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GROWING FARAFRA AND CHIOS LAMBS FED RATIONS CONTAINING VARIOUS HAY LEVELS 1- FATTENING PERFORMANCE

(With 4 Tables and 2 Figures)

By

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تغذية حملان الفرافرة والكيوس النامية على علائق تحتوى على مستويات مختلفة من دريس البرسيم ١- أداء تسمين الحملان

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استخدم ٢٩ حولى فرافرة وكيوس عمر (٣ – ٣,٥ شهور) ومتوسط وزن جسم ابتدائى ١٨,٩٣ كجم وقسمت الى ثلاث مجاموعلت تشمل كل مجموعة (٩، ١٠، ١٠ حملان) وتم تكوين ثلاث علائق لدراسة تاثير استخدام مستويات (صفر% – ٦% - ١٥% دريس برسيم) على اداء الحملان النامية وقد استمرت التجربة لمدة ١٠٥ يوم. - وجدت فروق معنوية (٠,٠٥) بين الوزن النهائى لحملان الفرافرة ٤١,٧ كجم و حملان الكيوس ٣٦,٥كجم ، كما توجد فروق عالية المعنوية (٠,٠١) بين متوسط الزيادة اليومية لحملان الفرافرة ٢١٨ جم/يوم وحملان الكيوس ١٦٨جم/يوم خلال دورة التسمين ١٠٥ يوم. أظهرت الحملان فى المجموعة الثالثة معدل نمو يومى أعلى (٢٠٨ جم/يوم) عن المجموعة الثانية والمقارنة (١٨٧، ١٨٣ جم/يوم) لكن الفروق بين المجموعات لم تكن معنوية. كانت كفاءة التحويل الغذائى (كجم مادة جافة/كجم نمو) أفضل فى المجموعة الثالثة (٥,٨٨) عن المجموعة الثانية (٦,٧٥) والمجموعة المقارنة (٧,٠٢). انخفضت تكلفة الغذاء (جنيه مصرى/كجم نمو) فى العلائق التى تحتوى على نسبة ١٥ ،٦% دريس برسيم بمعدل ٢٠,٢ ، ١٥,٥% على التوالى مقارنة بمجموعة المقارنة. ويستخلص من هذه الدراسة إمكانية استخدام دريس البرسيم فى علائق التسمين المبكر للحملان، مع إجراء المزيد من الدراسات على مستويات اعلي من دريس البرسيم و اثر ذلك على اداء الحملان.

SUMMARY

Twenty nine Farafra and Chios ram lambs 3 – 3.5-months-old averaging 18.93 kg were randomly assigned to three groups (9, 10 and 10 lambs) that fed 0%, 6% and 15% hay substituted the ration barley grains. Average body weight of Farafra eighteen lambs were 25.71, 31.84, 39.06 and 41.76 kg, at 18, 22, 26, 29 weeks of age and for Chios eleven lambs were 24.43, 29.23, 35.24 and 36.57 kg , respectively. Differences between body weights were significant (P< 0.05). Lambs received 15% hay containing diet, had the highest body weight, total gain, and average daily gain, moreover, 15% hay group had higher average daily gain being 208 g/d than other groups. Average total daily gains were 218 g/day for Farafra lambs and 168 g/day for Chios lambs. Lambs received 6 or 15% hay rations consumed less DM by 5.8 and 6.9%, respectively, compared with the control. Highest values of feed efficiency were for group 15% hay (5.88 DM), while the lowest efficiency value was for the control group (7.02 DM). Feed cost per kg gain when using diets containing hay was reduced by about 15.5 and 20.2 % for group 6% hay and group 15% hay, respectively. In conclusion, the use of concentrate diets with alfalfa hay level for early fattening did improve growth performance.

Key words: *Chios, Farafra, growing lambs, growth.*

INTRODUCTION

In Egypt, fattening process depends on supplementary feeding rather than grazing. This is because neither grazing nor cultivated areas permissible to animals, is enough to cover even the maintenance requirements of livestock population. These circumstances render the possibility to increase livestock population to a rather unfeasible process. Also, towards better concentrates utilization in feeding sheep and economic optimization of production per animal unit (Shehata, 1997). Ponnampalam *et al.* (2004) found that it is better to feed hay beside grains to reduce the risk of acidosis in fattening lambs. It was of interest to examine whether Farafra or Chios ram lambs exhibit better performance by using levels of Clover (alfalafa) hay for early fattening.

