



Production performance of ewes grazing on community rangeland supplemented with concentrate during late gestation and early lactation

O H CHATURVEDI¹, S K SANKHYAN², J S MANN³ and S A KARIM⁴

Central Sheep and Wool Research Institute, Avikanagar, Rajasthan 304 501 India

Received: 22 January 2010; Accepted: 12 February 2011

Key words: Community rangeland, Ewes, Gestation, Lactation, Production performance, Supplementary feeding

The biomass yield of the community rangelands is low and stocking density is high in general (Sankhyan *et al.* 1999) and sheep grazing on such land are underfed for most part of the year. Majority of the sheep farmers in semi-arid region do not supplement concentrate to their sheep even in critical physiological stages (Chaturvedi *et al.* 2002). Limited concentrate supplementation in addition to free grazing on community rangeland substantially improves production performance of the ewes (Chaturvedi *et al.* 2001). The information available on the effect of concentrate supplementation on performance of the ewes under farmers' field is, however, scanty. The present study was therefore, undertaken to demonstrate the usefulness of concentrate supplementation to ewes during late gestation and early lactation on their production performance at farmers' flock.

A study was carried out on farmers' sheep flock maintained on natural rangeland at Chawandia and Kurthal villages of district Tonk, Rajasthan, located in hot semi-arid region. The experiment was conducted for 120 days during mid October 2007 to mid February 2008. The average minimum and maximum temperature (°C) during the experimental period ranged from 5.72 to 15.11 and from 22.06 to 34.09. The relative humidity (%), wind velocity (km/h), total rain fall (mm) and sun shine (h) during the experimental period ranged from 33.24 to 47.16, 1.3 to 2.8, 0.0 to 0.06 and 7.80 to 9.86, respectively. Malpura and Kheri ewes (20), 3–4 year-old, in their late gestation and weighing 40.99 ± 2.34 kg as an average were randomly selected and divided into 2 groups of 10 each (G1 and G2). Ewes in all the groups were grazed on natural rangeland from 07.00 to 18.00 h followed by night shelter in improvised animal shed. The ewes in G2 were maintained on sole grazing while those in G1, in addition to grazing received pelleted concentrate mixture @400 g/ ewe/day

during entire late gestation to early lactation. The body weights of the ewes at the start of experiment, at parturition and at the end of experiment were recorded. Birth weights of the lambs and fortnightly changes in lambs' body weight up to 60 days were also recorded. Representative samples of concentrate pellets were analysed for dry matter (DM) by drying in the hot air oven at 60°C till constant weight. The samples were subsequently ground to pass through 1 mm sieve in a Willey mill and analysed for crude protein (CP) and ash (AOAC 2000), neutral detergent fibre (NDF), acid detergent fibre (ADF), acid detergent lignin (ADL) content (Van Soest *et al.* 1991). Cellulose and hemicellulose contents were calculated, respectively, by subtracting ADL from ADF and ADF from NDF. Data obtained were analyzed to test statistical significance using 't' test by a statistical software package (SPSS version 14, 2005)

The vegetation cover of community rangeland consisted *Cynodon dactylon* (dhob), *Desmostachya bipinnata* (dab), *Saccharum spontaneum* (kans), *Cenchrus biflorus* (barbhut) and *Jungalee gobhi* grasses, *Zizyphus nummularia* (pala), *Calotropis procera* (aak), *Capparis decidua* (ker), *Prosopis juliflora* (Israeli babool), *Crotolaria burhia* (legaria) and

Table 1. Ingredients and chemical composition of concentrate pellets fed to ewes

Item	Part (%)	Chemical composition	Percentage
Barley	25	DM	93.5
Guar korma	15	OM	89.8
Groundnut cake solvent extracted	10	CP	20.6
Mustard cake	8	NDF	56.2
Rice polish	15	ADF	21.2
De-oiled rice bran	20	Hemi-cellulose	35.1
Molasses	5	Cellulose	13.5
Mineral mixture	1	ADL	5.2
Common salt	1		
Vitablend AD ₃	25 g/quintal		

Present address: ¹Senior Scientist (e mail: omharichaturvedi@yahoo.co.in), ²Principal Scientist, ³Principal Scientist, ⁴Director, Transfer of technology and Social Science Division.

Table 2. Production performance of ewes and their lambs

Item	SUP (G1)	NSUP (G2)	SEM	Level of significance
Initial body weight of ewes (kg)	41.58	40.40	0.76	NS
Body weight of ewes at parturition (kg)	41.88	38.10	0.73	**
Gain/loss in body weight at parturition (kg)	0.3	-2.3	0.53	**
Final body wt of ewes at end of experiment (kg)	39.64	37.22	0.66	*
Body wt loss of ewes during lactation (kg)	-2.24	-0.88	0.85	NS
Body weight of lambs (kg)				
At birth	4.02	3.16	0.11	**
15 days	6.44	4.73	0.18	**
30 days	8.98	6.11	0.38	**
45 days	10.56	7.71	0.31	**
60 days	11.71	8.95	0.31	**
Body weight gain of lambs in 60 days (kg)	7.69	5.71	0.31	**
Average daily gain in 60 days (g)	128.2	95.1	5.10	**

SUP, supplemented; NSUP, not supplemented

Mareli shrubs and *Zizyphus jujuba (ber)*, *Acacia nilotica (babool)*, *Azadirachta indica* (neem) and *Prosopis cineraria (khejri)* fodder trees. The calculated values of digestible crude protein (DCP) and total digestible nutrient (TDN) contents of concentrate pellets were about 14 and 70%, respectively.

