CONVENTIONAL RATION, IMPROVE FEED INTAKE, FEED CONVERSION RATIO AND WEIGHT GAIN IN BALOCHI LAMBS

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ABSTRACT: *Twenty four Balochi lambs were used to evaluate fattening performance under conventional (green fodders: sorghum, barley, berseem) and commercial (concentrate mixture) feed resources. Twelve lambs were kept in group-A fed green fodders, while twelve lambs were designated as group-B fed concentrate mixture. During 1st week lambs in group A, consumed 3.717±0.196 kg feed, gained 0.313±0.060 kg weight and gave 11.875±3.027 Feed conversion ratio as compared to lambs of group B, which consumed 2.467±0.351 kg feed, gained 0.667±0.144 kg weight with 3.698±0.376 FCR. Almost similar trend obtained up to the last experimental week, when lambs in group 'B' consumed lesser feed (6.650±0.492 kg/animal) to produce 1.217±0.029 kg weekly weight gain with mean feed conversion ratio of 5.341±0.503 as compared group-A with 7.950±0.427 kg feed intake, 0.650±0.029 kg weight gain and feed conversion ratio of 12.230±0.404. Total feed intake for the overall 14 weeks experimental period in group A was 91.487 kg which resulted in a weight gain of 7.339 kg with 12.449 FCR, while in group B (compound feed) total feed consumption was 76.05 kg, gaining 17.365 kg weight with 4.386 FCR. It was concluded that conventional feed was effective for feed intake, feed conversion and weight gain in Balochi lambs.*

Keywords: Sheep, Balochi, feed, resources, growth performance

INTRODUCTION

Livestock is a leading wing of an Agriculture sector of Pakistan. Farming of animals play vital role in Agriculture Sector it contributes approximately 55.89% from and 11.79% of the total national Gross domestic product. The total sheep population of Pakistan is 29.1 million [1]. The sheep is one the major source of mutton production from the native derived feed resources. The best feeding strategies is the assurance for the production of mutton obtained from local breed of sheep. Generally, different feed resources such as range lands, green fodder, pastures and dry roughages are used in the country. There is drastic need of proper utilization of locally available feed resources for the farm animals in the development of ago-based industries and agriculture sector. In common practice goat and sheep are reared on range lands and pastures in Pakistan [2].

Livestock farming is the main source of rural economy of Pakistan especially province Balochistan. The contribution of the rural economy could be explained from the 80% of the rural population directly or indirectly is engaged in livestock farming and generate approximately 30-40% revenue from this sector. On the contrary livestock farmers are getting low profits due to improper management and utilization of feed resources. There is need to improve the socioeconomic conditions of peoples engaged in this sector [3]. The small ruminants such as sheep and goat are found in large number in Balochistan province and constitute more than 43% of sheep population of Pakistan. Rakshani Bibrik, Harnai and Balochi are the main breeds of sheep found in Balochistan province. Balochi sheep is well noted for the better yield of wool and mutton [4].

The Balochi originated in the area which is now southwest Pakistan, southern Afghanistan and eastern Iran. This breed has characteristic fat-tail and could be reared in severe temperate zone around the globe [5]. The suitable feeding and managemental strategies are of great importance for profitable sheep production. In routine sheep farming, pasture is considered the main source of feed [6].

The sheep production efficiency depends on the quality and supply of nutrients in the available resources. The supply of amino acids related to protein content of the feed, transportation and absorption in alimentary tract and its degradation from plant protein and microbial protein. The uptake of protein related to the amount of the protein absorption and availability of limiting essential amino acids and non-protein energy-yielding substrates [7-8].

The preceding studies have illustrated the extent of protein loss from the rumen, effect live weight gain in ruminants. With animals grazing temperate pastures, significant losses of ingested protein may occur from the rumen. For instance, in spring those animals grazing white clover can lose approximately 30% and those on alfalfa can lose approximately 40% of ingested protein [9]. When lambs grazing white clover (approximately 30%' CP) or fescue (approximately 20% GP) were supplemented with escape protein equal to that estimated to be lost from the rumen, live weight gain was significantly increased [7-8].

