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STUDIES ON NILI-RAVI BUFFALOES IN PAKISTAN. 2. EFFECT OF YEAR AND SEASON OF CALVING ON SERVICE PERIOD AND CALVING INTERVAL

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Data on 4977 breeding records of 1530 Nili-Ravi buffaloes maintained at Livestock Experiment Station, Bahadurnagar (Okara) during 1939-85 were analyzed to study the effect of year and season of calving on service period and calving interval. The service period and calving interval averaged 217.03 $\pm$ 2.79 and 522.72 $\pm$ 2.66 days, respectively. The service period in different years and seasons varied significantly. The service period was the minimum (188 days) in buffaloes calving during spring. The calving interval also varied significantly due to year and season of calving. The average calving interval was the shortest (495 days) among the buffaloes calving during hot humid season and was the longest (585 days) among the buffaloes calving during spring season.

INTRODUCTION

The buffalo has been accused for late age at first calving and long calving interval resulting in reduced reproductive efficiency, calf crop and milk yield on lifetime basis. In order to curtail the unproductive period, reduction in the length of calving interval seems inevitable . Since this parameter appears to have low genetic variability and is considered to be mainly influenced by environmental factors, the present study was undertaken to determine the effect of year and season of calving on the service period and calving interval in Nili-Ravi buffaloes.

MATERIALS AND METHODS

Data on 4977 breeding records of 1530 Nili-Ravi buffaloes maintained at Livestock Experiment Station Bahadurnagar(Okara) during 1939—85 were utilized in the present study. The breeding records of buffaloes having lactation of less than 6 months duration were not used in this study. Incomplete lactations for any recorded reason or those which followed a stillbirth, abortion or premature birth were also not included in the analysis. In all, records of 3507 service periods and 3782 calving intervals were available for analysis. Keeping in view the climatological data, the year was divided into five seasons viz. winter, spring, hot dry summer, hot humid summer and autumn. The effect of year and season of calving on service period and calving interval was studied by the analysis of variance technique based on the approximate method of unweighted means with disproportionate sub-class number (Bancroft,1968). Means of the traits in different seasons were compared for significance by Duncan's Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

The average service period and calving interval in different seasons have been given in Table 1.

Service Period: The average service period in Nili-Ravi buffaloes was 217.03 ± 2.79 days with 76.03% coefficient of variation(Table 1). The service period in different years and seasons varied markedly. The analysis of variance revealed highly significant differences in service period due to year and season of calving (Table 2).

The paired comparison of seasonal means of service period revealed significant differences among themselves (Table 1). The service period was the minimum (188 days) in buffaloes calving during hot humid season, followed by those calving during hot dry season (212.62 days). The service period was, however, the longest (280.12 days) in buffaloes calving during spring. The estimate of service period as obtained in the present study was substantiated by several workers (Ahmad et al., 1983; Reddy and Taneja, 1984), who reported that the service period ranged from 200 to 222 days.

Table 1. *Average service period and calving interval in Nili-Ravi buffaloes in different seasons*

Seasons	Traits			
	Service period (days)		Calving interval (days)	
	No. of records	Mean ± SE	No. of records	Mean ± SE
Winter	460	268.34 ± 7.14[a]	488	576.85 ± 6.03[a]
Spring	257	280.12 ± 10.90[b]	271	585.03 ± 9.89[a]
Summer(dry)	435	212.62 ± 10.21[c]	481	514.22 ± 20.02[b]
Summer(humid)	1483	188.00 ± 4.04[d]	1598	494.59 ± 3.98[c]
Autumn	872	222.95 ± 5.95[e]	944	528.78 ± 5.30[b]
Overall	3507	217.03 ± 2.79	3782	522.72 ± 2.66
Coefficient of variation (%)		76.03		31.30

The figures having the same superscript do not differ significantly.

