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LAMB PRODUCTION UNDER DIFFERENT SYSTEMS OF MANAGEMENT ON RANGELANDS OF BALOCHISTAN

M. MUNIR, A.W. JASRA[1] AND S. RAFIQUE[2]

Animal Sciences Institute, National Agricultural Research Centre, Park Road, Islamabad;
[1]Range Management & Forestry, and [2]Animal Production, Pakistan Agricultural Research Council, G-5/1, Islamabad, Pakistan

ABSTRACT

This study was conducted to determine the effect of three management systems on the production of Balochi lambs on rangelands of Balochistan province of Pakistan. Growth rate of Balochi lambs under three management systems i.e. T1–Extensive system (grazing only), T2–Semi-extensive system (grazing plus daily feed supplementation for three months @ 0.58 kg/lamb/day) and T3–Intensive system (experimental ration only @ 1.25 kg/lamb/day) was observed. All three treatments differed ($P<0.05$) in their effect on growth rate of lambs. T1 resulted in average daily weight loss of about 26 g/lamb. Lambs under T2 were able to maintain and put on average daily weight of 20 g/head and T3 lambs gained weight @ 66 g/head/day. This study revealed that the Balochi sheep possess propensity to survive under harsh conditions.

Key words: Lamb production, management system, rangelands.

INTRODUCTION

For sustainable pastoral livelihoods, lamb output particularly on rangelands requires special attention and control on flock feeding and feed distribution. In Cyprus, the effects of weaning time on milk yield and growth rate of lambs were studied to find a suitable production system for enhanced milk production as well as growth rate of lambs (Hadjiapyiolous and Louca, 1976; Economides, 1982). Bhadula and Bhat (1980) found significant effect of sex of the lamb on its birth weight and weight at six and nine months of age.

Extensively managed sheep without concentrate supplementation would experience higher incidence of *Eimeria* oocysts and would implicate body weight development and daily weight gain (Gauly *et al*., 2004). Hassen *et al*. (2004) mentioned that management options (feeding strategies and mating systems) including alternative breeding programmes enhanced sheep productivity. These workers concluded that season, year of birth, season x year of birth and sex had significant effects on birth weight, weaning weight and daily weight gain. According to Yilmaz *et al*. (2007), lambs born in winter were heavier than those born in spring, at birth and at 90 and 180 days of age. They recorded higher pre-weaning growth rate in winter born lambs than those born in spring. Furthermore, male lambs showed better pre-weaning growth than female lambs. However, the influence of lambing season and sex was not significant on post-weaning growth rate. Saghi *et al*. (2007) investigated the effects of flock, litter size, sex, age of the ewe at parturition, lamb age at weaning and their interactions on birth and weaning weight and daily growth of Balochi lambs. Except for effect of flock on weaning weight and daily growth, other effects were significant.

Winter is very harsh particularly for small ruminants raised extensively on Balochistan ranges and compels for seasonal migrations with significant effects on animal production in terms of feeding, reproduction, growth rate, disease incidence and marketing (Munir *et al*., 2007). This study was conducted to determine the effect of three management systems on lamb production on rangelands of Balochistan province of Pakistan.

MATERIALS AND METHODS

This study was conducted at the Range-Livestock Research Station (RLRS) of Arid Zone Research Centre (AZRC), Zarchi, district Kalat, Balochistan, Pakistan. This area is located at 29°07'N, 66°24'E and at an altitude of 1850 m (ICARDA, 1989), where average annual rainfall is 200 mm. Wahid (1990) described Zarchi vegetation as desert shrub type dominated by *Artemisia maritima* and *Haloxylon griffithii*. Chemical composition of major range plant species reported by Wahid (1990) was used as nutritional guideline. Thirty six young growing lambs (male and female) of Balochi breed used in an earlier study (Munir *et al*., 2007) were further monitored in this study. Pre-weaning as well as post-weaning mortality of lambs was observed. Their weaning weights were also recorded, the results of which have been reported earlier (Munir *et al*., 2007). Later on these 5-6 months old lambs weighing 13.6 ± 0.4 kg were divided into three groups under completely randomized design with 3 x 2 factorial arrangement of treatments. Each group consisted of 12 animals (6 male + 6 female) and was randomly allotted to one of the following treatments for three months:

a) Extensive management system (T_1): Animals were kept on grazing only for eight hours daily during the study period i.e. zero stall feeding.
b) Semi-intensive management system (T_2): In addition to daily grazing for 8 hours, animals were fed an experimental ration @ 0.58 kg/lamb/day.
c) Intensive management system (T_3): Lambs were fed the experimental ration only @ 1.25 kg/lamb/day (i.e. half in morning and half in afternoon) and were not allowed any grazing.

Ad libitum post grazing watering was allowed to all animals, however, animals under T_3 had round the clock access to water. Cost per kg of experimental ration ranged from Rs.6.50 to 8.00, depending upon fluctuation in market prices of ingredients. Ingredients and chemical composition of the experimental ration have been described elsewhere (Munir *et al*., 2007).

