

Study on herd life traits of culled and disposed Kankrej cattle at organized farms

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ABSTRACT

An analysis was performed to study the herd life traits of culled and disposed Kankrej cattle at organized farms of Gujarat State. Data were collected from different disposal and production registers for the period from January 2003 to December 2013 and these were analyzed by using General Linear Model (GLM) procedure in the SPSS statistical software (version 20.0). The least squares analysis of disposed Kankrej cows at organized farms was performed to study on various life time traits like Age at First Calving, Number of Lactations Completed, Total Lactation Days, Life time Milk Yield, Herd Life, Herd Productive Life, Herd Unproductive Life, Milk Yield Per Day of Productive Life and Milk Yield Per Day of Herd life. The overall least squares means for above mentioned life time traits in Kankrej cows were 1548.12 ± 11.26 days, 3.29 ± 0.10 number, 1012.58 ± 30.66 days, 6427.01 ± 229.67 kg, 3225.91 ± 49.70 days, 1745.20 ± 86.62 days, 1174.63 ± 23.56 days, 3.73 ± 0.06 kg and 1.74 ± 0.04 kg, respectively for Kankrej herd of organized farm.

Keywords: Kankrej, herd life traits, culling, disposal

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INTRODUCTION

Kankrej is one of the heaviest breeds of cattle in India. The breed has originated from Kankrej area of Banaskantha district of Gujarat state and is maintained by Bharwad and Rabari communities. The breeding tract of Kankrej cattle mainly lies in north Gujarat region and Kutch district comprising of Banaskantha, Sabarkantha, Mehsana, Ahmadabad and Patan district of Gujarat and Barmer, Jodhpur areas of Rajasthan. However, the Kankrej cattle is distributed throughout the state of Gujarat.

A long herd life of a cow substantially decreases the replacement costs per lactation and enables a cow to achieve her maximum capacity of performance when attaining full maturity. In addition, the potential for a long herd life resting on good health and fertility reduces treatment costs and the incidences of involuntary culling. Genetic contribution in the form of living progeny to the next generation from a cow is associated with herd life, calf production and their survival for better replacement. Longer herd life

increases the total lifetime and milk production, which in turn leads to higher selection intensity. The present investigation was made to explore the herd life traits of culled and disposed Kankrej cattle.

MATERIALS AND METHODS

Data of each disposed cattle from LRS, Sardarkrushinagar, CBF, Thara and CBF, Bhuj farms were taken from the periods 2003 to 2013. Data like date of birth, date of first calving, lactating days of all lactations, total milk produced in all lactations, number of parity and date of auctioned or disposed were collected from different registers of the farm and on the basis of above data various attributes like Herd Life (HL), Herd Productive Life (HPL), Herd Unproductive Life (HUNPL), Life Time Milk Yield (LTM), Total Number of Lactations Completed (LN), Milk Yield Per Day of Productive Life (MYPDPL), Age at First Calving (AFC) and Milk Yield Per Day of Herd Life (MYPDHL) were calculated.

The data used in this study comprised of different normal production records of the cows of different

herds. The records for first to maximum twelve lactations were considered for calculation of herd life performance traits. Records considered abnormal cowing to one or more of the following reasons were not considered for calculation of the herd life performance traits.

* Short lactation (Less than 200 days).

* Lactations following abortion or dystocia.

The herd life (HL) was considered as the period from date of birth to the date of disposal, whereas herd productive life (HPL) was considered as the date of first calving to the date of disposal. The explanations for other herd life traits are as under (Pundir and Raheja, 1997).

Herd Unproductive Life (HUNPL)

$$= \text{Herd life (HL)} - \text{Total Lactation Days (TLD)}$$

Life Time Milk Yield (LTM Y)

$$= \text{Amount of milk produced over herd life}$$

Total number of lactations completed (LN) over herd life.

