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Influence of different climatic seasons, order of lactation, sex of calf and sex ratio on gestation period in Holstein-Friesian upgraded cows

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Abstract

The gestation length is genetically determined trait, which can be modified by maternal, foetal and environmental factors. A study was conducted in an organized dairy farm where five years data from 1996 to 2000 was used up and subjected to statistical analysis. It was found that the over all least squares mean gestation was estimated as 269.58 ± 1.34 days with Coefficient of Variation of 11.02 per cent. The least squares mean of gestation length for first, second, third, fourth, fifth, sixth and seventh parity cow was estimated to be 270.34 ± 2.05 , 267.58 ± 2.47 , 268.88 ± 4.62 , 274.52 ± 2.12 , 264.78 ± 7.58 , 272.78 ± 5.56 , and 284.00 ± 3.00 days, respectively with a Coefficient of Variation of 11.23, 10.64, 13.66, 5.00, 13.85, 6.12 and 1.83 per cent, respectively. The first parity cows had relatively shorter gestation period than cows in later parity. However, the difference between parity was being nonsignificant. The least squares mean for gestation length were 269.31 ± 3.20 , 270.82 ± 2.30 , 270.66 ± 2.12 and 264.41 ± 4.06 days for winter, summer, south west monsoon and north east monsoon seasons, respectively. Animals calving in summer and south west monsoon had slightly longer gestation period than animals calving in other seasons. However, the variations in the mean gestation period between the four seasons of the year were found to be nonsignificant. Further, the mean gestation length did not vary significantly between the sexes of the calves born. The values being 277.57 ± 0.74 days with a Coefficient of Variation of 3.91 per cent and 276.64 ± 0.74 days with a CV of 4.04 per cent for dams carrying male and female calves, respectively. Out of 440 calves born, 212 were males and 288 were females. The male to female ratios was 48.18: 51.82. The chi squares analysis revealed nonsignificant variation in the sex ratio ($P < 0.05$).

Keywords: Climatic seasons, order of lactation, sex of calf, sex ratio, gestation period and Holstein-Friesian upgraded cows

Introduction

Gestation length is the period between the date of fertile service and the date of calving. This period is almost invariable within individual in a breed or type^[7]. Knowledge of the gestation length of cows is of great interest to cattle breeder, because it enables him to prepare his animals by drying them off and getting them into proper condition for parturition and subsequent lactation^[15]. The gestation length is genetically determined trait, which can be modified by maternal, foetal and environmental factors and was positively correlated with the birth weight of foetus^[2].

Material and Methods

The present study was taken up to study the factors affecting gestation period in Holstein-Friesian upgraded cows. Data on 224 cows were collected from the history sheets of organized dairy farm at Bangalore covering a period of five years. To expose the seasonal variation, each year was divided into four seasons of calving as winter (January to February), summer (March, April and May), south west monsoon (June, July, August and September) and north east monsoon (October, November and December), seasons on the basis of geo-climatic conditions prevailing in the area. To know the effect of parity, the data were grouped as parity 1, 2, 3, 4, 5 and in order to cope-up with the effect of non-orthogonality of the data due to unequal subclass frequencies, method of least square analysis was employed^[3].

Results

Length of gestation

The least squares mean of gestation period along with the Standard error (SE) and Coefficient of Variation (CV) for parity and season of calving in upgraded Holstein Friesian (HF) cows are depicted in the Table 1. The over-all least squares mean gestation was estimated as 269.58±1.34 days with Coefficient of Variation of 11.02 per cent.

Effect of Parity of the dam on gestation length

The data on the duration of gestation length grouped according to sequence of calving are presented in Table 1. The least squares mean of gestation length for first, second, third, fourth, fifth, sixth and seventh parity cow was estimated to be 270.34±2.05, 267.58±2.47, 268.88±4.62, 274.52±2.12,

264.78±7.58, 272.78±5.56, and 284.00±3.00 days, respectively with a Coefficient of Variation of 11.23, 10.64, 13.66, 5.00, 13.85, 6.12 and 1.83 per cent, respectively (Table 1). The sequence of calving was found to have no definite significant effect on the time they carry their calves in utero.

