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NOTES TO CONTRIBUTORS

1. Papers submitted should tackle livestock and poultry production problems in an original way.

2. Review papers of subjects of general interest may be published at intervals and will be prepared on invitation by the Editorial Board.

3. All papers will be subject to critical review by the Editorial Board, or others appointed by the Editor. Papers needing revision will be returned to authors and should be revised and returned promptly. Papers not suitable for publication will be returned to authors with a statement of reasons for not accepting them.

4. Authors are requested to submit their papers, finished in all details in type-script, double line spacing and with ample margins. Two copies beside the original are needed. The length of articles will be limited to 35 printed pages. Typing should be on quarter papers. Tables should be as few and as simple as is feasible for presentation of essential data.

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FACTORS AFFECTING GAIN IN FATTENING EGYPTIAN STEERS ON CLOVER

BY

G. A. R. KAMAR, A. L. BADRELDIN AND H. Z. ABDEL HAY

ANIMAL PRODUCTION DEPARTMENT, FACULTY OF AGRICULTURE, CAIRO UNIVERSITY AND MINISTRY
OF AGRICULTURE, GIZA, EGYPT

SUMMARY

A total number of 1415 Egyptian cattle males were used in this study. The purchase of calves was carried out during the months of October, November and December. The calves represented males collected from different provinces of the Egyptian Delta. The exact age of these calves was not known but their initial weights ranged from 90 to 140 kgs. The steers were weighed monthly. They were fed on Egyptian clover *ad lib* for 6 months from December until May, and on dry ration during the month of June. The following results were obtained :

1. The average steer initial and finishing weights were 112 and 258 kgs. respectively, and the steers gained an average of 0.55 kg. daily during the feed period of 212 days.

2. The calves bought before the beginning of the green feed season were heavier, had higher total, monthly and daily gain and gave better weights at finishing, than those bought later when the green season commences.

3. The increase in weights and gain was higher during the green feeding season than during the dry feeding season. The increase in weights was highly augmented during the last two months of green feeding when the clover is mature. When the yearlings were fed on the mature clover, the gain approach the values of beef breeds.

4. The initial weights of steers had a slight influence on the subsequent monthly or daily gain. As the initial weights of steers increased, the subsequent percentages of relative increment decreased.

5. The benefit from rearing steers is better when their initial weights are small and purchased before the green feeding season. It is better to finish the steers for one-month after the green feed season.

INTRODUCTION

In Egypt, there are three major agricultural seasons, the winter (from November to April), the summer (from May to July) and the nilotic (from August to October) seasons. During the period from October to May the clover green pasture is abundant. Therefore, all forms of animal production are in full activity. Fattening cattle is practiced on a large scale during that season of the year (winter agricultural season), since feed costings are in their lowest level and the adequacy of the green fodder used for feeding and fattening is at their best. For these reasons, matings are made during February to obtain the calf crop at the beginning of the winter agricultural season. Ordinarily, the male crop of calves are used afterwards, either for labour or for meat production. When raising the calves for meat production, they are usually kept, either until the beginning of the nilotic agricultural season or until its end.

The average daily gain of Egyptian steers fattened during summer is 0.60 kg. (Asker and Ragab, 1959). Nevertheless, this average gain in Egyptian steers differs according to their ages. The daily gain is 0.52, 0.46 and 0.61 kgs. at the periods from birth to 6, 6 to 12 and 12 to 18 months of age respectively (Ghoneim *et al*, 1957). In standard beef breeds, the average daily gain ranges from 0.9 to 1.1 kg. as found in Hereford cattle (Guilbert and Hart, 1946; Phillips, 1953; Ittner *et al*, 1955; Warwick and Cortwright, 1955). The Brahma cattle gains a daily average of 0.7 kg., while its cross with Hereford gains daily 0.8 kg. (Guilbert and Hart, 1946; Ittner *et al*, 1955; Warwick and Cortwright, 1955). Factors other than breed and age were found to affect the daily gain of steers. Differences in month of initiating fattening of steers give a good deal of variation in the daily gain as described by Asker and Ragab (1959) due to the differences in environmental conditions. Mott and Miles (1946) correlated initial weights of yearlings and two-year-old steers in spring with gain made during the following pasture season. Ruby *et al* (1948) ascertained the highly significant correlation between the initial weight and the subsequent gain.

The present study is an attempt to analyse the weights of local steers which are raised by the common method practiced in Egypt.

MATERIALS AND METHOD

The weights were obtained from 1415 male bullocks, raised at Edfina Farms, Behera province, Delta, Egypt. The animals were bought from different markets during the period from October to December. Their weights ranged from 90 to 140 kgs. at the time of purchase.