Milk yield per day of productive life (MYPDPL)

$$= \text{LTM Y} / \text{HPL}$$

Milk yield per day of herd life (MYPDHL)

$$= \text{LTM Y} / \text{HL}$$

Age at first calving (AFC)

$$= \text{Date of first calving} - \text{Date of Birth}$$

Method of Statistical analysis

The data obtained for various herd life traits were

analyzed statistically and expressed as Mean ± S.E. Data were analysed by CRD (Completely Randomized Design) using General Linear Model (GLM) procedure in the SPSS statistical software, version 20.0 (2001). One way ANOVA between herd life traits and pattern for disposal and also between herd life traits and reason for disposal followed by the Duncan post hoc test was performed to determine significant differences among the patterns and among reasons for disposal using General Linear Model (GLM) procedure in the SPSS statistical software (version 20.0).

The statistical model and ANOVA (Analysis of Variance) table for the design is as under

$$Y_{ij} = \mu + T_i + E_{ij}$$

Where,

Y_{ij} = Response due to i th treatment in j th experimental unit.

μ = General mean

T_i = Effect of pattern or reason of culling, where $i = 1, 2, 3, 4$ for pattern / $i = 1, 2, 3, 4, 5, 6$ for reason of culling

E_{ij} = Experimental error associated due to i th treatment in j th experimental unit.

RESULTS AND DISCUSSION

Age at First Calving

Age at first calving (AFC) in Kankrej cattle at LRS, Sardarkrushinagar was 1323.72 ± 13.89 days (3.63 years). It was 348 days lower than CBF, Thara and

Table 1. Comparison of Least squares means for various life time traits of Kankrej cattle between three farms

S. N.	Name of farm	No. of Observation	AFC (days)	Parity (n)	TLD (days)	LTM Y (kg)	Herd Life (days)	HPL (days)	HUNPL (days)	MYPDPL (kg)	MYPD HL (kg)
1.	LRS,SKN	205	1323.72 ^b	3.64 ^a	1025.87 ^{ab}	7600.00 ^a	2982.46 ^b	1834.33 ^a	1959.84 ^a	4.66 ^a	2.18 ^a
			± 13.89	± 0.19	± 55.29	± 452.06	± 90.58	± 205.23	± 42.63	± 0.11	± 0.08
2.	CBF, Thara	200	1671.75 ^a	2.85 ^{ab}	915.34 ^b	4957.79 ^b	3263.80 ^a	1592.06 ^b	676.72 ^b	2.91 ^b	1.34 ^b
			± 21.19	± 0.13	± 43.76	± 288.78	± 72.07	± 73.08	± 36.49	± 0.07	± 0.06
3.	CBF, Bhuj	129	1713.07 ^a	3.40 ^a	1142.21 ^a	6840.836 ^a	3554.04 ^a	1840.97 ^a	698.77 ^b	3.52 ^b	1.68 ^b
			± 24.66	± 0.18	± 61.55	± 432.67	± 95.49	± 96.35	± 41.46	± 0.10	± 0.08
	OVERALL	534	1548.12	3.29	1012.58	6427.01	3225.91	1745.20	1174.63	3.73	1.74
			± 11.26	± 0.10	± 30.66	± 229.67	± 49.70	± 86.62	± 23.56	± 0.06	± 0.04

The means with different superscript within a column among farms differ significantly at $P < 0.05$.

389 days lower than CBF, Bhuj observed during study period which indicated better care and feeding of animals at LRS, Sardarkrushinagar (Table 1). Overall age at first calving of Kankrej cattle in North Gujarat region was 1548.12 ± 11.26 days which was lower than the reports of Bhadoria et al. (2002) and Khatri et al. (2004) and higher than the earlier studies for indigenous cattle reported by Rehman et al. (2008), Das et al. (2011), Dangar and Vataliya (2014) and Anonymous, 2014. In general, AFC in zebu cattle is much higher as compared to their exotic or crossbred counterparts which is largely attributed to inherent character and lack of selection for their traits from generation to generation.

