Original Research

Non Genetic Factors Affecting Calving Interval in Surti Buffaloes

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Abstract

The records of 457 Surti buffaloes with 1346 lactations sired by 35 sires maintained at Livestock Research Station, Navsari Agricultural University, Navsari born during 1987 to 2012 were collected and analysed to examine the effect of non-genetic factors viz. season of birth, period of birth and parity on lactation length. The average calving interval in Surti buffaloes was found to be 447.92 ± 9.52 days. The analysis of variance revealed highly significant effect of parity but non-significant effect of period of birth and season of birth on calving interval. No effect of period of birth and season of birth on calving interval indicated breed characteristics to acclimatize with environment and managemental practice. Calving interval showed a significant decline from Parity-2 to Parity-8 indicates good reproductive management in farm.

Key words: Calving Interval and Non-genetic Factors, Surti Buffalo

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Introduction

In India, the majority of small and marginal farmers are more dependent on buffaloes than cattle for their livelihood as they also serve as an insurance against the risk of crop failure due to natural calamities (Dhanda, 2004). FAO (2000) has termed the buffalo as an important but 'an asset undervalued'. Buffalo is a triple purpose animal, being suitable for milk, meat and draught. The Surti buffalo is a reputed breed of buffalo with its origin in Charotar region of central Gujarat. High production efficiency in livestock production is an economically desirable attribute that targets ultimately for genetic up gradation. In fact, the economy of dairy industry mainly rely upon the performance parameters of dairy animals, therefore, it becomes more relevant to tackle out the means for ameliorating the performance efficiencies by developing

certain guidelines for selection (Dangar and Vataliya, 2014). It is the period between two successive calving. If the calving interval (CI) is more, the total number of calving in life time of animal will decrease with drastic effect on total life time productivity.

Thus, prolonged calving interval affects overall lifetime production and reproduction performance of an individual. The optimal length of CI in turn results in the higher life time productivity. Thus, segregation of factors like season, years and parity and their effect on trait like calving interval will enable the breeder in assessing the effectiveness of selection programme and managemental conditions over time. This will help in designing more appropriate breeding strategies to maximize genetic gain and also suggest amendments in managemental standards if desired. Therefore, the present investigation was planned with a view to study the non-genetic factors affecting calving interval in Surti buffaloes.

Materials and Methods

In order to achieve the objective, the data pertinent to production traits on 457 Surti buffaloes with 1346 lactation which were born during 1987 to 2012 and progeny of 35 sires maintained at Livestock Research Station, Navsari Agricultural University, Navsari, Gujarat, India were considered. The duration of 1987 to 2012 was divided into 4 periods; PB1 (1987 to 1992), PB2 (1993 to 1998), PB3 (1999 to 2004) and PB4 (2005 to 2012). The three seasons were delineated as winter (November-February), summer (March- June) and monsoon (July-October) on the basis of geo-climatic conditions prevailing in the region. Records of buffaloes with some specific or non-specific diseases, reproductive disorder and physical injury were excluded from the present investigation. For analysis Harvey (1990) software was used following LSMLMW mix model:

$$Y_{mijkl} = \mu + S_m + A_i + B_j + C_k + e_{ijkl}$$

Where,

Y_{ijkl} = record of lth buffalo born in ith period, jth season and kth parity

μ = population mean

S_m = random effect of m^{th} sire where m = 1to 35

A_i = fixed effect of j^{th} season where i = 1, 2 and 3.

B_j = fixed effect of i^{th} period where j = 1, 2, 3 and 4.

C_k = effect of k^{th} parity of calving where k=1, 2, 3, 4 and above.

e_{ijkl} = random error which is assumed to be normally independently distributed with zero mean and constant variance (NID, 0, σ2).

Duncan's Multiple Range Test (DMRT) as modified by Kramer (1957) was used for testing differences among least squares means.

