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Growth Performance of Kankrej Calves under Semi-Arid Condition

J.B. Patel, K.R. Tajane, J.P. Patel and N.S. Radadia

Livestock Research Station, Gujarat Agricultural University,
Sardar Krushinagar-385 506

ABSTRACT

The growth performance of Kankrej calves, reared under the semiarid conditions during 1985-86 was evaluated through the body weights and linear body measurements. Kankrej calves at the age of 48 weeks on an average weighed 150 kg and had 133, 119 and 112 cms of chest girth, height at withers and body length respectively. The sex differences were mostly nonsignificant. Calves gained 318 gms, 0.17 cm, 0.14 cm and 0.14 cm per day in body weight and measurements respectively. The per cent growth appeared to be more for body weights than that for measurements.

Zero to low heritability estimates for these traits indicated the little scope for intrapopulation selection. The observed growth performance can therefore be boosted through improvement in management inclusive of nutrition.

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INTRODUCTION

Growth performance at any livestock farm plays an important role in its economy. Better growth is essential for early maturity and optimised production. Besides, it reduce the morbidity and increases the survivability at the farm.

Mostly the growth performance has been studied through body weights, especially in Kankrej cattle (Tajane *et al* .1984a and 1984b) while the reports on body measurement are scanty. Therefore the body measurements besides weights were included in the present study to evaluate the growth of Kankrej calves reared under semiarid conditions.

MATERIAL AND METHODS

The body weights and measurements were recorded for Kankrej calves during April, 1985-March 1986. The weighing and measurements were taken weekly, fortnightly and monthly for 0 to 12, 13 to 24 and 25 to 48 weeks of age, respectively for the calves who attained the respective age in the year of study.

Heritabilities of body weights and measurements at different ages were estimated by paternal half sib correlation method (Becker, 1967). For the purpose following model was assumed.

$$Y_{ijk} = U+S_i+P_{ij}+E_{ijk}$$

Where Y_{ijk} was observation on K^{th} calf of i^{th} sex from J^{th} sire.

U, S, P and E were general mean, sex effect, sire effect and random error, respectively.

Growth rate was calculated as below :

$$\text{Growth rate (per cent)} = \frac{\text{Final weight} - \text{Initial weight}}{\text{Initial weight}} \times 100$$

RESULTS AND DISCUSSION

Average body weights and measurements at different ages are given in Table-1.

Kankrej male calves at the age of 48th week on an average weighed 153 ± 4.53 kg. and had 133.96 ± 1.97, 118.56 ± 2.02 and 112.44 ± 1.83 cms chest girth, height and withers and body length, respectively (Table-1). The respective averages in female calves were 146.36 ± 3.48 kg, 132.56 ± 1.35 cm, 120.24 ± 1.80 cm, 112.48 ± 1.15 cm (Table-1). These appeared to be lower in female calves than those in male calves. However, sex differences were significant only for body weights at 8, 36 and 40th week for chest girth at 12 and 36th week for height at wither at 1 and 36th week and for body length at 4 and 36th week of age.

Similarly Singh and Parekh (1986) reported significant sex effect on weight and measurements at birth in crossbred calves. Body weights of the calves studied presently were of higher order as compared to those reported earlier (Tajane *et al*, 1984b) indicating the improvement in growth performance at this station over the years.

Growth rates during various ages are presented in Fig-1. On an average calves gained 318 gms body weight, 0.17 cm chest girth, 0.14 cm height at witners and 0.14 cm body length per day during 48 week of age. These weight gains in the present study were more than those reported earlier (Tajane *et al* 1984 a) indicating the improved growth rates over the years. The maximum per cent of growth was found to be during first four weeks of age, whereafter the growth rate declined (Fig-1). However, skeletal growth as revealed from the linear body measurements did not very much over the subsequent weeks. Overall per cent gain in weights was comparatively more in contrast to that in liner measurements (Fig-1). Thus the general growth rate was faster than the skeletal growth rate.

