Egyptian J. Anim. Prod., 41, Suppl. Issue, Nov. (2004):85-91

BIOLOGICAL AND ECONOMIC ASSESSMENT OF FATTENING EGYPTIAN NATIVE BULLOCKS IN A NEWLY RECLAIMED AREA

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SUMMERY

Data of 53 bullocks in summer and 201 bullocks in winter were collected from a commercial feedlot farm located in a newly reclaimed area, some 90 km from Cairo on the Cairo–Alexandria desert road during the agricultural year 1997-1998. The goal of the study was to evaluate the biological and economic performance of fattening enterprises of Egyptian native bullocks in both winter and summer seasons, In addition to introduce solution to help improve the return of LE per year. The average initial body weight was 280±4.207 and 299±2.160kg in summer and winter, respectively. The bullocks were individually fed mainly on concentrates (14 % crude protein) plus roughage offered ad libtum. The age of these bullocks ranged from 6 months to less than two years. Data were analyzed using the General Linear Models (GLM) procedure. Alternative feeding regime was suggested depending on replacement of 50% of the concentrates in winter by berseem (Trifolium alexantrinum) as a solution to improve the return per LE per year. The average daily gain was 1.17 kg and 1.11 kg in summer and winter, respectively. The corresponding values of feed conversion (kg dry matter intake per kg body weight gain) were 9 kg and 10 kg. The values of return per animal were LE 392 and LE 316 in summer and winter seasons, respectively. Feeding cost accounted for 86 % and 87% of the total variable cost in summer and winter seasons, respectively. The return per LE per year was 12%. The alternative feeding regime reduced the total feeding cost to 82% and improved the return per LE per year to 19%. It could be concluded that, the economic analysis of this farm appeared that the intensification to obtain high biological performance was not enough to obtain the high value of the return per LE per year. So, to improve the value of the return per LE per year, other criteria could be taken into consideration such as reducing feeding cost using available green fodder.

Keywords: Cattle, Daily gain, farm income, return

INTRODUCTION

In Egypt, small holders own more than 90 percent of livestock. Actually, cattle and buffaloes produce about 80 percent of red meat (Abdel-Aziz, 1997). Hence, farms with small number of local cattle get rid of their calves soon after weaning or after the termination of the green fodder season. These small farms supply stock to feedlots for fattening in specialized farms. In most cases, middlemen collect these calves from local markets and sell them to fattening farms. Concentrates are

purchased from factory and/ or made on the farm from available local ingredients, which are usually cheap. Straw and hay are usually bought seasonally to avoid out of season high prices.

Large-scale feedlots for cattle follow landless production system (Sere and Steinfeld, 1996) and mainly depend on the transport of feeding stuffs from outside the farm. This system produces about 12% of the global production of beef and contributed about 20% of beef production in Egypt (Abdel-Aziz, 1997). It is also high capital, labor, and feed intensive. These feedlots are scattered in different parts of Egypt especially in newly reclaimed areas.

The key efficiency parameters in the feedlot farm are daily weight gain, feed conversion and economic return. However, up till now, the relative importance of the input items has not been precisely examined under practical Egyptian farm conditions.

Therefore, the aim of the present study was to evaluate the biological and economic performance of the enterprises of fattening Egyptian native bullocks under commercial conditions in both winter and summer seasons in a newly reclaimed area. In addition to introduce solution to help improve the return of LE per year.

MATERIALS AND METHODS

Data of 53 bullocks in summer and 201 bullocks in winter were collected from a commercial feedlot farm located in Wadi El-Natroon some 90 km Northwest of Cairo on the Cairo–Alexandria desert road. The average initial body weight was 280±4.207 and 299±2.160kg in summer and winter, respectively. Bullocks were bought from October to January (winter season) and from May to June (summer season) during the agricultural year 1997-1998. They were individually fed mainly on concentrates feed mix (14 % crude protein) purchased from outside the farm plus roughage (bean and wheat straw) offered *ad libtum*. The age of these bullocks was not estimated, while they ranged from 6 months to less than two year. They were vaccinated and drenched before fattening started. Fresh water was available to animals twice daily. Animals were housed in five barns; 50 bullocks each. Barns were made of bricks, with a ceiling 6m high made of corrugated metal sheets, and well ventilated. Two laborers were in change of each barn serving 50 bullocks. Also, a manger and two specialists were managing the farm.

Data analysis:

Data were analyzed using the General Linear Models (GLM) procedure (SAS,1998). Tests of significance were done according to Duncan's Multiple Range Test (1955). These data were analyzed according to the following model:

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

where,

Y_{ij} = any j^{th} observation on i^{th} season,
μ = overall mean,
S_i = effect of i^{th} season i= 1-2,
ß = regression coefficient of final weight on initial weight,
W_{ij} = deviation of initial weight from its average,
e_{ij} = random error.

