

REPORT ON A NEW APPROACH FOR MORE ECONOMIC LAMBS FATTENING SYSTEM

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SUMMARY

Towards better utilization of concentrates in feeding sheep and economic optimization of production per animal unit, fattening on full concentrate ration was tested on private farms. This paper presents results of 67 demonstrative trials implemented in the North Coastal Desert, Nubareia, Sharkeia and Menoufeia Zones using 2652 lambs and 96 kids during the period from 1987 to 1995.

Local lambs proved to have a pronounced potential of fast growth which averaged 225 g/h/d. Greater potential could be recognized through the wide range of means (145 to 379 g/h/d) among the flocks fattened with this system. Feed conversion efficiency averaged 4.2:1 (kg DM - feed per kg live body gain) and ranged among flocks from 6.2:1 to 2.9:1 during these *ad libitum* feeding trials. The DM Feed intake as a percentage of body weight averaged 3.7 %.

Economic estimation reveals a yearly interest rate around 37 % by applying this system for fattening lambs, whereas three fattening rounds could be done within year.

Keywords: Sheep, fattening system, economic

INTRODUCTION

In Egypt, fattening process depends on supplementary feeding rather than grazing. This is due to that production of either grazing or cultivated areas, permissible to animals, is not enough to cover even the maintenance requirements of livestock population which renders possibility to increase livestock population to a rather unfeasible process.

Fattening performance of local lambs recognized, through several feeding trials, to be of moderate order. Rations contained 50% concentrate gave 109 - 172 grams of daily gains (Abdel Hafiz and El-Homosi, 1975 a & 1976, Aboul-Naga *et al.*, 1972, El-Sherbini and El-Ashry, 1976 and Soliman *et al.*, 1975). Feed conversion efficiency was reported to be 4.1 from weaning up to 16 weeks and 2.6 from 16 - 24 weeks of age as SV per kg gain (Swidan *et al.*, 1979).

Abou-Basha (1980) tested three rations with different concentrate percentages (20, 40 & 80 %) and found that daily growth rates were 110, 145 and 178 g with feed conversion efficiency of 8.7, 6.9 and 5.6 DM-Feed per unit gain, respectively. Serafy

(1990) presented a comprehensive article highlighting the potential of using full concentrate ration for fattening small ruminants, from which he emphasized its validity.

MATERIAL AND METHODS

Towards better utilization of potentials of available animal resources and allowing higher income for sheep growers, a new system of fattening lambs on full concentrate ration was tried. This system was successfully implemented on other sheep breeds in Middle East countries and attained better growth performance represented in 169 to 430 g/h/d live body daily gain and 2.1:1 to 4.9:1 DM feed conversion efficiency to body weight gain. The initial weight for their fattening trials ranged between 14.4 and 18.2 kg, which represent mostly weaning time while marketing weight ranged from 29.3 to 39.7 kg (U.S.F.G.C., 1986).

Data source

The Sheep and Goats Research Department, Animal Production Research Institute supervised the implementation of 67 demonstrative field trials on the new lamb fattening system. The trials extended from 1987 to 1995 in North coastal desert areas and in new reclaimed areas in Nubareia, Sharkeia and Menoufeia Governorates and included 2501 lambs and 96 kids.

Lambs were weighed at the start of fattening then monthly and prior to marketing. Amounts of feed offered were recorded.

All farms used local lambs in the trials while two trials only were applied on goat kids, one of them was in Matrouh and the other in South Sinai.

Some farms, were able to keep a control group which was fed on the regular system of such farms. These data are presented as available to indicate differences.

Description of the new system :

