

The Performance of Egyptian Native Bullocks during fattening

E. Salah E. Galal¹, A.A. Younis², K.G. Attia³
and A.B. Awad

Animal Production Dept., Faculty of Agriculture, Ain Shams Univ., Shubra Al-Khaima, Cairo, Egypt, Animal Res. Dept. Desert Inst. Mataria, Cairo, Egypt, Vet. Dept., Beni Suef, Egypt,

DATA on 1491 Egyptian bullocks with an average initial weight of 210 kg were used to estimate the daily gain on the feed lot and study the effect of month of purchase, year, farm, initial weight and fattening period on daily gain.

Least-square estimate of daily gain was 801kg. All factors studied showed highly significant effects on daily gain except the initial weight. Among the classificatory sources of variation, *i.e.* month, year, and farm; month and year showed to be equally important in explaining the variability in daily gain (each accounting for 2.5% of the total variability), while farm was twice as important as either (accounting for 5.4% of the total variability). Daily gain reached maximum for animals bought in January and minimum for those bought in August.

In the recent years, cooperatives dealing with animal production and particularly fattening cattle began to play an effective role in meat supply.

In these cooperatives, fattening is an enterprise all years round, where fattening stock is purchased from cattle markets according to type and certain phenotypic characteristics. Therefore the effect of months of buying, year, farm, initial weight, fattening period are all expected to exert their influence on the final weight.

In this investigation the effects of these factors were considered simultaneously in the analysis so that each effect was illustrated in a rather clean estimate independent of all other factors. In such analysis a more accurate way could be presented to the fattener in order to take into consideration such effects so as to get the best results in fattening.

Material and Methods

Data

A number of 1491 bullocks were used in this study. They belonged to 4 farms, all situated in Upper Egypt (Beni Suef Governorate). Animals were bought from markets according to appraisal judgement and were those which thought to have a good fattening tendency, in that having a well built skeleton, good general health and beef type characteristics. Animals were weighed on the form just when they were received from the market. This is called the initial weight hereafter. Then animals were weighed at biweekly intervals after the morning feeding and drinking. The last weight on the farm

prior to selling is called the final weight. Initial weights ranged from 170 and 250 kg with an average of 210 kg. Average fattening period was 175 days. At any time, animals were put into 3 feeding groups according to their weights, those weighing up to 240 kg, 240 to 280 kg and those heavier than 280 kg. Animals were shifted from one group to another according to their progress in weight. The daily rations given to each group were 3 kg concentrates plus 1 kg wheat bran; 4 kg concentrates plus 2 kg wheat bran and 6 kg concentrates plus 2 kg wheat bran per head, respectively. Concentrates were in pellets containing 65% cottonseed meal, 12% wheat bran, 20% rice polish, 2% calcium carbonate and 1% common salt plus 5 parts of molasses to each 100 parts of the mixture for pelleting. Besides, wheat and/or barley straw was offered *ad libitum* to all groups. Water was offered twice daily.

Statistical Handling.

Since animals were bought from the markets, no information on their age or back history was available. Thus, the only sound criterion that could be studied was that of daily gain. Daily gain was calculated for each animal as the difference between final and initial weights divided by number of days spent on the farm.

The least squares procedures were used for the analysis with the following model :

$$Y_{ijkl} = u + m_i + t_j + f_k + B_1 X_{1ijkl} + B_2 X_{2ijkl} + e_{ijkl}$$

where,

Y_{ijkl} is the daily gain (kg/day) of the l th animal bought in the i th month of the j th year raised in the k th farm ;

u an effect common to all animals ;

m_i an effect due to the i th month, $i = 1, 2, \dots, 12$ from January to December;

t_j an effect due to the j th year, $j = 1, 2$ and 3 for 1964, 1965 and 1966 ;

f_k an effect due to the k th farm, $k = 1, 2, 3$ and 4 ;

X_{1ijkl} the deviation of the fattening period (day) of the $ijkl$ th animal from the mean of that measurement in all animals ;

X_{2ijkl} the deviation of the initial weight (kg) of the $ijkl$ th animal from the mean of that measurement in all animals ;

B_1 the regression of daily gain on fattening period ;

B_2 the regression of daily gain on initial weight, and e_{ijkl} a random error associated with the $ijkl$ the animal and assumed to distributed normally with mean zero and variance of σ_e^2 .

