

Effect of Parity on Lactational Efficiency of Murrah Crossbred Buffaloes (*Bubalus bubalis* L.) in Central Nepal

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Abstract With the aim of determining effect of parity on different traits related to lactational efficiency, Kalika Municipality, Padampur of Chitwan District was purposively selected and field assessment was conducted from April to August, 2017. Primary data were collected through direct interview with 37 buffalo rearing farmers using closed ended semi-structured questionnaire. Various traits related to lactational efficiency including colostrum period, days to reach peak milk yield, lactation length and dry period were taken under consideration. One way analysis of variance was performed to assess the effect of parity on the traits considered using GenStat4. Findings of present study revealed that overall mean of colostrum period, days to reach peak milk yield, lactation length and dry period were 5.2 ± 1.8 days, 23.3 ± 8.8 days, 344.0 ± 102.0 days, 110.9 ± 61.4 days, respectively which were obtained with ranges 2-11 days, 10-45 days, 90-600 days, and 30-300 days, respectively. Meanwhile, parity had no significant effect on major lactational traits considered under this study. However, buffaloes with mid parity (3rd - 4th) were superior in terms of colostrum period, days to reach peak milk yield and dry period. Thus, it is concluded that parity of buffaloes was not an important source of variation with respect to major lactational traits. However, further research should be carried out considering larger sample size and wider agro-ecological domain is recommended for the validation of present findings.

Keywords Production Traits, Murrah, Parity, Chitwan

1. Introduction

Riverine Buffalo (*Bubalus bubalis* L.) is the major milk contributing dairy species enhanced with multiple utilities in Nepal. The river water buffalo is the type that is more suitable for milk production. They are second most common source and occupy major rank of milk source in many countries (Sahin et. al, 2016) and contributes about 65% and 54.4 in terms of milk and meat (DLS, 2016). Murrah crossbred buffaloes that have important phenological and adaptation trait to thrive in adverse climatic condition were the subject of present research.

Buffalo contributes with milk, meat, manure for crop production and draft power in plain areas. Majority of households raise at least one buffalo for milk and manure production and sell male calf or mature male for family income. In road accessible areas, buffaloes are the main contributor of urban milk supply (Osti, 2007). Average milk production (305 days lactation) is 1372 kg, 1048 kg and 1031 kg respectively for the Murrah, Lime and Parkote breeds. (FAO, 2005). But, buffalo population and milk production is

increasing as compared to previous years. 5,167,737 buffaloes were reported in 2014/15 while 5,168,809 buffaloes in 2015/16. Similarly, 1,168,006 Mt milk production in 2014/15 and 1,210,441 Mt in 2015/16 was reported in Nepal according to the data provided by Ministry of Agriculture Development, 2015/16.

Milk production trait is closely related with the parity of animal. Different lactational trait that defines total productivity of buffalo farming are first day milk after parturition, colostrum period, days to reach peak milk yield, peak milk, lactation length, calving interval and dry period. Major considerations in this study were colostrum period (days), days to reach peak milk yield, lactation length (days) and dry period (days).

Lactation milk yield is most important parameter of dairy buffalo. Factors which affect the lactation yield would also influence the lactation length in buffalo (Chaudhary, 1992). Lowest production per lactation is achieved at the first lactation. With advancing age, milk production increase to reach the maximum at the 3rd, 4th lactations, then starts again to decrease (Velea, 1999). Peak yield had good correlation with total milk production ($r = 0.448$). The results indicated that peak yield could be a reliable measure in predicting livestock productivity (Kalyankar, 2003).

Colostrum is considered to be "liquid gold" as it contains maternal antibodies along with high energy source, protein,

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vitamins (A, E, D, B) and minerals (Georgiev, 2008). The fat, lactose, protein, and dry matter content of water buffalo milk are higher than that of cow milk (Sahin et. al, 2016). The iron content is 10 to 17 times higher in colostrum than in normal milk (Kuralkar and Kuralkar, 2010). A milch animal is supposed to be economical if she has shorter dry period and lower colostrum period for higher economic return. Thus the dry period is the important economic traits that determine the milk production efficiency of buffaloes (Sanker et. al., 2014).

