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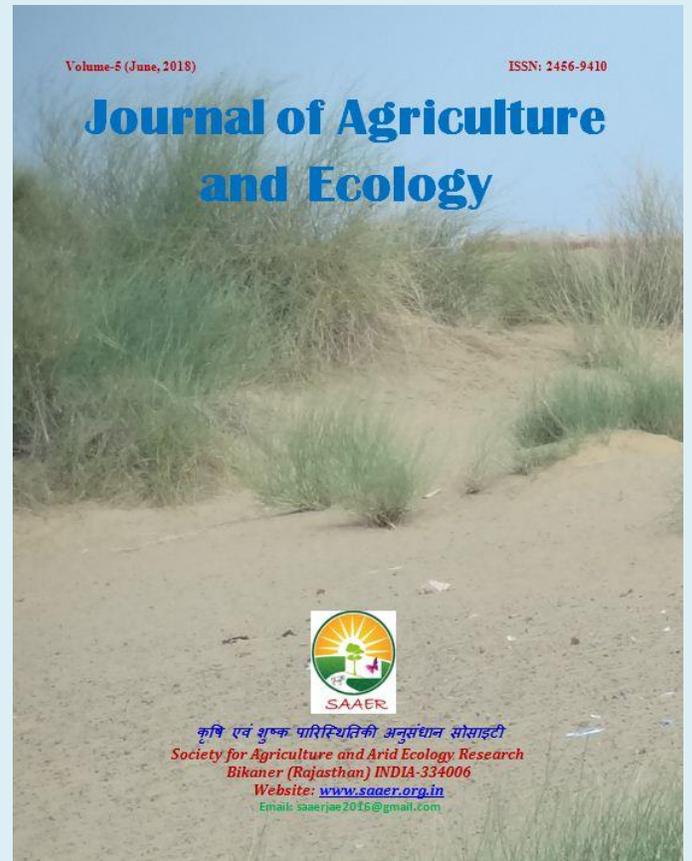
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Effect of supplementary feeding on the growth and economics of feeding of kids under semi-arid conditions

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Abstract

A trial was conducted at KVK- Panchmahal, Gujarat, India, to assess the effect of supplementation of concentrate and mineral mixture on growth of goats under semi-arid field condition. Thirty Gohilwadi growing kids (3-4 month old) were randomly divided into three groups of ten each. Group T₁ (goats kept under sole grazing), T₂ (goats fed 150 g concentrate mixture), and T₃ (goats fed 150 g concentrate mixture and 10 g mineral mixture in addition to grazing). The duration of experimental feeding was 90 days in all the groups. Total weight gain in T₁, T₂ and T₃ group was 3.22±0.98, 6.36±0.42 and 7.15±0.58 kg, respectively of experiment feeding after 90 days. Average daily gain (g) was 35.83±7.22, 70.66±4.67 and 79.44±6.47 in T₁, T₂ and T₃, respectively. The kids in supplemented group (T₂ and T₃) achieved significantly higher body weight (17.42±0.49 and 18.55±0.66 kg.) than the non-supplemented group (14.52±0.96). The net return from group T₂ and T₃ was significantly higher as compared T₁. It could be concluded that supplementary feeding of concentrate and mineral mixture to the growing goats improve the growth performance of goats.

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Introduction

Goats are reared mainly on the grazing on the community pasture and harvested cropped land. As a result of changing land use pattern and reduction of grazing land, maintenance of goats with zero input is becoming difficult. Therefore, rearing of goats on intensive or semi-intensive system of management remain the only viable options. However, goat rearer's in semi-arid regions do not provide concentrate and mineral mixture to their goats even in the critical physiological stages such

as growth (Khadda et al. 2009; Khadda et al. 2016). Therefore, growth performance of goats becomes poor and less profitable on account of lower dressing percentage and meat bone ratio. Supplementation of concentrate mixture to kids increases the growth rate, shortens the slaughter age, increase dressing yield, and improves carcass quality and sensory panel evaluation of tenderness. Minerals are essential constituents of feed and play an important role in nutrient utilization, growth and production. Mineral

supplemented feeds are utilized efficiently in animal system. Mineral status of feed and fodder is influenced by soil and environmental conditions while their requirement varies according to the physiological and productive status of animals (Tripathi & Karim 2008). However, the information available on the effect of supplementation of concentrate and mineral mixture on growth of growing kids under field condition is scanty. Therefore, the present investigation was undertaken to demonstrate the usefulness of concentrate and mineral mixture supplementation on growth performance of kids.

