

## Economic Impacts of Meat Producing Species on Fattening Period and Efficiency of Meat Production Farms under Egyptian Conditions

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### Abstract

### Original Research Article

This study aimed to evaluate the effect of meat producing species on fattening period and efficiency of meat production farms through field survey of different meat producing farms in Dakahlia province, which located at the north delta of Egypt. The meat producing animals included in this study were baladi cattle calves, cross-bred cattle calves and buffalo calves. The data included in the study were productive parameters as feed intake; marketing weights, weight gain and fattening period in addition to economic parameters as costs of production, feed cost, returns, and then different economic efficiency measures were calculated. The data analyzed using computer programs SPSS/PC<sup>+</sup>. The results revealed that, the best breed from economic point used for fattening under Egyptian conditions were cross-bred calves and is better than baladi calves and buffalo calves. These results attributed to the high body weight gain, high resistance to different diseases, lower total costs and a higher return in cross-bred calves than baladi and buffalo calves. Also, the value of economic efficiency measures as TR/TC were 118.94 % in cross-bred calves and is higher than the buffalo calves and baladi calves as were 118.34 % and 115.09 % respectively.

**Keywords:** meat production, economic efficiency, fattening period, cross-bred calves, buffalo calves.

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## INTRODUCTION

Beef production represents a large and important segment of the agricultural industry [1]. Cattle are considered one of the first animals domesticated for agricultural purposes. They were tamed to provide meat, milk, hides and for draft purposes [2]. The production varies from year to year depending on local conditions, seasons, and feeding systems.

The increase in world demand for beef is owed to the change in consumption with a projected population growth of about 1.1 percent annually. The role of beef production projects is very important in the agriculture system in decreasing the gap between consumption and production compared with other agriculture projects [2]. The beef cattle industry became a vital production and is of increasing importance [3-6]. Red meat demand in Egypt is more than the national production. The Egyptian government encourages beef producers to fatten buffalo male calves instead of slaughtering them as veal to bridge this gap [7].

Buffalo meat is a healthy red meat because of its lower cholesterol and fat content in comparison to

pork. Growth performances of buffaloes were affected by age and genotype [8] sex and feeding [9]. The average daily gain of buffalo calves ranged between 0.433 and 0.780 kg [10, 9, 11]. In beef production programs, 8-10 months age animals is preferred and a fattening period of 6-8 months to obtain 500-550 kg body weight will be more profitable [12].

Meat production performance parameters of fattening calves including weight gain and daily weight gain is significantly improved in crossbreed cattle than baladi cattle [13]. Live weight, yield ratio, meat price, gross production value, production costs, and net profit per animal differed significantly among different cattle breeds. The optimal fattening period in calves fattening were (5 months) as yielded much more net profit [14].

## MATERIALS AND METHODS

This study was carried out through field survey in different private meat production farms found in Dakahlia Province in Egypt. The meat producing animals included in this study were baladi cattle calves, cross-bred (baladi X Friesian calves) and buffalo calves. The data were collected from the accurate production and

performance records and questionnaire method in meat production farms of the study area.

#### Data classification

The data was classified to evaluate the economic and productive efficiency of beef production farms into:

#### Productive data

Included herd size, type of meat production animal (baladi cattle calves, cross-bred cattle calves and buffalo calves), types and amount of feed consumed, initial weight of purchased calves, fattening period of each breed, marketing weights at end of fattening period [15].

#### Economic data

##### Production costs

##### Total Variable Costs (TVC)

Included labor cost, feed costs, calves costs (purchase price), costs related to production [16]

##### Total Fixed Costs (TFC)

Included building and equipment depreciations. The equipment depreciation on the basis of 5 years and buildings depreciation rate calculated on the basis of 25 years.

Depreciation rate = value of asset / age of asset (year).

##### Total costs (TC)

Included the sum of total variable costs and total fixed costs [17]

$$TC = TVC + TFC$$

#### Returns of production

##### Total return

Included the returns from sales of fattened animals and manure sale (calculated by multiplying manure amount (m<sup>3</sup>) by the market price) [18, 19].

##### Net return

Net return = total return – total costs [16].

#### STATISTICAL ANALYSIS

The data collected, arranged, and analyzed statistically using computer programs **SPSS/PC**<sup>+</sup> [20]. The productive and economic parameters in beef production farms including costs and returns were calculated and analyzed for each animal by Egyptian pound to evaluate the collective efficiency measures including total return (TR) / total cost (TC), total variable cost (TVC) / total cost (TC), feed cost / total cost (TC), feed cost / total variable cost (TVC).