This paper mainly aims to assess the effect of parity on major milk yielding traits in Murrah Buffalo in Central Nepal.

2. Materials and Methods

Study location:

The assessment was conducted at Kalika Municipality, Padampur of Chitwan District which was purposively selected. **Padampur** is pocket for buffalo production as suggested by District Livestock Service Office, Chitwan.

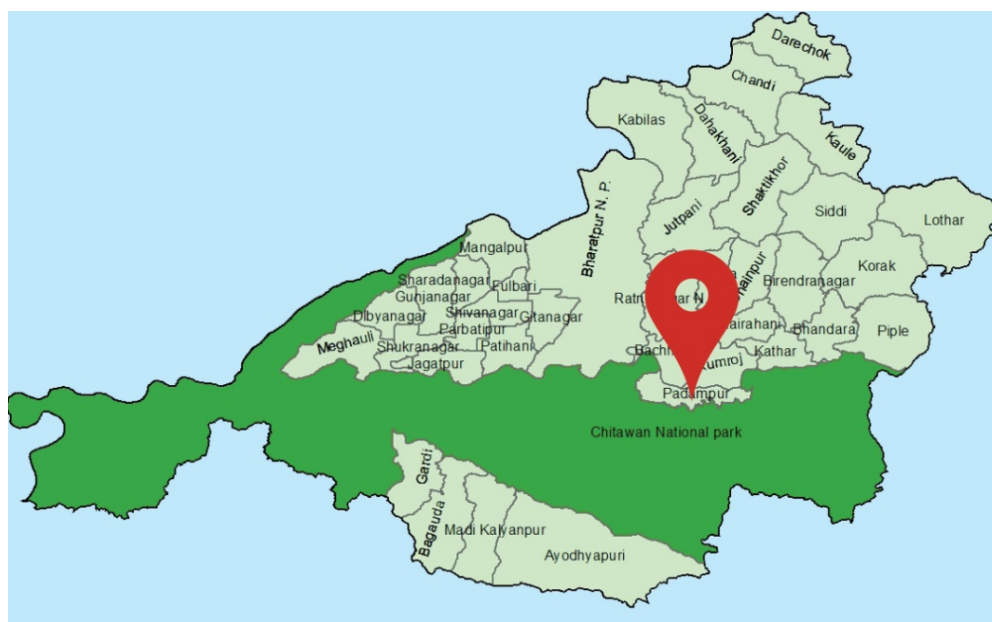


Figure 1. Map Showing study location; Padampur, Chitwan District, Nepal

Study Period:

Study was conducted from April to August, 2017.

Data/Information collection and Sampling procedure:

Primary data were collected through direct interview with 37 buffalo rearing farmers using closed ended semi-structured questionnaire and secondary data was retrieved from Dairy Cooperative.

Data Analysis (with complete model statement):

Data were entered at MS Excel 2010 and one way analysis of variance was performed to assess the effect of parity on the traits considered using GenStat4.

Traits under consideration (with definitions):

Different traits related to lactational efficiency including colostrum period, days to reach peak milk yield, lactation length and dry period were taken under consideration.

3. Results and Discussion

The effects on major lactational traits were analyzed and the findings were summarized as follows.

Colostrum Period

Overall mean of colostrum period in Murrah Buffalo was obtained as 5.2 ± 1.8 days which were obtained with range 2-11 days. Coefficient of variance was found to be 35.5%. Colostrum Period of buffalo with late parity was obtained highest i.e. 6.1 days and of mid parity was obtained to be lowest i.e. 4.7 days as presented in table 1. Meanwhile, parity has no significant effect ($p > 0.05$) on this trait. However, buffalo in mid parity i.e. lower colostrum days was found superior in terms of colostrum period. Findings of Smijisha and Kamboj (2012) suggest that colostrum in Murrah buffalo calves reared under different management practices is up to 5 days fed at the rate of $1/10^{\text{th}}$ of body weight using pail. Lower the number of colostrum days, higher will be the economic return.