The average body weights were regressed on age in weeks. The co- efficients of predicting the growth performance at given age are tabulated in Table-2. Its perusal revealed that the linear regression was the best fit for predicting the growth curves, r^2 values being more than 98 per cent. Present findings were in close accordance with those reported for Hariana calves (Rathi and Balaine, 1982).

The growth rates for body weights and chest girth were significant, while those for height at withers and length were non significant. Probably general growth might be propertionately more than the skeletal

TABLE 1

Average body weights and measurements at different ages in Kankrej calves.

Age in	No. of	Obser-vations	Body wt. (kg.)		Chest girth (cm.)		Height at wither (cm.)		Body length (cm.)	
weeks	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	34	31	29.38 ± 0.57	27.64 ± 0.71	70.76 ± 0.69	69.10 ± 0.67	70.94 ± 0.75[a]	67.74 ± 0.96[b]	61.35 ± 0.56	60.58 ± 0.92
4	26	22	39.10 ± 1.05	36.68 ± 0.85	77.53 ± 0.92	77.22 ± 0.86	75.00 ± 0.83	74.86 ± 0.67	70.38 ± 1.04[a]	66.77 ± 0.79[b]
8	26	21	51.77 ± 2. 14[a]	46.71 ± 1.34[b]	85.70 ± 1.29	83.14 ± 0.79	80.77 ± 0.96	80.52 ± 0.86	74.35 ± 1.01	74.57 ± 0.87
12	26	25	60.15 ± 2.65	55.36 ± 1.70	92.58 ± 1.36[a]	88.92 ± 0.94[b]	87.70 ± 1.27	85.04 ± 0.81	78.50 ± 1.65	76.40 ± 0.88
16	25	26	66.08 ± 3.36	65.10 ± 2.15	94.88 ± 1.66	94.03 ± 1.65	88.52 ± 1.45	86.54 ± 1.32	81.32 ± 1.42	80.20 ± 0.94
20	26	28	75.80 ± 3.77	73.89 ± 2.33	99.61 ± 1.76	99.60 ± 0.96	93.42 ± 1.30	90.78 ± 0.86	84.96 ± 1.25	83.14 ± 0.98
24	26	28	85.35 ± 3.85	83.00 ± 2.42	104.80 ± 1.78	103.78 ± 0.97	96.50 ± 1.50	95.32 ± 0.91	88.23 ± 1.17	87.53 ± 1.04
28	26	27	101.03 ± 4.45	94.44 ± 2.60	110.26 ± 1.98	107.60- ± 1.00	100.23 ± 1.47	99.29 ± 0.75	93.65 ± 1.35	90.44 ± 1.18
32	28	27	108.60 ± 4.66	104.33 ± 2.71	114.00 ± 1.71	111.74 ± 0.96	102.32 ± 1.39	100.88 ± 0.48	96.11 ± 1.54	94.29 ± 1.08
36	27	26	124.18 ± 4.10[a]	110.88 ± 3.32[b]	121.26 ± 1.57[a]	116.80 ± 1.12[b]	106.33 ± 1.03[a]	104.65 ± 0.95[b]	100.44 ± 1.29[a]	95.11 ± 1.25[b]
40	27	25	133.29 ± 4.16[a]	120.64 ± 3.27	124.29 ± 1.68	121.60 ± 1.32	108.77 ± 1.18	108.72 ± 1.56	102.88 ± 1.10	101.72 ± 1.15
44	25	25	143.56 ± 4.30	133.32 ± 3.41	128.68 ± 1.52	126.88 ± 1.55	113.60 ± 1.33	112.76 ± 1.62	106.96 ± 1.52	106.44 ± 1.16
48	25	25	153.00 ± 4.53	146.36 ± 3.48	133.96 ± 1.97	132.56 ± 1.35	118.56 ± 2.02	120.24 ± 1.80	112.44 ± 1.83	112.48 ± 1.15

Means carrying different superscripts within an age groups for a traits did not differ significantly from one another.