The season of green clover normally begins during November or December months and extends for 180 to 200 days until May. Accordingly, the animals were fed completely on clover during this period, along with some extra straw at night. The amount of berseem (Egyptian clover) given per head ranged from 25 to 40 kgs. daily. During the dry season, the animals were fed on a mixture of decorticated cotton seed cake and rice bran and straw. The feeding of animals was carried out for approximately seven months (212 days) beginning from the first of December to the first of July. The animals were weighed at the beginning of each month in kilograms early in the morning before feeding. Monthly live weight, gain per month and day and relative increment percentage were calculated. The relative increment percentages were calculated according to the equation $\frac{W_2 - W_1}{\frac{1}{2}(W_1 + W_2)}$ (Brody, 1949). Analysis of variance between the different months of buying, weight classes and months of experiment was carried out according to the method of two criteria of classification (Snedecor, 1950).

RESULTS AND DISCUSSION

Effect of month of buying :

The average initial live weight at buying was 111.7 kgs., while the average final marketing weight was 258.0 kgs. The differences in live weight observed between the initial weights, were almost observed between the final weights. The steers bought early in October had heavier initial weights and subsequently had heavier body weights, gain per month, gain per day and relative increment than those bought in November or December (Table 1, 2, 3 and 4). In other studies, the month of beginning (Ruby *et al.*, 1948; Asker and Ragab, 1959) was found to affect the daily gain of the steers according to differences in environmental conditions prevailing during the fattening period.

TABLE 1
Absolute increase in average steer weights (weights in kilogrammes)

Month of buying	No.	Initial weight*	January	February	March	April	May	June	July	Average
October.....	574	117.2	133.0	149.2	165.2	182.9	208.3	223.4	261.2	180.1
November.....	572	113.7	127.0	143.3	159.0	181.6	204.6	218.7	257.0	175.1
December.....	269	104.1	114.2	131.2	146.8	173.1	196.2	209.3	255.7	166.3
Average.....	1415	111.7	124.7	141.2	157.0	179.2	203.0	217.1	258.0	—

* At first of December.

TABLE 2
Absolute gain per month in steers weight (weights in kilogrammes)

Month of buying	No.	January*	February	March	April	May	June	July	Av. gain per month	Total gain**
October.....	574	15.8	16.2	16.0	17.7	25.4	45.1	14.7	17.3	20.9
November.....	572	13.2	16.3	15.7	22.6	22.9	44.1	8.4	16.2	113.2
December.....	269	10.1	16.9	15.7	26.3	23.0	13.1	12.3	16.8	117.4
Average gain..	1415	13.0	16.5	15.9	22.2	23.8	44.1	11.8	16.8	—

* Includes the gain from the beginning at December until January.

** Includes the total gain from beginning at December until July (212 days).

TABLE 3
Average steer gain per day in the different months (weights in kilogrammes)

Month of buying	January	February	March	April	May	June	July	Average
October	0.510	0.523	0.571	0.571	0.847	0.487	0.490	0.570
November	0.426	0.526	0.561	0.729	0.763	0.455	0.540	0.534
December	0.326	0.545	0.561	0.848	0.767	0.423	0.560	0.554
Average	0.419	0.532	0.568	0.716	0.793	0.455	0.530	0.553

TABLE 4
Relative increment in steers weight between each two successive months (Percentages)

Month of buying	January	February	March	April	May	June	July	Average
October	12.63	11.48	10.18	10.17	12.99	6.69	6.07	10.03
November	10.97	12.06	10.38	13.27	11.86	6.66	3.53	9.81
December	9.25	13.77	11.29	16.44	12.45	6.46	5.29	10.71
Average	11.00	12.41	10.66	13.21	12.46	6.71	4.96	10.18

The fluctuations observed in the monthly and daily gain and in relative increment may be due to the difference in the nutritive value of the green clover cuts. It is known that the first cuts of the clover contains more moisture and less nutritive value than the latter cuts. Accordingly, when the animals were fed on the first clover cuts during January, February and March they gain less weight and show less relative increment than those fed on the latter cuts during April and May when the highest values were observed. The observed decrease in the daily and monthly gain and in relative increment at the period of dry feeding during June and July, May be due to the effect of age or to the low standard of feeding (Table 5), as it is known that the advancement of age causes the decrease of growth rate. The steers bought early in October had not shown great decrease in the different values during the dry feeding period like those bought latter and so gave better finishing results.