Days to reach peak milk yield

Overall mean of days to reach peak milk yield was obtained as 23.3 ± 8.8 days which were obtained with range 10-45 days. Individually, days to reach peak milk yield was highest in Buffalo with late parity i.e. above 4^{th} takes 24.3 days to reach peak milk yield and lowest in the mid parity i.e. 3^{rd} to 4^{th} takes 21.1 days. Meanwhile, parity has no

significant effect on this trait. Variance was found to be 37.7%. The overall mean for days to attain peak yield in Marthwadi buffalo was 69.36 ± 0.28 days. The findings of Kalyankar and Gujar (2003) revealed that the parity order non-significant influence on days to reach peak yield. Similar findings are supported by Choudhary and Choudhary (1981). In Murrah buffaloes, significant influence of parity on peak yield from 1st to 5th lactation was also reported by Chhikara *et al.* in 1998. It is observed that primiparous animals required more days to reach peak yield. With advancing age, the animals attain peak yield earlier by around 12 days during 6th lactation (Kalyankar and Gujar, 2003).

Lactation length

Overall mean of lactational length was found to be 344.0 ± 102.0 days which were obtained with range 90-600 days. Lactation length of buffaloes in early, mid and late parity i.e. 1st to 2nd, 3rd to 4th and above 4th was found to be 333.75, 350.00, 355.71 days respectively. Variance was

found to be 29.7%. Thus these results showed that lactational length is not affected by differences in parity. Average lactational length of Murrah Crossbred buffalo in Hilly region of Nepal as suggested by Shrestha *et al.* (1994) was 321.0 ± 120.0 days. Similar study performed on Pakistan found the total lactation length in Nilli Ravi Buffalo was 301.73 ± 1.87 obtained with range 181-505 days. Among the buffaloes under study, 52% of them gave milk upto 300 days and remaining 48% buffaloes remained in milk more than 300 days. It was further observed that parity has significant effect on lactational length (Chaudhry, 1992). Lactation length is affected by various factors like sex of the calf, background of the buffalo, season of calving, parity and sire. Research findings of Gurnani *et al.* (1976), Cady *et al.* (1983), Shrestha (1985) observed short lactation period in different breeds of buffaloes. However longer lactation period i.e. 320 days was reported by Garcha and Tiwana (1980) in Murrah buffaloes.

Table 1. Effect of parity on various lactational traits of Murrah buffaloes in Chitwan

| Factors | No. of obs. | Colostrum period (days) | Days to reach peak milk yield | Lactation length (days) | Dry period (days) |
|---|-------------|-------------------------|-------------------------------|-------------------------|-------------------|
| Overall mean | 37 | 5.2 ± 1.8 | 23.3 ± 8.8 | 344.0 ± 102.0 | 110.9 ± 61.4 |
| Effect of parity | | | | | |
| Early (1 st to 2 nd) | 23 (12)* | 5.0435 | 23.696 | 333.75 | 135.00 |
| Mid (3 rd to 4 th) | 7 | 4.7143 | 21.143 | 350.00 | 87.14 |
| Late (Above 4 th) | 7 | 6.1429 | 24.286 | 355.71 | 90.00 |
| Significance | | NS | NS | NS | NS |
| CV% | | 35.5 | 37.7 | 29.7 | 55.3 |

NS= Non-significant; (*) the figure in the parentheses indicates the number of observation for lactation length and dry period for the buffaloes of 1st to 2nd parity.

