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**THE INFLUENCE OF SUCKLING PERIOD ON GROWTH  
PERFORMANCE AND CARCASS TRAITS IN EGYPTIAN BUFFALO  
MALES.**

**BY**

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**ABSTRACT**

This work was carried out to investigate the effect of traditional weaning systems which common in Egyptian villages. Twenty-one male buffalo calves (5 month old) were selected according to their previous weaning system. Such systems were  $\leq 45$ ,  $\leq 60$  and  $\leq 90$  days sucking periods respectively, forming 3 comparable groups. Each group composed of 7 animals. Animals were fed on ration contained 30:70% roughage to concentrate ratio. Fresh water was available for the animal *ad libitum*. Feed refusals were recorded to calculate feed intake. Animal were weighed individually every two week intervals before morning feeding. At 12 and 18 months of age, three animals from each group were fasted and weighed before slaughter to determine changes in carcass traits in comparable groups. The results revealed that the animals in 3<sup>rd</sup> group at 5-12 months age showed the highest values of initial and final body weight followed by 2<sup>nd</sup> and 1<sup>st</sup> groups respectively. Feed conversion ratio of tested groups at the same age interval showed that calves in the 3<sup>rd</sup> group was more efficient than those in the 2<sup>nd</sup> and the 1<sup>st</sup> groups respectively. Animals at 12-18 months age in the 1<sup>st</sup> group had the highest values in daily gain, relative gain, average daily feed intake and average DM intake than those in the 2<sup>nd</sup> and the 3<sup>rd</sup> groups respectively. Data on carcass traits for calves at 12 or 18 month age intervals showed that carcass weight, edible offal, dressing percentage, carcass muscles and their percentages from carcass weight (CW) and coefficient of meat were increased in the 3<sup>rd</sup> group than those in the 2<sup>nd</sup> and the 1<sup>st</sup> groups respectively. Opposite trend was noticed in carcass fat, bone, and their percentages of CW. Regarding the economical evaluation of animal groups, later weaning had little best net revenue in early ages, while suckling period  $\leq 60$ d had little best net revenue in later ages.

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**Key words:** Suckling period, growth performance, carcass traits, Egyptian buffaloes and economics.

**INTRODUCTION**

Feed cost is one of the most important variables that influence profit in any production system and has been reported to be 70% in average of the total cost of raising beef caws (Kruse *et al.*, 2004). Feeding costs are highly related to weaning system. Also increasing suckling period increases feed inputs (Grings *et*

al., 2002). The increase in the population size of Egyptian buffaloes (*Bos indicus*) increases the interest to investigate weaning systems effect on their meat production and their body changes (Aboul-Ela *et al.*, 2000). Approximately 20% of the total milk yield of dairy buffaloes caw is produced during the first 30 day of lactation (EL-Garhy and Abd El-Azeem, 2003). Therefore, waiting after 45 day at begin milking after weaning calves significantly reduces economic returns because less marketable milk is production (Aboul-Ela *et al.*, 2000). Also, the economical value of boneless meat of buffaloes represents about 42% of the total production of cattle in ARE. Also, male buffaloes represent 42% of the total buffalo production at Fayoum (CID, 2005). Weight gain, efficiency of food utilizing and carcass traits are the main characters considered in evaluating buffalo breeds for meat production (Nazley *et al.*, 2003; Sadek *et al.*, 1998; El-Shandweily, 1994; Omar *et al.*, 1993 and Salem *et al.*, 1983).

The present study was designed to investigate the influence of different suckling systems on productive performance and most of carcass traits in Egyptian buffalo males.

#### MATERIALS AND METHODS

This study was carried out in a commercial farm at Fayoum Governorate, Egypt. The work aimed to investigate the effect of traditional weaning systems, common in Egyptian villages, on buffalo calves performance

Twenty-one male buffalo calves (5-month old) were selected according to their previous weaning system. Such systems were  $\leq 45$ ,  $\leq 60$  and  $\leq 90$  days suckling periods respectively, forming 3 comparable groups. Each group composed of 7 animals. The plan of work in the present study is shown in Table (1).

Table (1): The plan of work for male buffalo calves at different suckling period.

