



Effect of Concentrate Supplementation On The Growth Performance and Economics of Kilakarsal Sheep

Dr.M.CHELLAPAN-
DIAN

M.V.Sc., Ph.D. Professor and Head Department of Animal Nutrition Veterinary College and Research Institute, (Tamilnadu Veterinary and Animal Sciences University) Tirunelveli – 627 358, Tamil Nadu

ABSTRACT

The effect of supplementary feeding of concentrates on dry matter intake, growth, cost benefit was studied in four months old Kilakarsal lambs under field conditions for 90 days. Control group was maintained only on grazing while experimental group was fed with 150 g concentrate mash feed daily in addition to grazing. Average daily dry matter intake (506.64 g), dry matter intake as % BW (3.80), live weight gain (5.89 kg) and average daily gain (65.40 g) were significantly higher ($P < 0.01$) in experimental lambs than control lambs. Better live weight gain (+ 2.36 kg) was achieved in concentrate fed lambs with a cost benefit of Rs.202/- per lamb. As feeding concentrates supplementary to grazing was observed to assist rapid growth rate in young sheep with better economic returns, it could be propagated as a technology for adoption under field conditions among Kilakarsal sheep farmers.

KEYWORDS : Kilakarsal lambs, Concentrate feed, DM intake, ADG, Cost benefit

INTRODUCTION

Kilakarsal, a meat type medium sized sheep breed, known for its hardiness and survival in harsh environment of southern districts of Tamilnadu, is mainly reared on grazing in semi arid rangeland, fallow lands, harvested fields, road sides and in the foothills of Western Ghats during dry summer season. The low growth rate of native sheep is generally ascribed to their poor genetic potential, low plane of nutrition and inadequate health care. Sheep farmers do not feed concentrates due to their poor economic condition and lack of awareness on the benefits of supplementation. However, it is well established that concentrate feed supplementation to young animals during active growth phase ensures adequate nutrient supply and promotes growth performance (Tripathi *et al.*, 2007). Many experiments have also indicated that a certain amount of concentrate supplementation in addition to free grazing would improve body weight gain in sheep (Santra *et al.*, 2002). Moreover, there is a consistently decreasing trend in the availability of range land for grazing in many villages of Tamilnadu. Considering this scenario and future possibilities, it was realized that an improvement in body weight gain and mutton productivity of free ranging Kilakarsal sheep breed could be achieved if the requirements for growth are met through supplementation of nutrients. Hence this study was conducted to assess the effect of supplementation of concentrate feed upon dry matter intake, growth performance of native Kilakarsal lambs and its impact on cost of production, cost benefits under field conditions.

MATERIALS AND METHODS

Kilakarsal lambs maintained in field units of *in situ* conservation programme on Kilakarsal sheep in two villages of Manur block of Tirunelveli district of Tamilnadu were selected for this study. Twenty four lambs with equal number of male and female and aged four months were grouped into two of twelve lambs each - a) Control group with no concentrate supplementation and b) Experimental group with concentrate supplementation. The initial body weights were 8.85 ± 0.12 kg and 9.05 ± 0.17 kg for control and experimental groups respectively. All the lambs were allowed for eight hours grazing in the rangeland adjoining the villages. The experimental lambs were supplemented with 150 g concentrate mash feed daily in morning hours prior to grazing. The concentrate feed was composed of maize grain 50%, groundnut cake 20%, wheat bran 12%, gram husk 15%, mineral mixture 2% and common salt 1% and contained 14.2 % DCP, and 68.5 % TDN (calculated values). The cost per kg concentrate mixture was Rs.20.00. The experimental feeding trial was conducted for a period of 90 days. The animals were weighed before and after feeding/grazing for two consecutive days every week to calculate the feed intake. Mouth grab samples, grass samples from grazing land, concentrate feed samples were collected and estimated for dry matter by overnight drying in hot air oven at 105°C to calculate the daily dry matter intake. Fortnightly body weights were taken to calculate the body weight gain. The data collected on body weight, feed intake were subjected to statistical analysis (Snedecor and Cochran, 1989).