Materials and Methods

Growth trial was conducted at KVK-Panchmahal under the semi- arid condition of Gujarat, India, to assess the effect of supplementation of concentrate and mineral mixture on growth of kids under field conditions. Thirty Gohilwadi kids of 3 to 4 months of age were randomly selected and distributed equally into three groups i.e. T₁ (kids were maintained on sole grazing for 8 hrs on community grazing land, T₂ (kids were fed 150 g concentrate mixture besides grazing on community grazing land) and T₃ (kids were fed 150 g concentrate mixture +10 g mineral mixture besides grazing). The concentrate mixture contained barley 20%, maize 20%, mustard cake 20%, cotton seed cake 15%, deoiled rice brain 12%, rice polish 10%, mineral mixture 2% and common salt 1%. All the kids were dewormed before initiation of the experiment. Fresh and clean drinking water was provided *ad libitum* twice daily throughout the experiment. The trial was conducted for 90 days from mid-November, 2011 to mid-February, 2012. The body

weights of growing kids were recorded at monthly interval. Representative samples of concentrate mixture and straws were analyzed for dry matter (DM) by drying in the hot air oven at 60 °C till constant weight. The sample were subsequently ground to pass through 1 mm sieve in a Wiley mill and analyzed for Ether extract (EE) crude fiber (CF), crude protein (CP) and ash as per AOAC 2000. The mineral mixture used in the experiment was area specific and was procured from Panchmahal district co-operative milk producers union Ltd, Godhra. The data were in a completely randomized design and significances of difference between treatments means was determined using student-t test (Snedecor and Cochran, 1994). Partial budget analysis and benefit cost ratio was calculated to assess the economic profitability of supplementary feeding (Danilo 2002). The vegetation cover of community rangeland consisted of *Cynodon dactylon* (Dhub), *Desmostachya bipinnata* (Dab), *Saccharum spontaneum* (Kans), *Cyperus rotundus* (Motha), *Trianthema manogyna* (Pathar chatta) and *Chinopodium album* (Bathwa) grasses, *Zizyphus spp.* (Pala), *Euphorbia spp.*(Thur) *Calotropis procera* (Aak), shrubs and *Prosopis juliflora* (Israeli babool), *Crotalaria burhia* (legaria), *Zizyphus jujuba* (Ber), *Acacia nilotica* (Babool), *Morus alba* (Mulberry), *Leucaena leucocephala* (Subabool), *Morus alba*(Sahtut), *Ficus religiosa* (Peepal), *Ficus benghalensis* (Bargad), *Ficus glomerata* (Gular), *Azadirachta indica* (Neem), *Tamarindus Indica* (Tamarind) and *Prosopis cineraria* (Khejri) trees used as fodder. However, the diet of the goats consistence mainly tree

leaves, dry and green grasses with little quantity of *Sorghum bicolor* (Jowar) and *Pennisetum typhoides* (Perlmillet) Stover.

Result and Discussion

Proximate composition of feed and fodder consumed by experimental goats is presented in Table 1. Most of the dry fodder available for feeding during experimental period was of medium quality and green fodder of good quality. The DM and OM content of basal

roughage and green forages were similar to that of reported by Misra et al. (2006). The CP and CF content of dry and green fodder was higher to that of reported by Misra et al. (2006) and Choudhary & Jat (2008). Concentrate mixture offered to experimental animals was of good quality. The DM, OM, CP and CF content in concentrate mixture were found 90.60, 88.96, 18.98 and 8.52 per cent, respectively.

Table 1. Proximate composition of feedstuffs used during the on farm trial (% on DM basis)

Particular	Concentrate mixture	Sorghum stover	Perlmillet stover	Mixed dry grass	Mixed green grass	Mixed tree leaves
DM	90.60±1.07	90.25±1.07	89.97±1.3	88.65±1.35	21.20±1.23	24.60±4.13
OM	88.96±2.11	91.23±1.90	90.18±1.7	90.70±1.90	90.68±1.56	90.06±2.59
CP	18.98±1.30	5.11±0.70	6.47±0.80	7.37±0.60	9.87±0.80	13.72±3.20
CF	8.52±1.020	29.73±2.11	33.56±1.9	37.3±1.80	31.12±2.1	18.95±5.07
EE	3.19±1.220	1.09±0.30	0.91±0.40	1.96±0.60	1.34±0.60	2.11±0.58
NFE	58.27±2.87	55.30±2.51	49.25±3.1	55.93±2.3	44.07±2.1	55.28±2.91
Total Ash	11.04±0.90	8.77±0.70	9.82±0.60	9.30±0.23	13.60±0.40	9.94±0.53

Effect on body weight and growth performance

The effect of supplementation on body weight is present in Table 2. The result of the study revealed that the maximum body weight of kids was attained by T₃ (18.55±0.66 kg.) followed by T₂ (17.42±0.49kg.) and T₁ (14.52±0.96 kg) after 90 days. These results are in accordance with the findings of Yadav et al. (2010). Similarly, effect of supplementation of concentrate mixture and

herbage allowance on the performance of grazing suckling lambs has also been reported by Prache et al. (1990). The body weight of goats fed concentrate mixture with mineral mixture was improved considerably as compared to control (Fig. 1& 2). The total weight gain over initial weight in T₁, T₂ and T₃ was 3.22±0.98, 6.36±0.42 and 7.15±0.58 kg after 90 days, respectively. Average daily weight gain was recorded to be 35.83±7.22, 70.66±4.67 and 79.44±6.47g/day in T₁, T₂ and T₃, respectively. Similar results were reported

by Yadav et al. (2010). Whereas, Rekhate et al. (2004) and Chopade et al. (2010) reported lower values in comparison with the present findings.

