



Original Research

Non Genetic Factors Affecting Lactation Length 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 least squares mean of lactation length in Surti buffaloes was found to be 310.01 ± 9.23 days. The analysis of variance revealed highly significant effect of period of birth and parity but non-significant effect of season of birth on lactation length. No effect of season of birth on lactation length indicated breed characteristics to acclimatize with environment. Lactation length showed a significant rise from Period-1 (1987 to 1992) to Period-4 (2004-2012) indicates improvement of breeding and managerial practices over the periods in the farm. As the parity increases the lactation length shows declining trend but after 6th parity it was again show increasing trend which indicates that the animals having high production potential have constant period of production and we have to give preference to such animals' in future breeding programme.

Key words: Lactation Length 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). Lactation length (LL) is one of the important traits affecting the lactation yield. Dairy animals are not selected for this economic trait because its increase can cause increase in calving interval, which is not an economically viable option. Milk production records are usually adjusted for lactation length. Many factors such as feed and fodder availability and managerial conditions along with seasonal variation affect it. Thus, segregation of factors like season, years and parity and their effect on trait like lactation length will enable the breeder in assessing the effectiveness of selection programme and managerial conditions over time. This will help in designing more appropriate breeding strategies to maximize genetic gain and also suggest amendments in managerial standards if desired. Therefore the present investigation was planned with a view to study the non-genetic factors affecting lactation length 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.

Statistical Methods

For analysis Harvey (1990) software was used following LSMLMW mix model:

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

Where,

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

μ = population mean

S_h = Random effect of sire

A_i = fixed effect of jth season where i = 1, 2 and 3.

B_j = fixed effect of ith period where j = 1, 2, 3 and 4.

C_k = effect of 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, σ^2).



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

Results and Discussion

The overall least-squares means for LL was found to be 310.01 ± 9.23 days as presented in Table 1. The estimated LL of the present study was very much similar with the results obtained by Patel and Tripathi (1994, 1998) in Surti buffaloes. However, the lower estimate of LL in Surti buffaloes was obtained by Pathodiya *et al.* (1999), Bharat *et al.* (2004), Warade *et al.* (2005) and Pandya *et al.* (2013).

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

Factors	N	Least Square Means and Standard Error of LL (Days)
μ	1346	310.01 ± 9.23
Season		NS
SB1	351	313.41 ± 9.68
SB2	117	307.34 ± 10.95
SB3	878	309.28 ± 9.20
Period		**
PB1	325	$289.88^c \pm 12.12$
PB2	409	$290.93^c \pm 10.95$
PB3	380	$315.64^b \pm 10.90$
PB4	232	$343.60^a \pm 15.39$
Parity		*
Parity 1	457	$1044.77^c \pm 37.70$
Parity 2	311	$1137.60^b \pm 38.60$
Parity 3	207	$1217.28^a \pm 40.18$
Parity 4	137	$1211.35^a \pm 42.38$
Parity 5	99	$1220.72^a \pm 45.06$
Parity 6	73	$1164.98^{ab} \pm 48.18$
Parity 7	36	$1170.11^{ab} \pm 58.86$
Parity 8	17	$1053.53^c \pm 76.91$
Parity 9	9	$1044.66^c \pm 100.68$

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

The higher estimates of LL in Murrah buffaloes as compared to the results of present study were obtained by Jain and Taneja (1982), Gupta *et al.* (2012) and Sigdel *et al.* (2014) whereas lower estimates of LL in the same breed were found by Thiruvankadan *et al.* (2014) and Jamuna *et al.* (2015). However reports by Umrikar and Deshpande (1985), Yadav *et al.* (2002), Pandey *et al.* (2015) and Jakhar *et al.* (2016) in Murrah buffaloes were comparable with the findings of the present study. Comparable results with that of present findings were also found by Chaudhry (1992) in Nili-Ravi and by Bharat *et al.* (2004) in Mehsana buffaloes. The lower estimates for LL have been reported in Mehsana (Tajane and Siddiquee, 1985) and in Surti, Murrah, Nili-ravi and their crossed buffaloes (Charlini and Sinniah, 2015). The results of the present study

pertaining to LL in Surti buffaloes are very much comparable with the findings of the same in Surti and other Indian breeds of buffalo and also reveal that the animals on the farm have optimum time period for the productivity and so as the production. The differences in LL due to season of birth were found to be statistically non-significant ($P>0.05$) in present study (Table 2). Similar finding was agreement with the report of Thiruvankadan *et al.* (2014) in Murrah buffalo.

Table 2: Analysis of variance for lactation length in Surti buffalo

Source	LL (Days)	
	DF	MS
Sire	34	11111.53**
SB	2	2166.45
PB	3	16838.5**
Parity	8	9594.91*
Error	1298	4265.39

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

The least squares analyses of variance for different factors affecting LL have been presented in (Table 2). The analysis revealed highly significant ($P<0.01$) effect of period of birth on LL in Surti buffaloes. These results revealed that there was periodic trend in the LL due to period of birth. Highest LL was found in period of birth 4 (343.60 ± 15.39 days) viz. animals born during the period 2005-2012 (Table 1). Reports on effect of period of birth on LL are scanty, so the results of this study could not be correlated with the results of other researchers.

Parity had significant ($P<0.05$) effect on LL (Table 2) in present findings. Parity 6 (296.84 ± 11.48 days) and 7 (301.01 ± 13.94 days) had lower LL as compared to other parities (Table 1). Parity 8 had highest LL of 325.34 ± 18.12 days followed by parity 1 of 321.23 ± 9.09 days. In general decreasing trends were observed in LL with advancement of age except parities 8 and 9. Significant effect of parity on LL have been reported by Swain and Bhatnagar (1983), Thiruvankadan *et al.* (2014), Sigdel *et al.* (2015) and Jakhar *et al.* (2016) in Murrah buffalo. Further, Swain and Bhatnagar (1983) found highest LL in first parity. Thiruvankadan *et al.* (2014) reported decline in LL with the advancement of parity as observed in our study. Chaudhry *et al.* (1992) and Tajane and Siddiquee (1985) reported significant effect of parity on LL in Nili-Ravi and Mehsani buffaloes respectively. However, Patel and Tripathi (1998) had reported no significant effect of parity on LL in Surti buffalo.

Conclusion

Lactation length showed a significant rise from Period-1 (1987 to 1992) to Period-4 (2004-2012) indicates improvement of breeding and managerial practices over the periods in the farm. As the parity increases the lactation length shows declining trend but after 6th parity it was again show increasing trend which



indicates that the animals having high production potential have constant period of production and we have to give preference to such animals' in future breeding programme.

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