Results and Discussion

Mean Daily Gain

The mean daily gain of .801 kg (Table 1) seems to be a relatively high estimate as compared with most of the available estimates on Egyptian cattle. Asker and Ragab (1959) reported an average daily gain of Egyptian steers during the summer as .6 kg. Kamar *et al.* (1961) estimated the daily gain of Egyptian steers fattened on clover for six months and finished for one month on dry rations as .55 kg, while the gain during the last month of dry feeding was .75 kg, a somewhat nearer figure to that obtained in the present study. Steers studied by Kamar *et al.* (1961) had average initial and final weights as 112 and 258 kg respectively, while the corresponding weights in the present study were 210 and 350 kg, respectively. Ragab and Abd-El-Salam (1962) studied growth rate of Egyptian male cattle at different stages from birth to 24 months of age. The stage which covered ranges of weights closest to that between initial and final weights of this study was that between 12 and 18 months of age. The average weights at the two ages were 221.49 and 310.48 kg, respectively, thus the realised average daily growth during that period is .439 kg. However, Ragab *et al.* (1966) estimated daily gain of fattened buffalo bulls between the ages : 12 and 18 months (230.3 and 359.3 kg, respectively) as .694 kg, while the corresponding estimates for steers between the two ages (236 and 360 kg, respectively) was .689 kg. The estimate of daily gain arrived at in this study even compares well with some estimates on standard beef breeds in the literature. Stringer *et al.* (1968) reported daily gain ranging from .84 to .92 kg for steers of Hereford and Angus blood between initial weights ranging from 220.1 to 231.1 and slaughter weights ranging from 416.3 to 487.1 kg. Also, Swiger *et al.* (1966) reported daily gain over a period of 252 days of feeding as .829 kg. Estimates of relatively higher magnitude, for example, are those reported by Magee *et al.* (1968) ranging from 1.17 to 1.30 kg on Hereford bulls ; Du Bosa *et al.* (1967) as .95 and 1.03 kg for steers of Hereford and other breeds, respectively and Vogt *et al.* (1967) ranging from .98 to 1.05 kg for steers from British breeds. However, the value of mean daily gain obtained in the present study could be an overestimate because the final weight was taken after feeding and drinking while the initial was not. However, a factor which could work in the other direction is that sellers usually overfeed and overdrink their animals to make use of the increase in selling weight, thus inflating initial weight.

Month-of-Buying Effect

The month during which the animal was bought, and consequently placed on fattening, had a highly significant effect on the gain which the animal made on the farm (Table 1). The highest daily gain was scored by cattle bought in January, while the lowest by those bought in August, being .869 and .730 kg, respectively. Actually, there is a trend that could be detected where animals bought in different months have a decreasing daily gain as months proceed from January to August, then daily gain

TABLE 1. Least-square constants of different effects and analysis of variance of daily gain.

Source	No.	Constant \pm S.E. kg		Analysis of variance		
				DF	MS	V%
Mean	1491	.801	\pm .065			
Month	1	.068	\pm .001	11	.189**	2.5
	2	.049	\pm .001			
	3	.019	\pm .002			
	4	.043	\pm .003			
	5	-.019	\pm .004			
	6	-.019	\pm .001			
	7	-.051	\pm .002			
	8	-.071	\pm .002			
	9	-.052	\pm .003			
	10	-.016	\pm .001			
	11	.030	\pm .001			
	12	.019	\pm .002			
Year	'64	.011	\pm .0005 a	2	.628**	2.5
	'65	.035	\pm .0003 b			
	'66	-.046	\pm .0004 c			
Farm	1	.027	\pm .0007 a	3	.672**	5.4
	2	.049	\pm .0004 a			
	3	-.077	\pm .0011 b			
	4	.001	\pm .0011 c			
Fatt. period (day)		-.00075	\pm (.246 \times 10 ⁻⁶)	1	1.489**	
Init. weight (kg.)		-.00020	\pm (.079 \times 10 ⁻⁶)	1	.036	
Residual				1473	.046	89.6