Table 2. Growth performance and economics of growing kids in different feeding groups

Parameters	Kids on grazing only	Kids with concentrate	Kids with concentrate & mineral mixture
No. of animals	10	10	10
Initial body weight (kg)	11.30±1.07	11.06±0.94	11.40±1.09
Final body weight (kg)	14.52±0.96 ^a	17.42±0.49 ^b	18.55±0.66 ^c
Body weight gain in 90 days (kg)	3.22±0.98 ^a	6.36±0.42 ^b	7.15±0.58 ^c
Average daily weight gain (g)	35.83±7.22 ^a	70.66±4.67 ^b	79.44±6.47 ^c
Additional weight gain (kg)	-	3.14±0.41	3.93±0.49
Average cost of production(Rs.)	475	610	632.50
Cost of per kg body weight gain(Rs.)	32.71	31.41	30.77
Total additional feed intake (kg/head)	-	13.50	14.40
Cost of additional feed intake (Rs.)	-	135.00	157.50
Additional income (Rs.)	-	392.5	491.25
Net return (Rs./goat)	1077	1432	1522
C:B ratio	3.06	3.34	3.40

Group mean with different superscripts differed significantly (p<0.05).

Figure1. Initial body measurement of goats

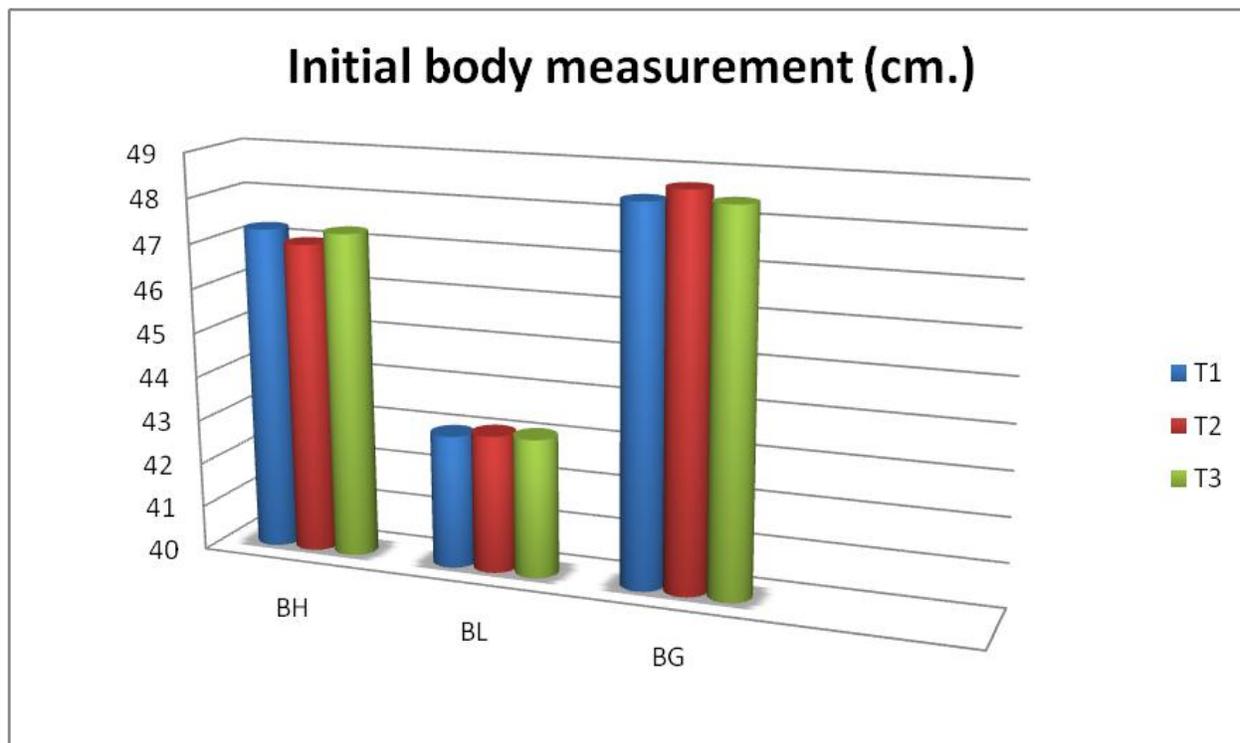
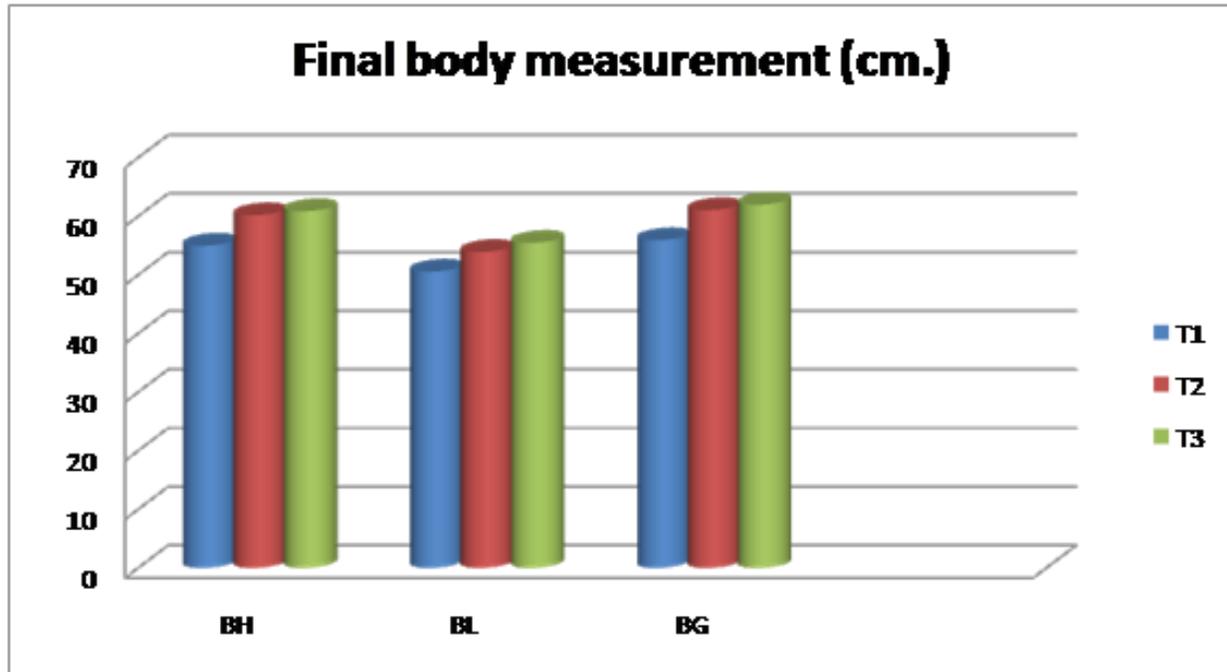