- 1- The suggested ration was formulated of; 83.0 % whole grain cereals, 15.0 % soybean meal (44 % protein), 1.4 % ground limestone (Ca CO_3), 0.5% salt (Na Cl) and 0.1% vitamins and trace minerals. The vitamins and trace minerals were included at the following rates per kg of the ration; 150 mg Zn $\text{SO}_4 \cdot 7\text{H}_2\text{O}$, 80 mg Mn $\text{SO}_4 \cdot \text{H}_2\text{O}$, 200 mg Mg O, 5 mg Co $\text{SO}_4 \cdot 7\text{H}_2\text{O}$, 1 mg KI O_3 , 5000 IU vitamin A, 1000 IU vitamin D and 20 IU vitamin E.
- 2- The ration was offered *ad lib*, using specific feeder (Fig 1). This feeder prevents the lambs from contaminating the feed with their feet beside controlling the release of feed to its trough, guaranteeing clean and fresh feed every time animals eat of the ration.
- 3- Water was available 24 hours a day for lambs.
- 4- The youngest lambs available on the farms were used in the trials where they averaged 18 kg body weight and about 3 months of age.
- 5- Lambs were vaccinated against internal and external parasites once at the start of fattening.
- 6- Lambs were kept in half-shed yarns over the fattening period.
- 7- Most lambs involved in the trials were fed on regular ration for some times prior being subjected to the system and needed 10 to 14 days adaptation period for

gradual reduction of amounts of roughage and increasing time allowed for feeding on the new concentrate ration.

RESULTS AND DISCUSSION

The average daily gain attained by lamb groups was 225 g/h/d. The minimum growth rate recorded for groups was 145 g/h/d while the maximum was 379 g/h/d (Table 1).

These rates of gain are clearly higher than those previously recorded (109 to 178 g/h/d) on local breeds fattened on different rations containing up to 80 % concentrate.

At the same time, growth rates are higher than that attained in the comparative groups (Table 2) which showed daily growth ranging from 141 to 167 g/h/d.

The feed conversion efficiency averaged 4.2 kg DM per kg live body gain for the 60 trials. A wide range of variation was noticed, being from 2.9 to 6.2 kg DM per kg body weight gain.

As these trials were a sort of demonstrative trials applied for training a wide sector of farmers and breeders who had different experiences and personal capabilities, so the low and high estimates attained would not be taken as indicative of a biological variance rather than representing wide differences in implementation conditions.

Since the maximum figures attained were derived from groups of lambs and not on individuals, they could be taken as potential performance for the fattening system rather than being a maximum point of a range.

Feed conversion for the comparative trials averaged 7.5 kg DM/kg BW with a narrow range from 7.4 to 7.6 kg DM/kg BW. Abou-Basha (1980) reported that feed conversion improved from 8.7 to 6.9 to 5.6 by increasing concentrate ratio in the ration from 20 to 40 to 80 %, respectively. However, he reported, only, growth rates of 110, 145 and 178 grams daily, which were smaller than those attained in this report.

The only two trials applied on kids showed average daily gain of 109 and 192 g/h/d.

Feed intake as a percentage of body weight was calculated and found to range from 3.5 to 4.1 % for lambs and 6.0 % for kids. The figures attained by sheep are relatively less than those recommended in NRC (1985) for lambs of daily growth rate from 270 to 295 g/h/d where it ranged between 4.0 and 4.3 %. This means that *ad lib* feeding did not encourage lambs to consume more feed when the ration was consisted of 100 % concentrate but it resulted in relative reduction in feed intake.

Though one of the advantages of feeding on full concentrate ration is that it allows to start fattening at an early age, when fattening started with lambs weighing 12.5 kg it took, relatively, a longer time to achieve marketing weight and attained a feed conversion efficiency averaging 5.7 kg DM/kg BW which was somewhat less than that achieved by lambs started at weights ranging between 15 and 18 kg and attained feed conversion efficiency ranging from 2.9 to 4.5 kg DM/kg BW.

Table 1: Fattening performances of lambs and kids in farms participated in the demonstration of the system

YEAR intake/ OF BREEDERS	NUMBER No. of ANIMALS	TOTAL SIZE	GROUP WEIGHT (kg)	INITIAL WEIGHT (kg)	MARKETING DURATION (days)	FATTENING (g)	A.D.G. ¹ DM/ Body wt.	FCE ² %	LOSSES body weight (%)	DM
FATTENING LAMBS:										
1987	3	81	27±3	20.8±0.6	32.1±1.9	47±8	242±10	4.0±0.2		3.64
1988	4	196	49	16.5±1.3	39.6±2.4	99	232±8	4.7±0.2		3.91
1989	18	630	20.8±0.8	34.4±0.4	75±3		189±10	?		
5	205	17.4	34.1	89		186	4.9		3.57	
1991	9	439	39±4	16.6±0.8	38.3±0.5	90±4	238±6	4.7±0.2	3.1±0.9	4.13
1992	12	583	42±3	19.1±0.5	36.0±1.1	79±7	217±8	4.7±0.2	0.7±0.4	3.65
1993	9			16.3±0.6	37.2±1.2	90±7	231±10	4.4±0.2	0.8±0.3	
1995	16	271	16.9 12 - 21	16.8 32 - 45	38.58 64 - 160	96.6 158 - 379	240 ± 2.9 - 6.1	4.10 0.0 - 0.5	0.	3.34
FATTENING KIDS:										
1989	1	51		12.9	19.6	64	105	?		
1993	1	45		11.5±0.3	26.3±0.6	77	192	5.9		6.00
AVERAGE BREEDER:										
AVERAGE	50	2501		18.4	36.3	80	225	4.2	0.0	
MIN				12	32	50	145	2.9		
MAX				27	45	160	379	6.2	6.0	