During the two months of April and May when the steers gained their highest weight and relative increment, the calves bought at light weights during December achieved the highest increase in the different items, while those bought at heavy weights made the least. The differences observed in the gain per month and relative increment were significant between the months of study, while the differences between the months of buying were not significant according to the reversal trend in gain and relative increment that occurred during April and May months (Table 2).

Generally, the daily gain obtained in the present study falls in the ranges observed by Ghoneim *et al* (1959) when the daily gains were 0.52, 0.46 and 0.61 kg. on the average for Egyptian steers of 0 to 6, 6 to 12 and 12 to 18 months of age respectively. Asker and Ragab (1959) feeding Egyptian steers obtained an average daily gain of 0.60 kg. whereas in the present study, the average was 0.55 kg. This may be attributed to the differences in the average of initial weights of the animals used. The daily gain observed in the Egyptian steers were comparatively low in respect to that of the standard beef breeds. These beef cattle gain in the average from 0.91 to 1.20 kg. daily when they were yearlings and from 0.79 to 1.27 kg. daily when they were 2-years-old (Woll, 1915; Snapp, 1952). In general, the Hereford gain 0.9 to 1.1 kg.

TABLE 5
Effect of green and dry feeding on steer gain per month, per day and relative increment percentage

Month of buying	Green feeding*			Dry feeding**		
	Per month (kg.)	Per day (kg.)	R. I.*** %	Per month (kg.)	Per day (kg.)	R. I.*** %
October	18.2	0.604	11.49	14.9	0.489	6.38
November	18.1	0.601	11.71	11.3	0.498	5.10
December.....	18.4	0.609	12.64	12.7	0.491	5.88
Average.....	18.3	0.606	11.95	13.0	0.492	5.84

* From December until the end of April.

** From May until July.

*** Average relative increment per month.

daily (Phillips, 1953), while the Brahma gain 0.7 kg. and its cross with the Hereford gain 0.8 kg. daily (Guilbert and Hart, 1946; Ittner *et al*, 1955; Warwick and Corlwright, 1955). However, the Egyptian

steers gained daily during the two months of feeding on mature clover about 0.76 kg. that approach the values of beef breeds. This indicates that with better feeding, high rates of gain could be attained.

Effect of initial weight :

When the animals were classified according to their initial weights, most of the individuals fall within classes ranging from 90 to 140 kgs. (Table 6). The differences between classes in initial weights were almost the same for the final weights indicating the effect of initial weight on the final live weights. The monthly and daily gain increased gradually as the weights of classes increased during the months of January and February. During the other months all the classes showed almost the same monthly and daily gain that increased gradually as the weights of classes increased during the months of January and February. During the other months all the classes showed almost the same monthly and daily gain. No appreciable changes could be observed between monthly and daily gain averages for all the months. However, in the period of April and May there was a tendency of decrease in monthly and daily gain with the increase of live weight. The average total gain of classes from 60 to 110 kgs. was higher (106.7 kgs.) than that of heavier classes (104.9 kgs.). The heaviest weight class deviate from this trend as it was represented by a small number (Tables 7 and 8). However, the differences in monthly gain between weight classes were not significant (Table 2). Mott and Miles (1946) correlated the initial weight of the steers with their subsequent gain. Ruby *et al* (1948) ascertained this correlation, while Warwick and Cartwright (1955) failed to find any correlation.

For all the months of study, it is clearly and significantly observed (Table 2) that with the increase in weights of classes, the relative increment decrease gradually (Table 9). This is also true for class averages for the whole period. This is due to that the increasingly live weight was not accompanied by coordinate increase in gain, but as observed previously, this may coincide with slight decrease or stability in values of gain.

TABLE 6
Absolute increase in average steers weights according to different initial weights (weights in kilogrammes)

Weight Classes	No.	Initial weight*	January	February	March	April	May	June	Average
60-80	10	77.9	89.6	104.4	120.0	143.8	168.6	183.9	126.9
81-90	94	86.8	99.3	115.4	131.7	156.1	180.9	194.6	137.8
91-100	261	96.0	109.7	125.0	140.9	164.8	188.5	202.3	146.7
101-110	294	105.5	118.8	134.1	150.4	172.2	197.2	212.3	155.8
111-120	314	115.4	128.7	144.6	159.5	180.8	203.6	218.7	164.5
121-130	217	125.2	140.1	157.3	174.2	193.5	216.4	231.8	176.9
131-140	118	135.7	151.7	169.6	184.4	203.7	227.4	242.2	187.8
141-150	70	144.4	159.6	175.7	192.4	213.5	233.8	249.6	195.6
151-160	27	155.3	170.9	186.5	202.1	218.4	243.3	260.3	205.2
161-180	10	165.8	174.1	194.2	208.7	232.3	253.8	269.2	214.0
Average	1415	120.8	134.3	150.7	166.4	187.9	211.4	226.5	—

* At December.