Energy supplementation may increase the efficiency of growth. The organisms responsible for fiber digestion in the rumen include bacteria, protozoa and fungi. The actual and relative biomasses of each group are a function of the availability of fermentable N, soluble sugar, starches, fiber or protein in the feed [10]. The corn and soybean meal were commonly used as the grain portion of the diet. However, according to the availability and price, other grains may replace all or some of the content of soybean meal and corn

meal in a diet. [6]. Sixteen percent crude protein for the diet of lamb is playing important role in the fattening of growing lambs weighing 20 to 30 kg. Whereas at 30 kg body weights and up crude protein level in the diet can be lowered as 14 percent [11]. At present the protein delivery capacity of ergonomically competitive legumes were shown the inadequate for the higher growth rates required in production systems and supplements of energy and protein will be needed to achieve good growth rates.

Sheep convert vegetation into products consumable by man. A flock of sheep can be a source of milk and mutton, but only in limited areas of the world sheep are milked or bred. In all parts of the tropics sheep meat is eaten. In contrast to large ruminants, sheep are small enough to be totally consumed on the day of slaughter, thus avoiding the need of storage, which is very difficult in a hot climate. Keeping in view this study was designed to compare the growth performance of Balochi lambs under conventional and commercial feed resources.

MATERIALS AND METHODS

Twenty-four castrated male Balochi lambs, around 6 month of age and weighing between 15-24 kg were randomly selected from the farm one week before the start of the experiment. All the animals were drenched with systamax (Welcome, Pakistan) and dipped with Tagavan for endo and ecto parasitic control, respectively. The animals were in-oculated against enterotoxaemia, anthrax, sheep pox, contagious caprine pleuro-pneumonia and foot and mouth disease. All animals were sheared one week before the arrival at experimental station. All animals were ear tagged with different tag numbers (261–284) printed on iron tags. The lambs were randomly divided into two main groups balanced for age and weight. Each group was further sub-divided into three sub-groups of four animals each to serve as blocks/replicates. Randomized complete block design was applied for all the treatments as shown in Table 1.

Table-1 Experimental Design and average weight of the Balochi lambs.

Group	Sub-group/block/ replicate No.	No. of Lambs per replicate	Average weight	Tag Nos.
A	1	4	17.25	271, 278, 281, 284
(conventional feed)	2	4	25.75	269, 276, 280, 279
	3	4	20.25	262, 263, 265, 266
B	1	4	17.25	272, 273, 274, 277
(commercial feed)	2	4	24.25	270, 275, 285, 283
	3	4	21.75	261, 264, 267, 268

Before the start of experiment, all lambs were fed the experimental ration for an adaptation period of 15 days to remove previous feed effects, if any. The lambs were kept off-feed and -water for twelve hours before the start of experiment and their initial weights were recorded on the following morning. There-after, the lambs were weighed weekly at the same time before morning-feeding till the expiry of the experiment. The six lamb-groups were allotted to six feeding pens randomly and four lambs in a sub-group were kept together in an individual allotted pen to serve as one experimental unit. Two experimental rations i.e., A-Control (conventional feed) with CP 11.25% and TDN 60.94% and B-treated (commercial feed) with 16% CP and TDN 73.08 on DM basis were offered. Composition of the two experimental rations is given in Table-2.

Table-2. The experimental diet fed Balochi lambs.

S. No.	**Ingredients**	A (%)	B (%)
1.	**Concentrates**		
i.	Wheat	-	10
ii.	Wheat bran	-	27
iii.	Rice polish	-	8
iv.	Rape seed cake	-	3
v.	Rape seed meal	-	1
vi.	Cotton seed cake	-	12
vii.	Cotton seed meal	-	1
viii.	Sun flower meal	-	1
ix.	Maize	-	15
x.	Molasses	-	10
xi.	Common salt	-	1
xii.	Di-calcium phosphate	-	1
xiii.	Sorghum (whole)	20	-
xiv.	Barley (whole)	20	-
2.	**Green roughages**		
i.	Breseem/sorghum/barley	60	10
	Total	100.0	100.0

Table-3. Chemical composition of experimental diets fed Balochi lambs (% on D.M basis).

S. No.	Nutrients	Ration	
		A	B
1.	Crude Protein %	5.29	14.0
2.	Total Digestible Nutrients	31.94	62.08
3.	Crude Fiber	0.94	5.91
4.	Crude Fat	3.4	3.18
5.	Crude Ash	3.63	4.38

Table-4. Chemical composition of experimental diet A fed Balochi lambs (% on D.M basis).

