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LACTATION NUMBER AND SEASONAL INFLUENCE ON CALVING PATTERN AND ESTRUS IN HOLSTEIN-FRIESIAN UPGRADED COWS

Veterinary Science

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ABSTRACT

Maintenance of satisfactory fertility level is the foremost requirements for successful operation of any dairy cattle breeding programme. The intensity and duration of estrous behavior as well as the fertility of cows are influenced by environmental factors such as weather, day length, photoperiod, and ambient temperature. Some studies unequivocally demonstrated the distinct seasonality of calving in the dairy cows. A study was conducted in an organized dairy farm where five years data from 1996 to 2000 was statistically analysed. From statistical point of view, the calendar year was divided into four seasons viz. winter (Jan-Feb), summer (Mar-May) south west monsoon(Jun-Sept)and northeast monsoon (Oct-Dec) seasons based on the geo-climatic conditions prevailing in that area. To know the effect of parity, the data were grouped as parity 1, 2, 3, 4, 5 and 6.The study revealed the frequency of calving to be highest in the summer (32.91%), followed by south west monsoon (31.85 %), north east monsoon (18.35%) and least in winter season (16.78 %) displaying typically seasonal pattern of calving in the cows. The variation in the frequency of calving during different season was statistically significant (P<0.05).Pertaining to the impact of parity, it was found that the frequency of calving was highest (44.40 %) in first parity and least in seventh parity cows (0.61 %), typically displaying a progressive decline in the trend with the progression of lactation orders. The variation in the percentage of calving during different parities were statistically significant (P<0.05). Moreover, the current investigation also unveiled that the percentage of cows showing estrus was higher during south west monsoon (40.66%) followed by summer (24.28%), north east monsoon (21.09%) and winter (13.96%) season. The variation in the percent of cows exhibiting estrus during different seasons was significant (P<0.05). The percentage of cows exhibiting estrus was computed as 27.46, 28.83, 18.66, 11.68, 8.34, 3.94 and 1.06 per cent, respectively for 1st, 2nd, 3rd, 4th, 5th, 6th and 7th parity cows. The frequency of cows exhibiting estrus indicated a significantly declining trend from 3rd parity cows with advancement of order of lactation (P<0.05).

KEYWORDS

Calving pattern, Estrus, Parity, Season and Holstein-Friesian upgraded cows.

INTRODUCTION

Maintenance of satisfactory fertility level is the foremost requirements for successful operation of any dairy cattle breeding programme. The intensity and duration of estrous behavior as well as the fertility of cows are influenced by environmental factors such as weather, day length, photoperiod, and ambient temperature (Singh et al., 2013)[14] Several studies unequivocally demonstrated the distinct seasonality of calving in the buffalo species in the country. Chaudhari et al.(2015) [1] reported the calving frequency to be highest in the summer for Tharparkar cattle and winter for Vrindavani cow and noticed the incidence of estrus during summer to be highest in Tharparkar cow and lowest in Murrah buffalo while Parikh et al.(2021)[10] noticed no such seasonal influence on calving pattern in Gir cows where calvings occurred throughout the year. However, there is paucity of information on the calving pattern in relation to season and order of lactation in upgraded HF cows. Such information on many cattle breeds is scarce, which has a bearing on neonatal calf management. Hence, understanding the calving pattern of the Holstein-Friesian upgraded cows in a particular agroclimatic zone is a pre-requisite to design strategies to improve the reproductive effeiciency of the dairy farm. Considering these factors, the current study was undertaken to evaluate the occurrence of estrus and calving pattern under different parity and seasons in a well-organized dairy farm near Bengaluru.

MATERIALS AND METHODS

The present study utilized the data on 224 cows collected from the history sheets of organized dairy farm at Bangalore for a period of five years (1996-2000). The Holstein-Friesian upgraded (Local X HF) cows were properly managed under the good veterinary care. The cows were fed a basal standard diet (concentrates) based on the quantity of milk produced. In addition, the cows were fed on pasture, guinea grass, Punjab-18 variety hybrid Napier and subabul.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 6. in order to cope-up with the effect of non-orhogonality of the data due to unequal subclass frequencies, method of least square analysis was employed (Harvey, 1990)[5].

RESULTS

Calving pattern

The frequency distribution of calving pattern during different season and parity are presented in Table 1.

Effect of season on calving pattern

The frequency of calving was high in the summer (32.91%), followed by south west monsoon (31.85 %), north east monsoon (18.35%) and least in winter season (16.78 %) displaying typically seasonal pattern of calving in the cows.The variation in the frequency of calving during different season was statistically significant (P<0.05, Table 1).

Effect of parity on calving pattern

The frequency of calving was highest (44.40 %) in first parity and least in seventh parity cows (0.61 %), typically displaying a progressive decline in the trend with the progression of lactation orders. The variation in the percentage of calving during different Parities were statistically significant (P<0.05, Table 1).

Estrus and its distribution

Seasonal variation

The percentages of cows showing estrus during different seasons are presented in Table 1. In the present study, the percentage of cows showing estrus was higher during south west monsoon (40.66%) followed by summer (24.28%), north east monsoon (21.09%) and winter (13.96%) season. The variation in the percent of cows exhibiting estrus during different seasons was significant (P<0.05, Table 1).