Alternative feeding regime:

Data collected from this farm showed that, all feeds offered in both summer and winter seasons, and no green fodder was provided. So, an alternative type of feeding regime, could be suggested which dependent on replacement of 50% of concentrates feeding in winter by berseem (*Trifolium alexantrinum*), which is available in winter season. In this case, The amount of berseem which covers 50% of nutritional requirements of the animal feeding to produce 1.2 kg daily gain was 15 kg per day (Crampton and Harris, 1996). The price of a kg berseem was LE 0.065 (farm gate prices in March 2003). The total feeding cost in the case of using berseem was modified according to the following equation:

TFC = CCFS + (CHCFW + (P * M* FP* NFB)),

where,

TFC = total feeding cost LE,
CCFS = cost of concentrates feeding in summer LE,
CFCFW = cost of 50% of concentrates feeding in winter LE,
P = price of a kg berseem LE,
M = Amount of barseem used /kg/day,
FP = fattening period in winter day,
NFB = No. of fattening bullocks in winter head.

RESULTS AND DISCUSSION

Biological performance:

Season significantly affected final weight, average daily gain and fattening period but these effects being non significant when initial body weight was corrected ($p<0.05$). This result was obtained due to that, the summer season had less initial body weight than that of winter, which allowed animals to attain higher final weight than those in winter season (Table1).

Averages dry matter intake (DMI)/ head/ day and efficiency of feed conversion (Kg DMI/ Kg body weight gain) represented in table 1. Indicating a slight depression in the feed intake and feed conversion of animals fattened during summer months. This could result from the negative effects of heat stress as reported by Younis and Mokhtar (1999). These result were within the range suggested by Sere and Steinfeld (1996) of 8 to 10 kg DMI per kg of live body weight gain as feed conversion rate for animals fattened under landless production system.

The average daily gain (Table 1) being higher than the previous estimates reported of 0.801 kg (Galal et al., 1973), 0.750 kg (Kamar et al., 1961) and 0.600 kg (Asker and Ragab, 1958). However, the present values were within the range obtained by El-Ashry et al. (1985) on different nutritional treatments of Brown Swiss male caves (from 0.830 to 1.160 kg). Also, Sere and Steinfeld (1996) reported values close to those obtained in the present study (1.0 to 1.5 kg). The present results demonstrated the ability of local cattle to put on weight once kept within the intensive production system.

Table 1. Least squares means (LSM) ± standard error (SE) for some biological parameters in different two fattening seasons

Parameters	Summer season		Winter season		Overall
	LSM	± SE	LSM	± SE	Mean
Number (head)	53		201		254
Final Weight (kg)	445[a]	± 6.340	433[a]	± 2.485	439
Fattening period (day)	120[a]	± 4.486	118[a]	± 1.759	119
Total gain (kg / head)	141[a]	± 6.659	129[a]	± 2.611	135
Av. Daily gain (kg)	1.17[a]	± 0.051	1.11[a]	± 0.020	1.14
Av. DMI* (kg / head / day)	10[a]	± 1.645	11[a]	± 1.232	10.5
Biological efficiency**	9[a]	± 2.233	10[a]	± 1.897	9.5

Values were rounded to the nearest integer.
Means with the same superscript letter in the same row are not significantly different ($p<0.05$).
* DMI = Dry matter intake. ** No. of kg DMI / kg body weight gain.

Economic performance:

Feeding cost represented the highest fraction of the total running cost in both seasons (Table 2). The cost values of animal feeding were LE 651 and LE 624 in summer and winter fattening, respectively (1 US dollar = LE 6.5).

However, the feeding cost per animal was higher in summer than in winter. However, the return per animal in summer exceeded its value in winter by LE 76 (Table 2). This result might be due to the reduced animal purchase prices in summer than that in winter being LE 1791 vs. LE 1982. This price difference could occur because small holders kept their calves to suck their dams in winter (berseem season), which decrease the supply of calves in winter. While in the beginning of the summer the small holder try to make early weaning and sell calves soon before the end of green fodder season. This increases the supply of calves which affected the animal purchase prices in the summer season.

Table 2. Economic analysis of fatting bullocks in the two studied different seasons

Items	Summer season		Winter season			
	LE	%	LE	%	LE	%
Number of animals (head)	53		201		254	
Feeding cost	34488	86	125433	87	159921	87
Labor cost	2072	5	7505	5	9577	5
Veterinary services	1530	4	5010	4	6540	4
Administration	1241	3	4108	3	5349	3
Miscellaneous	1000	2	2000	1	3000	1
Total running costs	40331	100	144056	100	184387	100
Total animal purchase price	94919		398336		493255	
Total variable costs	135250		542392		677642	
Total gross output	156048		605812		761860	
Gross margin*	20798		63420		84218	
Return/animal	392		316		332	
Return/LE						12

* Calculated according to Groen, 1989.