TABLE 7
Absolute gain per month in steers weights according to different initial weights (weights in kilogrammes)

Weight classes	No.	January*	February	March	April	May	June	Av. gain per month	Total gain**
60-80.....	10	11.7	14.8	15.6	23.8	24.8	15.3	17.7	106.0
81-90.....	94	12.5	16.1	16.2	24.4	24.8	13.7	18.0	107.7
91-100.....	261	13.7	15.2	16.0	23.8	23.6	13.9	17.7	106.2
101-110.....	294	13.2	15.4	16.3	21.7	25.1	15.1	17.8	106.8
111-120.....	314	13.3	15.9	14.8	21.3	22.8	15.1	17.2	103.2
121-130.....	217	14.9	17.2	16.9	19.3	22.9	15.3	17.8	106.5
131-140.....	118	16.0	17.9	14.7	19.3	23.7	14.8	17.7	106.4
141-150.....	70	15.2	16.1	16.7	21.1	20.3	15.8	17.5	105.2
151-160.....	27	15.6	15.6	15.6	16.3	24.8	17.0	17.5	104.9
161-180.....	10	8.3	20.1	14.5	23.6	21.5	15.4	17.2	103.4
Average	1415	13.4	16.4	15.7	21.4	23.4	15.1	17.6	105.4

* Includes the gain from the beginning at December until January.

** Includes the total gain from beginning at December until June.

*** N.B. 60-110 total gain = 106.7

111-180 total gain = 104.9

TABLE 8
Average steer gain per day in the different weight classes (weight in kilogrammes)

Weight Classes	January	February	March	April	May	June	Average
60-80.....	0.377	0.477	0.538	0.768	0.827	0.494	0.580
81-90.....	0.403	0.519	0.559	0.787	0.827	0.442	0.590
91-100.....	0.442	0.490	0.552	0.768	0.787	0.448	0.580
101-110.....	0.426	0.497	0.562	0.700	0.837	0.487	0.584
111-120.....	0.429	0.513	0.510	0.687	0.760	0.487	0.564
121-130.....	0.481	0.555	0.583	0.622	0.763	0.494	0.584
131-140.....	0.516	0.577	0.507	0.622	0.790	0.477	0.580
141-150.....	0.490	0.519	0.576	0.681	0.677	0.510	0.574
151-160.....	0.503	0.503	0.538	0.526	0.827	0.548	0.574
161-180.....	0.268	0.648	0.500	0.761	0.717	0.497	0.564
Average	0.432	0.529	0.541	0.690	0.780	0.487	0.577

N.B. 60-110 average gain per day = 0.584
111-180 average gain per day = 0.557

TABLE 9
Relative increment in steers weight each month in different weight classes
(Percentages)

Weight Classes	January	February	March	April	May	June	Average
60-80.....	13.97	15.25	13.90	18.04	15.88	8.68	14.29
81-90.....	13.44	15.00	13.12	16.96	14.72	7.30	13.42
91-100.....	13.32	12.96	12.04	15.58	13.36	7.11	12.40
101-110.....	11.78	12.18	11.46	13.45	13.59	7.38	11.64
111-120.....	10.90	11.64	9.73	12.52	11.86	7.15	10.63
121-130.....	11.24	11.57	10.20	10.50	11.18	6.83	10.25
131-140.....	11.13	11.15	8.31	9.95	11.00	6.30	9.64
141-150.....	10.00	9.61	9.08	10.40	9.08	6.53	9.11
151-160.....	9.56	8.73	8.03	7.75	10.75	6.75	8.60
161-180.....	4.89	10.92	7.20	10.70	8.85	5.89	8.08
Average	10.51	11.51	9.91	12.08	11.72	6.90	10.44

N. B. 60-110 average relative increment per month = 12.94
 111-180 average relative increment per month = 9.39

The green feeding showed superiority over the dry feeding in all the weight classes for the different items (Table 10). The differences between the two seasons decreased with the increase of steer weights in respect to gain per month and relative increment.