S.No.	Ingredients %	Kg	D.M	C.P	T.D.N	C.F	C. Fat	C.Ash
			1. **Concentrates**					
i.	Sorghum (whole)	20	18	2.05	14.4	0.43	0.50	0.30
ii.	Barley (whole)	20	18	1.8	13.86	0.21	2.10	1.61
			2. Green Roughage					
i.	Berseem	60	12	1.44	7.68	0.3	0.8	1.72
	Total	100	48	5.29	35.94	0.94	3.4	3.63

Table-5. Chemical composition of experimental diet B fed Balochi lambs (% on D.M basis).

S.No.	Ingredients %	Composition						
1	**Concentrates**	kg	D.M	C.P	T.D.N	C.F	C. Fat	C. Ash
I	Wheat	10	8.8	1.31	6.86	0.22	0.15	0.14
Ii	Wheat bran	27	24.03	3.65	15.13	2.49	0.93	1.48
Iii	Rice polish	8	7.2	0.87	5.83	0.23	0.90	0.54
Iv	Rape seed cake	3	2.76	1.02	1.90	0.37	0.24	0.20
V	Rape seed meal	1	0.9	0.35	0.57	0.12	0.01	0.06
Vi	Cotton seed cake	12	10.56	3.97	6.96	1.51	0.38	0.70
Vii	Cotton seed meal	1	0.91	0.37	0.60	0.10	0.02	0.05
viii	Sun flower meal	1	0.93	0.43	0.60	0.10	0.02	0.07
Ix	Maize	15	13.2	1.26	10.82	0.27	0.51	0.17
X	Molasses	10	9.0	0.35	4.95	00	0.009	0.69
Xi	Common salt	1	-	-	-	-	-	-
Xii	Di-calcium phosphate	1	-	-	-	-	-	-
2	Green roughage	-	-	-	-	-	-	-
I	Berseem	10	2.0	0.42	7.86	0.5	0.013	0.28
	Total	100	80.29	14.00	62.08	5.91	3.18	4.38

Animals fed on ration A were supplemented with green chaffed-barseem fodder fed *ad libitum* to the three replicates sub-groups in group 1 while the lambs fed on ration B were supplemented with green chaffed barseem/pen daily as source of vitamin A, to the three replicates /block in group 2, twice a day, at 8:30 A.M and 5:30 PM. Water was offered twice a day till to the expiry of the experiment. Each morning before feeding, the refusals of feed were collected and weighed. Common salt in feeding troughs was made available for control group 1 animals during the trial. Dung was removed from the pens.

Preparation of the ration

Ration A, ingredients were available at the farm and were mixed manually (Table-2), while ration B was purchased from the market manufactured by Shukrana Feed Mill Quetta and was formulated as per the experimental requirements.

RESULTS

The results revealed that feed intake, feed conversion ratio and weight gain were recorded significantly ($P<0.01$) different when experimental Balochi lambs were fed on different conventional resources. During initial period, the experimental lambs fed with farmers' feed (group A) consumed feed of 3.717±0.196 kg on average, weight gain 0.313±0.427kg and feed conversion ratio of 9.217±3.027 as compared to those fed on compound feed, consumed average feed of 2.467±0.351 kg, weight gain 0.667±0.492 kg and feed conversion ratio of 3.567±0.376. Similarly, in the second week, group 'A' consumed 4.290±0.017 kg/lamb feed and weight gain 0.400 ± 0.085 kg with feed conversion efficiency of 11.467±2.579, while group 'B' consumed 3.567±0.115 kg feed, weight gain 0.767±0.225 kg and feed conversion ratio of 4.933±1.626 (Table-6).

During week-3 group 'A' consumed feed of 4.833±0.029 kg/ animal, weight gain of 0.450 ± 0.087 kg and feed conversion ratio of 10.80±2.615, and in group 'B' consumed feed of

4.033±0.058 kg, weight gain of 0.913±0.040 kg and feed conversion ratio of 4.420±0.259. Likewise, in 4th week group-A consumed feed of 5.44±0.235 kg/animal, weight gain of 0.473±0.137 kg with feed conversion ratio of 12.733±0.702 as compared group-B consuming feed of 4.623±0.214 kg, weight gain 1.167±0.144 kg with mean feed conversion ratio of 3.893±0.494 (Table-6).