1- Average daily gain 2- Feed conversion efficiency 3- unestimated values.

Table 2. Results of the control trials implemented in some farms parallel to the trials implemented on the recommended system

System of groups	Number of animals	Total weight	Initial weight (Kg)	Marketing duration (Kg)	Fattening (days)	ADG kg dm/ g/h/d	FCE Kg/ BW	Losses
Sys.1	2	49	15.9±0.6	26.3±0.9	62	163		
Sys.2	1	25	23.7±0.5	28.2±0.7	32	141	7.5	
Sys.3	1	24	19.8±0.8	25.1±1.3	32	167	7.4	
Sys.4	2	98	17.6±0.6	35.3±0.9	114	163	7.6	0.0
Sys.5	1	50	13.9±0.3	29.9±0.6	117	137	7.6	6.0
Aver.			18.8±1.7	28.9±1.8	71±19		7.5	

ADG : Average daily gain FCE : Feed conversion efficiency blank : missing data

Sys.1. Bedouins system, kept suckling beside grazing and supplementary feeding with 350 g/day feed mixture pellets.

Sys.2. 15th May Farm, Hamam, Alexandria, fed on ammoniated straw plus wheat.

Sys.3. 15th May Farm, Hamam, Alex., fed on alfalfa hay plus wheat.

Sys.4. Sites in new reclaimed lands, Nubareia, fed on crop stubble plus feed pellets.

Sys.5. Feed lot Company, tested growth promoter with the previous ration (4)

Early feeding on full concentrate ration utilizes that rumen being undeveloped which allows fast adaptation of lambs on the diet. Starting at older age needs more time to minimize activity of the functioning rumen to avoid problems of increased acidity.

Marketing performances

Marketing weight, averaged 36.3 kg ranging from 32.0 to 45.0 kg. Such weight is the common weight for marketing local lambs indicating that using full concentrate ration could successfully produce lambs of regular marketing weights with relatively better efficiency of feed conversion and faster growth rates.

The performance of the carcass was not studied during these trials. However, observations accumulated from the producers and butchers who purchased the lambs gave a clear indication that dressing percentage was improved. This trend was reported in USFGC report (1984) which referred it partially to that lambs have small stomachs.

Carcass quality also was improved and fat content was reduced. This improvement is expected from the fast rate of growth attained and the smaller age of lambs at marketing. Commonly, lambs come to the marketing weight of 40 kg the age of 11-12 months while under the present system lambs were marketed at 6 - 7 months of age but with the same weight.

Economics

The main factor which could affect economics of the present system is the price of feed unit. During the years of the trials a tremendous change in feed prices took place, since the government has lifted the subsidy, accordingly analysis will include several possible prices.

Cost, in L.E. /kg, of ration based on the maximum and minimum price estimates

Ingredients	Percent	least price estimates	High price estimates	share cost	
in ration	per kg	share cost in ration	per kg	in ration	
Grain	83.0	0.55	0.4560	0.75	0.5167
Soybean meal	15.0	0.95	0.1430	1.30	0.1950
Salt	0.50	0.10	0.00005	0.30	0.0015
Lime stone	1.40	0.15	0.0021	0.40	0.0056
Vit. & Minerals mix.	0.10	3.50	0.0035	6.00	0.0060
Price/Kg ration			0.6091		0.7248
Trough Price (1 trough for up to 25 lambs)			L.E.		240.00
(1 trough for up to 50 lambs)					380.00
Economic analysis of fattening 20 lambs for one cycle (4 months duration) :					
Weaned Lamb price (150-190 per lamb)					3400.00
Medication (L.E. 10.00 / h)					200.00
Depreciation cost of trough (20 %of price/ year)					16.00
Labor cost (4 mo. x 1/3 labor time x L.E. 200.00)					267.00
Feeding cost: (price per kg L.E. 0.73 x gained weight of 23 kg x F.C.E 4.2 kg DM/kg BW)					1410.36