Figure2. Final body measurement of goats



Economics of feeding

A partial budget analysis measures was used in those items of expenditure and incomes suggested by Danilo (2002). Therefore, the cost of roughage, concentrate mixture and mineral mixture have been considered. The costs of concentrate mixture and mineral mixture were calculated on the basis of market rate prevalent during the study period which was Rs. 10 and Rs. 25 per kg, respectively. Sale price of goats was Rs. 125 per one kg live weight. The recurring cost which included feeding and net income from sale of goats presented in Table 2. The results of study revealed that the total additional feed intake and additional cost of feed in T₂ and T₃ was 13.5 kg and 14.4 kg and costing Rs. 135 and Rs. 157.5 per head, respectively. The weight gain difference for the T₃ and T₁ was 4.03 kg. The average cost of production of growing kids during study period was Rs. 475,

Rs. 610 and Rs. 632.50 in group T₁, T₂ and T₃, respectively. The net return from selling of goats in group T₂ and T₃ was significantly higher as compared T₁. The results of study revealed that the average cost per kg body weight gain was recorded Rs. 32.71, Rs. 31.41 and Rs. 30.77 in group T₁, T₂ and T₃, respectively. The average 6.30 per cent reduction in cost of body weight gain/kg in goats was due to the supplementation of concentrate and mineral mixture under of hot semi-arid ecosystem. The supplementation of concentrate and mineral mixture indicates that benefit cost ratio was 1:3.34 and 3.40 in group T₂ and T₃, which appears to be very lucrative over (T₁) traditional system of feeding (3.06). Based on the results, it may be concluded that the supplementation of feeding of concentrate and mineral mixture can be suggested to goat keepers to gain higher body weight and net

income from growing kids under field condition.

Conclusion

It can be concluded that supplementary feeding of concentrate (150g) and mineral mixture (10g) to the grazing goats under semi-arid field condition improves the growth performance and economic return to the goat keepers.

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