

## SERVICE PERIOD AND CALVING INTERVAL AS INDICES OF REPRODUCTIVE PERFORMANCE OF COWS UNDER FIELD CONDITIONS

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### SUMMARY

Data on 430 artificially inseminated and 257 naturally bred cows was used to determine the service period and calving interval. Combined together the service period mean  $\pm$  S. E. was calculated to be  $160.5 \pm 3.55$  and calving interval (mean  $\pm$  S. E.) to be  $400.88 \pm 5.64$  days. The service period and calving interval for the artificially inseminated cows were  $152.73 \pm 4.74$  and  $387.24 \pm 7.50$  days respectively. The corresponding values for naturally bred cows were  $182.48 \pm 4.80$  and  $423.69 \pm 8.11$  days respectively. The artificially inseminated cows had shorter service period and calving interval. The possibility to reduce service period and calving interval is discussed.

### INTRODUCTION

In Pakistan, livestock production accounts for about a percent of gross domestic product (Anwar et al. 1991). If the livestock population is allowed to increase with existing rate, there will be 21 million cattle in the country by year 2000 (Sial, 1991) for less than required to meet the national requirement of milk and meat. Efficient reproduction has a direct bearing on enhanced productivity. The term reproductive efficiency is used as a measure of net biological accomplishment. Production of one calf per year per cow maximizes milk production in the average dairy cow. Unfortunately this interval is

extended several months and this delay in conception is costly.

A shortening of service period by one day resulted in daily milk yield increases of 5-7 liters, and shortening of calving interval by one oestrous cycle resulted in a total gain of 105-147 liters of milk (Kvapilik et al. 1989). The need for improving the per head productivity of livestock in country is imperative to cope with future demand. Existing state of knowledge of the reproductive function is essential to maximize fertility and to understand and minimize abnormal reproduction to overcome some of the obstacles of productivity enhancement in cattle. The present project was thus planned to evaluate the existing status of reproductive performance of cow by assessing the service period and calving interval under field conditions.

### MATERIALS AND METHODS

Data for the present study were collected from the clinical records of the cows, brought to the clinic of the Department of Animal Reproduction, University of Agriculture, Faisalabad, for artificial insemination and pregnancy testing, during the years 1988-92. Incomplete record cards were excluded from the study. Information obtained on 687 cows was used to study the service period and calving interval. The animals were grouped according to the natural breeding and artificial insemination. A total of 430 cows were bred by

artificial insemination and 257 by natural breeding.

#### a) Service period

The period in days, between date of normal calving and date of subsequent conception was taken as service period. The data were arranged at 60 days interval so to determine the frequency distribution.

#### b) Calving interval

The period between two consecutive calvings in days was counted as calving interval. The data

were arranged at an interval of 120 days to determine the frequency distribution. The means  $\pm$  s. d. for both the service period and calving interval was calculated.

## RESULTS AND DISCUSSION

### Service period

The data from 430 artificially inseminated and 257 naturally bred cows revealed that the service period (mean  $\pm$  S. E.) was  $152.73 \pm 4.74$  and  $182 \pm 4.80$  days respectively. The service period

Table (1): Frequency distribution for service periods in artificially inseminated cows.

Length of service period (days)		Frequency of service periods		
From	To	Total	Percentage	Cumulative percentage
Upto	60	37	8.60	0.60
61	120	122	28.37	36.97
121	180	132	30.69	67.66
181	240	75	17.46	85.12
241	300	19	4.44	89.56
301	360	35	8.13	97.69
361	420	2	0.46	90.15
421	480	2	0.46	90.61
481	540	4	0.93	99.54
541	600	.	.	.
601	660	.	.	.
661	720	2	0.46	100.00
Total:		430	100.00	

Mean = 152.733  
 Standard deviation = 98.395  
 Standard error = 4.745

ranged from 24 to 720 days, with an average of  $160.50 \pm 3.55$  for both the groups combined together. The frequency distribution of service period is presented in Tables 1, 2 and 3. To achieve an ideal calving interval of 1 year the cow must conceive within 85 days though majority of cows are not bred until 20 days postpartum (Britt, 1975). This study revealed that out of 430 artificially inseminated cows only 36.97 percent cows had the service period upto 120 days and another 30.69 percent were served between 121 to 180 days postpartum. The corresponding values for 257 naturally bred cows were 22.95 percent and 29.96 percent respectively.

existent variation and on the other hand the potential of reducing the service period. The service period is principally affected by postpartum oestrous interval and conception rate at the bred oestrous or a combination of both.

### Calving interval

The average calving interval was found to be  $387.24 \pm 7.51$  and  $423.69 \pm 8.11$  days for artificially inseminated and naturally bred cattle respectively (Table 4-6).