MATERIALS and METHODS

The present study was carried out at Mallawi Animal Production Research Station, belonging to Animal Production Research Institute, Agriculture Research Center, Ministry of Agriculture. Twenty nine

growing Chios (n=11) and Farafra (n=18) ram lambs 3 – 3.5 months of age, were randomly divided into three groups (9, 10 and 10 lambs, respectively). Barley grains were substituted with 0 %, 6 % and 15 % hay. Average initial body weight was 18.93 kg. All animals were vaccinated using Covaxin® 8 and Ivomec® before the start of fattening experiment. The rations were offered ad libitum, using specific feeder, which prevents the feed contamination by lambs feet, besides controlling the release of feed trough, it guarantees clean and fresh feed all the time. Fresh water was available at all times. During the feeding experiment, fasting body weight was monitored every two weeks. All animals were in a good health. Feed intakes and refusals were recorded weekly. Formulation and chemical analysis according to AOA (1995) of ingredients and tested rations are presented in Tables 1 & 2.

RESULTS

Table 1: Experimental rations

Ingredients	Experimental rations		
	Ration 1	Ration 2	Ration 3
Clover hay	0.0	6.0	15.0
Barley grain	83.0	77.0	68.0
Soybean meal	15.0	15.0	15.0
Sodium chloride (NaCl)	0.5	0.5	0.5
Limestone (CaCo3)	1.4	1.4	1.4
Premix*	0.1	0.1	0.1

Premix consists per 3 kg consists of: Vit. A. 12000 000 IU, Vit. D_3 2200 000 IU, Vit. E 10 gm., Vit. k_3 29 gm., Copper, 10 gm., Zinc, 50 gm., Manganese, 55 gm., Iodine, 1 gm., Selenium, 0.1 gm., Carrier (Ca Co_3) 3000 gm.

Table 2: Chemical composition of ingredients and experimental rations

Items	DM	DM basis %						GE* MJ/Kg DM
		OM	CP	EE	CF	NFE	ASH	
Barley grain	89.55	97.92	11.71	2.15	3.71	80.35	2.08	18.46
Soybean meal	91.48	93.53	45.44	2.73	5.48	39.88	6.47	19.49
Clover hay	92.01	87.74	10.98	1.48	29.49	45.79	12.26	16.85
Ration 1	90.34	94.91	11.88	1.36	6.09	75.25	5.09	17.73
Ration 2	89.74	95.35	11.09	2.01	6.50	76.16	4.65	18.05
Ration 3	90.52	94.38	11.98	2.20	8.44	71.76	5.62	17.92

*Gross energy (GE) calculated according to MAFF (1975) using the following equation :
GE MJ/kg DM = 0.0226 CP + 0.0407 EE + 0.0192 CF +0.0177 NFE
Where: CP, EE, CF and NFE are expressed as gm/kg DM

Table 4: Feed intake and economic return of the experimental rations.

Items	Treatment		
	I	II	III
No. of lambs	9	10	10
Feed intake, kg. DM /h/d	1.312	1.236	1.222
Average daily gain, g	0.187	0.183	0.208
Feed efficiency, kg. DM/kg gain	7.02	6.75	5.88
Feed cost, LE/h/d	0.890	0.823	0.793
Feed cost, LE/kg gain*	4.76	4.50	3.80

* Based on the market price at that time for soybean meal, barely, hay, common salt and limestone were 1200, 600, 400, 100 and 60 LE./ton, respectively and premix 10.0 L.E/kg and price of kg live body weight is 13 L.E in 2002.

