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EFFECT OF AGE AT FIRST CALVING ON FIRST LACTATION PERFORMANCE OF NILI-RAVI BUFFALOES

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Data on 355 Nili-Ravi buffaloes kept at the Government Livestock Farm, Rakh Ghulaman, Bhakhar were analysed. The age at first calving (AFC), first lactation 305-day milk yield (FLMY) and first calving interval (FCI) averaged 57.4 + 0.5 months, 1553.7 ± 22.1 kg and 563.9 ± 8.8 days, respectively. There was a wide scope to improve AFC, for only 4.8% of the buffaloes could calve for the first time upto the age of 42 months. The regression analysis indicated significant effect of AFC on the FLMY and FCI. The FLMY increased by 5.3 ± 4.4 kg while the FCI decreased by 2.0 ± 1.7 days for each month increase in AFC. These beneficial effects of delayed breeding, however, do not otutweigh the advantage of reduced AFC reflected in twice the number of completed lactations during the life time by early calvers compared with the late calvers.

INTRODUCTION

Pakistani buffaloes are second to none in the world as producers of milk and meat. They are, however, less economical compared to the dairy cattle of the temperate region which may be attributed mainly to their late age at first calving and long calving intervals. Thus, to improve the economic prospects of buffaloes, a reduction in these traits is imperative.

A desirable correlated response for milk yield and calving interval due to reduced age at first calving would accelerate the improvement. However, an undesirable correlation would impede the improvement. The first lactation milk yield in buffaloes was reported to increase significantly with increased age at first calving (Dutt, 1965; Kanaujia and Balaine, 1975; Singh and Prasad, 1983) and such a trend is not desirable. The milk yield in buffaloes was not influenced significantly by the age at first calving (Mohan, 1977;

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Reddy and Mishra, 1980; Gurung and Johar, 1982). The first calving interval was little affected by the age at first calving as reported by Singh and Desai (1962) and Mohan (1977). However, Javed and Ahmad (1969) found a significant positive correlation between age at first calving and first calving interval in Nili-Ravi buffaloes.

The present study was, thus, aimed at determining the effect of age at first calving on first lactation milk yield and first calving interval in Nili-Ravi buffaloes maintained under semi-desert conditions.

MATERIALS AND METHODS

a) *Source of Data*: Data on 355 Nili-Ravi buffaloes kept at the Government Livestock Farm, Rakh Ghulaman, District Bhakhar during the years 1951 to 1978 were used in this study. The farm is located in the semi-desert area of 'Thal.' Normal and complete records on age at first calving (AFC), first lactation 305-day milk yield (FLMY) and first calving interval (FCI) were analysed. The lactations of less than six months durations were not included in the analysis.

b) *Statistical Procedures* : Mean and its standard error (SE) for each of the three traits were worked out. The effects of AFC on the FLMY and FCI were determined by regression analysis. The prediction equations based on linear mathematical description were also developed. Analysis of variance was also carried out to test the 'H : B = o. The procedures described by Steel and Torrie (1980) were followed.

RESULTS AND DISCUSSION

The AFC in this herd averaged 57.4 ± 0.5 months (Table 1). Mean FLMY and mean FCI were 1553.7 ± 22.1 kg and 563.9 ± 8.6 days, respectively. The coefficients of variation were : AFC, 17.2%; FLMY, 26.8% and FCI, 27.6%.

The AFC in this herd was very high, for only 4.8% of the buffaloes calved till the age of 42 months (Table 1). The proportion of the buffaloes calving upto the age of 60 months was 68.2% which suggested that there is a wide scope for improvement in this trait. The number of completed lactations in the life time of the buffaloes decreased steadialy with corresponding increase in AFC

(Table 1). The buffaloes calving upto the age of 42 months completed 6 lactations compared to 3 lactations in buffaloes calving for the first time after 72 months age. The results regarding the influence of AFC on the FLMY and FCI were as under:

1. *First Lactation Milk Yield* An increasing trend in FLMY was obvious with increased AFC (Table I). The milk yield in buffaloes calving for the first time upto 42 months age averaged 1487 ± 123 kg, whereas it was 1623 ± 74 kg in buffaloes calving for the first time above 72 months of age. The regression analysis indicated that for each month increase in AFC, the FLMY increased by 5.3 ± 4.4 kg (Table 2). The analysis of variance further revealed that this increase in milk yield was significant (Table 3).

Table 1. Variation in first lactation 305-day milk yield (FLMY) and first calving interval (FCI) due to age at first calving (AFC)

AFC (months)	No. of calvings		Mean ± S. E.		No. CLLT**
	No.	*CF(%)	FLMY (kg)	FCI(days)	
Upto 42	17	4.8	1487 ± 123	548 ± 31	6.0
43-48	59	21.4	1459 ± 53	572 ± 22	5.4
49-54	56	37.2	1492 ± 54	552 ± 20	4.9
55-60	110	68.2	1588 ± 39	580 ± 20	3.7
61-66	48	81.7	1639 ± 66	550 ± 22	4.0
67-72	47	94.9	1570 ± 62	549 ± 30	3.0
<72	18	100.0	1623 ± 74	565 ± 17	3.0
Mean 57.4 ± 0.5	—	—	1553 ± 22	564 ± 9	—
CV(%) 17.2	—	—	26.8	27.6	—

* CF = Cumulative frequency.