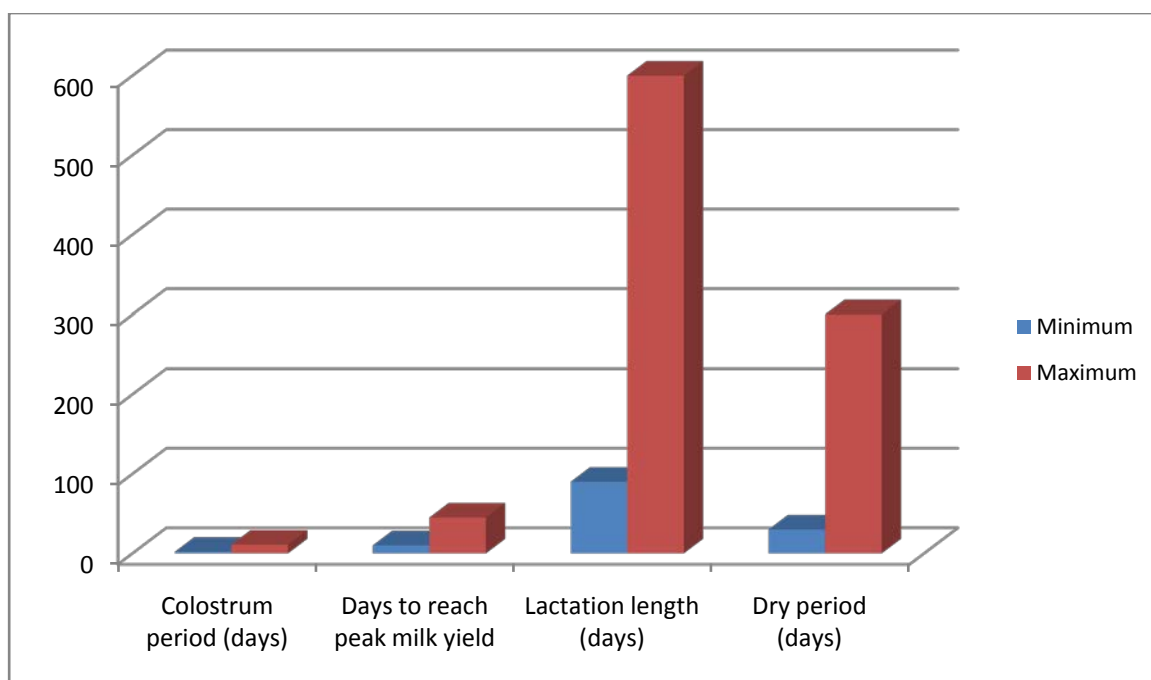


Figure 2. The range values (minimum and maximum) of lactational traits; colostrum Period, days to reach peak milk yield, lactation length and dry period

Dry Period

Overall mean of dry period in Murrah buffalo was obtained as 110.9 ± 61.4 days within the range of 30-300 days. Coefficient of variance was found to be 55.3%. Dry period of buffalo with early parity was 135.00 days, mid parity was 87.14 days and late parity was 90.00 days. Meanwhile, dry period has no significant effect on parity. Similar research conducted at Bihar, India by Sanker et. al (2014) observed 144.34 ± 0.77 days dry period which was higher than the optimum range. Parity had a highly significant effect on dry period. The average dry period was found to be the longest (157.85 ± 1.39 days) in first calvers followed by second (143.57 ± 1.33 days) and third (135.65 ± 1.50 days) calvers in their findings. Similarly longer dry periods were reported by Rao et. al. (1995), Sethi (1996-97) and Yadav et. al. (2003) in Murrah buffaloes. While, shorter dry periods have been reported by Dev et.al. (1994) in local buffaloes of Rajasthan, India. But, a milch animal is supposed to be economical if it has shorter dry period. Thus buffalo in mid parity i.e. 3rd to 4th with shortest dry period was found to be superior in terms of dry period in present study. Longer dry period as reported in present study could be the reason behind higher incidence of mastitis (Schukken, 2008; Fagiolo, 2007) in Chitwan district of Nepal i.e. 72% as reported by Thapa (2006).

4. Conclusions

Based on the findings of present study, it can be concluded that parity was not an important source of variation with respect to major lactational traits considered under this study. However, buffalos with mid parity (3rd - 4th) were superior in terms of colostrum period, days to reach peak milk yield and dry period. Further research should be carried out considering larger sample size and wider agro-ecological domain for the validation of present findings.

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