FIG. 1 GROWTH RATES DURING DIFFERENT AGES IN KANKREJ CALVES

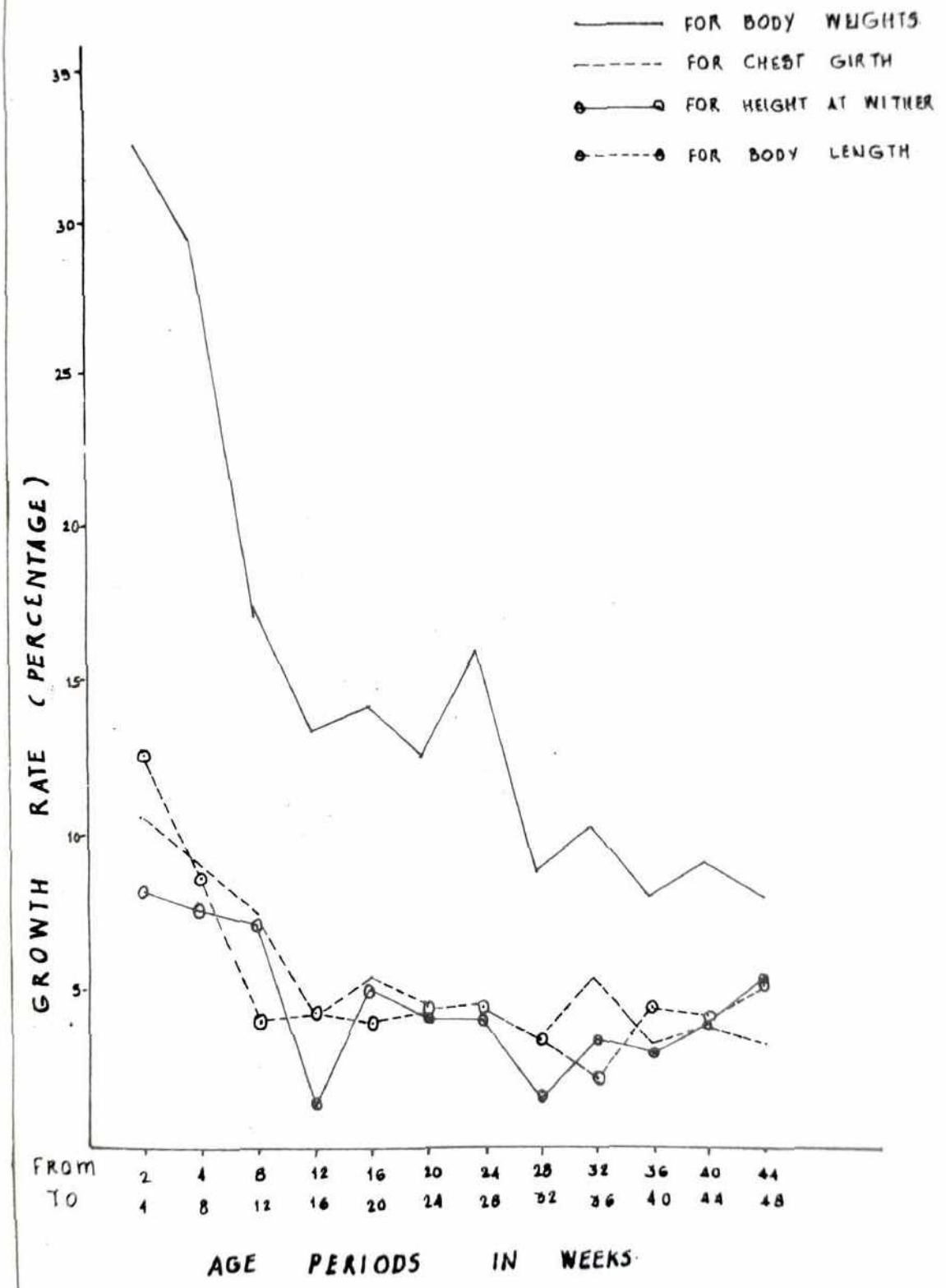


TABLE 2

Co-efficients of predicting the growth performance in Kankrej calves.