Calving Interval: The calving interval in the present study averaged 522.72 ± 2.66 days with 31.18% coefficient of variation (Table 1). The estimate of calving interval in the present study was substantiated by the findings of many workers (Cady et al., 1983; Reddy and Taneja, 1984). According to these workers the calving interval in buffaloes ranged from 508 to 548 days.

The calving interval in Italian, Bulgarian and Romanian buffaloes ranged from 409 to 508 days, which was comparatively shorter than the calving interval obtained in the present study (Succi and Roy Choudhry, 1968). The calving interval in Murrah and other Indian buffaloes was also reported to be shorter than Nili-Ravi buffaloes

(Kanujia, 1978; Roy et al.,1981). According to these workers, the calving interval ranged from 434 to 487 days.

The calving interval in Nili-Ravi buffaloes in Pakistan was reported to range from 430 to 467 days (Ashfaq and Mason, 1954; Asghar et al., 1985), which was not in agreement with the estimate of calving interval in the present study. However, Hamid et al. (1985) reported that the calving interval in Nili-Ravi buffaloes at the Commonwealth Livestock Farm Rakh Ghulaman, Mianwali averaged 564 days, which was higher than that of present study.

The analysis of variance revealed a significant effect of year and season of calving on calving interval (Table 2). The paired comparison of seasonal means of calving

Table 2. *Analysis of variance of service period and calving interval in Nili-Ravi buffaloes calving in different years and seasons*

Service period			Calving interval		
Source of variation	D.F.	M.S.	Source of variation	D.F.	M.S.
Years	46	17844.84**	Years	46	19235.36**
Seasons	4	64950.81**	Seasons	4	64482.77**
Years x seasons	184	5057.03*	Years x seasons	184	2711.37NS
Error	3272	3817.72	Error	3547	3288.49

* = Significant(P <0.05); ** = Significant (P < 0.01); NS=Non-significant.

interval showed significant differences in different combinations except winter and spring, where the differences were non-significant. The average calving interval was the shortest (494.59 days) among the buffaloes calving during hot humid season, followed by buffaloes calving during hot

dry season (514.22 days). However, the buffaloes calving dur[illegible] spring season showed the longest (585.03 days) interval (Table 1). The variations in calving interval due to year and season of calving are in line with the findings of several workers (Cady et al.,1983; Reddy and Taneja, 1984). Similarly, the significant influence of season of calving on calving interval in buffaloes was also inagreement with the findings of several other workers (Kanaujia, 1978; Reddy and Taneja, 1984).

The calving interval has a great economic bearing on the lifetime productivity of dairy animals. In order to reduce the unproductive period and to enhance calf crop during the lifespan of dairy animals, reduction in the length of calving interval seems most important. Ashfaq and Mason (1954) observed that calving interval was reduced from 20 months to less than 13 months as a result of improvement in the management of Nili-Ravi buffaloes at Bahadurnagar during 1947-51.

The calving interval in farm animals is by and large determined by the service period. The phenotypic correlation between these two traits has been reported to be 0.98 (Basu, 1985). The service period in buffaloes is generally reported to be very long because of silent heat, anovulatory heat, ovarian inaotivity during some seasons of the year, embryonic mortality and infertile services, etc. In general, calving interval of the buffaloes calving from December to June is longer than those calving from July to November because of longer service period in buffaloes calving in winter and summer.

The standard deviation and coefficient of variation for service period in the present study were 165.10 days and 76.03% and the standard deviation and coefficient of variation for calving interval were 163.60 days and 31.30% respectively (Table 1). This indicated that service period was a highly variable trait, while calving interval was less variable. Since calving interval is the linear combination of gestation period and service period, the former being only 3% variable (Basu, 1985), thus most of the variations in service period can be attributed to non-genetic

factors related to feeding, management, climate and intensity of breeding operations. The initiation of breeding at 45 to 50 days post-calving coupled with an intensive programme of heat detection and efficient practices of insemination will significantly shorten the calving interval.

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