TABLE 10
Effect of green and dry nutrition on steers gain per month, per day
and relative increment percentage (weights in kilogrammes)

Weight Classes	Green feeding*		Dry feeding**		R. I.*** %
	per month (kg.)	per day (kg.)	per month (kg.)	per day (kg.)	
60-80.....	18.1	0.597	15.41	0.494	8.68
81-90.....	18.8	0.618	14.65	0.442	7.30
91-100.....	18.5	0.607	13.45	0.448	7.11
101-110.....	18.3	0.603	12.49	0.487	7.38
111-120.....	17.6	0.580	11.33	0.487	7.15
121-130.....	18.2	0.600	10.94	0.494	6.83
131-140.....	18.3	0.603	10.30	0.477	6.30
141-150.....	17.9	0.588	9.63	0.510	6.53
151-160.....	17.6	0.578	8.96	0.548	6.75
161-180.....	17.6	0.579	8.51	0.497	5.89
Average	18.1	0.594	11.15	0.487	6.90

* From December until the end of April.

** From May until June.

*** Average relative increment per month.

PRACTICAL APPLICATION

Buying the yearlings early before the green season enables the breeder in getting steers that gives heavier gain, heavier final weights and with low prices than steers bought latter.

The improvement of the standards of nutrition for feeding Egyptian steers may rise their ability of gain to better levels, as it was found that feeding steers on mature clover during April and May gave high standards of gain.

Finishing the steers for one month is enough and also enables the breeder of obtaining higher prices than selling his steers after the green season directly.

It is preferable to buy the lighter animals, as these in spite of giving nearly the same gain like that of higher weights, permit the breeder of having more numbers of yearlings with the same price, also obtaining higher kilograms of meat equals to the gain achieved by the increased number of animals. As also the feeding quantities per head for the light animals in low, more economical progress could be achieved in relation to the feeding efficiency of such steers.

TABLE 11

Summary of the analysis of variance of body gain per month and relative increment percentage.

A. When effected by months of buying and months of weighing (means squares).

Items	Months of buying	Months of weighing
Body gain per month.....	2.13 N. S.	62.63**
Relative increment percentage....	150.83 N. S.	3032.62**

B. When effected by weight classes and month of weighing (means squares).

Items	Weight classes	Months of weighing
Body gain per month.....	0.35 N. S.	154.22 **
Relative increment percentage....	2605.28 **	4141.23 **

N. S. Not. significant
 ** Highly significant $p = 0.01$

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ملخص

استعمل في هذه التجربة ١٤١٥ عجل ذات أعمار تتراوح بين ٤ إلى ٨ شهور وأوزان تتراوح في الغالب بين ٩٠ إلى ١٤٠ كيلوجرام . وجمعت هذه العجول من عدة أسواق ومزارع لكي تمثل تمثيلاً صادقاً مجموعة العجول البقرية المصرية . وقد تتبع وزن العجول شهرياً في هذه التجربة . وغذيت العجول في الشتاء والربيع على البرسيم وغذيت لمدة شهرين بعد البرسيم على عليقة جافة . وقد تمكنا من الحصول على النتائج الآتية :

- ١ - العجول التي اشترت مبكراً قبل البرسيم كانت ذات أوزان عالية وحالة جيدة وأعطت أكبر أوزان وأحسن معدل زياد، أكثر من العجول التي اشترت قبل الموسم مباشرة في شهر ديسمبر .
- ٢ - التغذية أثناء موسم البرسيم أعطت أحسن معدل زيادة عن التغذية على علائق جافة بعد البرسيم كذلك تميزت نهاية موسم البرسيم عند نضجه بأكثر معدل زيادة في الوزن خلال أشهر التجربة .
- ٣ - معدل الزيادة في العجول المصرية أقل من المعدل الذي تعطيه العجول المتخصصة في إنتاج اللحم من الماشية الأجنبية ، إلا أنه في بعض حالات التغذية على مستوى عالٍ كما حدث في التغذية على البرسيم الناضج تعطى العجول المصرية معدل زيادة يقارب ذلك في عجول أنواع اللحم المتخصصة .
- ٤ - يكون تأثير الوزن الابتدائي للعجول على معدل الزيادة طفيفاً . ولكن نجد أنه كلما زاد الوزن الابتدائي أنقص ذلك من معدل الزيادة النسبية في العجول .
- ٥ - يفضل شراء العجول مبكراً بأوزان صغيرة . كذلك يفضل إنضاج العجول لمدة شهر بعد البرسيم . العجول المشتراه بدرى تعطى نتائج جيدة في مدة إنضاجها .
- ٦ - كان متوسط الوزن الابتدائي للعجول ١١٢ كيلوجرام والوزن النهائي ٢٥٨ كيلوجرام في مدة طولها ٢١٢ يوماً كان متوسط الزيادة اليومية فيها ٠,٥٥ كيلوجرام .