** $p \leq .01$

Within each of the years and farms, any two levels having the same letter do not significantly differ from each other (Duncan, 1955 at $p .05$), otherwise they do.

starts to increase until December, with the months of April and December being somewhat off that trend. Since feeding practices were held constant all over the year, differences between months could be due to the prefattening conditions prevailing during different parts of the year and/or weather conditions. Animals bought during the green season which extends nearly from October to May, are expected to have been generously nourished in so far as vitamins and minerals are concerned and relatively badly nourished in so far as energy is concerned. The berseem (*Trifolium Alexandrinum*), which constitutes the main green feeding stuff for farm animals in Egypt is high in its protein content but low in energy due to the high moisture content. Thus, once animals previously pastured on such green fodder are put on a concentrated ration, they tend to lay down edible tissues and put on more weight. On the other hand, animals fattened during the hot months of the summer are expected to have somewhat depressed appetite. Nevertheless, the first factor seems to be of more importance especially if months were grouped into two periods: from May to September and the rest as corresponding to dry and green feeding season with regard to the farmer, respectively. Animals bought in the first period had significantly less daily gain than those bought in the second. While if weather conditions were of prime importance animals bought in August should perform better than those bought in May, since the latter will spend nearly all their fattening period in the hot months while the former will catch some of the milder months. Asker and Ragab (1959) also detected an effect of month of buying on daily gain in Egyptian steers.

Although months of buying showed highly significant effect on daily gain, they accounted only for 2.5% of the total variability in daily gain, as much as years and half as much as farms (Table 1).

Year Effect

Differences among years were highly significant, accounting for 2.5% of the total variability in daily gain (Table 1). The widest difference was that between the years 1965 and 1966 (.081 kg). However, the difference between any two years is significant. With such large number of degrees of freedom in the residual term, it is expected that even small differences could prove significant. In other words, there is more of type I error being committed. Thus, the magnitude should be considered along with the significance of the differences. The widest difference between any two years of .081 kg (1965 vs. 1966) could account for 14.81 in the whole fattening period during which the animal increases on the average by nearly 140 kg.

Farm Effect

Farms showed highly significant effect on daily gain (Table 1). The third farm was significantly the lowest while the first two were significantly the highest. Farms contributed the highest proportion to the total variability in daily gain (5.4%) among the classificatory effects assumed in the model. The magnitude of farm differences is widest between the second and the third farms, being 126 kg daily. Such difference could account for as much as 21.525 kg in the total average gain per animal (140 kg), nearly 15.4%. Differences among farms could be due to differences mainly in management.

Effect of Fattening Period Length

Length of fattening period had a highly significant effect on daily gain. Animals with a fattening period of one day longer than others gained .75 gm a day less. Even though the relationship between length of the fattening period and daily gain was highly significant, the magnitude of the effect of the former on the latter is small. The negative relationship between the two indicates that there was a slight tendency for poor gainers to be retained for longer time on the feed lot. The weak relationship between the two variables is reflected in the relatively low, but highly significant, standard partial regression of daily gain on length of fattening period of -0.5 . The variability in the duration of fattening period itself was moderate, the coefficient of variability being 30%. The simple correlation coefficient between initial weight and duration of fattening calculated as -0.08 is of relatively low magnitude. It indicates however, that animals with lighter initial weight stayed longer on the feed lot than those with heavier one.

Initial Weight Effect :

Average initial weight of 210 kg calculated in this study would for animals about the yearling age. Ragab and Abd-El-Salam (1962) reported weights of growing male calves at the ages : 6, 12 and 18 months as 135.08, 221.49 and 310.48 kg, respectively. Each kg increase in initial weight was associated with nonsignificant amount of decrease in daily gain of .2 gm. The variability in initial weight itself was not high, the coefficient of variability being 12.2%. The standard partial regression of daily gain on initial weight was estimated as -0.006 . Similar to results obtained in this study, Kamar *et al.* (1961) reported non-significant effect of initial weight on gain in Egyptian cattle.

