

## SEASONALITY OF CALVING IN BHADAWARI AND MURRAH BUFFALOES IN BUNDELKHAND, INDIA

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### ABSTRACT

The pattern of calving was documented in Bhadawari and Murrah buffaloes. Lactation records of 246 Bhadawari and 234 Murrah buffaloes were used. The climate of the Bundelkhand region is of the semi-arid type. The region is marked by extremes of temperature, reaching up to 48°C during the summer months and dropping as low as 1°C in winter. The calving pattern was similar in Bhadawari and Murrah buffaloes. Season and month had a significant effect on calving. The calving frequency was highest during the rainy season (41.87% in Bhadawari and 40.17% in Murrah) followed by the autumn season (28.5% in Bhadawari and 35.04 in Murrah). The lowest percentage of calving (4.88 in Bhadawari and 3.85 in Murrah) was observed during the summer season. The seasonal calving pattern observed in both the breeds in the Bundelkhand region follow the same seasonal calving trend as in other parts of the country and most parts of the world.

**Keywords:** Bhadawari, Murrah buffaloes, calving, seasonality, reproduction

### INTRODUCTION

The Bundelkhand region lies between 23°8'-26°30' N latitude and 78°11'- 81°30' E longitude in central India. The climate of the Bundelkhand region is of the semi-arid type. The region is marked by extremes of temperature, reaching up to 48°C during the summer months and dropping as low as 1°C in winter. During the summer season, the high temperature in the plains creates low-pressure areas that induce the movement of the monsoon. The temperature begins to rise in February and peaks in May-June. Hot breezes, locally known as *loo*, are common during this period. The rainfall distribution pattern is irregular. Approximately 90% of all rainfall in the region is caused by the monsoon, and falls from June to October. The average annual rainfall is 800-900 mm, most of which is lost to runoff. July and August are the months of maximum rainfall, while November and April are the driest months of the year.

The economy of this region is heavily dependent on livestock because of the uncertainty of the rainfall and the poor soil. The region has 4.3

million cattle, 2.9 million buffaloes, 0.22 million sheep, 2.8 million goats, 0.25 million pigs and 34 thousand other livestock including horses, donkeys and camels (livestock census 2003). Buffaloes have an important bearing on the livelihood and nutritional security of human beings in this region. There were 189 buffaloes per 1,000 human beings, whereas the country average was 95 buffaloes per 1,000 human beings. The buffaloes of the region are mostly of non-descript type; however, Bhadawari, Murrah and graded Murrah are also seen prominently. There has been a large influx of Murrah buffaloes over the past few decades for upgrading the non-descript buffaloes; as a result, Murrah-type buffaloes are more concentrated in urban and peri-urban areas for supply of milk to city dwellers.

A continuous supply of milk is required at the consumer level, but buffaloes do not meet such a demand as they have tendency to calf more in one season another. In spite of large the populations of cattle and buffaloes, the increasing demand for milk is not fully met in the Bundelkhand region, particularly in the summer season, when the requirement is even greater compared to the winter season. The biggest limiting factor influencing the productivity of the buffaloes is the seasonality in displaying oestrus, conception rate and calving rate (Shah *et al.*, 1989; Singh and Lal, 1994; Srivastava and Sahni, 1999). This may be the cause of the prolonged intercalving period since buffalo calving during the unfavorable season may not resume their ovarian activity until the following favorable season, decreasing their reproductive efficiency. No report is available on the seasonal trend in the calving of the buffaloes in this part of the country. The objective of the study was to document the calving pattern of Bhadawari and Murrah buffaloes in the Bundelkhand region of India.

## MATERIALS AND METHODS

A herd of Bhadawari and Murrah buffaloes is maintained at the Indian Grassland and Fodder Research Institute, Jhansi (UP), India. The buffaloes were maintained under an intensive system of management, and their nutrient requirements were met as per standard. Data on 246 lactations of Bhadawari and 234 lactations of Murrah buffaloes were used for this study. Data included calving over a period of 8 years, from 2002 to 2009. Keeping in view the climatological data, the year was divided into five seasons: winter (December to January), spring (February to April), summer (May to June), rainy (July to September) and autumn (October to November). The statistical analysis of data was done using SPSS Ver. 13.

## RESULTS AND DISCUSSION

The highest percentage of calving took place in the months of August and October 19.12 and 18.69 percent, respectively followed by September, when 13.01 percent buffalo calvings occurred. The calvings in the month of July, November, December and January were 9.75, 9.34, 7.31 and 8.13 percent, respectively. The lowest percentage of calving (1 to 4) took place in the months of February to May in Bhadawari buffaloes. A similar calving pattern was observed in the Murrah buffaloes (Figure 1).

