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Full Length Research Paper

Effect of management systems on growth and conformation of male lambs of Kachhi and Kooka sheep

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A study was carried out on 12 male lambs under two management systems at the Department of Livestock Management. Six lambs from each breed were reared under intensive (A) and semi-intensive (B) management systems. The Kooka lambs comparatively gained more body weight per week (4.84±0.27% and 3.25±0.09%, respectively) than Kachhi lambs (4.03±0.12% and 2.61±0.21%, respectively) of group B and A, respectively. The average per week increase in body weight of lambs in group B was significantly higher (P<0.05) than that of group A. The average body weight of Kooka and Kachhi lambs of group B was significantly (P<0.05) higher than Kachhi and Kooka lambs of group A. Per week increase in body conformation in respect of height, girth and length (1.55±0.08%, 1.32±0.04% and 1.82±0.01%, respectively) of Kooka and Kachhi (1.00±0.03%, 1.06±0.02% and 1.54±0.06%, respectively) lambs of group B was comparatively higher (P<0.05) than Kooka (0.97±0.07%, 0.86±0.03% and 1.37±0.07%, respectively) and Kachhi (0.77±0.04%, 0.68±0.07% and 0.96±0.02%, respectively) lambs in group A. The overall mean height, girth and length of male Kooka lambs of group B were significantly (P<0.05) higher than Kachhi lambs of group A and group B but relatively similar to that of Kooka lambs in group A. Result concludes that, the male Kooka lambs gained more body weight and body conformation than that of male Kachhi lambs under both management systems (intensive and semi- intensive management system).

Key words: Management, intensive system, semi-intensive system, Kachhi and Kooka, male lambs.

INTRODUCTION

Livestock being a renewable natural resource plays a vital role in the economy of Pakistan and contributes almost 55.1% in the agriculture sector, and 11.5% in GDP, which is higher than the contribution made by the crop sector which contributes 43.9% in agriculture sector and 7.1% in GDP. Sheep plays significant role in livestock production; it contributes 759 thousand tones of milk, 220 thousand tones of meat and 42.5 thousand tones of wool (GOP, 2012). Mostly two types of sheep breeds (i.e. fat- tailed and thin-tailed) are found in Pakistan, among which Kachhi and Kooka are thin-tailed breeds mainly originated at various districts of Sindh, Province**.** The Kachhi breed of sheep is medium-sized and has a white body, and the face, neck and legs are tan or black in colour. It has small or tubular ears, prominent Roman nose and polled. While Kooka sheep are small to medium-sized, and the body, head and face are usually white in colour. The breed has long and drooping ears, slightly Roman nose and polled. The average live weight of adult male and female sheep of Kachhi is 42 and 35Kg, and the Kooka breed 52 and 36Kg, respectively (Iqubal et al., 1994). Even though both of these sheep breeds (Kachhi and Kooka) are best source of income for the rural people, very limited studies have been done by researchers. In the event of failure of seasonal rains, sheep rearing gives a helping hand to the farmers at the time of crisis arising from crop failure (Gopalakirshnan and Morley, 1985). On the other hand, majority of sheep breeds in dry tropics are able to

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live on the low quality vegetation and to withstand seasonal shortage of feed and water (Shehata, 2001). However, in most of the occasions the lambs are reared under two common feeding systems, i.e. fence-line feeding and self feeding systems. In the former system, the lambs are fed by moving them to pens that have high concentrate ration in the self feeders **(**Stanton and Le Valley, 2007), while in later system, they are allowed to free graze. It has been reported that the supplementation of concentrate in ration have made significant improvement on live weight and body conformation of sheep compared to those fed on normal fodder (Huma et al., 2005). In Pakistan especially nomads are engaged in the sheep farming, mostly people prefer the dairy farming.

Thus keeping the above fact and importance of sheep farming in mind, the hypothesis of the present study is objected to observe the effect of different management systems on the body weight and conformation of the male Kachhi and Kooka sheep.

OBJECTIVES OF THE STUDY

- To compare the growth and weight gain of male Kachhi and Kooka lambs under two management systems.

