CAMEL REARING IN DIFFERENT MANAGEMENT PRACTICES UNDER ARID ECOSYSTEM

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Camel rearing under extensive system is always considered cost-effective, sustainable, environment-friendly and socio-culturally acceptable in arid ecosystem. Due to large scale diversion of their traditional grazing areas to cultivation for food crops, the camel keepers are forced to rear their camels in intensive and semi-intensive management practices. However, these practices may affect growth performance of animal. The present study was conducted with the major objective to investigate effect of management practices on body weight gain, growth rate and performance.

Materials and Methods

Management practices : Two kinds of management practices were followed in ten camel (*Camelus dromedarius*) calves, around 14 to 18 months aged with similar initial body weight, belonging to National Research Centre on Camel, Bikaner and allotted randomly into two comparable groups of 5 each. The hetero breed and sex combination were kept in each group which contained three Bikaneri and two Jaisalmeri breed and each group contain three males and two females. The first group was reared under intensive management practice (IMP) and second group under semi-intensive management practice (SMP). All animals of SMP group were sent for grazing / browsing daily for about 7 to 8 hours and offered crop residue in the evening. Manger

feeding (IMP) consisting of crop residues of 'moth' (*phaseolus aconitifolius*) for 4 months and of guar (*Cyamopsis tetragonoloba*) for next 4 months was provided for both the group as per availability at farmer's door. The standard feeding schedule was followed according to NRCC farm, Watering was done once daily for all camels.

Performance and Biometrical parameters :

The body weights of calves were recorded first before shifting to respective treatments and thereafter all the animals were weighed in the morning before offering feed or water at fortnightly intervals by using electronic digital balance. The average weight of 2 consecutive days was taken to represent fortnightly body weight. The biometrical parameters (Higgins and Kock, 1984) were recorded by measuring tape at fortnightly intervals. The height was measured with the help of height measuring stand when camel was standing evenly on foot pad, with neck elevated to a normal position on plain ground level.

Proximate analysis : The representative samples of crop residues, tress, bushes and grasses were collected at fortnightly intervals for estimation of proximate as per AOAC, (1995).

Behavioural analysis : The choice of vegetation by camel calf in range land area was observed twice in a week and the coded

data were recorded on a five point scale which refers to the choice among bushes, grasses, trees i.e. 1 point for 80 to 100 %, 2 points for 60 to 79 %, 3 points for 40 to 59%, 4 points for 20 to 39 % and 5 points for 1 to 19% (Fraser, 1988).

Statistical and economic analysis : The experimental data were subjected to statistical analysis by adopting the paired - t test (Snedecor and Cochran 1989). The economics of rearing of camel calves in different management systems were calculated.

Results and Discussion

The performance parameters : The mean $\pm$ SE of performances in different management practices are presented in the table. After 240 days of trial period, mean body weight and rate of growth were significantly ($P < 0.01$) increased in SMP as compared to IMP group. The moth and guar crop residues intake was significantly ($P < 0.05$) higher in IMP than SMP group. The analysis of other performance parameters under IMP group revealed that total dry matter intake (DMI) was 5.85 ± 0.71 kg/calf/day. The ratio between water intake and DMI was 1.99 ± 0.15 . Tandon *et al* (1993) found that dry fodder intake and water intake were positively correlated. The feed conversion efficiency was 12.52 ± 0.61 . The total DMI per 100 kg body weight was 2.29 ± 0.10 kg/calf. Total intake per day per kg metabolic body size was 0.088 ± 0.005 kg, since they were very young and growing animals. Similarly to these finding Singh *et al*. (2000) reported that the relationship between dry matter intake and growth of weaned calves to be positively correlated. Though statistically not significant ($P > 0.05$) the iron, zinc and copper level in serum samples of all camels calves of SMP was found to be

higher than IMP group. The possible reason could be the availability of these minerals in desert grown tress, bushes, grasses etc.

The biometrical parameters : The mean values of all biometrical parameters were more or less similar at 0 day of trial. After 240 days of trial period the body length, heart girth, height at wither, hump circumference (horizontal), neck length, leg-length (fore and hind), foot pad length (fore) were increased significantly ($P < 0.01$) in SMP compared to IMP group. The significant ($P < 0.05$) variation was also observed for hump circumference (vertical) and foot pad width (fore) between two groups. A significant correlation coefficients between body weight and heart girth, and heart girth and leg length were reported in Bikaneri, Jaisalmeri, Kutchi and Mewari breed of camels by Khanna *et al*. (1990).

Proximate analysis : The availability of organic matter (OM) from desert-grown trees, bushes and grasses were more compared to Moth and Guar crop residues. The overall crude Protein (CP), Ether Extract (EE), Nitrogen Free Extract (NFE) availability were on higher plane in grazing land on which SMP group devoted 7-8 hr. grazing time daily with 7 : 3 grazing - resting cycle. The availability and intake of higher plane of nutrients could be attributed to overall better performance of SMP group as compared to IMP group.

