

COMPARISON AND EVALUATION OF AWASSI LAMBS FATTENING SYSTEMS IN PALESTINE.

W. HainmacI¹, J. Abo Omar², R. Otlunan³ and H. Shanti

1-Ministry of Agriculture, Palestine.

2-An_Najah National University, Nablus, Palestine.

3- AI Azhar University, Gaza, Palestine

SUMMARY

This research was conducted to investigate the performance of Awassi lambs in the two fattening systems in Palestine. Both systems are based in specific locations in the country with variable outcomes. A total of sixty Awassi lambs were used in the experiment. Lambs were divided into two groups of thirty lambs in each. Lambs in the first group were fed a concentrate ration similar to those fed in commercial fattening operations. Lambs in the second group were fed a barley-based diet (70% barley plus 30% legume roughage). Lambs were fed their rations for 70 days. Lambs were weighed at weekly basis. At day 42 of beginning of the feeding trial, a digestibility trial was conducted on eight of each group. A six days total collection of feed, feces and urine was performed. The performance of lambs fed the commercial fattening rations was much better than lambs fed the barley based rations. This was observed from the performance parameters such as the total gain, average daily gain (278 vs. 146 g) and the feed conversion efficiencies. Lambs fed the commercial fattening rations had average feed efficiency of 5.5 kg while that of lambs the barley based rations was 8.8 kg. The cost of gain was significantly ($P < 0.05$) higher in lambs fed the barley-based diets. The digestion trials showed that the dry matter and nutrients digestibility were higher for the commercial fattening rations compared to barley based rations.

Keywords: fattening systems, Awassi lambs, fattening rations, barley.

INTRODUCTION

The animal production sector plays an important role in the local Palestinian Agricultural Sector. The contribution of this sector is about 36% (Ministry of Agriculture (MOA), 1999). The importance of this sector comes from the components of the sector, which are the sheep, goats, dairy cattle and poultry sector. The fattening operations are among the important activities within animal production sector. Recent statistics showed that about 400 thousands heads of lambs are fattened in 2000 (MOA, 2000). Such a fattening projects are important in the animal production sector as makes about 61% of the animal production value (MOA, 2000). However, the execution of

fattening operations varies widely in Palestine. The variations are due to several reasons; among these are the sizes of investments, location of the fattening farm and the experience of farmers. Locally, there are two types of lamb fattening systems, the commercial (intensive) and the extensive systems. In the first, commercial fattening manufactured feeds are used in these operations while a barley-based diet is used in the extensive system (Abo Omar, 1992). The extensive fattening system is mainly adopted in eastern slopes of the West Bank (Barghuti and Abo Omar, 2000). Fattening animals in this system are mainly fed with roughage either from pastures or market. Adoption of the

extensive fattening system has negative impact on local pastures. Lambs fed under this system are considered as potential destroyer of the pastures especially in the eastern slopes, which can lead to environmental hazards. The intensive systems of livestock raising might be more friendly to local environment. The majority of lambs under fattening operations in either system are of Awassi breed.

Cereal grains such as barley are common feed ingredients in local fattening operations. It makes a major part of manufactured feeds. Barley is incorporated in formulated feeds at rate of about 25% (Abo Omar, 1992). However, it is used as a sole grain feed ingredient in the extensive fattening system. The amount of barley used in local fattening operations is estimated to be 100 thousand tons/year (MOA, 2000). Use of barley in feeding ruminants for the extensive fattening operations used to give satisfactory results. The estimated daily gain of such feeding program is about 120-200 g (MOA, 1999); while in the intensive fattening system is estimated to be more than 240 g/day (MOA, 1999). The outcome of such fattening operations is variable especially when the extensive fattening system is considered.

The objectives of this work were to investigate the outcome of the two systems in regard to general performance, daily gain, conversion efficiency, the visceral organ mass and the gastrointestinal tract content and feed wastes during the feeding trial.