** CLLT = Number of completed lactations in life time.

A significant increase in milk yield due to increased age at first calving has also been reported by Dutt (1965), Kanaujia and Balaine (1975), and Singh and Prasad (1983). Dutt (1965) analysed data on 53 foundation and 96 farm-bred buffaloes and reported that the age at first calving was significantly correlated

with first lactation milk yield in foundation stock (r = 0.32). Kananjia and Balaine (1975) observed that age at first calving significantly affected milk yield in Indian buffaloes. It was observed by Singh and Prasad (1983) that age at first calving was significantly correlated with first and second lactation milk yield.

Table 2. Regression analysis for the magnitude of variation in milk yield and calving interval due to age at first calving

Parameter	No. of observations	Mean AFC (months)	Intercept (b_o)	Regression coefficient (b_r)
First lactation 305-day milk yield (kg)	355	57.4	1252.4	5.3 ± 4.4
First calving interval (days)	325	57.2	675.2	-2.0 ± 1.7

Table 3. *Analysis of variance for regression of milk yield and calving interval due to age at first calving*

Parameter	Source of variation	d. f.	Mean squares	F. ratio
1. First lactation 305-day milk yield	Regression	1	4,624,227 6	5.57*
	Residual	353	830,742.4	
2. First calving interval	Regression	1	125,857.7	5.26*
	Residual	323	23,922.2	

*Significant $P<0.05$).

Contrary to the present findings, it was reported by Singh and Desai (1962) that age at first calving had no significant effect on first lactation milk yield. Milk yield in buffaloes was also reported to be little affected by age at first calving (Mohan, 1977; Reddy and Mishra, 1980; Gurung and Johar, 1982).

An increase in FLMY due to increased AFC is not a desirable association since reduction in AFC, which is of utmost importance, would decrease the FLMY. Attempt should be made to improve feeding and managemental practices to avoid production depression in buffaloes bred at relatively younger ages.

2. First Calving Interval: There was no specific trend for FCI with changing AFC (Table 1). The regression analysis, however, indicated that FCI decreased by 2.0 $\pm$ 1.7 days for each month increase in AFC (Table 2) and this decrease was significant (Table 3). Similar trend was also observed by Salerno (1960) who remarked that animals calving for the first time at less than 3 years age had a shorter calving interval than those calving later.

Contrarily, a positive and significant correlation between age at first calving and first calving interval was recorded in Nili-Ravi buffaloes by Javed and Ahmad (1969). Several other workers found that first calving interval was little affected by the age at first calving. Singh and Desai (1962) observed that age at first calving did not affect calving interval in Bhadwari buffaloes. Mohan (1977) reported that correlation coefficient between age at first calving and first calving interval was non-significant.

A decrease in FCI with increased AFC as observed in the present study is not a desirable association. Improved husbandry practices are recommended to overcome the undesirable influences of the reduced age at first calving.

REFERENCES

Dutt, M. 1965. Significance of age at first calving and 305-day first lactation yield in relation to life time production, longevity and productive life in Murrah buffaloes. Ind. Vet.J. 42: 28-39 (Amin. Breed. Abst., 34: 1061, 1966).

Gurung, B.S. and S.K. Johar. 1982. Studies on factors affecting first lactation yield in Murrah buffaloes. Ind. Vet.J. 59: 521-526 (Anim. Breed. Abst., 51: 2751, 1983).

Javed, R. and M.D. Ahmad. 1969. Heritability estimates of age at first calving and calving interval in Nili-Ravi buffaloes. Pak. J. Agri. Sci. 6:79-82.

Kanaujia, A.S. and D.S. Balaine. 1975. Factors affecting some production traits in Indian buffaloes. Ind. J. Dairy Sci. 28: 57-62 (Anim. Breed. Abst., 43: 4443, 1975).

Mohan, D.K. 1977. Genetic studies on some of the reproductive traits of Murrah buffaloes. Thesis Abst., Haryana Agri. Univ. 3: 255-256 (Anim. Breed. Abst., 48: 1106, 1980).

Reddy, K.M. and R.R. Mishra. 1980. Effect of age at first calving on lactation components and calving distribution in Murrah buffaloes. Ind. J. Dairy

Sci. 33: 347-350 (Anim. Breed. Abst., 50: 1427, 1982).

Salerno, A. 1960. On the length of the calving interval in the buffaloes. Ann. Fac. Agri. Portici Ser. III, 26: 18 (Anim. Breed. Abst., 29, 1418, 1961).

Singh, S.B. and R.N. Desai. 1962. Production characters of Bhadwari buffalo-cows. Ind Vet. J. 39: 335-343 (Anim. Breed. Abst., 31: 1015, 1963).

Singh, S.P. and J. Prasad. 1983. To study the correlation of certain body measurements, age at first calving and body weights at different age levels with total milk and butter fat production in Murrah buffaloes and Red Sindhi cows. Livestock Advisor, 8: 47-49 (Anim. Breed Abst., 51: 4156, 1963).

Steel, R.G.D. and J.H. Torrie. 1980. Principles and Procedures of Statistics. McGraw Hill Kogakusha Ltd., Tokyo.