During 5th week group 'B' consumed feed of 5.157±0.160 kg/animal, weight gain of 1.333 ± 0.144 kg with feed conversion ratio of 3.893±0.494 as compared to group 'A' consumed significantly greater feed of 6.370±0.316 kg, weight gain of 0.500±0.050 kg with feed conversion ratio of 12.733±0.702. Similarly, during 6th week, group 'B' consumed feed of 5.530±0.177 kg/animal, weight gain 1.283±0.189 kg with mean feed conversion ratio of 4.347±0.665 as compared to group-A, where feed consumption was 6.633±0.208 kg, weight gain of 0.480±0.101 kg with mean feed conversion ratio of 14.267±3.536 (Table-6).

The results for 7th week showed that lambs in group 'B' fed consumed feed of 5.667±0.208 kg/animal, weight gain of 1.467 ± 0.058 kg with mean feed conversion ratio of 3.850±0.104 against group 'A' consumed 6.800±0.100 kg feed, weight gain of 0.750 ± 0.00 kg with 9.053±0.150 mean feed conversion ratio. Moreover, during 8th experimental week lambs in group-B consumed feed of 5.467±0.451 kg/animal, weight gain of 1.467±0.616kg with mean feed conversion ratio of 3.847±0.453 as compared to those fed on farmers' feed (group A), where feed consumption was 6.617±0.076 kg, weight gain of 0.483±0.029 kg with mean feed conversion ratio of 13.700±0.794 (Table-6).

During 9th week the lambs in group 'B' fed on compound feed had lowest feed intake of 5.933±0.0115 kg, weight gain of 1.317±0.161 kg with mean feed conversion ratio of 4.557±0.603 against lambs in group 'A' had 7.030±0.079 kg feed intake, producing weight gain of 0.600±0.132 kg with mean feed conversion ratio of 12.00±2.358. Similarly, during 10th experimental week lambs in group 'B' consumed less feed (6.090±0.066 kg/animal) for producing weight gain of 1.417±0.144 kg with mean feed conversion ratio of 5.003±1.014 as compared to those fed on farmers' feed (group A) had feed consumption of 7.037±0.032 kg to produce weight gain of 0.540±0.069 kg with mean feed conversion ratio of 13.033±1.762 (Table-6).

During the 11th week Balochi lambs in group 'B' consumed 6.890±0.475 kg feed/animal, producing weight gain of 1.750±0.433 kg with mean feed conversion ratio of 4.080±0.878 as compared to the lambs in group 'A' consumed more feed (8.160±0.694 kg) weight gain of 0.590±0.026 kg and feed conversion ratio of 13.800±1.308. Likewise, similar was the situation during 12th week and lambs in group 'B' consumed minimum feed (7.163±0.944 kg/animal), producing weight gain of 1.417±0.144 kg with mean feed conversion ratio of 5.093±1.063 as compared farmers' feed (group A) had feed consumption of 8.283±0.465 kg and weight gain 0.577 ± 0.025 kg with feed conversion ratio of 14.367±1.365 (Table-6).

During 13th week of experiment lambs in group 'B' consumed average feed of 6.963±0.343 kg to produce 1.233±0.275 kg weight gain with mean feed conversion ratio of 5.800±1.609 as compared group-A, where feed consumption was 8.367 ± 0.153 kg, weight gain 0.533±0.021 kg with feed conversion ratio of 15.633 ± 0.404. Similar was situation during last week of the experiment, when lambs in group 'B' consumed lesser feed (6.650±0.144 kg/animal) to produce 1.217±0.029 kg weight gain with mean feed conversion ratio of 5.467±0.503 as compared group-A, with 7.950±0.060 kg feed intake, 0.650±0.100 kg weight gain with mean feed conversion ratio of 12.453±2.588 (Table-6).

Table-6: The average feed consumption, feed conversion ration and weight gain in Balochi lambs fed conventional feed in comparison to commercial feed.