- To measure the body conformation of male Kachhi and Kooka lambs under two management systems.

MATERIAL AND METHODS

Grouping and rearing of sheep lambs

Twelve male sheep lambs (6 Kachhi and 6 Kooka breeds) of approximately 3 month age were reared at two management systems at Livestock Experiment Station, Department of Livestock Management, Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University Tandojam to achieve the objectives of the study. All the experimental lambs were tagged, and 3 lambs from each breed were assigned in each of group A and B. Group A was reared under intensive management system and fed green fodder. While group B was reared under semi-intensive management system and allowed open grazing + concentrate ration.

The basic methodology is shown in following flow chart (fig.1).

Formulation of concentrate ration

Concentrate ration was formulated on the basis of 70% TDN and 12% CP (Banerjee, 2008) and the percentage of ingredients used for feeding trial were given bellow Table 1.

Adaptation period of lambs

All the lambs in each group were kept under adaptation period for 10 days and the age of lambs in both groups (A and B) was also recorded.

Weight of sheep lambs

Before starting actual experiment the initial weight was recorded through weighing balance (YAMETO Company, China). Thereafter, weekly observations up to twelve weeks on the body weight were noted.

Measurement of body conformation of sheep lambs

The initial body conformation in respect of height, girth and length was taken through plastic tape measure (The Brown Company, Berlin, New Hampshire). The height of lambs was measured from wither upto end of hoof. The heart girth was measured behind the elbow of the lamb upto wither. The length of lambs was measured from pin of shoulder upto the end of pin bone. Thereafter, weekly observations up to twelve weeks on the body conformation (height, girth and length) of both groups (A and B) were taken.

Statistical Analysis

The data so obtained was tabulated and analyzed through computerized statistical package i.e. STUDENT EDITION OF STATISTICS (SXW), VERSION 8.1 (COPYRIGHT 2005, ANALYTICAL SOFTWARE, USA).

RESULTS

In the present study, it was noted that initial body weight and conformation (height, girth and length) of lambs in both groups (A and B) varied greatly. Due to variation in these attributes, it was hard to observe the statistical differences among the increase in the body weight and conformation of Kachhi and Kooka lambs under intensive and semi-intensive management system, thus data was computed on percent basis.

Body Weight

Result summarized in Table 2 revealed that the average initial body weight of Kachhi and Kooka in group A varied between 9.9Kg and 10.7Kg, respectively and in group B ranged between 9.7Kg and 10.3Kg, respectively. This variation in the body weight of Kachhi and Kooka lambs could be attributed with type of breed. However, at the end of experiment (12 weeks), the total increase in body weight

