in Baladi calves (36%) than buffaloes. This is due to the increase of average daily gain of Baladi calves than buffalo calves by 0.260 kg daily (Table 1).

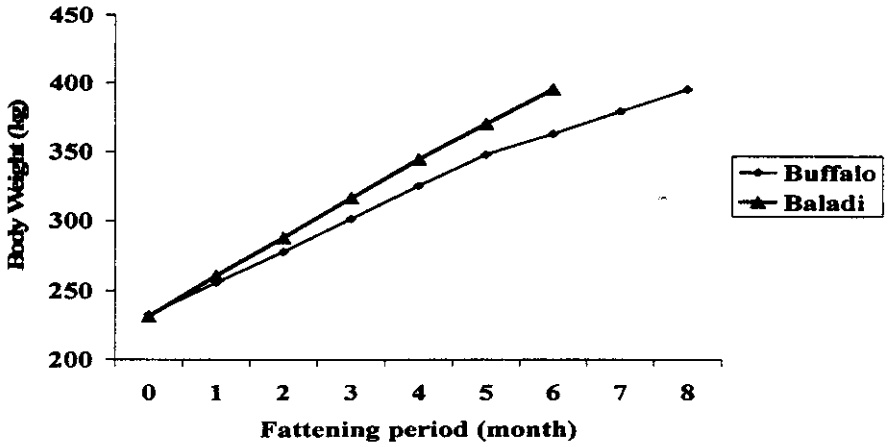

Figure (1): Growth curve of Baladi and Buffalo calves throughout the fattening period.

Table 1: Growth traits of Baladi and Buffalo calves during fattening period.

(n=15/ each)

Trait	Baladi	Buffalo	P value
Initial body weight (Kg)	231.4 ± 1.9	232.6 ± 1.0	0.58
Final body weight (Kg)	400.3 ± 1.5	398.9 ± 2.6	0.65
Total weight gain (Kg)	168.9 ± 2.2	166.3 ± 2.5	0.44
Fattening period (day)	185.7 ± 7.4	252.7 ± 5.9	0.0001
Average daily gain (Kg)	0.93 ± 0.04	0.67 ± 0.02	0.0001

The obtained average daily gain in buffalo (0.67 kg) and Baladi calves (0.93 kg) were within the results of El-Feel *et al.* (1993), Omar *et al.* (1993), Sadek *et al.* (1993a), Mehrez *et al.* (1993) in buffaloes and of Omar *et al.* (1993); Sadek *et al.* (1993b); El-Bedawy *et al.*, (1996 and 2004), Alsheikh *et al.* (2004) and El-Asheeri *et al.* (2008). On the other hand, Ashour *et al.* (2000) and El-Kholy *et al.* (1997) reported average daily gain of buffalo calves more than one kg daily.

Obtained fattening period (252.7 day) required for buffalo to reach 400 kg is shorter than that reported by Mehrez *et al.* (1993) using close initial and final body weight (330 day), while Sadek *et al.* (1993) reported very longer fattening period (463 day) under similar experimental condition except the final body weight which was 450 kg .

Carcass traits

Figure (2) indicated that the dressing percentage and boneless meat percentage were higher (P 0.01) in Baladi than in buffalo calves. The present values of dressing percentage and boneless meat percentage are close to that reported by Sadek *et al.* (1993b); El-Bedawy *et al.* (2004) and El- Asheeri (2008); El-Feel *et al.* (1993), and El-Kholy *et al.* (1997). The lower dressing percentage in Buffalo calves compared to Baladi calves due to that

Buffalo calves are late maturing animals. However, the lower bonless meat (%) due to the heavy weight of their bones

