

Breeding Efficiency of Kankrej Bulls

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ABSTRACT

Breeding efficiency of 13 Kankrej bulls used in the cattle breeding farm at the Institute of Agriculture, Anand (Now Anand Campus of the Gujarat Agricultural University) was studied using 3,864 observations for the period from January 1941 to 1971. The mean breeding efficiency was found to be 31.00 ± 2.36 per cent. This worked out at 3.23 services per conception. The breeding efficiency differed with bulls, season of breeding, age of females and age of bulls.

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INTRODUCTION

Breeding efficiency of bulls is a character of great economic importance. Both the cow as well as the bull are responsible for the impaired breeding efficiency of the dairy herd. Sometimes however, due to heavy cost of feeding, the owner sells the otherwise fertile female animals that are apparently showing low breeding efficiency without examining the breeding efficiency of bulls. Due to this, valuable fertile female animals may be sold from the herd each year. This loss is not only in terms of high replacement cost of the herd but also is in terms of loss of valuable fertile genetic materials. It was therefore thought desirable to study the breeding efficiency of Kankrej bulls as related to some important factors.

MATERIALS AND METHODS

Data (3,864 observations) for this study were collected from the breed-

ing records of the Kankrej herd of the Seth Mungalal Narmal Goenka Gau-shala at the Institute of Agriculture, Anand (Now Anand Campus of the Gujarat Agricultural University) for the period from January 1941 to May 1971.

During the period of study the herd was practically stall fed. Loose housing system was followed. Roughages were fed in groups to the different classes of the herd, while the concentrate was fed individually. The animals were observed 3 to 4 times for heat during the day and were given a natural service. Bulls were housed separately in individual pens. Bulls were fed succulent and dry fodders *ad libitum* and concentrates (1.5 to 2.0 kg/head/day) in their pens, individually. Bulls were groomed and were given exercise daily. The breeding efficiency of bulls was calculated on the basis of percentage successful conceptions as evidenced by birth of calf. The statis-

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tical analysis of the data was done according to Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

(I) Mean Breeding Efficiency of Bulls:

From a total of 3,864 services 1,198 conceptions were obtained. Thus the mean breeding efficiency was found to be 31.0 ± 2.36 per cent. This worked out at 3.23 services per conception. Miller *et al.* (1937) reported 36.15 per cent average conception rate in the natural breeding programme, number of services required per conception being 2.93. Miller and Graves (1938) reported slightly lower (26.06%) breeding efficiency of bulls used naturally, the number of services per conception being 3.83. For the bulls used in A.I. programme Tanabe and Salisbury (1946) reported an average conception rate of 48.2 per cent and average of 2.07 services per conception. In the study carried out by Miller *et al.* (1937) all the animals were fertile and free from brucellosis.

(II) Breeding efficiency of Different Bulls:

The breeding efficiency varied from 21.82 per cent (Bull-13) to 47.50 per cent (Bull-1) (Table-1). Out of 13, seven bulls had breeding efficiency below the average. The differences among bulls for breeding efficiency were significant. Breeding efficiency of bulls 1 and 2 was significantly different from the rest of the bulls, but the difference between the two bulls was not significant. Baier *et al.* (1956) and Zwart (1965) found the bulls to differ in their breeding efficiency.

(III) Breeding efficiency of bulls in different seasons :

The breeding efficiency of bulls varied from 27.47 per cent in Monsoon

TABLE 1

Breeding efficiency of different bulls (per cent).

Number of bulls	Total number of services	Number of conceptions	Breeding efficiency (per cent)
1	120	57	47.50
2	466	205	43.99
3	251	97	38.64
4	162	59	36.42
5	248	88	35.48
6	190	67	35.26
7	514	155	30.15
8	306	89	29.08
9	209	53	25.31
10	664	166	24.96
11	194	44	22.68
12	146	32	21.91
13	394	86	21.82

S.E. 2.36

C.D. 5.14

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$\bar{X} = 31.00$

to 35.99 per cent in Summer with an over all average efficiency of 31.31 ± 1.52 per cent (Table-2). The effect of season of service on breeding efficiency of bulls was highly significant. The breeding efficiency of bulls used in Monsoon and Winter was however, not different from each other. Mercier and Salisbury (1947) reported the breeding efficiency of bulls to differ in different seasons. Miller and Graves (1938) observed the lowest breeding efficiency (23.0%) in the month of July.