Item	Groups		
	1	2	3
Number of animals	7	7	7
Weaning age, day.	45	60	90
<b>Growth trials</b>			
Age at the start	5 mo	5 mo	5 mo
Body weight at the start, kg	158±5.5	162±4.7	174±6.5
*First slaughter age	12 mo	12 mo	12 mo
*Second slaughter age	18 mo	18 mo	18 mo

\* 3 animal were taken/each group.

Calves were weighed every two weeks. Average daily gain (ADG) was determined and the feed intake was adjusted to meet the growth requirements (NRC, 1984). Fresh water was available for the animals *ad libitum*. Ration was formulated from 70% concentrated feed mixture (CFM) plus 30% roughages (berseem, berseem

hay and wheat straw, according to its availability). The concentrate feed mixture composed of 22% yellow corn, 30% wheat bran, 38% undecorticated cotton seed, 4% rice bran, 3% molasses, 2% limestone and 1% common salt. The proximate chemical analysis of the feed ingredients is shown in Table (2).

**Table (2): Chemical analysis of the feed ingredients used, on dry matter (DM) basis\*.**

Item	CFM	Berseem	Berseem hay	Wheat straw
Dry matter, %	90.44	13.00	90.00	91.81
On DM basis, %				
Crude protein	18.08	16.62	13.00	3.39
Crude fiber	16.39	15.20	21.20	38.08
Ether extract	3.80	2.64	2.10	1.73
Ash	12.55	13.00	13.90	17.32
Nitrogen free extract	49.18	52.54	49.80	39.48

\* Determined according to A.O.A.C. (1990).

At 12 and 18 months of age, three animals from each group were 12 h fasted before slaughtered. During the initial processing, the internal non-carcass parts were separated and weighed and were classified as edible offal (heart, liver, kidneys, spleen, reproductive organs and respiratory organs) as described by (Abd-El Rhman, 2001 and Salem *et al.*, 1983). The warm carcass was weight without any attached offal's and then split into left and right sides to study carcass traits. Proximate chemical analysis of rations and residues were carried out according to A.O.A.C. (1990). At the end of the work simple economical evaluation was conducted.

Statistical analysis was applied using SPSS for windows (1997) including analysis of variance and the differences between treatments means.

## RESULTS AND DISCUSSION

### Growth performance, feed intake and feed conversion:

The effect of suckling period and age intervals on growth performance and feed conversion for buffalo males (*Bos indicus*) are shown in Table 3. Data revealed that average weight for calves at 12 months age, at different comparable groups tended to increase significantly ( $p \leq 0.01$ ), as a result of increasing suckling period. Averages of body weight for buffalo calves at 5 and 12 months ages in the 3<sup>rd</sup>, the 2<sup>nd</sup> and the 1<sup>st</sup> groups were 156.5 & 271.6, 148.5 & 264.5 and 140.3 & 257.9 kg respectively. Increasing suckling period tended to improve growth performance in early age, and this effect decreased gradually with advancement in age of calves. Also, the same trend was noticed in caw calves (Kruse *et al.*, 2004). In age interval 5-12 months for Egyptian buffalo males, feed intake, dry matter intake and feed conversion, tended to increase due to the decrease in suckling period, which allow rumen development, than the increase in suckling periods.

Table (3): Influence of suckling period on growth performance and feed conversion of Egyptian male buffalo calves.