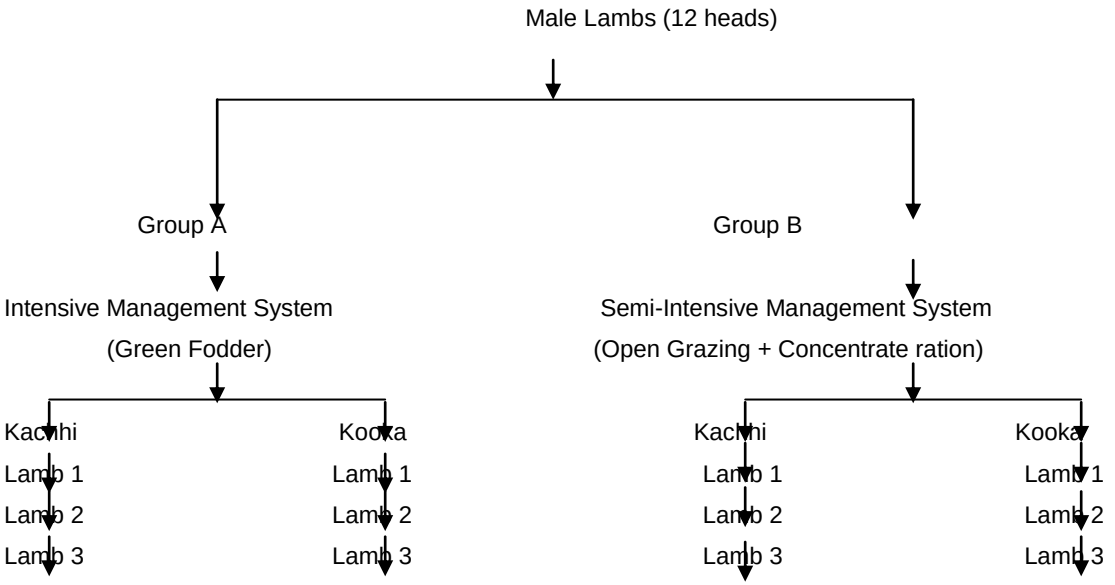

Figure 1 Flow chart of experiment.

Table 1. Feed formulation for growing lambs.

S.No:	Ingredient	Percent
1	Cotton seed (cake)	37.0
2	Wheat bran	26.0
3	Molasses (cane)	12.0
4	Wheat straw (Ground)	23.0
5	Di-calcium phosphate	1.5
6	Salt	0.5
	Total	100

of Kachhi and Kooka lambs of group A reached 13.60Kg (27.21%) and 15.90Kg (32.70%), respectively, whilst of group B lambs gained the weight up to 15.90Kg (38.99%) and 18.70Kg (44.92%), respectively. It was further observed that the average per week increase in body weight of lambs in group B was significant ($P<0.05$) contrast to that of group A. Moreover, the Kooka lambs comparatively gained more body weight per week (i.e. 4.84±0.27% and 3.25±0.09%, respectively) contrast to that of Kachhi lambs (i.e. 4.03±0.12% and 2.61±0.21%, respectively) in group B and A, respectively. It is of interest to note that coefficient of variation (CV) in the body weight of Kachhi (15.59%) and Kooka (19.36%) breeds was higher under semi-intensive management system as compared to Kachhi (10.28%) and Kooka (12.686%) under intensive management system. While it was observed that male Kooka lambs grew rapidly under both management systems.

Result for the mean body weight of lambs under group A and B revealed remarkable variation between the groups (Table 2). Regardless, the average body weight of Kooka lambs (14.10±0.45Kg) in group B was slightly higher compared to that of Kooka lambs (13.90±0.50Kg) in group

Table 2. Effect of management systems on the body weight (Kg) of Kachhi and Kooka lambs.

Variable	Group A		Group B	
	Kachhi	Kooka	Kachhi	Kooka
Initial Body weight (Kg) (x)	9.90	10.70	9.70	10.30
Final Body weight (Kg) (y)	13.60	15.90	15.90	18.70
Difference (Kg) (y-x)	3.70	5.20	6.20	8.40
Total increase in Body weight (%) (y-x÷y×100)	27.21	32.70	38.99	44.92
Per week increase in Body weight (%)*	2.61±0.21^{d}	3.25±0.09^{c}	4.03±0.12^{b}	4.84±0.27^{a}
Over all mean Body weight (Kg) **	12.3±0.32^{b}	13.9±0.50^{a}	12.6±0.31^{b}	14.1±0.45^{a}
SD	1.26	1.76	1.96	2.71
CV%	10.28	12.68	15.59	19.39
LSD(0.05)	* 0.58 ** 1.13			

A, the difference was not statistically significant (P>0.05). Whilst, the mean body weight of Kooka lambs (14.10±0.45Kg) and Kachhi lambs (12.60±0.31Kg) was significant (P<0.05) in group B than that of Kachhi lambs in group A (12.30±0.32Kg). However, among the same group, Kooka lambs gained comparatively more weight contrast to that of Kachhi lambs.

Means followed by different letters (a,b,c,d) within same row are significantly different from one another.