Herd Life

The overall herd life (HL) of Kankrej cattle at farms was 3225.91 ± 49.70 days which was lower than the reports of Pundir and Raheja (1997) for Haryana cattle (3673.00 ± 50.80 days) and Bhattacharya et al. (2000) for Tharparkar cattle. The overall herd life of Kankrej cattle was found to be 3225 ± 49.70 days (8.84 years) at organized farms of North Gujarat. The overall mean herd life of Kankrej cows at CBF, Bhuj was higher $\{3554.04 \pm 95.49$ days (9.74 years) $\}$ than CBF, Thara $\{3263.80 \pm 72.07$ days (8.94 years) $\}$ and lower at LRS, Sardarkrushinagar $\{2982.46 \pm 90.58$ days (8.17 years) $\}$. Results of herd life for Kankrej cows at three farms under present study were higher (8.84 years) than the Haryana cattle (2.74, 4.67 and 3.25 years) as reported by earlier workers Kaushik et al. (1994) and Sahiwal cattle (8.19 years) as reported by Pundir and Raheja (1997).

Herd Productive Life

Herd productive life (HPL), a health trait that evaluates a cow's genetic ability to stay in the herd, takes into account various characteristics that make a cow more sustainable thus more profitable.

The overall herd productive life for Kankrej cows at the organized farms at North Gujarat was 1745.20 ± 86.62 days (4.78 years). The overall HPL of Kankrej cows at organized farm under present study was lower than Haryana cattle (2227.00 days) as reported by Pundir and Raheja (1997), Rathi cattle (1940.55

days) as reported by Singh et al. (1997) and Sahiwal cattle (1872.28 days) as reported by Singh et al. (2011).

The present findings regarding mean herd productive life (HPL) of Kankrej cattle observed was higher at CBF, Bhuj $\{1840.97 \pm 96.35$ days (5.40 years) $\}$ followed by at LRS, Sardarkrushinagar $\{1834.33 \pm 205.23$ days (5.02 years) $\}$ and lower at CBF, Thara $\{1592.06 \pm 73.08$ days (4.36 years) $\}$. The results were higher than the reports of Patel (1971) for Kankrej cattle at Anand (3.45 years) and Chharodi (4.58 years), Chaudhary (1999) for Gir cattle (1641.99 ± 71.81 days) and Jakhar et al. (2010) for Haryana cattle (4.38 ± 0.20 years).

However, these findings of HPL (1745.20 days) of Kankrej cattle was higher than those obtained (1061.64 ± 47.65 days) by Burte (1995) for Kankrej cattle, Burte (1995) for Jersey X Kankrej crossbred (1431.33 ± 110.29 days) and Pundir and Raheja (1997) for Sahiwal cattle (1171.00 ± 101.40 days). HPL of Kankrej cattle at CBF, Bhuj (5.04 years) and LRS, Sardarkrushinagar (5.03 years) were comparable with the results (4.94 years) reported by Reddy and Nagarcenkar (1988) for Sahiwal cattle.

Total Lactation Days

The overall total lactation days (TDL) in Kankrej cow's disposal from organized farm were 1012.58 ± 30.66 days. Table 1 revealed that total lactation days of Kankrej cows was higher at CBF, Bhuj (1142.21 ± 61.55 days) followed by at LRS, Sardarkrushinagar (1025.87 ± 55.29 days) and CBF, Thara (915.34 ± 43.76 days). Present TLD of Kankrej cows at all three stations were higher than findings of Kaushik et al. (1994) for Haryana cattle of G. L. F., Hastinapur -Meerut (899.10 ± 76.57 days) and were lower than Kaushik et al. (1994) for Haryana cattle of Babugadh-Gaziabad (1373.39 ± 72.6 days).