The body weight of ewes at parturition was higher ($P<0.01$) in G1 than that in G2. The ewes raised on sole grazing lost 2.3 kg body weight at parturition in comparison to that of advanced pregnancy (Table 2), while the ewes raised on grazing plus supplementation gained marginally (0.3 kg) at parturition. The present findings indicate that the ewes in G2 group were not able to meet their nutrient requirements from sole grazing, as a result they mobilized their body reserves to meet the additional nutrient requirements of growing foetus, leading to reduction in their body weight (Santra and Pathak 1999). These findings of body weight changes of the ewes without and with concentrate supplementation corroborate the earlier reports (Chaturvedi *et al.* 2001, 2003). Reproduction performance of migratory sheep is improved through nutritional and vitamin supplementation (Kalla and Gupta 2005). The birth weight of lambs born to concentrate supplemented ewes was 0.87 kg higher than those non-supplemented (Table 2). The birth weight of lambs in G1 was higher ($P<0.01$) than that in G2. The body weights of lambs at 15, 30, 45 and 60 days of age were also higher ($P<0.01$) in G1 than that in G2. The body weight gain and average daily gain (g) of lambs at 60 days of age was also higher ($P<0.01$) in G1 than that in G2 (Table 2). Higher birth weights in G1 lambs were due to concentrate supplementation of ewes during pregnancy (Shinde *et al.* 1996, Chaturvedi *et al.* 2003). Milk yield of ewes increased up to 250 g/day due to concentrate supplementation in comparison to that of without concentrate supplementation. Concentrate supplementation of lactating goats increased their daily milk yield (Rohilla and Khem Chand 2004). The higher weight of lambs at 15, 30, 45 and 60 days of age and

also their higher ADG in case of G1 were due to increased milk yield. These findings of body weight changes of lambs are similar to those of earlier reports (Chaturvedi *et al.* 2001, 2003). The lambs of supplemented ewes were sold at higher rates (Rs 850/lamb) than those of non-supplemented ewes (Rs 700/lamb).

It is concluded from this study that the ewes grazing on community rangelands are not able to meet their nutrient requirements during late gestation and early lactation. However, concentrate supplementation at the rate of 400 g/ewe/day during these critical stages enhanced their production performance, general condition as well as birth weight and growth rate of lambs.

SUMMARY

Malpura and Kheri ewes (20), 3–4 year-old, in their late gestation and weighing 40.99 ± 2.34 kg as an average were randomly selected and divided into 2 groups of 10 each (G1 and G2). Ewes in both the groups were grazed on natural rangeland from 07.00 to 18.00 h. The ewes in G2 were maintained on sole grazing while those in G1, in addition to grazing received pelleted concentrate mixture at the rate of 400 g/ewe/day during entire late gestation to early lactation. The body weight of ewes at parturition was higher in G1 than that in G2. The birth weight of lambs in G1 (4.02 kg) was higher than that in G2 (3.16 kg). The body weights of lambs at 15, 30, 45 and 60 days of age were also higher in G1 than that in G2. The body weight gain and average daily gain (g) of lambs at 60 days of age was also higher in G1 than that in G2. Milk yield of ewes increased up to 250 g per day due to concentrate supplementation in comparison to that of without concentrate supplementation. The lambs of supplemented ewes were sold at higher rates (Rs 850/lamb) than those of non-supplemented ewes (Rs 700/lamb). The ewes grazing on community rangelands are not able to meet their nutrient requirements during late gestation and early

lactation. However, concentrate supplementation @ 400 g/ewe/day during these critical stages enhanced their production performance, general condition as well as birth weight and growth rate of lambs.

REFERENCES

- AOAC. 2000. *Official Methods of Analysis of the AOAC International*. 17th edn, Vol. 1 and 2. Association of Official Analytical Chemists, Gaithersburg, MD.
- Chaturvedi O H, Mishra A S, Santra A, Karim S A and Jakhmola R C. 2001. Effect of supplementary feeding during late gestation on production performance of ewes grazing on community rangeland. *Indian Journal of Animal Sciences* **71** (No.): 714–17.
- Chaturvedi O H, Tripathi M K, Mishra A S, Verma D L, Rawat P S and Jakhmola R C. 2002. Land as well as livestock holding pattern and feeding practices of livestock in Malpura taluk of semiarid eastern Rajasthan. *Indian Journal of Small Ruminants* **8**: 143–46.
- Chaturvedi O H, Bhatta R, Santra A, Mishra A S and Mann J S. 2003. Effect of supplementary feeding of concentrate on nutrient utilization and production performance of ewes grazing on community rangeland during late gestation and early lactation. *Asian-Australasian Journal of Animal Sciences* **16**: 983–87.
- Kalla O P and Gupta K. 2005. Factors affecting reproduction traits of migratory sheep in Himachal Pradesh. *Indian Journal of Small Ruminants* **11**: 205–07.
- Sankhyan S K, Shinde A K and Karim S A. 1999. Seasonal changes in biomass yield, nutrient intake and its utilization by sheep maintained on public rangeland. *Indian Journal of Animal Sciences* **69** (6): 617–20.
- Santra A and Pathak N N. 1999. Nutrient utilization and compensatory growth in crossbred (*Bos indicus* × *Bos taurus*) calves. *Asian-Australasian Journal of Animal Sciences* **12**: 1285–91.
- Shinde A K, Karim S A, Mann J S and Patnayak B C. 1996. Performance of sheep under different silvipastoral systems. *Indian Journal of Animal Production and Management* **12**: 30–33.
- Van Soest P J, Robertson J B and Lewis B A. 1991. Methods for dietary fibre, neutral detergent fibre and non starch polysaccharides in relation to animal nutrition. *Journal of Dairy Science* **74**: 3583–97.