RESULTS AND DISCUSSION

The details of feed intake and growth of Kilakarsal lambs in control and experimental groups during the experimental period are given in Table 1.

Table 1. Feed intake and growth in Kilakarsal lambs on concentrate supplementation

Parameter	Control	Experimental group
Daily DMI (g)	417.28 ± 2.58^a	506.64 ± 3.15^b
DMI (% BW)	3.61 ± 0.13^a	3.80 ± 0.24^b
Initial Body weight (kg)	8.85 ± 0.12	9.05 ± 0.17
Final Body weight (kg)	12.38 ± 0.23^a	14.94 ± 0.19^b
Overall live weight gain (kg)	3.53 ± 0.14^a	5.89 ± 0.18^b
ADG (g)	39.22 ± 1.77^a	65.40 ± 1.62^b

Mean values with different superscripts vary significantly ($P < 0.01$)

DMI – Dry matter intake, ADG – Average daily gain

Average daily dry matter intake (DMI) and DMI as % BW in experimental group (506.64 ± 3.15 g; 3.80 ± 0.24) were significantly higher ($P < 0.01$) than the control group (417.28 ± 2.58 g; 3.61 ± 0.13). Similar increase in DMI was observed by Chaturvedi *et al.* (2010) in Malpura and Kheri male lambs and Das (2010) in Sikkim local kids due to concentrate supplementation to grazing. DMI in both the control and experimental groups could meet the requirements of growing lambs (Ranjhan, 1998). Final live weight (14.94 ± 0.32 kg), overall live weight gain (5.89 ± 0.17 kg) and average daily gain (ADG) in experimental animals (65.40 ± 1.62 g) were significantly higher ($P < 0.01$) than control. The additional concentrate intake ensured increase in readily available carbohydrates and nitrogen which improved the growth of animals (Lee *et al.*, 2001). Similar higher finishing body weight, total body weight gain and ADG were reported by Santra *et al.* (2002) in Malpura and Awassi x Malpura lambs and Chaturvedi *et al.* (2009) in Avikalin lambs supplemented with concentrates to grazing. Higher ADG was also reported on supplementation with concentrate mixture daily in grazing local growing goats (Yadav and Khan, 2011) and in Sirohi kids under farm conditions (Chaudhary *et al.*, 2015).

The economics of feeding concentrates to Kilakarsal lambs during the experimental period are given in Table 2.

Table 2. Economics of concentrate supplementation in Kilakarsal lambs during the experimental period (90 days)

Parameter	Control	Experimental group
Lamb rearing cost (includes grazing and other maintenance cost)	Rs.300.00	Rs.300.00
Additional cost of concentrate feed	--	Rs.270.00

Total cost of production per lamb	Rs.300.00	Rs.570.00
Average live weight gain	3.53 kg	5.89 kg
Cost per kg live weight gain	Rs.84.99	Rs.96.77
Receipts (Sale price @ Rs.200 per kg live weight gain)	Rs.706.00	Rs.1178.00
Net return (Receipts – Cost of production)	Rs.406.00	Rs.608.00
Cost benefit per lamb	--	Rs.202.00

11. Yadav. C.M. and Khan, P.M. 2011. Effect of grazing and supplementary feeding on growth of growing goats under field conditions. Indian Journal of Small Ruminants 17 (1) : 103-104.