Item	Suckling periods			
	G1 ≤45d.	G2 ≤60d	G3 ≤ 90d	SE
<b>From 5-12 months of age</b>				
No. of calves	7	7	7	-
Initial weight, at 5 month of age**	140.3 <sup>c</sup>	148.5 <sup>b</sup>	156.5 <sup>a</sup>	1.23
Final weight, kg at 12 months of age**	257.9 <sup>c</sup>	264.5 <sup>b</sup>	271.6 <sup>a</sup>	1.65
Daily gain, kg/day	0.56	0.55	0.55	0.01
Relative gain <sup>1</sup> (% of initial wt.)	83.82	77.78	77.78	-
Average daily feed intake, kg*	6.43 <sup>a</sup>	6.24 <sup>ab</sup>	6.15 <sup>b</sup>	0.17
Average daily DM, intake, kg*	5.92 <sup>a</sup>	5.74 <sup>ab</sup>	5.66 <sup>b</sup>	0.15
Feed conversion, kg DM/kg gain*	10.57 <sup>a</sup>	10.44 <sup>ab</sup>	10.29 <sup>b</sup>	0.04
<b>From 12-18 months of age</b>				
No. of calves	4	4	4	-
Initial weight, kg at 12 month of age	257.9	264.5	271.6	1.65
Final weight, kg at 18 months of age	441.5	443.98	446.4	2.97
Daily gain, kg/day*	1.02 <sup>a</sup>	1.00 <sup>a</sup>	0.97 <sup>b</sup>	0.01
Relative gain (% of initial wt.)*	71.19 <sup>a</sup>	67.86 <sup>b</sup>	64.34 <sup>c</sup>	-
Average daily feed intake, kg*	12.05 <sup>a</sup>	11.78 <sup>b</sup>	11.40 <sup>c</sup>	0.34
Average daily DM, intake, kg*	11.09 <sup>a</sup>	10.84 <sup>b</sup>	10.49 <sup>b</sup>	0.31
Feed conversion, kg DM/kg gain	10.87	10.84	10.81	0.03

\*P<0.05; \*\* P<0.01; means within the same rows with different superscripts are significantly different at P<0.05.

<sup>1</sup> (gain/ initial wt) 100.

The effect of suckling period on later raising stage (12-18 month) of Egyptian male buffaloes is presented in Table 3. Data reveals increases ( $p \leq 0.05$ ) in daily gain, relative gain, average daily feed intake and average daily DM, intake as a result of decreasing suckling period for animals. This was attributed to rumen activity which increased rapidly in animals which had a short suckling period ( $p \leq 45$ d). These results agree with the finding of Grings *et al.* (2002) in beef heifers.

#### Carcass traits:

Data presented in Table (4) show that some carcass traits were affected by suckling period and age of slaughter. Animals in the 3<sup>rd</sup> group (G<sub>3</sub>) had heavier slaughter weight, carcass weight, edible offal, carcass muscle and coefficient of meat in whole carcass at 12 months of age compared to the 1<sup>st</sup> and the 2<sup>nd</sup> groups (G<sub>1</sub> & G<sub>2</sub>). While, dressing percentage, carcass fat, kg and carcass muscle % CW were significantly higher in the 3<sup>rd</sup>-group (G<sub>3</sub>) than other groups. The carcass bone, kg and bone percentage of CW were significantly lower in the 3<sup>rd</sup> groups (G<sub>3</sub>). The present results illustrate that, suckling long period improve carcass traits in buffalo males calves which slaughtered at 12 months. The main reason of these results is attributed through the rapid muscles growth rate in calves due to the increase in milk consumption through the long period of suckling.

Table (4): Influence of suckling period on carcass traits of Egyptian male buffaloes slaughter at 12 and 18 months age.