## RESULTS AND DISCUSSION

### Feed intake (Kg) and feed cost (EGP) in meat production among baladi calves, cross-bred calves and buffalo calves.

The results in Table 1, showed that there is a significant difference ( $P < 0.05$ ) of feed amount and feed costs used in meat production from different cattle and buffalo calves. The highest amount of ration mixture observed in cross-bred calves followed by buffalo calves then baladi calves, respectively, whereas, the highest amount of sugar beets consumption observed in buffalo calves followed by cross-bred calves and the lowest amount consumed in baladi calves.

The consumed amount of berseem and derris observed in table 1, is higher in balady X fresian (cross-bred calves), then the baladi calves and the lowest amount observed in buffalo calves. Meanwhile, silage consumption is highest in baladi cattle calves, followed by cross-bred calves and the lowest amount showed in buffalo calves.

The feed cost results in beef production cleared that, the highest feed costs observed in cross-bred calves followed by buffalo calves fattening and the lowest feed costs presented in baladi calves fattening.

These results agreed with Fox *et al.* [21] who mentioned that concentrates represent the major cost component in diet of beef production and the diet represent 80-90% of the total production cost and may agree with Gong *et al.* [15] who found difference in feed amount and costs resulted from the difference in length of fattening period.

### Production performance parameters of meat production among baladi calves, cross-bred calves and buffalo calves

Results in table 2, illustrated that there is a significant difference ( $P < 0.05$ ) in production performance parameters of meat production among baladi calves, baladi X fresian calves and buffalo calves. The purchasing weight (kg) among different meat production animals not differ significantly and the higher purchasing weight observed in baladi X fresian calves followed by buffalo calves then baladi calves. Meanwhile, the marketing weight (kg) differs significantly among meat production animals as the highest marketing weight showed in baladi X fresian followed by buffalo and the lowest marketing weight in baladi cattle.

The results of fattening period (day) showed a significant difference among the different meat production animals and cleared that the length of the period is higher in baladi cattle followed by buffalo and lower in baladi X fresian cattle that depend on the growth rate till reach the marketing weight according to the type of meat production animal. For the weight gain

and daily weight gain (kg) results there is a significant difference among meat production animals where the highest weight gain and daily weight gain were in balady X fresian cattle followed by buffalo and the lowest weight gain and daily weight gain in baladi cattle. These results are owed to the higher performance and growth rate in cross-bred cattle than buffalo and baladi cattle.

This result may agree with Garip *et al.* [12] who found that fattening period is between 6-8 months and the fattening period depends on weight at placement, feeding and desired finishing weight. Also, the results agree with Sadek *et al.* [13] who said that growth rate of cross-bred calves were higher than baladi calves growth rate and cross-bred animals more efficient converter of feed to meat than native animals.

#### Returns (TR and NR) and costs (TVC and TC) parameters of meat production among balady calves, cross-bred calves and buffalo calves

The results in Table 3, cleared that there is a significant differences ( $P < 0.05$ ) in returns and costs parameters of meat production among baladi calves, cross-bred calves and buffalo calves. The meat sale value showed a higher level in baladi X fresian calves followed by buffalo and the lowest value in baladi. The difference in the meat sale value depends on the difference in marketing weight among the different species. The fecal matter sale value showed no significant difference among the different species.

The results of total return (TR) and net return (NR) showed a significant differences among different animals where the higher level of returns in baladi X fresian breed followed by buffalo calves and the lowest returns level observed in baladi breed. The difference in returns depends on difference in the values of meat sale and fecal matter sale beside the difference in production costs.

Meanwhile, the TVC and TC results also significantly different among the meat producing species as showed a higher level of total variable costs (TVC) and total costs (TC) in baladi X fresian breed,

followed by buffalo and the lowest levels in baladi breed. The difference in production costs parameters mainly owed to the differences in the feed intake amount and its cost, the difference in the fattening period and the difference in the purchasing value of calves for fattening among the different species plus other inputs cost related to the production process.

These results in agreement with Şahin *et al.* [14] Who illustrated that there is a significant difference in net profits among breeds and profits come from the efficiency of growth, efficiency of weight gain, and costs of feed and other inputs.

#### Economic efficiency measures of meat production among balady calves, cross-bred calves and buffalo calves

The economic efficiency measures results in Table 5 cleared that there were a significant differences ( $P < 0.05$ ) in efficiency measures of meat production among baladi calves, baladi X fresian calves and buffalo calves. Where the percentages of total return/total costs (TR/TC) showed a higher level in baladi X fresian as were (118.94) followed by buffalo calves were (118.34), and the lowest percentage were (115.09) showed in baladi cattle. Whereas, the percentages of total variable costs/total costs (TVC/TC) showed no significant difference among the different meat production species.