Acknowledgement

The authors wish to thank Mr. K. Islam for allowing the use of the data.

References

- Asker, A.A. and Ragab, M.T. (1959). 'Fattening Egyptian steers in the Tahrer Province'. *Alex. J. agric. Res.* 7, 157.
- Du Bosa, L.E., Cartwright, T.C. and Cooper, R.J., (1967). 'Predicting steak and roast meat from production and carcass traits'. *J. Anim. Sci.* 26, 688.
- Duncan, D.B. (1955). Multiple range and multiple F test". *Biometric*, 11, 1.
- Kamar, G.A.R., Badreldin, A.L. and Abd El Hady, H.Z. (1961). 'Factors affecting gain in fattening Egyptian steers on clover'. *J. Anim. Prod. U.A.R.*, 19, 32.
- Magee, W.T., Markel, R.A., Bratzier, L.J., Pearson, A.M. and Kemp, K.E. (1968). 'Relationships among performance traits of grade Hereford bulls'. *J. Anim. Sci.* 27, 13.
- Ragab, M.T. and Abd El Salam, M.F. (1962). "The effect of sex and month of calving on body weight and growth rate of Egyptian cattle and buffaloes". *J. Anim. Prod. U.A.R.* 2, 109.
- Ragab, M.T., Darwish, M.Y.H. and Malek, A.G.A. (1966). '1-Developmental changes and dressing percentage in a group of buffalo males'. *J. Anim. Prod. U.A.R.* 6, 9.

- Stringer, W.C., Hendrick, H.B., Cramer, C.L., Epley, R.J., Dyer, A.J., Krause, G.F. and White, R.H. (1968). 'Effect of full feeding for various periods and sire influence on quantitative and qualitative characteristics'. *J. Anim. Sci.* **27**, 1547.
- Swiger, L.A. Gregory, K.E., Arthand, V.H., Briedenstein, B.C., Koch, R.M. Sumpton, L.J. and Rowden, W.W. (1966). 'Adjustment factors for carcass, gain and feed traits of beef cattle'. *J. Anim. Sci.* **25**, 69.
- Vogt, D.W., Gaines, J.A., Carter, R.C., McClure, W.H. and Kincaid, C.M. (1967). 'Heterosis from crosses among British breeds of cattle postmeaning performance to slaughter'. *J. Anim. Sci.* **26**, 443.

أداء ذكور العجول المصرية خلال فترة التسمين

السيد صلاح الدين جلال ، أحمد عبد المقصود يونس ، كمال غمريال عطية

عاطف بشرى عوض

كلية الزراعة جامعة عين شمس

تم في هذا البحث تحليل ١٤٩٦ سجلا من ذكور العجول البقرى المصرية بمتوسط وزن بدائي ٢١٠ كجم - ذلك لتقدير معدل النمو اليومي خلال فترة التسمين ودراسة أثر شهر الشراء والسنة والمزرعة والوزن البدائي وطول فترة التسمين على معدل النمو اليومي * واستخدمت طريقة المربعات الصغرى لتحليل هذه البيانات * قدر متوسط النمو اليومي بمقدار ٨٠٦ كجم - وكان لكل العوامل المدروسة أثر معنوي جدا على النمو اليومي فيما عدا أثر الوزن البدائي * بين الشهر والسنة والمزرعة كان الشهر والسنة متساويين في الأهمية في توضيح التباين في معدل النمو اليومي (كل احتساب ٢٥٪ من التباين الكلي في معدل النمو) ، بينما كان للمزرعة ضعف الأهمية (احتسبت ٤٥٪ من التباين) *

وقد بلغ معدل النمو اليومي أقصاه للحيوانات المشتراه في يناير وادناه لتلك المشتراه في أغسطس وقد نوقشت أهمية هذه النتائج *