Body Conformation

Result presented in Table 3 showed that the initial body conformation (height, girth and length) of lambs in both groups (A and B) was not similar and varied greatly. The average initial body conformation (height, girth and length) of Kachhi lambs in group A was 42.9cm, 52.3cm and 39.7cm and of Kooka lambs 44.8cm, 53.6cm and 41.9cm, respectively. While in case of group B lambs, the initial body conformation (height, girth and length) was 42.6cm, 52.0cm and 39.5cm for Kachhi and 44.4cm, 53.4cm and 41.6cm for Kooka lambs, respectively. However, at the end of experiment (12 weeks), the total increase in body conformation (height, girth and length) of Kachhi lambs of group A reached at 47.10cm (8.91%), 56.80cm (7.92%) and 44.60cm (10.98%), and of Kooka lambs at 50.40cm (11.11%), 59.50cm (9.91%) and 49.50 (15.35%), respectively. Result further revealed that total increase in body conformation (height, girth and length) of the Kachhi lambs in group B was 48.10cm (11.43%), 59.10cm (12.10%) and 47.60cm (17.01%) and for Kooka lambs, 53.60cm (17.16%), 62.70cm (14.83%) and 51.90cm (19.84%), respectively. Further in present study, it was observed that per week increase in body conformation i.e. height, girth and length (1.55±0.08%, 1.32±0.04% and 1.82±0.01%, respectively) of Kooka lambs of group B was higher followed by Kachhi lambs in group B (1.00±0.03%, 1.06±0.02% and 1.54±0.06%, respectively), Kooka (0.97±0.07%, 0.86±0.03% and 1.37±0.07%, respectively) and Kachhi (0.77±0.04%, 0.68±0.07% and 0.96±0.02%, respectively) lambs in group A. The overall mean of height, girth and length for male Kooka lambs (48.7±0.50cm, 57.40±0.51cm and 46.10±0.55cm, respectively) in group B were significant (P<0.05) than Kachhi lambs of group A (45.30±0.32cm, 55.20±0.38cm and 43.10±0.44cm, respectively) and group B (46.40±0.41cm, 55.60±0.38cm and 44.00±0.47cm, respectively). However, the body conformation (height, girth

Table 3. Effect of management systems on the Body conformation (Height, Girth and Length) of Kachhi and Kooka lambs.

Factor	Group A Kachhi			Kooka			Group B Kachhi			Kooka		
	Height (cm)	Girth (cm)	Length (cm)	Height (cm)	Girth (cm)	Length (cm)	Height (cm)	Girth (cm)	Length (cm)	Height (cm)	Girth (cm)	Length (cm)
Initial (x)	42.90	52.30	39.70	44.80	53.60	41.90	42.60	52.00	39.50	44.40	53.40	41.60
Final (y)	47.10	56.80	44.60	50.40	59.50	49.50	48.10	59.10	47.60	53.60	62.70	51.90
Difference (y-x)	4.20	4.50	4.90	5.60	5.90	7.60	5.50	7.10	8.10	9.20	9.30	10.30
Total increase (%) (y-x÷y×100)	8.91	7.92	10.98	11.11	9.91	15.35	11.43	12.01	17.01	17.16	14.83	19.84
Per week increase (%)*	0.77±0.04^{d}	0.68±0.07^{d}	0.96±0.02^{d}	0.97±0.07^{bc}	0.86±0.03^{c}	1.37±0.07^{bc}	1.00±0.03^{b}	1.06±0.02^{b}	1.54±0.06^{b}	1.55±0.08^{a}	1.32±0.04^{a}	1.82±0.01^{a}
Over all mean**	45.30±0.32^{c}	55.20±0.38^{c}	43.10±0.44^{c}	47.60±0.63^{ab}	57.00±0.57^{a}	45.30±0.61^{ab}	46.40±0.41^{bc}	55.60±0.38^{bc}	44.00±0.47^{bc}	48.70±0.50^{a}	57.40±0.51^{a}	46.1±0.55^{a}
SD	1.38	1.48	1.64	1.84	1.96	2.43	1.81	2.35	3.03	3.01	3.03	3.23
CV%	3.05	2.68	3.80	3.87	3.41	5.37	3.90	4.22	6.23	6.19	5.28	7.01