TABLE 2

Breeding efficiency of bulls in different seasons (per cent).

Number of bulls	Seasons of breeding		
	Monsoon	Winter	Summer
1	31.42	46.51	61.90
2	37.62	40.85	49.95
3	39.36	35.36	41.43
4	24.00	37.50	45.31
5	33.80	33.33	37.96
6	33.87	30.19	40.00
7	33.50	31.38	25.80
8	26.23	20.00	35.00
9	14.89	23.33	34.72
10	25.09	22.11	27.89
11	12.82	27.77	30.64
12	24.22	21.12	18.18
13	20.30	26.72	19.31
Average	27.47	30.47	35.99

S.E. 1.52

C.D. 4.24

 $\bar{X} = 31.31$

A.V. Table

Sources of Variance	d.f.	M.S.
Bulls	12	866.96**
Seasons	2	860.86**
Bulls x Seasons	24	198.88
Error	117	120.05

Significant at 1.0 per cent.

(IV) Effect of Age of Females :

Breeding efficiency of bulls mated to heifers was the maximum (40.82%) as shown in Table-3A. It dropped down by nearly 3.7 per cent when mated to the cows of 1st lactation but the decrease was not significant. The decrease was however significant (about 10.0%) when they were mated to second lactation cows. The decrease in breeding efficiency of bulls along with increase in age of females from 2nd lactation onward was small and insignificant. Pandya (1953)

TABLE 3

Effect of age of females and bulls on breeding efficiency (per cent).

(A) Females

Heifers	Order of lactations				
	1	2	3	4	5
40.82	37.10	27.72	27.63	27.16	27.53

(B) Bulls

Age in years

Below 3years	3-4years	4-5years	Above 5 years
37.74	36.48	31.03	27.19

A.V. Table

Age of Females

Sources of variance	d.f.	M.S.
Bulls	8	912.02**
Age of females	5	1201.46**
Bulls x age of females	40	137.62
Error	108	134.61

Age of Bulls

Sources of variance	d.f.	M.S.
Bulls	11	283.10**
Age of bulls	3	288.69*
Error	33	91.93

* Significant at 5.0 per cent

** Significant at 1.0 per cent.

reported that the minimum number of services were required for conception by the Kankrej animals, five years of age.

(V) Age of Bulls :

The breeding efficiency of bulls varied from 27.19 per cent for bulls above five years of age to 37.74 per cent for bulls below 3 years with an over all average of 33.11 ± 1.38 per cent (Table-3B). The age effect on breeding efficiency was significant. Breeding efficiency of bulls below 3 years and 3-4 years of age was significantly different from that of the older bulls. However the bulls of these two age groups did not differ in their breeding efficiency. Miller and Graves (1938) reported higher breeding efficiency for bulls under 6 years of age. Davson (1938) found consistent decline in fertility of bulls with advance

in age. Tanabe and Salisbury (1946) found maximum breeding efficiency in case of young (1 to 3 years) bulls.

(VI) *Interaction effect between the age of bulls and age of females :*

Bulls upto 4 years of age when mated to heifers showed the maximum breeding efficiency. The lowest breeding efficiency was observed for the bulls of 4-5 years of age when bred to females of the second lactation. The interaction effect between the age of females and the age of bulls upon the breeding efficiency of bulls was significant. Bowling *et al.* (1940) found smaller number of services for uncalfed heifers when bred to bulls of under 5 years of age than the older bulls. Hilder *et al.* (1944) found bulls over 5 years of age to show distinctly higher number of services per conception than did young bulls when bred to heifers.

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