Effect of parity

The percentage of cows exhibiting estrus was computed as 27.46, 28.83, 18.66, 11.68, 8.34, 3.94 and 1.06 per cent, respectively for 1st, 2nd, 3rd, 4th, 5th, 6th and 7th parity cows. The frequency of cows exhibiting estrus indicated a significantly declining trend from 3rd parity cows with advancement of order of lactation (P<0.05, Table 2).

Table 1. Distribution of percentage of estrus, conception and calving during different seasons

Seasons	Number of animals in oestrus	Per cent	Number of Conception	Per cent	Number of calvings	Per cent
Winter	87	16.11	82	17.1	80	16.87
Summer	188	34.81	157	32.57	156	32.91

South west Monsoon	168	34.11	154	31.95	161	31.81
North east Monsoon	97	17.96	89	18.46	87	18.35
Chi-square value		10.48		8.45		8.22

Table 2. Frequency distribution estrus, conception and calving in different lactations.

Lactation no.	Number of animals in oestrus	Per cent	Number of Conception	Per cent	Number of calvings	Per cent
1.00	227	39.00	218	42.41	218	44.4%
2.00	155	26.63	135	26.26	133	27.08%
3.00	82	14.09	67	13.03	63	12.08%
4.00	57	9.79	43	8.36	42	8.55%
5.00	39	6.70	24	4.66	23	4.68%
6.00	16	2.75	24	4.66	9	1.83%
7.00	5	0.86	3	0.58	3	0.61%
Chi-square value		106.21		94.11		105.54

DISCUSSION

Calving pattern

Several studies unequivocally demonstrated the distinct seasonality of calving in the buffalo species in the country. However, there is paucity of information on the calving pattern in relation to season and order of lactation in upgraded HF cows. Such information on many cattle breeds is scarce, which has a bearing on neonatal calf management.

In the present study, the frequency of calving was highest in the summer season (32.91%) and south west monsoon season (31.85%) followed by north east monsoon (18.35%) and least in winter (16.87%) season displaying the typical seasonal pattern of calving in the cows ($P<0.05$).

This indicated that probably climatic conditions during the start of breeding season were most favourable for inseminations leading to successful calving during summer and south west monsoon seasons.

These findings are well in agreement with the reports of Singh et al. (1982)[13] and Gupta et al. (2001)[3]. Higher number of calvings recorded in the south west monsoon season are possible due to natural tendency of the cows to breed in such a pattern that more and more calvings occur during rainy season, when plenty of feeds and feeders are available (Hafez, 2000)[4].

Similar marked seasonal trend in the incidence of calving have been reported in HF cows (Kumar and Singh, 1974; Ganapule, 1984)[2], in Friesian and Sahiwal cows (Sharma et al., 1984)[12] and in Gangatiri cows (Ray et al. 1992)[11]. However, Ganapule (1984)[2] reported 45 per cent of calving occurred during winter season. Kumar and Singh (1974)[8] have shown that maximum calvings (36.0%) in HF herd occurred between August to October and Ray et al. (1992)[11] during winter (37.01%) in Gangatiri cows. Although, seasonal variations in the frequency of calving were reported by the earlier workers as well as in the present study, the deviation in these studies could well be expected because of different breeds included and the differences in the fertility of sires and dams used. These findings indicated the seasonal variations in frequency of calvings, which could be attributed mainly to the influence of climate on the reproductive cycles of females besides other factors. Singh et al. (1986)[13] ascribed these seasonal variations to significant differences in the incidence of estrous cycle in the cows.

The present study reflected that the highest number of animals came into estrus and were inseminated in the summer and south east monsoon and witnessed the highest number of calvings. Thus, it may be concluded that the reproductive efficiency may be improved by providing congenial environment to animals through modern managemental practices suitable for different seasons.

Estrus pattern

Maximum percentage of oestrus was noticed in summer (34.81%) and south west monsoon (34.11%). More or less similar percentage of estrus were observed during north east season (17.96%) and winter (16.11%). The incidence of estrus was significantly affected by seasons as tested by chi-square test ($P<0.05$).

Higher incidence of estrus in summer and south west monsoon seasons was also observed by Gupta et al. (2004)[3]. In the present study, low variation in the incidence of estrus observed among season (summer and south west monsoon) could be because of ad libidum availability of greens even during summer.

The lower incidence of estrus in winter (16.11%) and north east monsoon (17.96%), despite the availability of green fodder, may be because of very high humidity and low ambient temperature. Significantly lower number of cows were in estrus during winter and north east monsoon as compared to summer were observed in the present study. Similar trend was also observed by Gupta et al., (2004)[3] in crossbred cows. The winter and north east monsoon might have stressed the cows due to extremely low temperature during winter and hot humid environment during north east monsoon (McDonald et al., 1995)[9].

CONCLUSION

The conclusion may be drawn that the frequency of calving was highest in the summer season and south west monsoon season followed by north east monsoon and least in winter season displaying the typical seasonal pattern of calving in the cows indicating the probable climatic conditions during the start of breeding season which were most favourable for inseminations leading to successful calving during summer and south west monsoon seasons.Further, most animals entered estrus and conceived during the summer and south east monsoon, resulting in the greatest number of calvings. Thus, the reproductive efficiency may be improved by providing congenial environment to animals through modern managemental practices suitable for different seasons.

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