Traits	*bO*	*Co-efficients* b_1	r^2
Body weight			
Male	26.99	2.62 ± 0.74**	99.60
Female	25.91	2.43 ± 0.48**	99.80
Chest Girth			
Male	73.70	1.28 ± 0.54*	99.10
Female	72.23	1.26 ± 0.49*	99.24
Height at withers			
Male	72.36	0.95 ± 0.54	98.42
Female	70.66	0.98 ± 0.53	98.56
Body length			
Male	65.02	0.97 ± 0.49	98.76
Female	63.25	0.98 ± 0.57	98.33

* and ** significant (P<0.05) and (P<0.01), respectively.

growth as evidenced from the comparatively higher co-efficients (F_1) of slope for body weights than those for measurements (Table-2).

Heritability estimates for body weights ranged from -0.62 ± 0.08 to 1.37 ± 0.14, while those for linear measurments ranged from -0.80 ± 0.07 to 2.99 ± 0.10 (Table-3). These estimates were comparable to those reported by Patel and Parekh (1982), Lee *et al.* (1984) Lee and Ohh (1985) and Singh and Parekh (1982), Lee *et al.* (1984) Lee and Ohh and Singh and Parekh (1986). Apparently heritabilities were of higher magnitude for growth measurements up to 8 weeks of age.

TABLE 3

Heritability estimates for body weights at different ages.

Age in weeks	*K*	*Body weight*	*Chest girth*	*Height at withers*	*Body length*
1	4.15	1.37 ± 0.14	0.57 ± 0.13	1.82 ± 0.14	0.12± 0.11
4	3.89	0.52 ± 0.15	0.47 ± 0.15	1.53 ± 0.17	1.12 ± 0.17
8	4.61	0.93 ± 0.15	0.44 ± 0.13	0.48 ± 0.13	0.65± 0.14
12	3.82	-0.06 ± 0.12	2.99 ± 0.10	- 0.18 ± 0.11	-0.40 ± 0.10
16	3.81	-0.62 ± 0.08	-0.22 ± 0.11	- 0.80 ± 0.07	-0.10 ± 0.12
20	4.42	-0.36 ± 0.08	-0.48 ± 0.07	- 0.26 ± 0.09	0.44 ± 0.13
24	4.42	0.01 ± 0.11	-0.48 ± 0.07	- 0.51 ± 0.07	0.57± 0.14
28	4.30	-0.34 ± 0.09	-0.35 ± 0.09	- 0.60 ± 0.07	-0.21 ± 0.10
32	4.47	0.41 ± 0.13	0.27 ± 0.12	1.96 ± 0.15	-0.34 ± 0.08
36	4.71	0.32 ± 0.08	0.66 ± 0.05	1.50 ± 0.07	0.66 ± 0.14
40	5.11	0.16 ± 0.12	-0.32 ± 0.07	- 0.50 ± 0.06	0.10± 0.11
44	5.48	0.11 ± 0.11	-0.48 ± 0.05	0.20 ± 0.12	-0.15 ± 0.09
48	5.48	0.11 ± 0.11	-0.49 ± 0.05	0.21 ± 0.12	-0.13 ± 0.09

K = Weighed average number of calves per sire within a sex group of calves.

It is thus envisaged that more nongenetic variability in the measurements at later ages. On the contrary, Ohh *et al* (1984) reported the reduction in nongenetic variability over the ages as heritabilities for these traits tended to increase from birth to 18 month of age in korean dairy cattle.

Because of lower additive genetic variability in body weights and measurements, there seemed to be little scope of intra population selection. However, growth performance can be augmented by improving the management further, besides introducing the better sires from other sources.

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