When the data were grouped according to the various seasons, the highest percentage of calving (41.87) took place in the rainy (July to September) season, which was followed by the autumn (28.05) and the winter seasons (15.45). The lowest percentage (4.88) of calving was recorded in the summer season in Bhadawari buffaloes. A similar pattern of calving was recorded in Murrah

buffaloes (Figure 2). Analysis of variance showed a significant effect ( $P>0.01$ ) of month and season on calving.

The results of the present study indicated that the rainy and the autumn seasons were the main calving seasons for buffaloes, when more than 70% of the calving took place. The findings of the present study were in accordance with the findings of Hassan *et al.* (2007) and Hussain (2007) in Nili Ravi buffaloes in Pakistan. Anonymous (2008) also reported the main calving period between July to December in Murrah, Pandharpuri, Jaffrabadi and Surti buffaloes Haryana, Maharashtra, Gujrat and Rajasthan states, respectively. Sule *et al.* (2001) confirmed a distinct seasonality in breeding behavior in Surti buffaloes reared in Rajasthan. The monthly and seasonal calving pattern of Surti buffaloes indicated that buffaloes calved round the year but have a tendency to calve more during the rainy season (July to September) followed by the winter season (October to January). The rainy period and the winter period appeared the most favorable seasons while the summer appeared the most unfavorable season for buffalo reproduction. Reddy *et al.* (1999) also reported August to November the most favorable period for reproduction in Murrah buffaloes. Agrawal (2003) reported that a determining factor in production and reproduction of farm animals all over the world is environment. Season affects the breeding efficiency, and buffaloes have tendency to performance better during the cool months; 70-80% of calvings in buffaloes occur between July and January. Misra and Sengupta (1965) reported that in India, the buffalo's sexual vigour declines during the summer and improves with the onset of the colder season. El-Sheikh (1987) reported more than 63% calvings occurred during the colder season in Egyptian buffaloes. The colder season in

Egypt is characterized by optimum temperatures and an abundance of nutritious pasture fodder for the lactating buffalo and her offspring.

According to Shah *et al.* (1989), high environmental stress together with under-nutrition (during the summer season, farmers are unable to fulfill the fodder requirements of buffaloes because of less fodder availability during this period) might be responsible for the long periods of seasonal anoestrus in buffaloes. Similar effects of these factors on oestrus activity were also reported by McCool *et al.* (1987) in Australian swamp buffaloes. However, Borghese (2005) reviewed the calving seasonality in buffaloes and reported that the reproductive seasonality in the buffalo does not seem to depend on diet, food availability or metabolic status, while climate and particularly photoperiod, depending on melatonin secretion play, a vital role. Melatonin is a hormone secreted by the pineal gland during the night and represents the endocrinal signal of the light-dark rhythm in the environment. Parmeggiani *et al.* (1993, 1994), found high levels of melatonin during the night, and the persistency of these levels was clearly related to the photoperiod: they were the highest in December and decreased progressively from March - April to June. Borghese *et al.* (1995), also reported, in a study on buffalo heifers and cows in Italy, that the melatonin trends show remarkable differences between seasons. In June, in the summer, the lowest value and least persistency of melatonin peak were found because of the shortest nights, while the highest values were noted at the equinoxes, particularly in September, the month corresponding to the start of hypothalamus-pituitary- ovarian axis activity.

From the present study, it was clear that Bhadawari and Murrah buffaloes in the Bundelkhand region follow the same seasonal calving trend as

