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# Factors Influencing Pre and Post Weaning Body Weights and Daily Weight Gain in Indigenous Breeds of Camels under Farm Conditions

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## ABSTRACT

Body weights and average daily gain from birth to 36 months of age at quarterly and six monthly interval and factors (Breed, year and sex) influencing these traits were analyzed in 3 breeds (Bikanerik, Jaisalmeri and Kachchhi) of camels. Breed, year and sex effects contributed significantly ($P<0.05$) at birth, and at 3 and 6 months' body weight except for breed effect on 3 months' weight. The second parity born calves weighed about 8.0% more than the first parity born calves. The contribution of breeds and year effect was significant ($P<0.05$) at 12 and 18 months of age. The average weight at 2 and 3 years of age indicated a significant influence due to breed, year and sex effects. A significant contribution of year and sex was also observed on average daily gain from birth to 3 months, 3 to 6 months and 18 to 24 months of age. The contribution of breed and sex was significant on average daily gain from 30 to 36 months of age. The results indicated a significant contribution of various factors on body weights and average daily gain at quarterly and six monthly intervals and thus showed scope for further improvement through selection of indigenous camels for these traits.

**Key words:** Weaning, Body Weight, Breeds, Camel.

## INTROUDUCTION

Indigenous camels (*Camelus dromedarius*), with their multifarious utility, make up important livestock of rural and urban sectors in the northwest hot arid and semi-arid regions of India. Performance evaluation of these breeds with respect to body weights and average daily gain as well as factors influencing these traits, are

important in assessing the indigenous breeds of camels for future performance and productivity. Thus the objective of this paper was to study the factors influencing pre and post weaning body weight in indigenous breeds of camels under farm conditions.

## MATERIALS AND METHODS

Body weights (birth to 3 years of age) and average daily gain were recorded in three indigenous breeds of camels (Bikaneri, Jaisalmeri and Kachchhi) maintained at The National Research Centre on Camels, Bikaner from 1987-1996. Body weights and average daily gain from birth to 12 months of age were recorded at 3 month intervals and from 12 to 36 months of age at 6 monthly intervals. The weights were recorded on a 3 tons capacity dial weight bridge, with minimum divisions of 200 g.

All the camels at the farm were managed under a semi-intensive system of management with 6 hours of grazing in the farm range land area (10:00 a.m. to 4:00 p.m.) and then offered dry moth chara (*Phaseolus aconitifolius*), at the rate of 2% of body weight (The breeding and calving season was winter, extending from December to March. The calves were weaned at the age of 9 months. The newly born calves and their mothers were also sent for grazing one week after calving. Least squares analysis (Harvey, 1987) was used for statistical analysis. Duncan's multiple range test (Duncan, 1957) was applied to test the mean differences between groups for significance.

## RESULTS AND DISCUSSION

Breed, year and sex-wise least square means of body weights are presented in (Tables 1). The mean birth weight over the years varied from 34.1 ± 0.64 to 40.8 ± 1.33 kg and the breed wise average for Bikaneri, Jaisalmeri and Kachchhi calves was 38.2 ± 0.47, 36.4 ± 0.61 and 35.1 ± 0.64 kg, respectively, with over all average of 36.6 ± 0.36 kg. The contribution of breed, year and sex effects were significant ($P<.0.01$) on the birth weight. Male calves weighed more than females. Baniwal and Chaudhary (1983) have also reported a significant contribution of sex and year in Bikaneri camels.

The calves from second parity females weighed 8.0% more than the first parity born calves. A significant contribution of parity

and sex has been reported by Harmans *et al.,* (1990). The calf crop born from 1988-1990 and 1994-1996 weighed almost the same at birth. At three months, weight among the breeds varied from 77.2 ± 6.41 to 94.8 ± 3.20 kg with over all mean of 84.4 ± 1.28 kg, contribution of year and sex effects was significant ($P<0.01$). Males were superior to the females. The mean six month weight ranged from 141.0 ± 0.92 kg to 153.1 ±3.57 kg with over all average weight of 146.9 ± 0.92 kg, the contribution of breed, year and sex effects were significant ($P<0.05$).

