



Studies on seasonal effect of calving on reproduction and production traits of Murrah buffaloes

RAM MILAN¹SANJEEV KUMAR² RRK SINHA³ AND RP TEWARI⁴

Department of Animal Husbandry and Dairying, CS Azad Uni. of Agri. & Tech. Kanpur,
Uttar Pradesh, India

ABSTRACT

The effect of various seasons (winter, summer, rainy and autumn) of calving on service period, dry period, lactation period and lactation milk yield of Murrah buffaloes was studied. The study reveals that the overall mean service period was recorded 110.68 ± 3.27 (days). However, the longest service period was recorded in winter calvers 165.59 ± 9.67 (days), whereas shortest service period was 98.43 ± 4.62 (days) in rainy season calvers. The effect of season of calving on service period was to be highly significant. The overall mean dry period was 136.16 ± 3.29 (days). The longest and smallest dry periods were recorded 156.86 ± 9.59 (days) and 131.07 ± 4.70 (days) in winter and rainy season calvers, respectively. The effect of season of calving on dry period was non-significant. The overall lactation period was 296.58 ± 4.15 (days). Further, the study also indicated that longest lactation period were recorded as 323.63 ± 13.47 (days) in summer while shortest lactation period was recorded 283 ± 5.99 (days) rainy calvers. The effect of season of calving on lactation period was significant. The maximum and minimum lactation milk yield were 1735.04 ± 105.47 (litres) and 1514.26 ± 91.96 (litres) in summer and winter calvers, respectively. The effect of season of calving on lactation milk yield was non-significant in Murrah buffaloes.

Keywords: Murrah buffaloes, season, calving, service period, dry period, lactation period, milk yield



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INTRODUCTION

India possesses the best genetic resource of buffaloes in the world, which are well recognized by some of the best dairy breeds viz: Murrah, Nili-Ravi, Jaffarabadi, and Mehsana. The murrah breed is the best milch breed and is predominant in the states of Haryana, Punjab, Uttar Pradesh and Delhi. Many livestock, Dairy institutes, Agricultural universities, cattle farms in India reared breed of Murrah buffaloes. Murrah is the most documented breed of the buffaloes for various growth, reproduction and production (Sethi, 2007 and Thiruvankadan *et al.*, 2010, Kumar *et al.*, 2017). Murrah is one of the superior breeds of Indian buffaloes with a population of 20.49 million, which constitutes around 65% of Indian buffaloes of well-defined breeds. Haryana (Jhajjar, Rohtak, Bhiwani, Jind) is the home tract of Murrah buffaloes but the graded Murrah buffaloes are found throughout the country owing to its higher milk production potential coupled with adaptation to wide ecological conditions and feed conversion efficiency.

The milk production in India is non-uniform and has well defined seasonal variability. Major proportion of milk produced during winter season which is known as flush season, while milk production is reduced during summer and is called lean season. The cost of milk production and its sale price fluctuate accordingly. Buffaloes contribute a large proportion, 71.3 million tones milk (53%) of total milk production in India (Annual Report 2013-14 Central Institute

for Research on Buffaloes, Hisar). Consequently, it was considered most appropriate to study, the effect of season of calving over the service period, dry period, lactation period and lactation milk yield, as these traits are directly related to total milk production and milk production is associated with calving of milch animals. The effect of season of calving was studied by Kumar (2015), Yadav *et al.* (2003), Khan *et al.* (2009), Suresh *et al.* (2004), and Sharma *et al.* (2010) on service period while Dutt *et al.*, 2001, Chakraborty *et al.*, 2008 on dry period. Further, Wakchaure (2008), Jain (2009), Gupta (2009), Pandey *et al.* (2015) and Jhakar *et al.* (2016) studied on lactation period whereas Singh *et al.* (2011), Thiruvankadan (2011), Sahoo *et al.* (2014), Pandey *et al.* (2015), Kumar *et al.* (2015), Jakhar *et al.* (2016) and Kumaravel *et al.* (2006) on lactation milk yield; but so far not sufficient work has been done on Murrah buffaloes. Therefore, the study of Murrah buffalo with respect to the effect of season of calving on service period, dry period, lactation period and lactation milk yield were carried out.

MATERIALS AND METHODS

The study was conducted on Murrah buffaloes and data were collected from the records of the dairy farm of the Chandra Shekhar Azad University of Agri. & Tech., Kanpur. In all, 341 observations of the service period, 364 dry periods, 400 lactation periods in days and 410 lactation milk yields in liters were recorded. The four seasons in a year namely winter (December to February), Summer (March to May), Rainy (June to August) and Autumn (September to November) were designated as S1, S2, S3, and S4, respectively. Service period was calculated by subtracting the date of the previous calving from the date of successive service of the individual, while dry

¹Programme coordinator/Senior scientist cum Head, KVK, Nalanda

²Asstt. Prof., Deptt. of LPM, B.V.C., Patna Bihar Animal Sciences University

³Asso. Prof. (Ret.) Department of A.H. and Dairying, CS Azad Uni. of Agri. & Tech, Kanpur, Uttar Pradesh, India

*Corresponding Author Email : ramm.milann@gmail.com

period was estimated by subtracting the date of drying from the date of next calving. However, lactation period was counted by subtracting the date of calving from respective date of drying whereas; lactation milk yield was recorded from the milk records maintained at University dairy farm. The mean, standard error (S.E.) of mean and co-efficient of variation were calculated according to [Snedecor and Cochran \(1968\)](#). Complete Randomized Design (CRD) was adopted and analyses of variance were calculated to test the significance of the variation ([Snedecor and Cochran 1968](#)).