Life Time Milk Yield

Looking to the economic aspect, milk yield is an important trait amongst all traits. The overall life time milk yield (LTMY) in Kankrej cows disposed from organized farm of North Gujarat was 6427.01 ± 229.67 kg. The present findings related to mean life

time milk yield (LTM_Y) of Kankrej cattle observed was higher at LRS, Sardarkrushinagar (7600.00 ± 452.06 kg) followed by CBF, Bhuj (6840.836 ± 432.67 kg) at and lower at CBF, Thara (4957.79 ± 288.78 kg). Though the TLD was lower (1025.89 days), the LTM_Y at LRS, Sardarkrushinagar was better (7600.00 kg) than the C.B.F., Bhuj indicated better daily milk production of Kankrej cows at LRS, Sardarkrushinagar. LTM_Y of Kankrej cows at LRS, Sardarkrushinagar and CBF, Bhuj were higher than those reported by Burte (1995) for Kankrej cattle (5862.69 ± 289.36 kg) and Singh et al. (1997) for Rathi cattle (5706.96 ± 580.13 kg).

LTM_Y of Kankrej cows at all three farms were higher than those reported by Kaushik et al. (1994) for Haryana cattle (2662.04 ± 306.92 and 4090.02 ± 291.03 kg, respectively) at Meerut and Babughadh farm, Pundir and Raheja (1997) for Sahiwal cattle and Haryana cattle (4707.00 ± 195.90 kg, and 4192.00 ± 123.70 kg, respectively). The present findings of LTM_Y of Kankrej cows were lower than the earlier studies for crossbred cow reported by Burte, (1995) and Singh et al. (1997).

Total lactation number/parity

Overall lactation completed by Kankrej cows disposed from organized farms of north Gujarat was 3.29 ± 0.010 . The mean lactation number / parity of Kankrej cows disposed observed during the period at LRS, Sardarkrushinagar, CBF, Bhuj and CBF, Thara was 3.64 ± 0.19 , 2.85 ± 0.13 and 3.40 ± 0.18 nos., respectively. Present findings of parity of Kankrej cows disposed were more or less comparable with earlier reports for Haryana (3.87) and Gir (3.37) reported by Jakhar et al. (2010) and Chaudhary (1999), respectively. However, the present findings of parity of disposed Kankrej cows (4.68), Rathi cows (4.70) and Tharparkar cows (4.38) reported by Reddy and Nagarckenkar (1988), Singh et al. (1997), Bhattacharya et al. (2000), respectively. The present findings of parity were also lower than crossbred cows (4.85 and 5.04) reported by earlier workers (Burte, 1995 and Singh et al. 1997)

Milk yield per day of productive life and Milk yield per day of herd life

The overall Milk yield per day of productive life and Milk yield per day of herd life of Kankrej cows disposed from organized farms of North Gujarat were 3.73 ± 0.06 and 1.74 ± 0.04 kg, respectively. Milk yield per day of productive life and Milk yield per day of herd life of Kankrej cattle were highest (4.66 ± 0.11 and 2.18 ± 0.08 kg.) at LRS, Sardarkrushinagar followed at CBF, Bhuj (3.52 ± 0.10 and 1.68 ± 0.08 kg.) and CBF, Thara (2.91 ± 0.07 and 1.34 ± 0.06 kg.).

Overall findings for Milk yield per day of productive life (MYPDPL) of all three stations were lower (3.73 kg) than earlier reports for Haryana (6.02 kg), Gir (4.35 kg), reported by Yadav and Rathi (1992) and Chaudhary (1999), respectively. However, overall findings for Milk yield per day of productive life of all three stations were higher than the reports for Tharparkar cattle (1.71 ± 0.09 kg) reported by Bhattacharya et al. (2000). Overall findings for Milk yield per day of herd life of Kankrej cows was lower (1.74 ± 0.04 kg) than the reports for Gir cattle (1.97 ± 0.88 kg) by Chaudhary (1999).

CONCLUSION

Performance of Kankrej cattle of Livestock Research Station, S. D. Agricultural University, Sardarkrushinagar (Gujarat) was better than other two organized farms. Looking to the performance of Kankrej cattle it can be concluded that Kankrej cattle has genetic potential which by means of proper breeding strategies and management can be exploited further.

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