The mean 12 month weight in Bikaneri, Jaisalmeri and Kachchhi was 206.5 ± 1.80, 199.3 ± 2.49 and 203.3 ± 2.98 kg respectively, contribution of breed and year effects were found to be significant ($P<0.05$). Calves born in the year 1995 weighed the most (220.5 ± 5.66 kg) followed by 1991, 1990, 1988. The breed and year effect also contributed significantly to 18-month weight. Similar results were also reported in the NRCC Annual Report 1996.

The least square means of 24 month weight in Bikaneri, Jaisalmeri and Kachchhi was 274.1 ± 2.99, 265 ± 3.85 and 262.7 ± 4.21 kg, respectively and the contribution of breed, year and sex effects were found to be significant ($P<0.05$). The weight at $30^{th}$ months varied from 285.9 ± 4.27 to 298.3 ± 4.29 kg with overall average of 292.4 ± 2.22 kg, the effect of breed was significant. Body weight at 36 months of age varied from 312.7 ± 8.43 to 333.1 ± 4.45 kg with overall average weight 320.9 ± 2.60 kg. Males weighed significantly more than females.

Breed, year and sex wise, least square means for average daily gains are presented in (Table 2). The average daily gain from birth to 3 months varied from 0.594 ± 0.02 kg to 0.715 ± 0.09 kg/day with overall gain of 0.605 ± 186 kg/day. Males showed a significantly higher gain than females. The mean daily gain from 3 to 6 months of age ranged from 0.567 ± 0.024 to 0.700 ± 0.04 kg/day with overall gain 0.627 ± 0.014 kg. The contribution of breed and sex was significant ($P<0.05$). The average daily gain from 6 to 9 months varied from 0.355 ± 0.033 to 0.401 ± 0.02 kg and 0.208 ± 0.03 kg/day, respectively.

The daily gain from 18 to 24 months of age ranged from 0.111 ± 0.015 to 0.219 ± 0.24 kg/day, respectively. The contributions of year and sex effects were significant. The daily gain from 24 to 30 months of age varied from 0.l07 ± 0.01 to 0.201 ± 0.014 kg/day and year to year variation was observed to be significant ($P<0.01$).

The daily gain from 30 to 36 month of age ranged from 0.107 ± 0.01 to 0.201 ± 0.094 kg/day. The contribution of breed and sex effects were significant ($P<0.01$). Ouda *et al.,* 1992 observed significant difference in the growth after two years of age due to sex and year effects. Present results indicated significant contribution of various genetic and non-genetic factors to the body weights and average daily gain, thus suggesting scope for selection.

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**REFERENCES**

Annual Report 1996. Annual Report of the National Research Center on Camel (NRCC). Bikaner, India.

Baniwal, B.K. and A.L. Chaudhary. 1983. Factors affecting body weights at different ages in Bikaneri camels *Camelus dromedarius*. Indian J. Anim. Sci. (53) 3: 300-304.

Duncan, D.B. 1957. Multiple range tests for correlated and hetero secdastik means. Biometrics, 13: 164-176.

Harvey, W.R. 1987. Mixed models east squares and maximum likelihood computer programme PO-1. United States, Department of Agriculture, New York.

Hermas, S.A., A. Shareha, Biala and A.A. Saad. 1990. Growth of the Magrebi camel in Libya. Camel Research Center, Tripoli, Libya. Proceeding, International Conference on camel production and improvement 10-13 December, 1990, Tobruk, Libya.

Ouda, J.O., M.K Mbni and B.M. Woie. 1992. Production performance of Somali and Rendille camels and their crossbreeds in northern Kenya paper presented at all African Conference on Animal Agriculture, November 1992. Nairobi, Kenya.

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Table 1: Breed, year and sex wise least square means of body weight (kg) in three indigenous breeds of camels.[1]

