An Analytical Study of Reproductive Performance in Gir Cows

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ABSTRACT

Today India stands first in milk production in the world but average consumption is still below the FAO recommended average. Gir is a milch breed, received less attention from development perspectives; hence exploration in improving its production potentiality is required. Reproduction management of livestock is vital to successful dairying, which is governed via several parameters, viz, age at first conception, first service period, first intercalving period, age at first calving and first gestation length, etc. However this study was confined to study the reproductive performance of animals in terms of age at first conception, first gestation length and age of animal at first intercalving period. This study was conducted to study the reproductive performance in 178 Gir cows at Kasturba Gram Dairy Farm, Indore, on the basis of records available at the farm, for which 24 years data were analyzed and statistically interpreted on two parameters, i.e. periodical (yearly) and seasonal basis. The results reveals that the standard error for all the three parameters, viz., age at first conception, first gestation length and age of animal at first intercalving period varied within narrow limits during the period 1976-1995 but a high variation was seen during the period between 1995-1999. However there was a non-significant relationship, w.e.f. 1976-1999 for different periods, but there was significant relationship at 5% level among different season for all the parameters, which may be assigned for a number of factors, viz., adopting advance animal husbandry practice, selecting animals of superior quality and modification in management practices during such periods.

Key words: *Gir cows; First intercalving period; Age at first conception; First gestation length; Period;*

Today the total milk production of India is, 102.9 MT and stands first in the world with an annual growth rate of nearly 4%, of which a large proportion, nearly 46% is consumed as raw milk, what is still below the FAO recommended daily consumption quantity (*FAOSTAT, 2007*). Gir is known as milch breed of dairy cows and the original tract of Gir breed is Gir hills and forests of Kathiawar including Junagadh, Bhavnagar, Rajkot and Amreli districts of Gujarat. This breed received less attention from development perspectives and requires exploration in further improving its production potentiality (*Gaur et al. 2003*).

In general, if a cow does not produce a calf, she will not produce milk. Calves are also necessary to provide replacements for the dairy herd and surplus heifers can form a very important part of the dairy farmer's income. Since, reproduction management of livestock is vital to successful dairying. Reproductive management of an animal is governed through a number of parameters, viz, age at first conception, first service period, first intercalving period, age at first calving and first gestation length etc. However this study is limited to study the reproductive management in terms of age at first conception, first gestation length and age of animal at first intercalving period.

The productive improvements among dairying animals can be made through proper management, feeding and handling, etc. which may influence expression of productive characters as per its heritability nature. Before identifying the animals for breeding and production purpose screening of animals shall be performed on the basis of physical traits. The rate of improvement in performance from selection during any intercalving is dependent on above indicated primary factors (*Patel et al. 1999*). Intercalving period is largely determined by the service period. The period and season of calving

had non-significant on calving interval in Sahiwal, Red Sindhi, Gir and haryana cows (*Mishra et al. 1980*), but the season and period had significant effect on calving interval in Gir cows.

METHODOLOGY

This study was conducted to study the reproductive performance in Gir cows at Kasturba Gram Dairy Farm, Indore (M.P.) which is situated nearly 7 km from Indore. The reproductive management of Gir cows is studied on the basis of records available at the farm, for which 24 years data were analyzed and statistically interpreted to get a clear picture of reproductive performance in them. In total, the record of 178 cows was analyzed among two parameters, i.e. periodical (yearly) and seasonal basis. However the periodical data was collected on three year basis and the codes were assigned as per below :

1976-79	- P1
1980-83	- P2
1984-87	- P3
1988-91	- P4
1992-95	- P5
1996-1999	- P6

Similarly data distributed among different seasons of the year was also grouped into four categories as per below

S1 -Summer season (April to June)
S2 -Rainy season (July to September)
S3 -Winter season (Oct. to Dec.)
S4 -Spring season (Jan. to March)

Data collected was analyzed with the help of suitable statistical techniques, viz., standard error, analysis of variance and F-test.

RESULTS AND DISCUSSION

First intercalving period: The age at which the heifer becomes a cow is her age at first calving, which usually depends on the rearing pattern and the desired generation interval. The sooner a heifer calves down, the sooner she contributes to the economy of the farm in the form of milk and calves. Therefore, the farmers must weigh up the possible extra rearing costs of calving heifers as close to two years of age. The results presented in Table 1 show the standard error and analysis of variance for first intercalving calving period of the cows. However the overall mean of first intercalving period was found to be 400 ± 18.6 days. *D'Souza et al. (1995)* observed that the heritability for first calving interval was found to be 0.06 in Gir cows. *Ulmek and Patel (1995)* reported that season of calving influence calving interval significantly in Gir cows. The date presented in table further reveals that intercalving period varied within narrow limits during the period 1976-1995 but a high variation is seen during the period between 1995-1999 but there was a mild variation in standard error among different seasons. However F-value found to be non-significant in respect to various periods between 1976-1999, but there was a significant relationship at 5% level among different season for first intercalving period. Similarly, *Mathur et al. (1994) and Gajbhiya et al. (1987)* have also reported similar data on first intercalving period in Ongole cows.