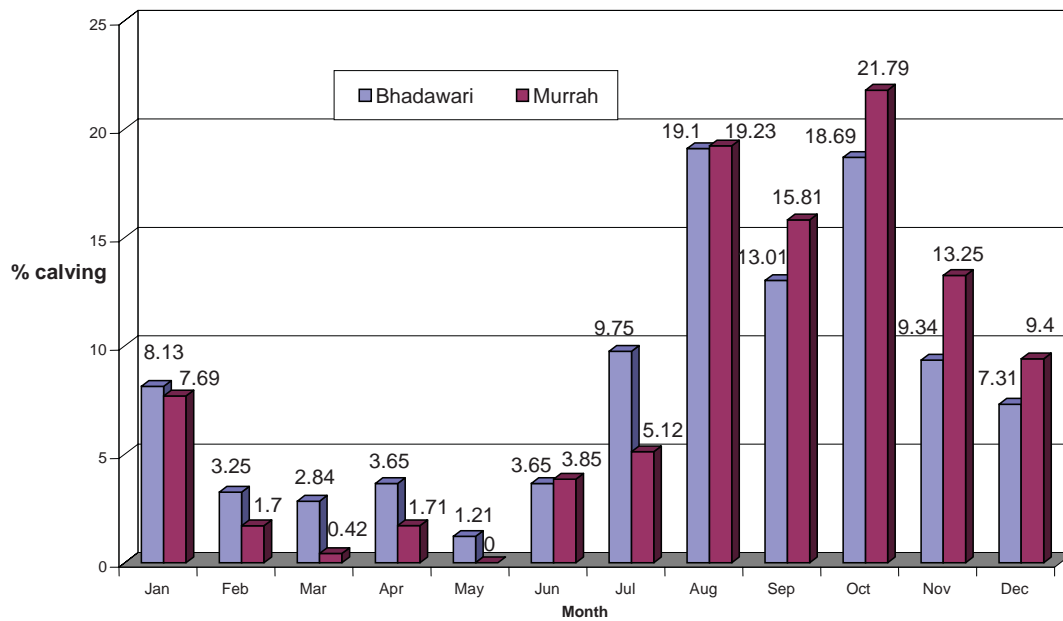


Figure 1. Month-wise calving pattern in Bhadawari and Murrah buffaloes.

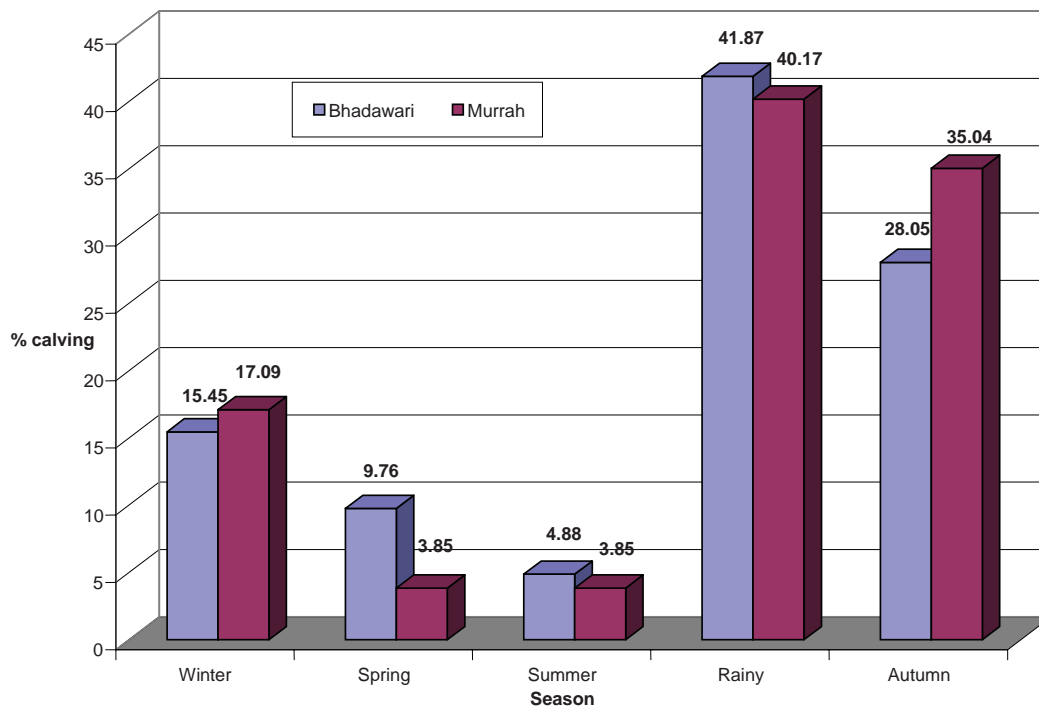


Figure 2. Season-wise calving pattern in Bhadawari and Murrah buffaloes.

in other parts of the country and in most parts of the world. The seasonality in calving observed in these two breeds of buffaloes indicate that the photoperiodicity in different seasons plays a greater role than the diet, as these animals were maintained under an intensive system of management and fed properly throughout the year.

The results of present study and the reports of the various authors suggest a relationship between photosensitivity and the seasonal reproductive trend in buffaloes. However, optimum feeding regime of concentrate rations and cultivated green fodder is necessary throughout the year, and proper housing would be beneficial in getting throughout the year calving.

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