MATERIALS AND METHODS

1. The fattening trial:

Sixty Awassi male lambs were obtained from commercial market soon after weaning. Soon after reaching the experimental site, lambs were treated against both internal and external

parasites and were dosed against enterotoxaemia. Animals were stratified into weight categories and randomly divided into two groups of thirty lambs each. Lambs in the first group were fed a commercial fattening ration (Table 1). The second group of lambs was fed a fattening ration similar to that practiced in the fattening extensive system, the ration is made of roughage and barley (Table 2). Animals were fed in groups and had free access to water and salt blocks. Lambs were weighed at weekly basis along with feeding trial, which lasted for 70 days. The daily feed offered, refused and intake was recorded and feed samples were collected for later analysis. Animals were observed for abnormalities, health problems and comments about all these were recorded. The weight gain cost of gain and feed efficiencies were recorded.

2. The digestion trial:

Forty two days after starting of the feeding trial, eight lambs were taken randomly from each group and placed in metabolic crates. Prior to this, lambs were sheared and prepared for the collection period. Animals were adapted to crates for four days. The daily feed intake was recorded during the entire collection period. The ort was recorded for each animal. Samples of each were collected and sampled for later analysis. Water was available to lambs free choice. Fresh and oven dried weight of feces of each animal were ground to 1 mm, and representative samples were taken for later analysis. The excreted urine by each animal during 24 hours was collected using a plastic jar (2 liters) containing 20 ml of diluted sulfuric acid (v : v) and 500 ml of tap water. The collected urine was transferred to a 5 liter container and diluted with tap water to the mark. A sample of 100

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ml was taken for the diluted urine and kept in a 2 liter bottle in a refrigerator.

Table 1. The ingredients and chemical composition of **the** commercial fattening ration.

<u>Ingredient</u>	<u>kg per ton</u>
Corn	400
Wheat	150
Bran	160
SBM	175
Limestone	.27
Barley	75
Vitamins	1
Salt	5
Urea	7
Chemical composition (%):	
Crude protein	18
Crude fiber	6.1
Crude fat	3.3
Ash	5.2
Calcium	1.2
Phosphorus	0.6
Energy (Mcal/kg)	2240
moisture	12

Table 2. Composition of the barley based ration

<u>Ingredient</u>	<u>% of ration</u>
Barley	70
Hay	30
Chemical composition:	
Crude protein	17.8
Crude fiber	16.2
Crude fat	3.6
Ash	4.0
Calcium	1.2
Phosphorus	0.5
Energy (Mcal/kg)	4656
Moisture	13%

The samples (100 ml, each) of diluted urine during 7 days were composited in the 2 liter bottle. A triplicate sample of 2 ml of urine sample was analyzed for nitrogen content.

3. Chemical analysis:

Samples of the feed ingredients used in the experiment and feed refused and feces were used to determine the contents of the following: Moisture, ash, crude

protein, crude fat and crude fiber according to A.O.A.C. (1984). Nitrogen free extract was determined by difference.

4. Statistical analysis;

Data were statistically analyzed by the t- independent test using SAS package (SAS, 1988) to determine the effect of experimental rations on feed intake, body weight gain, feed conversion and nutrients digestibility.

RESULTS AND DISCUSSION

1. Composition of barley:

The results of chemical composition of barley showed that barley includes 13% crude protein, 6.1% crude fiber, and

2.5% ash (Table 3). These results are in agreement with the NRC list (1984). Barley has low calcium content (.06%); the phosphorus content is 0.35%. Similar trends were reported by NRC (1984).

Table 3. Chemical composition of barley used in the experiment

Nutrient	%
Crude protein	13.0
Crude fiber	6.0
Crude ash	2.5
Calcium ...	0.06
Phosphorus	0.35
Gross energy(GE), kcal	4300

2. Lambs performance:

"Table (4) showed the overall performance of lambs utilizing the two experimental diets. It is obvious that the total- gain is significantly higher ($P < 0.05$) in lambs fed the concentrate diet. These lambs gained 93% more than the barley fed lambs. The average daily gain of lambs fed the concentrate diet was 278 g. this value is similar to values reported by

other research with lambs fed commercial diets (Abo Omar and Gavoret, 1995 and Harb, 1986). Similarly, gain in lambs fed barley diets was close to that observed in most of fattening operations adopting the traditional methods of fattening (MOA, 2000). Similar trends were observed in values of feed conversion ratios for both lambs fed concentrate or barley diets.