Item	Suckling periods			
	G1 ≤45d.	G2 ≤60d	G3 ≤ 90d	SE
<b>At 12 months of age</b>				
No. of animals	3	3	3	-
Slaughter weight, kg**	257.9 <sup>c</sup>	264.5 <sup>b</sup>	271.6 <sup>a</sup>	1.65
Carcass weight (CW),kg**	151.52 <sup>c</sup>	159.76 <sup>b</sup>	167.09 <sup>a</sup>	1.19
Edible offal, kg <sup>a</sup>	8.23 <sup>c</sup>	8.44 <sup>b</sup>	8.57 <sup>a</sup>	0.25
Separable fat <sup>1</sup> , kg1 <sup>a</sup>	2.77 <sup>a</sup>	2.06 <sup>b</sup>	1.86 <sup>c</sup>	0.02
Dressing <sup>2</sup> ,% <sup>a</sup>	58.75 <sup>b</sup>	60.40 <sup>ab</sup>	61.52 <sup>a</sup>	0.13
Carcass muscles, kg**	120.47 <sup>c</sup>	120.40 <sup>b</sup>	139.37 <sup>a</sup>	9.74
Carcass fat, kg**	7.45 <sup>b</sup>	7.79 <sup>ab</sup>	8.19 <sup>a</sup>	0.83
Carcass bone, kg**	23.59 <sup>a</sup>	21.57 <sup>b</sup>	19.53 <sup>c</sup>	1.11
Carcass muscles % CW <sup>a</sup>	79.51 <sup>b</sup>	81.62 <sup>ab</sup>	83.41 <sup>a</sup>	4.13
Carcass fat % of CW	4.92	4.88	4.90	0.05
Carcass bone %of CW**	15.57 <sup>a</sup>	13.50 <sup>b</sup>	11.69 <sup>c</sup>	0.81
Coefficient of meat in whale carcass <sup>3**</sup>	5.42 <sup>c</sup>	6.41 <sup>b</sup>	7.56 <sup>a</sup>	-
<b>At 18 months of age</b>				
No. of animals	3	3	3	-
Slaughter weight, kg	441.5	443.98	446.4	2.97
Carcass weight (CW),kg**	266.40 <sup>c</sup>	275.80 <sup>b</sup>	284.40 <sup>a</sup>	5.83
Edible offal, kg	12.92	13.17	13.26	1.01
Separable fat, kg <sup>a</sup>	6.21 <sup>a</sup>	6.09 <sup>ab</sup>	5.96 <sup>b</sup>	0.06
Dressing,% <sup>a</sup>	60.34 <sup>b</sup>	62.12 <sup>ab</sup>	63.72 <sup>a</sup>	1.42
Carcass muscles, kg**	213.25 <sup>c</sup>	225.22 <sup>b</sup>	233.58 <sup>a</sup>	8.44
Carcass fat, kg	17.90	17.62	18.06	1.36
Carcass bone, kg <sup>a</sup>	35.24 <sup>a</sup>	32.96 <sup>b</sup>	32.76 <sup>b</sup>	1.97
Carcass muscles % CW	80.05	81.66	82.13	21.42
Carcass fat % of CW <sup>a</sup>	6.72 <sup>a</sup>	6.39 <sup>b</sup>	6.35 <sup>b</sup>	0.08
Carcass bone %of CW	13.23 <sup>a</sup>	11.95 <sup>b</sup>	11.52 <sup>b</sup>	0.92
Coefficient of meat in whale carcass <sup>2*</sup>	6.56 <sup>c</sup>	7.37 <sup>b</sup>	7.68 <sup>a</sup>	-

\*P<0.05; \*\* P<0.01; means within the same rows with different superscripts are significantly different at P<0.05.

<sup>1</sup> Separable fat included: Omentum and kidney fat, <sup>2</sup>-warm carcass weight relative to slaughter weight <sup>3</sup>- meat (including of lean and fat): bone ratio.

The comparisons of carcass trait of Egyptian buffalo males, which slaughtered at 18 months age, were shown in Table 4. Data revealed increases in carcass weight, carcass muscle and coefficient of meat in the 3<sup>rd</sup> group (G<sub>3</sub>) than the 1<sup>st</sup> and the 2<sup>nd</sup> groups (G<sub>1</sub>&G<sub>2</sub>), while dressing percentage was nearly similar with previous results. Opposite significant trend was observed with regard to carcass bone, carcass fat and carcass bone percentage from CW. Also separable fat followed such trend.

Data cleared that when calves weaned at later age, relative improvement in carcass traits was obtained, such results may be due to the more consumption in milk, as it is a good feed for calves and this rate of conversion to muscles was more than other feeds in early ages for buffalo calves.

The economical efficiency (Table 5) was in favor of suckling period  $\leq 90$  day ( $G_3$ ) from 5-12 months of age. However, the differences between such periods did not exceed 3.5%. While, from 12-18 months age and overall experimental stage was in favor of  $G_2$ , however the differences between such periods did not exceed 1%.

Table (5): Economical efficiency of the tested suckling periods.