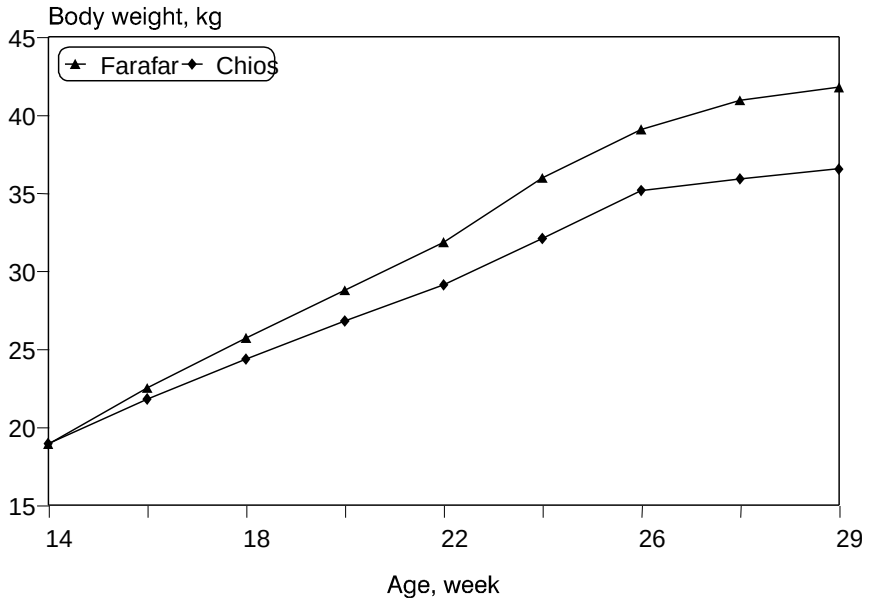

Fig.1. Changes of live body weight (kg) of Farafra and Chios lambs through the fattening period.

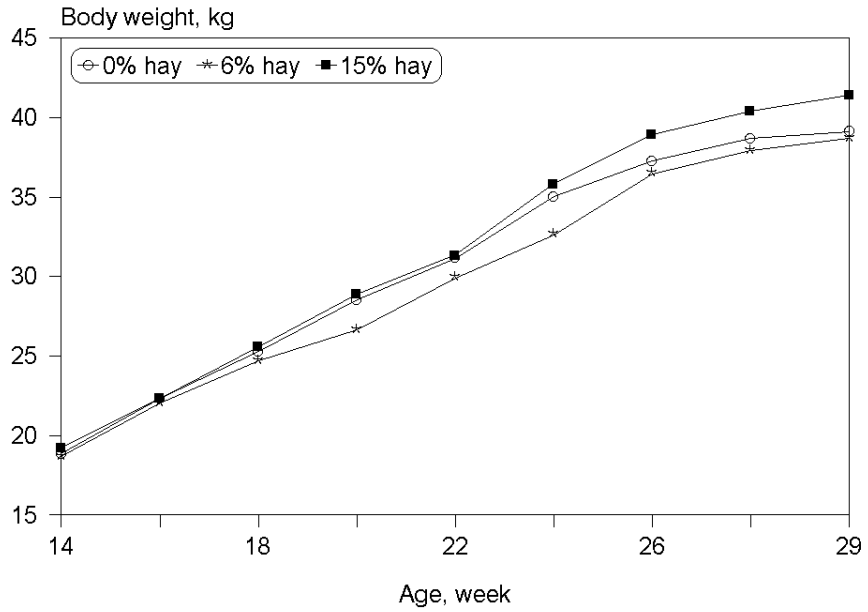

Fig. 2: Change of live body weig (kg) through the fattening period with different feeding system

DISCUSSION

Breed effect: The least-squares means of body weight, total gain and daily gain of Farafra and Chios lambs during fattening period from weaning at 14 weeks of age to slaughter weight at 29 weeks of age are presented in Table (3) and Figure (1). Body weights of Farafra lambs were heavier than Chios at all ages (i.e 18, 22, 26 and 29 weeks of age). Averages body weight of Farafra lambs were 25.71, 31.84, 39.06 and 41.76 kg, and for Chios lambs were 24.43, 29.23, 35.24 and 36.57 kg, respectively. These genotype differences were not significant except the final weight significant at 29 weeks ($P< 0.05$) (Table, 3). So, daily gain values and total daily gain of Farafra lambs were higher than Chios lambs at all periods. Average daily gains were 243, 219, 258, and 128 g/day for periods from 14-18, 18-22, 22-26 and 26-29 weeks of age, respectively. Moreover, average total daily gain was 218 g/day for Farafra lambs and 168 g/day for Chios lambs. All genotype differences in daily gain were significant ($P< 0.05$) for periods from 14-18 and 18-22 weeks, but were highly significant ($P< 0.01$) for periods from 22-26 and 26-29 weeks. Also, breed was of highly significant ($P<0.01$) effect on average total daily gain during fatting period (Table, 3). In this

