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Effect of Parity on Productive and Reproductive Performance of Buffaloes Reared under Farmers' Management at Coastal Districts in Bangladesh

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Abstract: *Previously we have shown that poor reproductive performances of buffaloes are linked with poor breeding and other management practices in certain coastal areas in Bangladesh. The aim of the present study was to determine the effect of the parity as an important trait on productive and reproductive status of non-descript type buffaloes reared under subsistence farming conditions at selected coastal districts in Bangladesh. Data records for lactation length (LL), milk yield per day (MY/d), calving interval (CI) and dry period (DP) through a pre-tested questionnaire on 220 buffaloes were collected, analyzed and evaluated. Parity did not significantly affect milk yield per day (MY/d) and dry period (DP), but had a significant effect on lactation length (LL) and calving interval (CI). The lactation length (LL) was found significantly higher in the first parity (181±0.67 days) compared with that of the second and third parity (172±1.14 and 178±1.02 days, respectively). Furthermore, calving interval (CI) was significantly higher in first lactation (496±0.29 days). It is concluded that as the parity significantly correlates with calving interval (CI) and lactation length (LL) of buffaloes, the Buffalo's breeders/owners may consider the parity, calving interval (CI) and lactation length (LL) together with milk yield (MY/d) and dry period (DP) in management programs as important parameters for selecting breeding buffaloes which eventually may greatly contribute in farm productivity and profitability in the selected coastal areas.*

Keywords*: Bangladesh, buffaloes, coastal areas, parity, productive and reproductive performance*

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I. Introduction

Buffaloes play a pivotal role in providing a sustainable food production system in most developing countries (Pasha and Hayat, 2012). Buffaloes- the so-called 'Black gold' hold a strategic place next to the cattle in the overall livestock economy in Bangladesh contributing as an important source of milk, meat, drought power, hides and skins etc. (Islam et al., 2017). The buffalo population is estimated to be 1.45 million (FAO, 2014) and it has earlier been reported that the coastal regions possess approximately 40% of the total buffalo population in Bangladesh (Huque and Borghese, 2013). The productivity of buffalo is reported to be lowest (410 kg milk buffalo^{-1} year^{-1}) in Bangladesh compared to other south Asian countries, however, studies show increasing buffalo population with the increasing demand of milk and meat in course of time in the country (Islam et al., 2017; Siddiky and Faruque, 2017).

Buffaloes have a several morphological traits which strengthen their ability to live in shaded hot humid countries (De Rosa et al., 2009). Buffaloes have the ability to convert poor and coarse feed, straw and crop residues to protein rich meat with low cholesterol (Desta, 2012). It is economically important due to their excellent fertility efficiency and productivity, where ability of buffalo's have adaptive capacity to sub-tropical climatic conditions (Bernardes, 2007). Despite these vital importance of the species and livelihood dependency of farmers in the subsistence farming system, the productivity of indigenous non-descript buffaloes in the coastal belt is far below than supposed to be of actual potential of the animal. Therefore, it is important to find correlations between productive and reproductive status of the animals for enhanced productivity and profitability of buffalo farming in the area.

It has been reported that the reproductive efficiency in buffalos may be affected by several factors, including milk yield and parity (El-Wishy, 2007) and an interrelationship between parity, milk yield and calving interval has also been observed. Parity has been reported to affect the milk yield (Afzal et al., 2007; Gabr, 2015) and calving interval (Sanker et al., 2014; Hassan et al., 2017) as reported by several researchers. In Bangladesh,

there is few information about the interrelationship between parity, productive performance and reproductive efficiency in buffaloes. As an important productive and reproductive parameters there might have interrelationships between parity, milk yield and calving interval. Therefore, this study was undertaken to assess the effect of parity on reproductive and productive status of non-descriptive buffaloes at different coastal districts in Bangladesh.

II. Materials and Methods

The present study was conducted in coastal areas of Barishal division covering Barishal, Patuakhali and Bhola district in Bangladesh. Two hundred twenty (220) buffalo cows were randomly selected to collect data regarding productive and reproductive parameters depending on parity with the help of a well-structured questionnaire in interviewing the farmers. A total of forty (40) farmers were interviewed during the period from March, 2019 to November, 2019.