The frequency distribution for calving interval has been presented in Tables 4, 5 and 6. Only 22.95 percent cows had a calving interval of upto 400 days and 57.97 percent cows had a calving interval between 401 and 520 days. A large number of studies previously conducted (Menendez et al. 1984; Chowdhury et al. 1988; Novy et al. 1988; Drumond, 1989; Agyemang et al. 1990; Meirelles et al. 1991 and Deshmukh et

Table (2): Frequency distribution for service periods in naturally bred cows.

Length of service period (days)		Frequency of service periods		
From	To	Total	Percentage	Cumulative percentage
Upto	60	5	1.94	1.94
61	120	54	21.01	22.95
121	180	77	29.96	52.91
181	240	72	28.01	80.92
241	300	18	7.02	87.94
301	360	31	12.06	100.00
Total:		257	100.00	

Mean = 182.484  
 Standard deviation = 77.064  
 Standard error = 4.807

Almost similar length of service period has been reported by Dutt et al. (1974), Shāarma and Bhatnagar (1975), Carmona and Soto (1987), Anta and Tahir et al. (1988), Chaudhry et al. (1989) and Rao (1990). A much longer service period has been reported previously by Temblador and Sanchez (1977) Mirza et al. (1985) and Martinez et al. (1987). However, a significantly lower service period than that revealed during this study has also been reported by Kupferschmied (1975) Gel' Lbert et al., (1990), Podzo et al. (1990), Baryshev et al. (1990), Furstenberg et al. (1990), Juma et al. (1990) Lisenkov (1991), Deshmukh et al. (1992), Khatker et al. (1992), and Dhumal et al., (1992), indicating on one hand the large

Table (3): Over all frequency distribution for service periods

Length of service period (days)		Frequency of service periods		
From	To	Total	Percentage	Cumulative percentage
Upto	60	42	6.12	6.12
61	120	176	25.62	31.34
121	180	209	30.42	62.16
181	240	147	21.39	83.55
241	300	37	5.38	88.93
301	360	66	9.62	98.55
361	420	2	0.29	98.84
421	480	2	0.29	99.13
481	540	4	0.50	99.71
541	600	-	-	-
601	660	-	-	-
661	720	2	0.29	100.00
Total:		687	100.00	

Mean = 160.500  
 Standard deviation = 93.552  
 Standard error = 3.552

Table (4): Frequency distribution for calving interval in artificially inseminated cows.

Length of calving interval (days)		Frequency of service periods		
From	To	Total	Percentage	Cumulative percentage
Upto	400	159	36.98	36.98
401	520	207	48.15	85.13
521	640	54	12.55	97.68
641	760	4	0.93	98.61
761	880	4	0.93	99.54
881	1000	2	0.46	100.00
Total:		430	100.00	

Mean = 387.244  
 Standard deviation = 155.728  
 Standard error = 7.510

Table (5): Frequency distribution for calving interval in naturally bred cows.

Length of calving interval (days)		Frequency of service periods		
From	To	Total	Percentage	Cumulative percentage
Upto	400	59	22.95	22.95
401	520	149	57.97	80.92
521	640	49	19.00	100.00
Total:		257	100.00	

Mean = 423.691  
 Standard deviation = 130.037  
 Standard error = 8.111

Table (6): Over all frequency distribution for calving interval.

Length of calving interval (days)		Frequency of service periods		
From	To	Total	Percentage	Cumulative percentage
Upto	400	218	31.77	31.77
401	520	356	51.00	83.57
521	640	103	14.98	99.55
641	760	4	0.58	99.13
761	880	4	0.58	99.71
881	1000	2	0.29	100.00
Total:		687	100.00	

Mean = 400.878  
 Standard deviation = 147.702  
 Standard error = 5.635

## Cows Under Field Conditions

al. 1992) have also reported a calving interval of greater than 400 days. However, a few workers (Meirelles et al. 1988, Filseth, 1990, Cori et al. 1990, Agabriel et al. 1992; Bittante et al. 1992), have reported the average calving intervals of less than 400 days closer to the ideal calving interval of 1 year in cattle of different breeds in different geographical areas.

Since the calving interval has two components i.e. the service period and gestation period, the gestation period being constant, it is the service period that determines the length of calving interval. This has been reflected in this study where the calving interval in artificially bred cows is comparatively shorter due to the shorter service period compared to those bred naturally.

The results of this study favour the artificial breeding if both the service period and calving interval are taken into account. The other contributing factor, as mentioned by other workers referred above may be the breed differences, season, managemental and environmental factors, demography and variation in sample size. This study however, clearly favours artificial breeding over natural breeding and also draws our attention to the possibility of reduction in service period if the above mentioned factors are given due significance to achieve the ideal calving interval of one year under field conditions.

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