| | Birth | 3 months | 6 months | 9 months | 12 months | 18 months | 24 months | 30 months | 36 months |
|---|---|---|---|---|---|---|---|---|---|
| Overall mean | 36.601±0.36 (201) | 88.451±1.28 (167) | 146.97±0.92 (129) | 181.21±1.41 (130) | 203.10±1.42 (190) | 233.01±2.04 (138) | 267.60±2.41 (136) | 292.42±2.22 (111) | 320.97±2.60 (101) |
| Bikaneri | 38.20±0.47 (106) | 89.095±1.57 (94) | 150.27±1.45b (58) | 182.76±1.94 (59) | 206.55±1.80b (102) | 243.49±2.63b (76) | 274.12±2.99b (72) | 301.30±2.71b (61) | 322.18±2.96 (56) |
| Jaisalmeri | 36.46±0.61 (55) | 87.172±1.81 (50) | 146.22±1.69a (33) | 179.91±2.39 (36) | 199.37±2.49a (48) | 227.90±3.95a (29) | 265.97±3.85b (29) | 288.23±4.35a (20) | 319.19±5.02 (17) |
| Kachchhi | 35.13±0.64 (40) | 89.085±2.92 (23) | 144.43±1.63a (38) | 180.95±2.55 (35) | 203.39±2.98b (40) | 227.65±4.13a (33) | 262.70±4.21a (35) | 287.73±4.11a (30) | 321.54±4.44 (28) |
| Range (1988-1996) | 34.09±1.06 to 40.48±1.33 | 77.285±6.41 to 94.819±3.20 | 141.08±1.95 to 153.13±3.57 | 173.73±3.81 to 191.88±3.57 | 189.94±3.65 to 220.57±5.66 | 221.75±5.55 to 244.57±4.34 | 257.71±3.80 to 284.87±11.7 | 285.95±4.27 to 298.46±4.29 | 312.79±8.43 to 333.18±4.54 |
| Sex | | | | | | | | | |
| Male | 37.55±0.46b (103) | 90.938±1.55b (85) | 148.64±1.18b (69) | 181.54±1.80 (65) | 204.34±1.93 (88) | 235.21±2.89 (59) | 264.96±2.89a (66) | 290.54±2.99 (49) | 324.44±3.39 (45) |
| Female | 35.65±0.47a (98) | 85.964±1.68a (82) | 145.31±1.32a (60) | 180.87±1.91 (65) | 201.87±1.84 (102) | 230.81±2.64 (79) | 270.23±3.12 (70) | 294.23±2.79 (62) | 317.49±19a (56) |

[a,b] Means with different letters are significantly different (p<. 05).
[1] Figure in parentheses represents the number of observations.

Table 2: Breed, year and sex wise least square means for average daily gain (kg) in three indigenous breeds of camels.1

| | 0-3 months | 3-6 months | 6-9 months | 9-12 months | 18-24 mos. | 24-30 mos. | 30-36 mos. |
|---|---|---|---|---|---|---|---|
| Overall mean | 0.605±0.18 (125) | 0.627±0.01 (93) | 0.381±0.01 (82) | 0.230±0.01 (114) | 0.177±0.01 (120) | 0.162±0.01 (99) | 0.156±0.01 (97) |
| Bikaneri | 0.603±0.02 (69) | 0.657±0.02[b] (44) | 0.387±0.02 (33) | 0.241±0.02 (52) | 0.198±0.01 (63) | 0.163±0.01 (57) | 0.157±0.17[b] (53) |
| Jaisalmeri | 0.583±0.02 (38) | 0.648±0.02[b] (30) | 0.355±0.03 (19) | 0.208±0.03 (32) | 0.160±0.11 (25) | 0.157±0.01 (22) | 0.123±0.01[a] (17) |
| Kachchhi | 0.629±0.03 (18) | 0.576±0.02[a] (19) | 0.401±0.02 (30) | 0.243±0.02 (30) | 0.173±0.01 (32) | 0.167±0.17 (20) | 0.187±0.01[b] (27) |
| Range (1988-96) | 0.594±0.02 to 0.715±0.09 | 0.576±0.02 to 0.699±0.04 | 0.338±0.04 to 0.432±0.04 | 0.175±0.10 to 0.338±0.06 | 0.111±0.01 to 0.219±0.02 | 0.107±0.01 to 0.201±0.01 | 0.132±0.01 to 0.186±0.01 |
| Sex | | | | | | | |
| Male | 0.630±0.02[b] (65) | 0.640±0.01 (53) | 0.369±0.02 (44) | 0.227±0.02 (54) | 0.157±0.01[a] (54) | 0.158±0.01 (50) | 0.175±0.01[b] (43) |
| Female | 0.579±02[a] (60) | 0.617±0.02 (40) | 0.393±0.02 (38) | 0.234±0.02 (60) | 0.196±0.01[b] (66) | 0.166±0.01 (59) | 0.136±0.11[a] (53) |

[a,b] Means with different letters are significantly different ($p<.05$).

[1] Figures in parentheses represent the number of observations.