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Results and Discussion

Least squares mean for CI was found to be 447.92 ± 9.52 days (Table 1). The CI was found in concurrence with the results obtained by Jain and Tailor (1994) and Pandya *et al.* (2013), whereas the higher CI was reported by many workers (Patel and Tripathi, 1995; Tailor *et al.*, 1997; Patel and Tripathi, 1998; Bharat *et al.*, 2004 and Warade *et al.*, 2005) in Surti buffaloes. The estimated CI was also in conformity with the results obtained by Swain and Bhatnagar (1983) and Prakash *et al.* (1989) in Murrah buffaloes. The higher CI as compared with that in present study was reported by many workers (Gupta *et al.*, 1994; Nawale, 2010; Yadav *et al.*, 2007; Gupta *et al.*, 2012; Thiruvenkadan *et al.*, 2014 and Jakhar *et al.*, 2016) in Murrah buffaloes. Moreover, Hussain *et al.* (2006) and Bashir *et al.* (2015) have reported higher CI in Nili-Ravi buffaloes as compared to the findings of the present study.

Table 1: Season of birth, period of birth and parity wise least square means and standard error for calving interval in Surti buffaloes

Factors	N	Least Square Means and Standard Error of CI (Days)
LSM	889	447.92 ± 9.52
SB1	236	444.97 ± 11.53
SB2	79	454.16 ± 15.19
SB3	574	444.63 ± 9.25
PB1	225	443.75 ± 20.43
PB2	264	420.54 ± 17.08
PB3	253	447.76 ± 14.38
PB4	147	479.63 ± 22.74
Parity 1	-	-
Parity 2	311	484.40^{a} ± 8.50
Parity 3	207	468.89^{ab} ± 9.63
Parity 4	137	449.30^{bc} ± 11.13
Parity 5	99	433.34^{cd} ± 12.75
Parity 6	73	434.80^{cd} ± 14.30
Parity 7	36	413.84^{d} ± 19.34
Parity 8	17	416.42^{d} ± 27.05
Parity 9	9	482.36^{a} ± 36.82

Mean of a trait bearing different superscript differ significantly (P<0.05)

Table 2: Analysis of variance for calving interval in Surti buffalo

	CI (Days)	
Source	**DF**	**MS**
Sire	34	22794.57
SB	2	2589.57
PB	3	23453.3
Parity	8	56785.28**
Error	842	11191.19

***** = *Significant (P<0.05), ** = Highly Significant (P<0.01)*

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From all above reports by different workers in Surti and other buffaloes, it can be clearly said that Surti buffaloes at Livestock Research Station, Navsari have optimum CI as compared to Surti buffaloes maintained at other farms and other breeds of buffaloes, which is the likely result of the better reproductive management practices followed on the farm particularly for the lactating animals. This is also an indication of more number of lactation and ultimately better lifetime productivity of the animals on the farm. Marginally lower CI was observed in monsoon born animals and it was highest in summer born animals (Table 1), differences being statistically non-significant (P>0.05; Table 2). There was no seasonal trend in CI due to season of birth. CI mainly depends on the optimum length of service period so, season of birth have not affected CI significantly.

In present study period of birth has no significant (P>0.05) effect on CI (Table 2). However, apparently period of birth 2 had lowest CI of 420.54 ± 17.08 days, whereas period of birth 4 had highest CI of 479.63 ± 22.74 days (Table 1). The effect of parity on CI was found to be highly significant (P<0.01; Table 2). There was decreasing trend in the calving interval with the advancement of age in Surti buffaloes except 9th parity. In present study parity 2 had highest CI of 484.40 ± 8.50 days, while parity 7 had lowest CI of 413.84 ±19.34 days (Table 1). Jain and Tailor (1994) observed significant effect of parity on CI in Surti buffaloes. Similar effect was observed by Patel and Tripathi (1998) and they reported decline in CI from first parity to sixth and thereafter, increase in seventh parity. Bharat *et al.* (2004) reported significant effect of parity on CI in Surti and Mehsani buffalo. Swain and Bhatnagar (1983), Gupta *et al.* (1994), Thiruvenkadan *et al.* (2014) and Jakhar *et al.* (2016) reported significant effect of parity on CI in Murrah buffalo. Further, Thiruvenkadan *et al.* (2014) and Hussain *et al*. (2006) found highest CI in first parity. Bashir *et al.* (2015) found significant effect of parity on CI in Nili-Ravi buffalo. Similar findings were observed in present study.

However, contrary to present finding Charlini and Sinniah (2015) indicated that parity had non-significant effect on CI in Surti, Murrah, Nili-Ravi and their crosses.

Conclusion

Calving interval showed a non-significant effect of period of birth and season of birth indicates constant performance and constant breeding and managemental practices over the periods and seasons in the farm. As the parity increases the calving interval shows declining trend was show the animals having good reproductive performance as the parity increases.

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