Table 4. Results of fattening trial (\pm standard error).

Items	Concentrate group	Barley group
No. of lambs	30	30
Days of experiment	70	70
Initial weight	24.3 \pm 0.5	24.5 \pm 0.4"
Final weight	43.25 \pm 0.9	34.4 \pm 0.66
Gain (kg)	18.95 \pm 1.1	9.8 \pm 0.7
Mean daily gain (g)	278 + 7.5	144 \pm 4.5
Daily feed intake (kg)	1.55	1.20
Daily feed wastes %	6	14 -
Feed conversion efficiency	5.56	8.3
Cost of total gain(NIS)	105.36 \pm 4.5a	89.5 \pm 3.5b
Cost of diet (NIS/kg) "	10	1.1
Cost of 1 kg gain(NIS)	5.56 \pm 0.2b	9.13 \pm 0.9a

Rows with different letters are significantly different at $P < 0.05$ level.

3. Feed intake:

The experiment showed that feed intake for lambs fed the barley based rations was lower than that of lambs fed the commercial concentrate diets (1.55 vs. 12 kg). The bulkiness of diets for lambs fed the barley-based diets may explain the depressed intake compared to intake of lambs in the other group. This intake was similar to intakes observed in many other fattening trials (Abo Omar and Gavoret, 1995; Harb, 1986).

4. Body weight gain:

The total gain in lambs fed the commercial fattening diet was about 19 kg during the entire feeding trial. However, gain in lambs fed barley diets was about 10 kg. The average daily gain in the two experiments was 278 and 144 g, respectively. The lower gain in lambs fed the barley-based diets explains why fattening operations in the extensive fattening systems take long time for termination. Lambs in this system should be kept under fattening more days to achieve the marketing weight (MOA, 2000).

5. Feed conversion efficiency:

The efficiencies of feed conversion were 5.6 and 8.3 kg in lambs fed the commercial fattening and the barley diets, respectively. Lambs fed the commercial fattening diets have 48% higher average

conversion efficiency compared to the efficiency in the other group. This again explains the long duration of fattening trials performed by fanners adopting the extensive system of fattening observed in many locations in Palestine.

6. Cost of gain:

The cost per kg gain is indicated in Table (4). The higher cost of gain observed in lambs fed the barley diet was due to two reasons, First the low conversion efficiency of feed, second the more cost/kg of that diet. Roughage prices are higher than that of concentrates in many occasions, especially in summers followed low precipitation seasons.

7. Digestibility of diets:

The digestibility of dry matter and the different feed nutrients are shown in Table (5). It is the first attempt to evaluate digestibility parameters in local lambs either consuming the traditional fattening rations or in those consuming rations as in the extensive fattening system. The digestibility of DM, CP, CF, and DE were significantly ($P < 0.05$) higher in lambs fed the concentrate diets compared to lambs fed the barley based diets. The high fiber content of diets containing barley may explain the low digestibility values observed. Barley in diets reduced the overall digestibility of the rations as it has negative effect on the digestibility.

Table 5. Digestibility parameters for diets fed to fattening lambs (\pm standard error).

Items	Concentrate ration	Barley based ration
DM	79.5 \pm 2.3a	73.2 \pm 2Ad
CP	75.5 \pm 1.9a	70.5 \pm 2.2/3
CF	62.0 \pm 2.8a	55.4 \pm 1.56
NFE	90.0 + 2.8	87.0 \pm 2.2
Ash	88.8 \pm 2.9	86.0 \pm 2.6 <
DE	4250 \pm 21.7a	1270 \pm 13.46

Rows with different letters are significantly different at $P < 0.05$ level.

8. *Feed waste:*

The study showed that the feed waste in each group to be 6 and 14% for the commercial fattening and barley based rations, respectively (Table 4). The high amount of waste observed in the barley based ration was due to the type of feeders used for this ration which was used to simulate similar feeders used in the extensive fattening operations. Lots of feed can be saved when use modern feeders as used in the commercial fattening operations.

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