The quantity of concentrates fed to the experimental group was 13.50 kg per lamb. Cost per kg live weight gain was higher in concentrate supplemented group (Rs.84.99) compared to control (Rs.96.77) as additional feed cost was involved on account of concentrate supplementation @ Rs.270/- per lamb (13.50 kg x Rs.20). However, as the experimental lambs gained an average of 2.36 kg (5.89 kg – 3.53 kg) live weight more than the control lambs during the same period of growth, a cost benefit of Rs.202/- per lamb could be achieved in concentrate fed lambs considering the present market rate of Rs.200/- per kg live weight ((2.36 kg x Rs.200) – Rs.270). Thus feeding concentrates supplementary to grazing in young Kilakarsal sheep was found to be cost effective and economically beneficial in this study. Shinde *et al.* (1995) had reported similar high returns and favourable economics in semi intensively reared Avivastra lambs with concentrate supplementation. Chaturvedi *et al.* (2010) and Yadav and Khan (2011) had also observed that feeding concentrate mixture was economical under field conditions in growing sheep and goats respectively.

CONCLUSION

The results of this study indicated that supplementation of concentrate feed to grazing has provided additional nutrients to support rapid growth rate in Kilakarsal lambs. As it was beneficial both in terms of increased live weight gain and generating maximum profit, supplementation of concentrates to grazing sheep could be propagated as a technology for adoption for better returns under field conditions among Kilakarsal sheep farmers.

ACKNOWLEDGEMENT

The authors acknowledge with sincere gratitude the financial help and necessary facilities provided by Dr. M.S. Tantia, Principal Scientist & Head, Network Programme, ICAR – National Bureau of Animal Genetic Resources, Karnal under ICAR – NBAGR scheme on “*In situ* conservation of Kilakarsal sheep” for conducting this research work at TANUVAS Small Ruminant Research Centre, Tirunelveli.

REFERENCES

1. Chaturvedi, O.H., Bhatta, R.A., Sankhyan, S.K. and Karim, S.A. 2010. Nutrient utilization and production performance of lambs grazing community rangeland with or without concentrate supplementation. Indian Journal of Animal Sciences 80 (7): 693-696
2. Chaturvedi, O.H., Sushil Kumar, Mishra, A.K., Arora, A.L. and Karim, S.A. 2009. Effect of complete feed or grazing and supplementation of lambs on the performance, nutrient utilization and feed cost of production. Indian Journal of Animal Sciences 79 (9): 917-920
3. Chaudhary, U.B., Das, A.K., Tripathi, P. and Tripathi, M.K. 2015. Effect of concentrate supplementation on growth performance, carcass traits and meat composition of Sirohi kids under field condition. Animal Nutrition and Feed Technology 15 : 251-260.
4. Das, A. (2010) Effect of different levels of concentrate supplementation on performance of Sikkim local kids fed mixed jungle grass based diet. Animal Nutrition and Feed Technology 10 : 87-97
5. Lee, M.R.F., Jones, E.L., Moorby, J.M., Humphrey, M.O., Theodorou, M.K., Macrae, J.C. and Scollan, N.D. 2001. Production responses of lamb grazed on Lolium perenne selected from an elevated water-soluble carbohydrate concentration. Animal Research 50 : 441-449.
6. Ranjhan, S.K. 1998. Nutrient requirements of livestock and poultry. Publication and Information Division, Indian Council of Agricultural Research, New Delhi, India.
7. Santra, A., Karim, S.A. and Chaturvedi, O.H. 2002. Effect of concentrate supplementation on nutrient intake and performance of lambs of two genotypes grazing a semi-arid rangeland. Small Ruminant Research 44 : 37- 45
8. Shinde, A.K., Karim, S.A., Singh, N.P. and Patnayak, B.C. 1995. Growth performance of weaner lambs and kids under intensive and semi-intensive feeding management. Indian Journal of Animal Sciences 65 (7) : 830 – 833.
9. Snedecor, G.W. and Cochran, W.G. (1989) Statistical Methods. Iowa State University Press, Ames, Iowa, USA.
10. Tripathi, M.K., Chaturvedi, O.H., Karim, S.A., Singh, V.K. and Sisodiya, S.L. 2007. Effect of different levels of concentrate allowances on rumen fluid pH, nutrient digestion, nitrogen retention and growth performance of weaner lambs. Small Ruminant Research 72: 178-186.