Keeping in view the availability of lambs, the experiment was started on October 1 and continued for three months. Where applicable, the ration was offered in the afternoon when the lambs returned from grazing. The initial body weights were recorded in the start of experiment and later on the animals were weighed on fortnightly basis on 1st and 16th of every month. The experiment was terminated on 31st December. Meanwhile, post weaning mortality was also observed.

All animals were vaccinated according to the prevailing vaccination schedule in Balochistan. They were also drenched with Nilzan (Levamisol hydrochloride) for endoparasitic control, and were also dipped in Neguvon solution for ecto-parasites.

Data on body weight were analyzed by analysis of variance using completely randomized design (Steel and Torrie, 1984) and means were compared by the LSD test using MSTAT-C computer package. The growth rate of lambs was calculated through regression analysis.

RESULTS AND DISCUSSION

As reported earlier (Munir *et al*., 2007), the weaning weights averaged 15.56 ± 0.66, 16.80 ± 0.80 and 19.22 ± 0.79 Kg in the lambs managed under extensive (T1), semi-extensive (T2) and intensive systems (T3) of management, respectively. The weaning weights of lambs managed under intensive system (T3) were significantly higher than those of the lambs managed under other two systems (T1 and T2), the difference in weaning weight between lambs of latter two groups was non-significant. During pre-weaning period, there was 16.7% mortality in lambs of T1 group, whereas no mortality was observed in other two groups (Munir *et al*., 2007).

The results on fortnightly body weights of lambs used in the study are given in Table 1. For the first one and half month of the study, the lambs under T1 and T2 had more or less similar but lower ($P<0.05$) body weights than lambs of T3 group. During the next one and half month period of the study, the lambs under three treatments differed significantly from one another ($P<0.05$) in their body weights; T3 lambs had the highest body weight, T2 lambs were intermediate and T1 lambs had the lowest body weight. Table 1 also shows that the animals kept under the intensive management (T3) showed constant increase in their live-weights right from the first week of experiment, till the end, whereas the lambs kept under extensive system of management (T1) showed cyclic growth rate; in the first two weeks a decrease of nearly one kg in body weight was noted in this group. This decrease in weight continued till the end of forth week. At the end of sixth week, T1 lambs showed a marked increase of one kg in live-weight, which, however, gradually decreased from 18.0 to 15.3 kg at the end of the study. This sharp decline could also be linked with other associated factors like infections with *Eimeria* species, as reported by Gauly *et al*. (2004), in addition to nutritional deficiencies.

After initial decrease in body weight till the forth week, the lambs kept under semi-intensive system of management (T2) showed a gradual increase in live-weight and by the end of experiment they showed not only marked compensation in live-weight but also recorded higher gain. Conclusively, supplementation of lambs is necessary during periods when the Balochi ranges are nutritionally depleted because of severe weather conditions in winter.

The results of growth rate and post-weaning mortality in lambs of the three groups are shown in Table 2. All three treatments differed significantly ($P<0.05$) in their effect on growth rate of lambs. Treatment 1 resulted in average daily weight loss of almost 26 g/lamb over the study period of three months. Lambs on T2 were able to relatively maintain and put on some weight and gained an average daily weight of 20 g/head and the lambs kept under T3 system on an average gained weight of 66 g/head/day. Post-weaning mortality of lambs was 8.33 percent each in lambs of T1 and T2 group, whereas no post-weaning mortality was recorded in lambs of T3 group. Hassen *et al*. (2004) recorded lower performance of lambs born in the dry season. Gauly *et al*. (2004) reported higher oocysts output in lambs extensively managed where no concentrate was given to them. Consequently, significant differences were found between the groups for body weight development. It may be concluded that the Balochi sheep possess propensity to survive under conditions of under nutrition, yet if reared under intensive condition, the mortality could still be reduced to a negligible extent.

Table 1: Body weights (Kg) of Balochi lambs maintained under three management systems during winter

Treatments	W0	W1	W2	W3	W4	W5	W6
T1	19.5[a]	18.3[b]	17.7[b]	18.0[b]	17.4[c]	15.5[c]	15.3[c]
T2	19.0[a]	18.8[b]	17.9[b]	19.1[b]	18.0[b]	19.7[b]	20.0[b]
T3	19.7[a]	20.4[a]	21.2[a]	23.9[a]	24.6[a]	23.5[a]	26.4[a]
SEM	0.74	0.74	0.74	1.13	1.12	1.40	1.42

W1 – W6 - Fortnightly body weights of lambs from 1st October to December 31.
T1, T2 and T3 - Extensive, semi-intensive and intensive management respectively.
Values in the same column with different superscripts are different from each other (P<0.05).

Table 2: Growth rate and post-weaning mortality of Balochi lambs managed under three management systems during winter

Item	T1	T2	T3
Growth rate (g/h/d)	-25.87[c]	19.92[b]	66.26[a]
Mortality (%)	8.33	8.33	0.00

Values in the same row with different superscripts are different from each other (P<0.05).

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