Least significant Difference (LSD; 0.05) = Height * 0.17, ** 1.36; Girth * 0.13, ** 1.32; Length * 0.21, ** 1.41
Means followed by different letters (a,b,c,d) within same row are significantly different from one another.

and length) of Kooka lambs of group B was relatively similar to Kooka lambs in group A (47.60±0.63cm, 57.00±0.57cm and 45.30±0.61cm, respectively). It could be argued that the CV in the body conformation (i.e. height, girth and length) of Kachhi (3.90%, 4.22% and 6.23%, respectively) and Kooka (6.19%, 5.28% and 7.01%, respectively) breeds was comparatively significant under semi-intensive management system than that of Kachhi (3.05, 2.68and 3.70%, respectively) and Kooka (3.67%, 3.41% and 5.37%, respectively) under intensive management system. While, on the weekly basis increase in the body conformation, the Kooka lambs grew rapidly under both management systems.

DISCUSSION

Body weight

The average initial body weight of Kachhi and Kooka in group A varied between 9.9Kg and 10.7Kg, respectively and in group B ranged between 9.7Kg and 10.3Kg, respectively. This variation in the body weight of Kachhi and Kooka lambs could be attributed with type of breed. These results are in line with the findings of Caroasco *et al*. (2008); they reported that the initial body weight of St. Croix White and Barbados Blackbelly lambs was 8.0Kg to 11.6Kg. Regardless, the average body weight of Kooka lambs in group B was slightly significant compared to that

of Kooka lambs in group A. The mean body weight of Kooka lambs and Kachhi lambs was significant (P<0.05) in group B (Semi-intensive management system) than that of Kachhi lambs in group A (Semi-intensive management system). These figures are in line with Huma et al. (2005**)** they reported that sheep lambs were gained more body weight under semi-intensive system at the age of 210 days. While, Waldron (2005) reported that the Dorper and Rambouillet lambs were gained 29.4Kg and 29.3Kg body weight, respectively. Karunanithi *et al*. (2007) reported that Mecheri sheep lambs which were fed with supplemented concentrate ration, achieved 10.44Kg body weight, which is highly significant (P± 0.01) than the lambs (7.60Kg) fed with dry fodder under intensive management system. It is of interest to note that coefficient of variation (CV) in the body weight of Kachhi and Kooka breeds was more significant (P<0.05) under semi-intensive management system as compared to Kachhi and Kooka under intensive management system. While on the basis of per week increase the male Kooka lambs grew rapidly under both management systems (intensive and semi-intensive management systems). These results are in line with the findings of Ilisiu et al. (2010), they found that feeding systems were paramount important for enhancing the total body weight of lamb where type of breed is a main factor. In another study, Gopalakirshnan and Morley (1985) found that the Bushair breed of sheep gained more body weight than Guddi, and Nagri, respectively. Nayak *et al*. (2008) reported that Ganjam sheep achieved desirable body weight at 6 months of age under different management systems.

Body Conformation

The average initial body conformation (height, girth and length) of Kachhi lambs in group A was 42.9cm, 52.3cm and 39.7cm and of Kooka lambs 44.8cm, 53.6cm and 41.9cm, respectively. While in case of group B lambs, the initial body conformation (height, girth and length) was 42.6cm, 52.0cm and 39.5cm for Kachhi and 44.4cm, 53.4cm and 41.6cm for Kooka lambs, respectively in table-3. However, at the end of experiment (12 weeks) the body conformation (height, girth and length) of Kachhi lambs of group A reached at 47.10cm, 56.80cm and 44.60cm and of Kooka lambs at 50.40cm, 59.50cm and 49.50cm, respectively. The body conformation (height, girth and length) of Kooka lambs was comparatively significant (P<0.05) than that of Kachhi lambs under both management systems (intensive and semi-intensive management systems). These results are in resemblance with the findings of Tailor and Yadav (2011). They reported that the height, girth and length of Sonadi sheep were 56.93±0.52cm, 58.72±0.57cm and 55.50±0.54cm, respectively, Nayak *et al.* (2008); they investigated the height, girth and length of Ganjam sheep (52.55±0.41cm, 57.53±0.49cm and 49.60±0.26cm, respectively). Similarly Gopalakirshnan and Morley (1985) reported that the height, girth and length of Muzaffarnagri sheep breed were significant (P<0.05) increased than that of Chokla sheep. The findings of Caroasco et al. (2008) indicated that feeding treatments/management systems had low effect on body compactness and conformation. Atta and El-Khidir (2004) found that the heart girth was highly correlated with body weight for males and females of the Nilotic sheep. In another study Afolayan et al. (2006) found significant (P<0.001) correlation coefficient between chest girth and body weight.