Meanwhile, the percentages of feed cost/TC and feed cost/TVC were significantly different among different species where the higher level were in buffalo calves, followed by baladi X fresian calves and the lowest percentage observed in baladi calves. These results in agreement with Attallah [16, 22] who mentioned that economic efficiency measures differ significantly from breed to another.

The study concluded that, the best animal used for fattening and meat production under Egyptian conditions were cross-bred (baladi X fresian) and is better than fattening buffalo and baladi calves due to its higher growth performance parameters, higher returns and its better values of economic efficiency measures.

**Table-1: Feed intake (kg) and feed cost (EGP) in meat production among baladi calves, cross-bred calves and buffalo calves**

Breed	N	ration mixture	sugar beats	berseem	derris	silage	feed cost
		Mean $\pm$ SE	Mean $\pm$ SE	Mean $\pm$ SE	Mean $\pm$ SE	Mean $\pm$ SE	Mean $\pm$ SE
Baladi calves	115	C 1261.99 $\pm$ 28.80	C 223.64 $\pm$ 34.17	B 185.68 $\pm$ 33.29	B 53.56 $\pm$ 13.45	A 27.87 $\pm$ 7.05	C 4877.65 $\pm$ 87.49
Baladi X fresian calves	350	A 1444.25 $\pm$ 21.61	B 547.63 $\pm$ 36.11	A 201.03 $\pm$ 25.79	A 63.72 $\pm$ 10.66	B 6.51 $\pm$ 2.16	A 6272.66 $\pm$ 57.81
Buffalo calves	360	B 1382.72 $\pm$ 20.98	A 567.19 $\pm$ 38.25	C 85.81 $\pm$ 15.73	C 14.88 $\pm$ 4.44	C 5.56 $\pm$ 1.84	B 6063.60 $\pm$ 45.59

Means within the same column of different litters are significantly different at ( $P < 0.05$ )

**Table-2: Production performance parameters of meat production among baladi calves, cross-bred calves and buffalo calves**

Breed	N	Purchasing Weight (kg)	Marketing Weight (kg)	Fattening period (day)	Weight gain (kg)	Daily weight gain (kg)
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
Baladi calves	115	A 221.86±4.84	C 430.07±4.76	A 257.06±4.37	C 208.22±5.21	C 0.81±0.04
Baladi X fresian calves	350	A 235.21±2.76	A 492.46±2.20	C 230.33±2.90	A 255.66±2.30	A 1.11±0.02
Buffalo calves	360	A 228.74±2.24	B 457.37±1.99	B 245.64±2.89	B 228.44±2.48	B 0.93±0.02

Means within the same column of different litters are significantly different at (P < 0.05)

**Table-3: Returns and costs parameters (EGP) of meat production among baladi calves, cross-bred calves and buffalo calves**

Breed	N	Meat sale value	Fecal matter sale value	Total return (TR)	Total variable Costs (TVC)	Total cost (TC)	Net return (NR)
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
Baladi calves	115	C 17202.80±95.44	A 39.03±0.12	C 17241.83±205.62	C 14958.87±139.22	C 14980.51±139.22	C 2261.32±92.75
Baladi X fresian calves	350	A 19698.40±80.55	A 39.92±0.07	A 19738.32±85.19	A 16572.70±68.33	A 16594.36±68.32	A 3143.96±71.82
Buffalo calves	360	B 18294.80±60.22	A 40.08±0.07	B 18334.88±58.87	B 15470.48±56.80	B 15492.09±56.80	B 2842.79±35.48

Means within the same column of different litters are significantly different at (P < 0.05)

**Table-4: Economic efficiency measures of meat production among baladi calves, cross-bred calves and buffalo calves**

Breed	N	TR/TC	TVC/TC	Feed cost/TC	Feed Cost/TVC
		Mean ± SE	Mean ± SE	Mean ± SE	Mean ± SE
Baladi calves	115	B 115.09±1.33	A 99.45±0.22	C 32.56±0.80	C 32.61±0.81
Baladi X fresian calves	350	A 118.94±0.79	A 99.78±0.00	B 37.80±0.36	B 37.85±0.36
Buffalo calves	360	A 118.34±0.46	A 99.64±0.11	A 39.12±0.43	A 39.19±0.43

Means within the same column of different litters are significantly different at (P < 0.05).

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