Item	Suckling periods		
	G1 $\leq 45d$ .	G2 $\leq 60d$	G3 $\leq 90d$
<b>From 5-12 months of age</b>			
Cost of daily feed intake <sup>1</sup> , LE	5.27	5.12	5.04
Cost of total feed intake <sup>2</sup> , LE	1106.7	1075.2	1058.4
Price of daily gain <sup>3</sup> , LE	7.84	7.70	7.70
Price of total gain <sup>4</sup> , LE	1646.4	1617.0	1617
Net revenue /day <sup>5</sup> , LE	2.57	2.58	2.66
Net revenue /whole period <sup>6</sup> , LE	539.7	541.8	558.6
Relative economic efficiency	100	100.39	103.5
<b>From 12-18 months of age</b>			
Cost of daily feed intake, LE	9.88	9.56	9.35
Cost of total feed intake, LE	1778.40	1720.80	1683.00
Price of daily gain, LE	14.28	14.00	13.58
Price of total gain, LE	2570.40	2520.00	2444.40
Net revenue /day	4.40	4.44	4.23
Net revenue /whole period, LE	792.00	799.20	761.40
Relative economic efficiency	100	100.91	96.14
<b>Overall experiment stage</b>			
Cost of total feed intake, LE	2885.10	2796.00	2741.40
Price of total gain, LE	4216.80	4137.00	4061.40
Net revenue /whole, LE	1331.70	1341.00	1320.00
Relative economic efficiency	100	100.7	99.12

- 1, Include the price of concentrate mixture and roughage.
- 2, 1 $\times$  experimental period (210, 180 and 390 day).
- 3, daily gain  $\times$  price of kg live weight gain (LE 14).
- 4, 3 $\times$  experimental period.
- 5, net revenue = 3-1      6, net revenue = 4-2

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### تأثير فترة الرضاعة على النمو وصفات الذبيحة في ذكور الجاموس المصري

على ربيع عبد الرحمن

قسم الإنتاج الحيواني - كلية الزراعة - جامعة الفيوم - مصر.

أجرى هذا العمل لدراسة تأثير نظام الفطام التقليدي في الريف المصري. تم اختيار ٢١ من ذكور الجاموس في عمر خمسة شهور طبقاً لنظم الفطام التي اتبعت معهم سابقاً وهي نظم بعد فترة ٤٥ يوم أو ٦٠ يوم أو ٩٠ يوم من الرضاعة على التتابع، مكونين بذلك ٣ مجموعات مقارنة وكانت كل مجموعة تحوى ٧ حيوانات. تم تغذية الحيوانات على عليقه تحتوى جزء خشنة وجزء مركز بنسبة ٣٠ : ٧٠% وكان الماء متاح للحيوانات في اى وقت - وتم حساب ما تبقى من عليقه الحيوانات لحساب الغذاء المستهلك. وزنت الحيوانات كل أسبوعين قبل عليقه الصباح وعند عمر ١٢ ، ١٨ شهر ذبح ثلاثة حيوانات من كل مجموعة من مجموعات المقارنة بعد الصيام والوزن لتقدير التغيرات في نباتح مجموعات المقارنة - وقد أشارت النتائج إلى أن مجموعة المقارنة الثالثة في فترة النمو من عمر ٥-١٢ شهر كانت أعلى في الوزن عند عمر ٥ شهور والوزن عند عمر ١٢ شهر وتلتها الحيوانات في المجموعة الثانية ثم حيوانات المجموعة الثالثة كما كانت هذه الملاحظة متطابقة مع كفاءة تحويل الغذاء بينما كانت حيوانات المجموعة الأولى في فترة التنشئة من عمر ١٢-١٨ شهر أعلى في قيم معدل النمو اليومي والنسبي ومتوسط الاستهلاك اليومي من الغذاء والمادة الجافة عن حيوانات المجموعة الثانية والثالثة كما أشارت نتائج الذبح للحيوانات في عمر ١٨ شهر وزن الذبيحة ووزن الأعضاء المأكولة ونسبة التصافي ووزن العضلات بالذبيحة ونسبتهم من وزن الذبيحة وكفاءة إنتاج اللحم من الذبيحة كانت أعلى في نباتح حيوانات المجموعة الثالثة عن حيوانات المجموعة الثانية والأولى على التتابع. ولوحظ عكس ذلك من وزن الدهن والعظم ونسبتهم من الذبيحة. وبخصوص التقييم الاقتصادي للمجموعات الحيوانية فإن الفطام المتأخر له تأثير قليل لتحسين العائد الاقتصادي في الأعمار المبكرة بينما فترة الرضاعة لمدة ٦٠ يوم أدت إلى تحسين قليل للعائد الاقتصادي في الأعمار المتأخرة.