RESULT AND DISCUSSIONS

Reproduction and Production parameters are the key to the success of dairy farming and parameters like service period, dry period, lactation yield and lactation length are the mirrors of success in dairy farming.

Service Period

It is evident ([Table 1](#)) that the overall mean for service period was obtained as 110.68 ± 3.27 days. The analysis of variance revealed that there is highly significant effect of season of calving ($P < 0.001$) on service period.

Table 1: The arithmetic means and standard error (S.E.) of Service Period

Season of Calving	Service Period (Days)
Winter season (S ₁)	165.59 ± 9.67
Summer season (S ₂)	137.22 ± 10.07
Rainy Season (S ₃)	98.43 ± 4.62
Autumn season (S ₄)	100.14 ± 6.19
Over all mean	110.68 ± 3.27

The buffaloes which calved during rainy (S₃) and autumn (S₄) seasons had smaller service period, while winter (S₁) season calver had longer, in contrary to that [Khan et al. 2009](#) reported in Nili-Ravi buffaloes and crossbred cows that calving in winter had fewer days open than those calving in summer.

The significant effect of season of calving obtained in our study which has also been reported by [Jakharet al. \(2016\)](#) which is almost similar to the present study, they found service period was 187 days. Similarly, [Patil \(2011\)](#) and [Suresh et al. \(2004\)](#) also found significant effect of season of calving on service period. The service period which is directly related with the calving interval of the animal and their productive life is the most important traits that an animal should not have more than 100-120 days of the service period. In contrary to that [Wakchaure \(2008\)](#) and [Gupta \(2009\)](#) found non-significant relationship with a season of calving.

Table 2: The arithmetic means and standard error (S.E.) of Dry Period

Season of Calving	Day Period (Days)
Winter season (S ₁)	156.86 ± 9.59
Summer season (S ₂)	136.00 ± 10.34
Rainy Season (S ₃)	131.07 ± 4.73
Autumn season (S ₄)	136.31 ± 6.08
Over all mean	136.16 ± 3.29

Dry Period

It is evident from [Table 2](#) that the mean and S.E. for dry period of Murrah buffaloes was obtained as 136.16 ± 3.29 days and this trait had no significant effect on season of calving.

The smallest dry period (131.07 ± 4.73 days) was in rainy (S₃) season calvers, but the highest dry period was 156.86 ± 9.59 days in winter calvers. The effect of season of calving was reported as non-significant by [Wakchaure et al. \(2008\)](#) and significant by [Suresh et al. \(2004\)](#). [Jakhar et al. \(2016\)](#) found 173.34 ± 5.59 days dry period in Murrah buffaloes but [Thiruvankadan et al. \(2010\)](#) found in the higher range (250.5 ± 15.9 days) in Murrah buffaloes.

Lactation Period

The [Table 3](#) shows the overall means and S.E. for the lactation period was observed as 296.58 ± 4.15 days.

Table 3: The arithmetic means and standard error (S.E.) of Lactation Period

Season of Calving	Lactation Period (days)
Winter season (S ₁)	317.92 ± 11.86
Summer season (S ₂)	323.63 ± 13.47
Rainy Season (S ₃)	283.07 ± 5.99
Autumn season (S ₄)	300.90 ± 7.55
Over all mean	296.58 ± 4.15

The analysis of variance indicated that the season of calving had non-significant ($P > 0.05$) effect on lactation milk yield in Murrah buffaloes. The non-significant effect of season of calving on lactation milk yield has also been reported by [Gupta \(2009\)](#), [Chakraborty \(2008\)](#), [Singh et al. \(2011\)](#), [Thiruvankadan \(2011\)](#), [Kumar et al. \(2015\)](#) and [Jakhar et al. \(2016\)](#) in Murrah buffaloes which was similar to our results.

The maximum milk yield was 1735.04 ± 105.47 liters in summer calvers while minimum milk yield was 1514.26 ± 91.95 liters in winter calvers. [Kumar et al. \(2015\)](#) and [Jakharet al. \(2016\)](#), found comparatively much more milk which was 2065.76 ± 41.29 litres, 2060.93 ± 20.22 litres and 2078.20 ± 31.21 litres respectively in 305 days milk production, whereas, [Pandey et al. \(2015\)](#) found the least milk which was 1365 ± 03 litres. The complete lactation milk yield of buffaloes fluctuated due to change in feeding and management of the herd, climate changes in different years.

CONCLUSION

This study concluded that rainy season calvers of Murrah buffaloes had shortest service period (98.43 ± 4.62 days) and dry period (131.07 ± 4.73 days) while summer season calvers had maximum milk yield (1735.04 ± 105.47 days) and longer lactation period (323.63 ± 13.47 days). Therefore, it is advocated that the maximum calving should be done in rainy and summer season in order to get more milk yield and more profit from Murrah buffalo rearing.

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