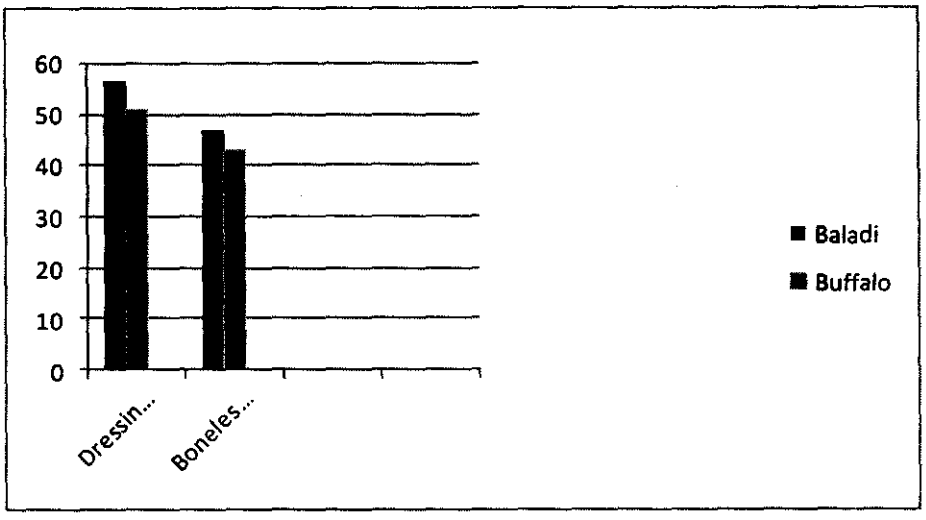

Figure (2): Dressing (%) and boneless meat (%) in Baladi and Buffalo calves

Economy of fattening

Tables (2) and (3) indicate that total running costs of fattening buffalo calves were greater than Baladi by about 35.9% (P<0.0001). In both genotypes feeding cost represents about 95.4% out of total running costs. During the fattening period, buffalo calves consumed 36.1% more (P<0.0001) of dry matter to reach to the target body weight (400 kg) relative to Baladi. This is reflected on the feed conversion which was higher in Baladi than buffalo (- 3.6 kg/1kg gain), which due to the high total running costs of buffalo relative to Baladi. Costs of producing one kg gain and meat were higher in buffaloes by 37.5 and 50.8 %, respectively (Table 3).

Table 2: Total running cost (L.E.) of fattening Baladi and Buffalo calves during fattening period.

(n=15/ each)

Trait	Baladi	Buffalo	P value
Concentrate feed mixture	1699.8 ± 64.8	2313.5 ± 53.1	0.0001
Rice Straw	76.2 ± 2.9	103.7 ± 2.4	0.0001
Total feeding costs	1776.1 ± 67.7	2417.2 ± 55.4	0.0001
Veterinary care	25.4 ± 1.0	34.6 ± 0.8	0.0001
Labor	74.3 ± 3.0	101.1 ± 2.4	0.0001
Miscellaneous	10.0	10.0	-
Total running costs	1885.8± 71.7	2562.9± 58.5	0.0001

Sadek *et al.* (1993a) reported that feed conversion of 12.26 kg starch value to produce one kg weight gain for buffalo. Mehrez *et al.* (1993) reported

close feed conversion rate (15.42 kg) to the present result based on the dry matter intake.

Results of El- Bedawy *et al.* (2004) and El-Asheeri *et al.* (2008) on Baladi calves indicated lower feed conversion rate (8.2 – 8.37 kg to produce one kg gain) than the obtained results (9.5 kg) based on dry matter intake. The present fattening period (185.7 day) was also higher than that reported by El-Asheeri (2008) (171.3 day).

Table 3: Feed conversion rate and economic parameters of fattening Baladi and Buffalo calves during the fattening period.

Trait	Baladi	Buffalo	P Value	Difference (%) *
Dry matter (kg)	1594.3 ±60.8	2169.9 ±49.8	0.0001	+ 36.1
Feed conversion**	9.5 ± 0.4	13.1 ± 0.3	0.0001	+ 37.9
Economic efficiency:				
Running costs (LE)	1885.8± 71.7	2562.9± 58.5	0.0001	+ 35.9
Cost of producing one kg gain (LE)	11.2 ± 1.4	15.4 ± 1.1	0.0001	+ 37.5
Cost of producing one kg meat (LE)	23.8± 0.95	35.9 ± 0.85	0.0001	+ 50.8

*** Calculated as the difference between each trait of Buffalo – the corresponding trait of Baladi divided by Baladi trait) multiplied by 100**

**** Feed conversion = amount of dry matter (kg) consumed to produce one kg gain**

Conclusion

Fattening of buffalo calves between 230 to 400 kg is being less feasible compared to Baladi calves. The present results may provide a reliable interpretation to the lower contribution of buffaloes in local meat production compared to cattle. More studies on larger number are required to reach to the appropriate age and / or weight of fattening buffalo calves to maximize the cost/ benefit ratio.