Weeks	Feed intake (kg)		Weight gain (kg)		F.C.R	
	A	B	A	B	A	B
1	3.717a	2.467b	0.313a	0.667ab	11.875a	3.698ab
2	4.250a	3.567b	0.400a	0.767ab	10.625a	4.650b
3	4.833a	4.033b	0.450a	0.913ab	10.740a	4.417b
4	5.440a	4.623b	0.473a	1.167b	11.501a	3.961b
5	6.370a	5.157b	0.500a	1.333ab	12.740a	3.868b
6	6.633a	5.530b	0.480a	1.283b	13.187a	4.310ab
7	6.800a	5.667a	0.750a	1.467ab	9.066a	3.862b
8	6.617a	5.467ab	0.483a	1.417b	13.699a	3.858b
9	7.030a	5.933a	0.600a	1.317b	11.711a	4.504ab
10	7.037a	6.090a	0.540a	1.417bb	13.031a	4.297b
11	8.160a	6.890ab	0.590a	1.750b	13.830a	3.937b
12	8.283a	7.163ab	0.577a	1.417b	14.355a	5.055b
13	8.367a	6.963ab	0.533a	1.233b	15.697a	5.650b
14	7.950a	6.50ab	0.650a	1.217b	12.230a	5.341ab
Total	91.487	76.05	7.339	17.365	174.287	61.408
Average	6.534	5.07	0.524	1.240	12.449	4.386

DISCUSSION

In the present study fattening performance of Balochi lambs under conventional and commercial feed resources was

evaluated. It was observed from the findings of the present study that feed consumption and FRC efficiencies were found significantly affected. Animals consumed significantly greater amount of farmers feed and gained quite low weight. In contrast to present study [12] Drouillard *et al*. (1991)found out low feed intake and low weight gain with pasture feeding.

The performance of lambs fed on farmers' conventional feed was poor and animals consumed concentrate feeding produced significantly good growth rate. The results are well supported by the findings of [13] Hunter (1988) who experienced increased productivity with concentrate feeding, demonstrated that tropical pastures with low-quality, protein- deficient forages typical dry season adversely affect the growth rate. Moreover a previous study demonstrated that the restricted growth due to protein deficiency pastures and might be expected to have a major depressive effect on growth of the metabolically active tissues [12]. Results of present study suggested that compound feed (group-B) can provide better lamb fattening as compared to farmers' feed which might be due to high energy and crude protein content of the compound feed as compared to low CP content of farmers feed or low digestibility and possible losses of protein from the rumen of animal. It was described that tropical legumes are likely to lose significant amounts of protein from the rumen due to microbial degradation and absorption of ammonia. Thus the present study shows that situation was quite in favor of compound feed, that for obtaining higher weight gains with remarkably less amount of feed [14]. Moreover, compound feed contained all recommended ingredients were suitable for fattening lambs. Similarly previous report of NRC (1985) suggested that some essential amino acids were limiting growth in ruminants [15].

It was suggested that proportion of the diet as legume may markedly increase the crude protein content of the diet. But it may produce no effect on enhancing intestinal protein supply or the protein energy ratio of absorbed products. This is especially so where the legume has a low digestibility and provides insufficient energy for the microbes to utilize the degraded protein [8].

The results reported by Miresan and Popa (1978) and Murugan (1997) [16-17] were further confirmed the findings of the present investigation who found better weight gains and feed conversion efficiencies of the lambs fed on compound feed as compared to lambs fed on forages and grasses. It had been reported that increase in live body weight and FCR of the scientifically formulated feed were significantly superior against those recorded from conventional feed. It was further to mention that the performance of lambs fed with forages and roughages (farmers' feed) offered by the farmers were not equally efficient neither in the gaining weight nor in case of the feed conversion efficiency [18-19]. Moreover, feed lambs on farmer's feed is quite laborious and time taking, while in case of compound feed, labour, time and costs could also be minimized. Thus, it was apparently visual that compound feed was better in all lamb fattening parameters as compared to farmer's feed. The results reported by Ogan (2000) [20] suggested that the fattening lambs through roughages and forages may not be profitable but considerably high returns have been achieved when fattening lambs were fed on scientifically formulated feed. Previous studies described weight gain, feed conversion ratio and net profits were considerably efficient in the lambs fed on compound feeds as compared to those fed on forages and grasses [6, 21-22].

CONCLUSIONS

In summary, groth performance of Balochi lambs fed on compound feed was significantly higher and the lambs in this group consumed considerably less amount of feed and produced significantly more weight gain with remarkably efficient feed conversion throughout the experimental period during the periodical observations. The lambs fed on forages and roughages resulted poor feed efficiency and in the last week of experiment they consumed 12.453 kg of feed for gaining one kilogram of weight as compared to those fed on compound feed consumed only 5.467 kg of feed to gain one kilogram weight.

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