Behavioural analysis : Analysis of behavioural pattern of calf posture at IMP group reveals that maximum time involved in standing posture was 0 to 2 hours (90%), 2 to 4 hours (87%) of crop residue supply at manger. The present findings are consistent with the observation of Bhakat *et al*. (2004) in different types of shelter management for camel. The analysis of

Table : Mean $\pm$ SE of performances of camel calves in different management practices

Parameters	Intensive management Practices (IMP)		Semi-Intensive management Practices (SMP)
Initial body weight (Kg)	224.10 $\pm$ 12.31	NS	229.40 $\pm$ 10.51
Body weight after 240 days (Kg)	293.05 $\pm$ 11.90	**	314.60 $\pm$ 10.01
Total gain (Kg)	68.95		85.20
Rate of growth (gm/day)	273 $\pm$ 59	**	331 $\pm$ 68
Moth crop residue Intake (manager) Kg / day / calf	6.06 $\pm$ 0.51	*	5.42 $\pm$ 0.79
Guar crop residue Intake (manager) Kg / day / calf	6.89 $\pm$ 0.47	*	5.93 $\pm$ 0.61
Intake of water (trough) Lt / day / calf	11.69 $\pm$ 1.24	NS	12.24 $\pm$ 1.58
Concentration of iron (ppm)	5.99 $\pm$ 0.70	NS	7.64 $\pm$ 1.25
Concentration of zinc (ppm)	5.44 $\pm$ 0.66	NS	6.34 $\pm$ 0.29
Concentration of copper (ppm)	1.36 $\pm$ 0.21	NS	1.22 $\pm$ 0.24

** Significant at 1% level, * Significant at 5%, NS : Non-significant

present data on behavioural pattern and choice of vegetation of camel calves in rangeland area reveals that among the trees first order of preference was Khejri (*Prosopis cineraria*), followed by Jal (*Salvadora persica*), Ardu (*Ailanthus excelsa*), Sesam (*Dalbergia sissoo*) and Neem (*Azadirachta indica*). The time devotion were 19% for Khejri, 17% for Jal, 15% on Ardu, 12% for Sesam and 7% on Neem. Among the shrubs and bushes, first order of preference was Phog. (*Calligonum polygonoides*) followed by Pala (*Zizyphus nummularia*), Muralikakani (*Lysium barbarum linn*), Ker (*Capparis deciduas*), Bui (*Aerua pseudotomentosa*) and Kheemp (*Leptadenia pyrotechnica*). The time devotion (in rangeland area) were 16% for Phog, 13 % on Pala, 12% for Muralikakani, 11% on Ker, 10% for Bui, 8% on Kheemp. The grazing and resting cycle reveals that calf devoted 70% time for grazing / browsing and 30% time for resting during 7 to 8 hours period in rangeland area. Among the grasses first

order of preference was Ganthia (*Dactyloctenium aegyptium*) followed by Dhaman (*Cenchrus setigerus*) and Sewan (*Lasiurus sinducus*), Gramma (*Penicum antidotale*), Dhamasa (*Fagonia indica*), Boor (*Andropogan lamiges*) and Bhurut (*Cenchrus bifforus*). The time devotion was 14% for Ganthia, 12 % on Dhaman, 11% for Sewan, 10% on Gramina, 9% for Dhamasa, 8% on Boor and 6% for Bhurut. **Economics of feeding :** The total feeding cost (in Rs.) per calf for 240 days was more in IMP group (Rs. 3053/-) than SMP group (Rs. 2601/-). Similarly total feeding cost per day per calf was more in first group (12.72/-) as compared to second group (Rs. 10.84/-). Total cost per kg body weight gain per calf was quite less in SMP group (Rs. 30.60/-) as compared to IMP group (Rs. 44.28/-) because total body weight gain and average growth rate were quite high, in SMP as compared to IMP group. From the data it is evident that the overall performance of SMP group was better and economical as

compared to IMP group.

Summary

Ten camel calves (14 to 18 months) were allotted randomly into two groups of Intensive (IMP) and Semi intensive (SMP) for 240 days trial. After feeding trials mean body weight and average growth rate were significantly ($P < 0.01$) increased in SMP compared to IMP group. The various biometrical parameters were significantly ($P < 0.01$) increased in SMP compared to IMP group. The concentrations of Iron, Zinc and Copper in serum of calves were low in IMP as compared to SMP group. The first in order of preference was Khejri (*Prosopis cinerara*). Total feeding cost per kg body weight gain per calf was quite less and economical in SMP as compared IMP group. The overall performance of SMP group was better and economical as compared to IMP group.

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