Age at first conception: The overall age at first conception in Gir cows in present investigation has been observed to be 1442.6 ± 32.4 days, which is similar to

Table 1. Mean and Standard error

Classification	No. of observations	S.E. of first intercalving periods	S.E. for age at first conception	S.E. of first gestation length
Periods:				
P1 (1976-79)	21	34.05	59.25	1.25
P2 (1980-83)	29	29.47	51.28	1.08
P3 (1984-87)	43	23.93	41.64	0.88
P4 (1988-91)	61	20.08	34.94	0.74
P5 (1992-95)	21	34.55	60.12	1.27
P6 (1996-99)	3	75.49	131.35	2.78
Season:				
S1 (April – June)	32	31.32	54.49	1.15
S2 (July – Sept)	45	27.68	40.17	1.02
S3 (Oct. – Dec.)	53	24.68	42.86	0.91
S4 (Jan. – March)	48	39.10	68.04	1.44
Overall mean (μ)	178	18.69	32.41	0.69

Singh et al. (1968) in Haryana heifer. The higher values for age at first conception in the present study was reported by *Barwe et al. (1995)* in Gir cows, but the lower values of age at first conception was reported by *Mirza et al. (1985)* in Sahiwal cows and *Novakovic et al. (2011)* reported that the lower value (508.19±9.36 days) in High Yielding Holstein-Friesian cows.

The data presented in Table-1 shows that standard error was evenly distributed among different periods from 1976-1995 but a significant high value was found for period 1996-1999 thereby making a non-significant relationship among different periods. However the standard error for different seasons was also evenly distributed and there was a significant relationship at 5% level as revealed in Table 2. This improvement may be assigned for a number of factors, viz., adopting advance animal husbandry practice and selecting animals of superior quality during such periods. However, the parameter age at first conception was found to be non-significant in respect to periods was also reported by *Mirza et al. (1985)* in Sahiwal cows.

First gestation length:

First gestation length is an important factor contributing towards the economy of the dairy enterprises. Some scientists reported that gestation length will be lengthy when the cows calved male calves and female calves takes shorter duration in Gir cows. The mean and standard error for first gestation length in Gir cows have been presented in Table 1 and Analysis of variance in Table 2.

In this study the gestation length was found to be 279.8 + 0.69 days. Similar value of first gestation period were also reported by *Sharma et al. (1989), Norman et al. (2009) and Babu Rao (1990)* whereas the lower value (273.12 1.96) were reported by Patel (1999) for Gir cows and greater value in Zebu cattle (284.4±1.1) reported by *Camargo et al. (2005)*.

Firas Rashad Al-Samarai (2008) reported that the overall means of gestation length for Holstein cows was 276.65 days and the heritability 0.21. The results revealed significant effect of season and year of calving, parity on gestation period, whereas, the sex of calf and age at first calving was not significant. Estimates of heritability were moderate (0.21) which reflect the role of the additive variation in trait variation.

The data presented in Table 1 shows that standard error was evenly distributed among different periods between 1976 to 1995 but a significant higher value was found for period 1996 to 1999, thereby justifying a non-significant relationship among different periods as indicated in Table 2. However the standard error for four different seasons was nearly evenly distributed in Table 1 but there was a significant difference at 5% level as indicated in Table 2. This could be due to fact of adopting advance animal husbandry technologies, selecting animals of superior quality and modification in management practices.

Table 2. Analysis of variance.

Source of variance	F' value for first intercalving periods	F' value for age at first conception	F' value for first gestation length
Periods	0.560 NS		
Season	109.825 *	0.710 NS	0.340 NS
Error		478.308*	38636.026*

* Significant at 5% level NS = Non significant

CONCLUSION

Earlier studies conducted have reported similar data on first intercalving period in Ongole cows. Similarly the overall age of the animal at first conception was also similar to haryana heifers, but higher values were earlier reported in Gir cows and lower values were reported in Sahiwal cows. However similar values were reported in first gestation period leads to the conclusion that the heritability estimates for all the reproductive traits were very low, which indicates major variation due to environment and improvement might came through the selection process. Hence efforts shall be directed towards reducing the age of animal at first calving through selection or other scientific means to obtain maximum economic benefit and requires further exploration in scientific manner for improving their production potentiality. Similarly the livestock owners or personnel's engaged in dairy farms shall be trained to adopt advance animal husbandry practices, selection of superior quality animals on the basis of physical, genetic and productive traits and scientific modification in various management practices in order to improve the productive performance in Gir cows.

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