respect, Ali (1994) work on Ossimi and Chios, found that breed had significant differences (P< 0.05) in final weight and total gain. The difference in average daily gain was not significant (160.0 g/day and 162.6 g/day) for Ossimi and Chios, respectively. While, El-Mahdy *et al.*, (2000) working on Ossimi and ½Ossimi × ½Rahmani, found that the differences between body weights of each of initial and final weights, due to breed group effect were not significant. Macit *et al.* (2002) reported that the difference between Morkaraman and Tushin lambs groups in daily weight gain was significant.

Feeding system: Body weight and daily gain comparisons were made during the fattening period. Data represents the least-squares means of body weight, total gain, daily gain and average total daily gain for the different levels of hay. Table (3) and Figure (2) show changes of live body weight through the fattening period with different levels of hay (0, 6 and 15%).

These data show that the third group which received the diet containing 15% hay, had the highest body weight at all ages, total gain, and average daily gain. However, the second group that received the 6% hay containing diet had light body weight at all ages, total gain and average daily gain than the first group (control). Moreover, the third group had the highest average daily gain of 208 g/d than the second and first group (control), 183 g/d and 187 g/d, respectively, although the differences were not significant (Table, 3). These differences may be attributed to higher levels of hay supplementation that improved the growth performance or increased dry matter intake which attributed to their regulatory effect on dietary energy intake. According to Fimbres *et al.*, (2002), when lambs were fed rations, particle size of forage was small enough so that physical fill was not the dominant factor in the regulation of intake.

Mohamed (1986) reported that Barki male lambs were affected by feeding system, they fed the animals on restricted feeding and hay ad lib. plus a daily intake of 2% of the average live body weight as a concentrate pelleted mixture. They reported that the average body weight, average total gain and average daily gain/head/day were 48.71, 26.37 kg and 126 g and 50.06, 26.56 and 127 g for the group fed hay ad lib. and restricted fed group, respectively, but the differences were not significant. On the other hand, Marai *et al.*, (1997) found that average daily gain in lambs fed all concentrate ration (245.05g) was higher than those fed ration based on concentrates plus roughages (118.049). However, Shehata (1997) reported that the average daily gain attained by

local lambs groups was 225 g/h/d, ranging from 145 g/h/d to 379 g/h/d, when fed on full concentrate ration. While, Shalaby (2000) found that there were wide individual variations in average daily gain of Barki lambs fed on full concentrate ration, ranging from 207 to 278 g/head/day. El-Bedawy *et al.,* (2004) observed that total gain and average daily gain were not significantly increased by 10 % hay than in 30% hay (15.1 vs. 14.7 kg) and (217 vs. 210 g), respectively.

Feed intake and feed efficiency: Dry matter (DM) intake, efficiency of DM utilization (kilograms of dry matter/ kilograms live weight gain) and feed cost were calculated for different feeding systems (Table, 4). Amount of DM consumed averaged 1.312, 1.236 and 1.222 kg/head/day for groups 0%, 6% and 15% hay, respectively. Lambs received 6 or 15% hay rations consumed less feed DM by 5.8 and 6.9%, respectively. Results revealed that increasing the percentage of hay in the diets caused a slight depression in the amount of DM consumed in spite of the increased average daily gain. This depression of dry matter consumed may be attributed to the high fiber content (8.44% CF) for 15% hay group compared to (6.09% and 6.50% CF) for 6% hay and 0% hay groups. Cameron and Hogue (1968) found that lambs fed the low fiber high oil group gained significantly ($P< 0.05$) less than other groups that consumed the medium and high fiber diets. The values of feed conversion (kg DM consumed/ kg gain) were 7.02, 6.75 and 5.88 kg DM/kg gain for 0, 6 and 15% hay groups. The most efficient value was observed for 15% hay group, while the lowest one was for control. Feed conversion ratio was enhanced gradually with increasing hay percentage in the ration. Silva and Portugal (1991) found that the composition of diet (60% concentrate and 40% straw) had a greater proportion of concentrate and the protein to energy ratio was more balanced. Therefore, it may have allowed an increase of the microbial activity and degradation rate of carbohydrate components. They added that 40% roughage in the diet may allow a greater passage rate and thus a greater intake.