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العائد الاقتصادي من تسمين العجول البلدي والجاموسي تحت النظام السائد في مصر.

آمال كمال العشيري

قسم الإنتاج الحيواني – كلية الزراعة – جامعة القاهرة – جيزة – ج. م. ع.

استخدم في هذه الدراسة عدد (٣٠) عجل بقري وجاموسي (١٥ عجل لكل منهما)، بهدف دراسة الزيادة اليومية وكفاءة تحويل الغذاء والكفاءة الأقتصادية عن تسمين هذه العجول. تم شراء عجول التجربة عند وزن (٢٢٩–٢٣٨ كجم) من السوق المحلي، وتمت معاملتها ضد الطفيليات الداخلية والخارجية بمجرد الشراء. تم إيواء الحيوانات مربوطة في عنابر نصف مفتوحة، وتمت تغذيتها على مخلوط العلف المركز، وقش الأرز خلال فترة التجربة. كان متوسط وزن العجول البقري والجاموسي عند الشراء ٢٣١.٤ ± ١.٩ و٢٣٢.٦ ± ١.٠ كجم على التوالي ولم يكن الفرق معنوياً بين متوسط وزن المجموعتين. تركت الحيوانات لتنمو بهدف الوصول إلى ٤٠٠ كجم كوزن للتسويق. وتم وزن حيوانات التجربة شهرياً لحساب منحني النمو، ومتوسط الزيادة اليومية ومقدار الزيادة في الوزن الحي خلال فترة التجربة كصفات للنمو ، بينما تم حساب طول فترة التسمين، وتكلفة إنتاج كيلوجرام نمو وكيلوجرام لحم كصفات اقتصادية.

أوضح منحني النمو عدم وجود فروق معنوية بين أوزان العجول الجاموسي والبقري حتى الشهر الثالث من فترة التسمين، ثم بعد ذلك أظهرت العجول البلدية تفوقاً في النمو مقارنة بالعجول الجاموسي. كانت فترة التسمين اللازمة لوصول العجول البلدية إلي الوزن المستهدف (١٨٥.٧ ± ٧.٤ يوم) أقصرمعنويا (P<0.0001) منها بالنسبة للعجول الجاموسي (٢٥٢.٧ ± ٥.٧ يوم) للوصول إلي الوزن النهائي والذي بلغ ٣٩٨.٩ ± ٢.٦ كجم للعجول البلدية ، مقارنة بوزن ٤٠٠.٣ ± ١.٥ كجم للعجول الجاموسي. كان معدل النمو اليومي للعجول البلدية أعلى معنويا (P<0.0001) من العجول الجاموسي وسجلت الدراسة متوسطات بلغت ٠.٩٣ و٠.٦٧ كجم على التوالي بزيادة قدرها ٣٨.٨ %. كان متوسط التكاليف الجارية أعلى (P<0.0001) معنويا في العجول الجاموسي بحوالي ٣٥.٩ % مقارنة بتكاليف تسمين العجول البلدي. كان معدل الكفاءة الغذائية أقل (P<0.0001) في العجول الجاموسي (١٣.١ كجم مادة جافة) مقارنة بالأبقار (٩.٥ كجم مادة جافة) بفارق ٣.٦ كجم. بلغ متوسط تكلفة إنتاج واحد كجم نمو في العجول الجاموسي ١٥.٤ جنيه مقارنة بالعجول البقرى ١١.٢ جنيه للعجول البقري. كما كانت تكلفة إنتاج كجم من لحوم الجاموس أعلى منها في الأبقار ، حيث كانت ٣٥.٩ و ٢٣.٨ جنية علي التوالي.

يمكن استنتاج أن تسمين العجول الجاموسي من ٢٣٠ إلي ٤٠٠ كجم له جدوى اقتصادية أقل إذا ما قورن بالعجول البلدية على نفس الوزن.

قام بتحكيم البحث

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