CONCLUSION

It was concluded that, the male Kooka lambs gained more body weight and body conformation than that of male Kachhi lambs under both management systems (intensive and semi- intensive management system). The lambs that were allowed grazing and concentrate ration revealed better performance than the lambs those were given green fodder. Modern nutritional applications should be applied and improve management systems to achieve better results. New research studies should be conducted to improve the genetic potential of local breeds of sheep.

REFERENCES

Afolayan RA, Adeyinka IA, Lakpini, CAM (2006). The estimation of live weight from body measurements in Yankasa sheep. J. Anim. Sci. 51, 343-348.

Atta M, Khidir OA (2004). Use of heart girth, wither height and scapuloischial length for prediction of live weight of Nilotic sheep. J. Small Rum. Res. Sci. 55 (1): 233-237.

Banerjee GC (2008). Animal Nutrition: Composition and classification of feed stuffs. A Text Book of Animal Husbandry. 8th (Ed :). Oxford and IBH Publishing Corporation. pp.217.

Caroasco S, Ripoll G, Sanz A, Rodriguez JA, Panea B, Revilla R, Joy M (2008). Effect of feeding system on growth and carcass characteristics of Churra Tensina light lambs. J. Meat Sci., 2008, 80 (2): 239-248.

G.O.P (2012). Pakistan Economic survey. Economic Advisers' Wing, Finance Division, Government of Pakistan, Islamabad. pp.27-28.

Gopalakirshnan CA, Lal, GMM (1985). Role of sheep in rural economy. In: Livestock and Poultry Enterprises for

Rural development. 1st (Edd:). Vikas Publishing House Pvt. Ltd., New Delhi, pp.607.
Godfrey RW (2005). Hair sheep production in the tropics: A Caribbean perspective. Hair sheep workshop. Virginia State University, USA, 2005.
Huma R, Sheikh SA, Ali SS, Baloch GM, Farhana H, Memon SN, Kaleri FA (2005). Growth performance of lambs under two management systems. J. Biol. Sci. 312-319.
Ilisiu, E, Daraban S, Gabi NM, Ilisiu VC, Rahmann G (2010). Improvement of lamb production in Romania by crossbreeding of local Tsigai breed with high performance breeds. J. Agri. For. Res. 4(60): 259-266.
Iqubal SS, Elina B, Robyn B (1994). Book of Animal Husbandry. Ist (Ed:). National Book Foundation Islamabad. pp.67-68.
Karunanithi K, Thiruvenkadan AK, Senthilvel K, Murlidharan J (2007). Growth rate and economics of rearing Mecheri lambs under different levels of concentrate feeding. J. Vet. Anim. Sci. 3(2): 83-88.
Nayak S, Sahu G, Mohapatra AK (2008). Study on management practices, phenotypic and reproductive characteristics of Ganjum sheep under range conditions of Orissa. SAARC. J. Agri. 6 (2): p. 93-106.
Shehata EI (2001). Report in a new approach for a more economic lamb fattening system. Egyptian J. Ani. Pro. 4, 211-215.
Stanton T L, Valley L (2007). Lamb feed lot nutrition. Colorado State University Extension Agriculture, Bulletin No. 1613: p.18.
Tailor SP, Yadav CM (2011). Growth performance of pre- and post- weaning Sonadi lambs and adults in native tract. Indian J. Small Rumi.17 (2):221-224.
Waldron DF (2005). Performance of hair sheep in range environment. Hair sheep workshop. Virginia State University, USA.