					5294.00
Output :					
Lambs sold, reduced to 19 considering for possible losses (19 lambs x 40 kg x L.E. 8.25 per kg)					6270.00
Manure (6 m ³ x L.E. 18.00)					108.00

					6378.00
Net income					1084.00
Net income /head/ cycle					54.2
Capital need/year for fattening 20 lambs (cash deposit to run one round)			L.E.		6000.00
Interest rate per year (3 rounds)					42.7 %

The economic advantage of this system as compared to other systems can not be indicated because of the lack of data on other systems. However, farmers who successfully implement this system reported that this system allowed them a high margin of profit compared to old methods they applied.

Concerning goat kids, the pilot study gave promising results, although the size of data available is not enough to give accurate economic analysis.

CONCLUSIONS

Local sheep breeds exhibit a good potential for fast growth; the key factor is the type of feeding used and the stage at which lambs start their fattening regime. Lambs at the 2-3 months are suitable to start fattening. Ration containing 14 % crude protein and not more than 5% crude fiber allowed an average growth rate of 225 g/h/d during the stage of growth from 17 up to 40 kg of body weight. Some groups gave average growth of 370 g/h/d on the same ration.

Moreover, the implementation of this system could be of positive impact on sheep production process in Egypt. This trend could be achieved by :

- 1- Transfer of lambs to consume concentrate ration for fattening while keeping, if not improving, the economic impact of the process will allow saving the available limited fodder and agri- byproducts for feeding more numbers of mature ewes.
- 2- Possibility to start fattening at earlier age, and smaller weight, could be of help through :
 - early weaning of lambs will shorten time needed, by the ewe, to proceed for new lambing. As local ewes are characterized with extended reproduction season, this process will increase lambing frequency within the life span.
 - Modifying the poor mothering ability, represented in low milk for suckling. This ration act as a dry milk replacer which facilitates early weaning and consequently protection of lambs pertain low suckling milk. Otherwise, this system could encourage either keeping ewes producing twins or uptake of breeding programs act for that.
- 3- The high profit margin accomplished by applying this system gives lamb producers better opportunity to compete with the imported lambs of low prices in the market. This facilitates sustainability of lamb production process.

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تقرير عن إتجاه جديد لنظام تسمين الحملان إقتصادياً

عصام شحاته

قسم بحوث الأغنام والماعز، معهد بحوث الإنتاج الحيواني، وزارة الزراعة، الدقى، الجيزة

تم دراسة التسمين على علائق مُركزه كامله في المزارع الخاصة بغرض الوصول إلى أفضل إستخدام للمواد المُركزه في تغذية الأغنام بهدف تحديد الإنتاج الأمثل للوحدة الحيوانية.

تم قياس ٦٧ صفة توضحية نُفذت في صحراء الساحل الشمالى، النوباريه، الشرقية، المنوفية وكان عدد الحملان ٢٦٥٢ وعدد ٩٦ من صغار الماعز خلال الفترة من ١٩٨٧ إلى ١٩٩٥ .

إتضح من النتائج أن الحملان المحلية تتمتع بكفاءة عالية في سرعة النمو (٢٢٥ جم/اليوم) وقد كان المدى (١٤٥-٣٧٩ جم/اليوم) . أما بخصوص الكفاءة التحويلية للغذاء فكانت ٤,٢ : ١ (كم مادة حاجه-عليه لكل كيلو جرام حى مكتسب) وتراوحت بين القطعان (١ : ٦,٢) إلى (١ : ٩,٢) كان الغذاء المأكول (مادة جافه) كنسبة من وزن الجسم ٣,٧ %

أوضح التقييم الإقتصادى مُعدل ربح سنوى حوالى ٣٧% عن طريق تطبيق هذا النظام لتسمين الحملان حيث أمكن تنفيذ ثلاث دورات للتسمين خلال العام الواحد.