The return per LE per year represented in table 2 was estimated as 12%. This value was slightly greater than that of the alternative chance of money by 2% only, indicating that, the investment in this type of projects is good but is not enough rewording. Also, it was less than that reported by Abdel-Aziz (1997) (24%). This could be due to the high values of running cost. The items of running cost contributed 28% of total variable cost while the purchase of animal contributed 72% of the total variable cost. The value of purchase of animals was higher than that obtained by Osman (1997) (60% of the total variable cost). Also, the price of a ready-made concentrate max was LE 570/ ton, whereas, this cost would be reduced to LE 470/ ton if the concentrates were formulated on farm from available local ingredients according to Osman (1997) which could add extra return of LE 68 per head.

The suggested alternative feeding regime reduced the feeding cost per animal from LE 624 in winter season to LE 429 which reduced the total feeding cost in winter from LE 125433 to LE 86234 (LE 62717 as concentrates and roughage plus LE 23517 as berseem). In this case, the contribution of feeding cost could be reduced from 87% to 82% of total running cost, while this value was still grater than the value of 77% which was reported by El-Ashery, et. al. (1985). This result could be due to the lower percentages of the other items of the running costs especially the percentage of labor cost (5%) than that (11%) which reported by El-Ashry, et. al. (1985). Also, this feeding regime was improved the return per LE per year from 12% to 19%. This value was still less than that reported by Abdel-Aziz (1997) (24%), because the items of total costs were more than the prices of sell fatting bullocks, which occurred due to the different ways of calculating cost items. The percentage of Abdel-Aziz (1997) (24%) was an average value of the whole commercial feedlot farming system in Egypt.

It could be concluded that, the economic analysis showed that the intensification to obtain high biological performance in feedlot farms was not enough to obtain the high value of the return per LE per year. So, to improve the value of the return per LE per year, another alternative could be taken into consideration such as reducing the total feeding cost through using a different feeding regime such as using available green fodder.

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التقييم الفنى والإقتصادي لتسمين العجول البقرى المصرية الأصيلة فى منطقة حديثة الاستصلاح

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تم تسمين عدد ٥٣ عجل بقرى خلال موسم الصيف و ٢٠١ خلال موسم الشتاء فى مزرعة تجارية لتسمين العجول بإحدى المناطق حديثة الاستصلاح على بعد حوالي ٩٠ كم من القاهرة فى طريق مصر إسكندرية الصحراوي خلال العام الزراعي ١٩٩٧-١٩٩٨. تهدف الدراسة الى تقييم الأداء الفني والاقتصادي فى عملية تسمين العجول البقرى الأصيلة وتقديم حل يساعد فى تحسين العائد الاقتصادي. كان متوسط الوزن فى بداية التسمين ٢٨٠ ± ٤.٢٠٧ و ٢٩٩ ± ٢.١٦٠ كجم فى كلا من الصيف والشتاء على الترتيب. غذيت العجول أساسا على مركزات (١٤ % بروتين خام) بالإضافة الى توفير العليقه الخشنة حتى الشبع. تراوح عمر هذه العجول بين ٦ شهور الى اقل من سنتين عند بداية فترة التسمين. تم تحليل البيانات المتحصل عليها بالنموذج الخطى العام. تم اقتراح نظام غذائي بديل يعتمد أساسا على استبدال ٥٠ % من المركزات فى الشتاء بالبرسيم كحل لتحسين العائد بالجنية سنويا. كان متوسط العائد اليومي ١.١٧ و ١.١١ كجم فى الصيف والشتاء على الترتيب. وبنفس الترتيب كانت قيم معامل التحويل الغذائي (كجم مادة جافة مأكولة لكل كجم عائد فى وزن الجسم) هى ٩ و ١٠ كجم. وقدرت قيم العائد لكل حيوان ٣٩٢ و ٣١٦ جنية فى الصيف والشتاء على الترتيب. وقد مثلت تكاليف التغذية ٨٦ و ٨٧ % من التكاليف المتغيرة الكلية فى الصيف والشتاء على الترتيب. العائد على الجنية فى السنة كان ١٢ %. أدى استخدام النظام الغذائي البديل إلى خفض تكاليف التغذية الكلية الى ٨٢% وتحسين العائد بالجنية فى السنة الى ١٩ %. من ذلك يمكن استنتاج ان التحليل الاقتصادي لهذه المزرعة أوضح ان التكثيف للحصول على أداء بيولوجي عالي ليس كافيا لتحقيق عائد مرتفع على الجنية فى السنة. لذلك، لتحسين العائد، يجب ان توضع معايير أخرى فى الحسبان مثل تقليل تكاليف التغذية باستخدام العلائق الخضراء المتوفرة.