Mohamed (1986) reported that feed conversion ratio calculated on the basis of kilograms dry matter per kilograms of live weight gain was 8.5 and 9.3kg gain for the hay ad lib and restricted fed groups, respectively, indicating a slight better feed efficiency of the hay ad lib group. While, Shehata (1997) found that 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 lib feeding trials. Also, Shalaby (2000) reported that feed conversion ratio ranged from 4.024 to

5.455 kg DM per kg live body weight and averaged 4.364 kg. El-Bedawy *et al.*, (2004) found that feed conversion ratio as kg DM/kg gain was 5.00 and 5.32 for 10% and 30% hay diets, respectively. However, hay level had no significant effect on fed conversion.

It is shown from Table (4) that the average of feed cost per kilograms gain was 4.76, 4.50 and 3.80 LE/kg gain for groups 0% (control), 6% and 15% hay, respectively. Feed cost per kg gain from diets containing hay was reduced by about 5.5 and 20.2% for groups 6 and 15% hay, respectively, compared with the control. Such results may indicate that using higher hay percent than that applied in this experiment would be used, accordingly more profitability could be obtained. In the present study, inclusion of hay in the diets of growing lambs significantly improved average daily gain, feed conversion ratio. More important, it reduced feed costs and hence increased economic efficiency.

Gaber *et al.* (1998) showed that, when lambs fed on all concentrate ration, feed costs were 0.725 LE/h/d and economic return was 2.9 LE/kg gain. However, Shalaby (2000) reported that cost of one kilogram weight gain averaged 3.6 LE and ranged from 3.078 to 4.790 LE for Barki Lambs on all concentrate rations.

It could be concluded that, Farafra ram lambs exhibited better performance on early fattening than Chios ram lambs in regard to final weight, average daily gain and total gain through fattening period. The use of concentrate with alfalfa hay level for early fattening did improve growth performance (body weight, average daily gain and total gain). Also, when hay level was increased to 15% with concentrate, it improved the feed conversion efficiency (kg DM consumed/kg gain) and reduced the feed cost per kilograms by about 20.2%.

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Table 3: LSM ±SE of body weight and daily gain of growing lambs during the fattening period.

Items	Breed		Treatment			Overall mean
	Farafra	Chios	I	II	III	
No. of lambs	18	11	9	10	10	29
Body weight, kg						
at 14 weeks (Initial weight)	18.91±1.00	18.95±1.29	18.97±1.49	18.59±1.36	19.24±1.36	18.92±4.23
at 18 weeks	25.71±1.22	24.43±1.57	25.31±1.82	24.45±1.67	25.46±1.67	25.19±5.16
at 22weeks	31.84±1.38	29.23±1.78	31.07±2.07	29.46±1.89	31.07±1.89	30.79±5.85
at 26 weeks	39.06±1.50	35.24±1.94	37.03±2.25	35.81±2.05	38.61±2.05	37.58±6.36
at 29 weeks (Final weight)	41.76±1.48	36.57±1.91	38.60±2.22	37.79±2.02	41.10±2.02	39.77±6.27
Total gain, kg	22.84±0.69	17.62±0.90	19.63±1.04	19.20±0.95	21.86±0.95	20.86±2.94
Daily gain, kg						
14 – 18 weeks	0.243±0.01	0.196±0.02	0.227±0.02	0.209±0.02	0.222±0.02	0.224±0.06
18 – 22 weeks	0.219±0.01	0.171±0.02	0.206±0.02	0.179±0.02	0.201±0.02	0.200±0.05
22 – 26 weeks	0.258±0.01	0.215±0.01	0.213 ± 0.01^{b}	0.227 ± 0.01^{ab}	0.270 ± 0.01^{a}	0.242±0.04
26 – 29 weeks	0.128±0.01	0.063±0.02	0.075±0.02	0.094±0.02	0.118±0.02	0.105±0.05
Average daily gain, kg	0.218±0.01	0.168±0.01	0.187±0.01	0.183±0.01	0.208±0.01	0.199±0.03

a , b : meame row having differ superscript different significantly ($p<0.05$) for the same category.