Effect of season of calving on gestation length

The least squares mean of gestation period in upgraded Holstein cows in different season are presented in the Table 1. The least squares mean for gestation length were 269.31±3.20, 270.82±2.30, 270.66±2.12 and 264.41±4.06 days for winter, summer, south west monsoon and north east monsoon seasons, respectively. The variations in the mean gestation period between the four seasons of the year were found to be nonsignificant.

Table 1: Least squares mean for service period along with standard error and coefficient of variance and the factors affecting it.

Effect	Number of observation	Mean±SE	CV (per cent)
Overall mean	336	128.97±4.0	58.25
Parity			
1	83	137.17±9.09	60.37
2	48	133.88±13.85	71.67
3	147	127.24±5.55	52.94
4	18	123.56±10.76	36.97
5	34	120.03±12.29	59.71
6	6	85.67±14.36	41.06
Season			
Winter	59	121.24±9.54	60.49
Summer	91	116.27±6.75	55.45
Southwest Monsoon	103	131.63±7.64	58.93
Northeast Monsoon	73	145.86±10.88	63.75

Effect of sex of the calf on the gestation length

The mean gestation length did not vary significantly between the sex of the calves born. The values being 277.57 ± 0.74 days with a Coefficient of Variation of 3.91 per cent and 276.64± 0.74 days with a CV of 4.04 per cent for dams carrying male and female calves, respectively (Table 1).

Sex ratio

Out of 440 calves born, 212 were males and 288 were females. The male to female ratios was 48.18:51.82 (Table 1). The chi squares analysis revealed nonsignificant variation in the sex ratio ($P<0.05$).

Discussion

Gestation period

In the present study, the overall least squares mean for gestation length was found to be 269.58±1.34 days with coefficient of variations as 11.02 per cent. The mean gestation period was close to that reported by [9] in this breed and value was 266 to 289 days. The average gestation length in this breed has been reported to be as low as 266 days [9] and as high as 298 days [14].

This indicates herd variation in the breed for this trait, which could be due to the genetic quality of animals, temperature-humidity complex, sires used or age complexion of herds. The variability present in the gestation period was very low, the coefficient by variability being 11.02 per cent only, indicating that reduction of this character would be slow and difficult. It was reported [2] that the gestation period is positively correlated with the birth weight weight of foetus. Thus,

reduction in gestation would lower body weight of foetus, which may have adverse effects by increasing calf mortality. There is also danger of increasing the parturient complications by compressing the gestation period.

The effect of season of calving was nonsignificant on gestation period (Table. 1), which is in close agreement with the findings of [9] in HF and [21] in crossbred cows. However, some studies reported the season of calving to be a significant source of variation in gestation period in HF [1,6] and [12] in crossbred cows. Animals calving in summer and south west monsoon had slightly longer gestation period than animals calving in other seasons (Table 1). The results of the present study were in conformity with those of [3] in Gir cows and [4] in Sahiwal cows.

The sex of the calf was a significant source of variation in gestation length (Table 1). The male calves were carried one day longer (1.14 days) in utero than female calves. The results of the present study are in accordance with those of [16] and [3], in Gir, [4] in Sahiwal and [5] in Malvi cows.

The effect of parity was observed to be nonsignificant on gestation period. Similar findings were observed by [21] in local Boran Cows. The first parity cows had relatively shorter gestation period than cows in later parity. However, the difference between parity was being nonsignificant.

Sex ratio

Sex ratio is the most vital aspect of dairy farming, because it is more economical to produce more number of female calves for the herd replacements and for culling old and low producing females from the herd.

In the preset study, the sex ratio (% of male births) was found

to be 48.18. The sex ratio did not deviate significantly from the normal expected ratio of 50 per cent. This was in agreement with findings of [20], [17], [13], [11] and [18]. On the other hand [10] and [19] reported significantly higher frequency of male birth than that of the female birth. However, in the present study, the secondary sex ratio for the herd indicated a preponderance of female calves.

Conclusion: From the present study, it can be concluded that the supplementation of propylene glycol, bypass fat and bypass protein in early lactating period favoured the body condition and resulted in optimum BCS during peak yield.

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Ethical Matters: The Present study was a part of MVSc. Programme, indicating no ethical issues.

Conflict of interest: All the authors declares that they have no conflict of interest.

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