The productive and reproductive performance of the dairy animals was determined on the basis of the parameters like lactation length (LL), milk yield per day (MY/d), calving interval (CI) and dry period (DP) of the animals. All data were analyzed using the Statistical Package for the Social Science software package for Windows (SPSS v.18; SPSS Inc., Chicago, IL, USA). Results were expressed as the percentage, mean ± SE (standard error mean).

III. Results and Discussions

In this study, the effect of parity on lactation length (LL), milk yield per day (MY/d), calving interval (CI) and dry period (DP), as well as the relationship between these parameters were analyzed. Parity did not affect significantly milk yield per day and dry period, but had a significant effect on lactation length and calving interval (Table 1).

Table (1). Impact of different parity of indigenous non-descript buffaloes in reproductive and productive traits.

Parity	No. of animal	Lactation length (days)	Milk yield (lts./day)	Calving interval (days)	Dry period (days)
1	61	181±0.67	2.15±0.37	496±0.29	185±1.20
2	74	172±1.14	2.19±0.35	455±0.26	178±1.08
≥3	85	178±1.02	2.20±0.41	485±0.24	176±0.85
	220	*	NS	*	NS

NS= Non-significant. * = significant difference at level ($P \leq 0.05$).

The highest lactation length was found in first parity (181±0.67 days). Thiruvenkadan et al., (2014) found that a reduction of lactation length with the increase of calvings, from first calving to buffaloes with six or more calving. Mourad and Rashwan (2001) and Afzal et al., (2007) has reported that there were no effect of parity on lactation length. More recently, Poudel et al., (2017) and Jamuna et al., (2015) observed that parity was a factor affecting lactation length in Murrah buffaloes. Several factors are affecting the calving interval in buffaloes, including parity (Kumar 2015; Hassan et al., 2017; Parmar et al., 2017). The results of the present study revealed that parity had significantly higher effects on calving interval, where buffaloes calving for the first time had the longest calving interval; and it is comparable to that of the present finding along with others (Suresh et al., 2004; Sanker et al., 2014; Christa and Sinniah, 2015; Hassan et al., 2017; Hector et al., 2018).

In the present study, milk yield was lower in buffaloes in the first parity than the yield in the 2nd and 3rd or more lactation ($p > 0.05$). Kawthar et al., (1990) have shown that parity had significantly affected a 305-day milk yield however it was in Egyptian buffaloes under an intensive production system. Other researchers have reported the increase of the milk yield with the advancement of parity (Khalil et al., 1992; Dhar and Deshpandi, 1995; Mourad and Rashwan, 2001; Verma et al., 2017). This might be attributed to genetic properties, age at first calving, lactation length, feeding regime or management system. The main reasons for the increase in the milk yield in relation with the increase in the lactation number are the buffalo's weight gain and maturation of milk secretion system (Mourad and Rashwan, 2001). The present result is in agreement with the finding of Cady et al. (1983) who found that, in Nili-Ravi buffaloes, the milk yield was lowest in the 1st parity and was not different between 2nd to 5th lactation.

The longest dry period was recorded in the first parity (185±1.20 days), while the lowest value was reported in the third or more (176±0.85 days). In this study, maximum lactation length was observed in the first parity, while the dry period was the highest in first lactating buffaloes. Similarly, the average dry period was found to be longest in first lactation followed by second and third lactation (Yadav et al., 2003; Poudel et al., 2017). Thiruvenkadan et al., (2014) reported that the longest dry period was observed in first parity with significant reduction in later parities. In contrast, Hussain et al., (2006) revealed no significant effect of parity on dry period.

IV. Conclusion

Parity has a significant consequence on lactation length and calving interval of buffaloes that effect on productive performance of indigenous buffaloes in Bangladesh. The first lactation period having a longer calving interval and being less productive. Buffaloes having shorter dry period (176 days) in third or more lactation recorded the highest milk yield. It is concluded that as the parity significantly correlates with calving interval (CI) and lactation length (LL) of buffaloes, the buffalo breeders/owners may consider the parity, calving interval (CI) and lactation length (LL) together with milk yield (MY/d) and dry period (DP) in buffalo breeding and management programs. Buffaloes, especially those of one and two calving should be provided with better management conditions for optimum milk yield and reproductive performance.

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