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Reproductive performance of different crossbred cows of Bangladesh

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The study was conducted at Central Cattle Breeding and Dairy Farm in Savar, Dhaka to evaluate the reproductive performance of different crossbred cows in terms of gestation length, service per conception, postpartum heat period and calving interval. The genotypes Australian Friesian Sahiwal (AFS), Sahiwal × Friesian (SL×F), Local × Friesian (L×F), Local × Friesian × Friesian (LF_1×F) and Local × Friesian × Friesian × Friesian (LF_2×F) were considered. The highest performance for the trait service per conception was found in AFS (1.40±0.69) and the lowest performance was found in SL×F (1.80±0.63). The longest gestation length and calving interval were observed in SLxF, 281.0±3.26 and 542.0±9.87 days, respectively. The longest postpartum heat period (201.7±17.40 days) was found in LF_1×F cows. On the other hand, the shortest gestation length (277.0±5.21 days), postpartum heat period (135.5±10.58 days) and calving interval (436.07±9.87 days) were observed in L×F crossbred cows. From the above perspective it is concluded that L×F crossbred cows are more suitable for Bangladesh.

Key words: Reproductive, performance, crossbred, cows.

INTRODUCTION

Bangladesh is agriculture based subtropical country. Livestock is an important sub-sector of agriculture which plays an important role to promote human health and poverty alleviation. About 20% of the people directly depends on the livestock sector and thus contributes around 16.5% to the country GDP. The cattle production is an important part of livestock. Farmers rear cattle mainly for draft purpose but also as a means of economic upliftment from sale of milk. Majid et al. (1995) observed that the highest gestation was found in ¼ local - ¼ Friesian - ½ Sahiwal and shortest was in Friesian cows. Sultana (1995) found that the gestation period of local (L), Sahiwal (SL), ½ F- ½ SL, Jersey (J), ½ L- ½ J and ½ F was 274.98±1.76, 276.29±4.71, 275.5±2.42 and 274.72±1.48 days respectively. Islam and Bhuiyan (1997) observed that the breed type had no significant effect on number of services per conception. Khan (1990) found that the genotypic mean independent of parity had non-significant difference for service per conception.

The native cattle of Bangladesh have low productivity but disease resistance capacity was higher than that of exotic breeds. To develop the performance of native cattle, up gradation is necessary. Livestock development depends mainly on genetic potential of the animal. Native ruminant animals are non-descriptive and their genetic potential have not yet been recognized. Conservation and improvement of native animal germplasm are essential for profitable livestock farming to meet the

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increasing demand of milk and meat. Optimum nutrition, disease control and management practices permit better expression of genetic potential. Climatic stresses in the form of high ambient temperature, high humidity and erratic or inadequate rainfall affect the productivity of dairy cattle in the tropics. Reproductive efficiency is a major factor in the profitability of a dairy enterprise through its effect on the annual milk production of the herd and the cost of herd depreciation. In this study an attempt was made to evaluate the reproductive performance of different crossbred cows and to find out the suitable crossbred animals.

MATERIALS AND METHODS

Study area

The study was conducted at Central Cattle Breeding and Dairy Farm, Savar, Dhaka. The data collected during the period from 2005 to 2009.

Animals and data collection

The information on the reproductive performance of 54 cows of different genotypes was collected at Central Cattle Breeding and Dairy Farm, Savar, Dhaka. The experimental animals were divided into five genetic groups according to their genetic composition, that is, Australian Friesian Sahiwal (AFS), Sahiwal × Friesian (SL×F), Local × Friesian (L×F), Local × Friesian × Friesian (LF_1×F) and Local × Friesian × Friesian × Friesian (LF_2×F). A total of 270 observations on the reproductive parameters were recorded and statistically analyzed by following slight modification method of Majid et al. (1995).

Feeding and management

Feeding and management system in the farm was uniform throughout the year. Stall-feeding was practiced regularly. Concentrate feeds were included wheat bran, sesame oil cake, rice bran, grass pea and salt. Green grasses were supplied daily. Different types of green grasses, that is, Napier, Para, Maize, German and Oats were cultivated in the field near the farm. The grass after collection were ensiled in the pits and fed to cows both as fresh and ensiled. Records on date of birth, birth weight, date of first service, date of calving, daily milk yield, date of abortion, date of death and sold and lactation length were kept.

Traits studied

The following characteristics were used to measure reproductive performance of different crossbred animals that is gestation length, service per conception, postpartum heat period and calving interval.

Data collection

Gestation length

Rectal palpation technique was used for diagnosis of pregnancy. The period of intra-uterine development of embryo and fetus was considered as gestation length. It was calculated as the interval from fertile service to parturition. The duration of gestation was determined in days. The difference in gestation period was associated with twinning, sex of calf and parity of cow.

Service per conception

This is defined as the average number of services or insemination required per conception and is a simple method of assessing fertility (Payne, 1970). Experimental animals were serviced by using artificial insemination (A.I.) technique.

Postpartum heat period

Postpartum heat period was calculated as the interval between parturition to next heat that was observed after a certain period of parturition. The period was considered in days.

Calving interval

The calving intervals were recorded on the basis of interval between the dates of one calving to the date of next calving. The calving intervals were recorded in days.

RESULTS AND DISCUSSION

The reproductive parameters of different crossbred animals and the average values were presented in the Table 1. The results are discussed under the following sub-headings.

Gestation period

Gestation period of different genetic groups were found to be 274.5±6.83, 281.0±3.26, 277.0±5.21 279.3±4.54 and 277.2±3.93 days under the genotypes AFS, SL×F, L×F, LF_1×F, LF_2×F, respectively. The mean gestation length was highest in SL×F (281.0±3.26 days) and lowest in AFS (274.5±6.83 days). The gestation length of present findings are more or less similar with the findings of Maarrof et al. (1987) who analyzed the data of 85 Jenubi cattle in dairy farms of central Iraq, where average gestation length was 283±1.5 days. Variation in gestation length within the species may be contributed mainly by maternal and fetal factors. The maternal factors include age of the dam, nutritional status and body condition of the dam. Fetal factors include the sex of the fetus, twinning and hormonal functions of the fetus. Environment such as season, feeding, and management also contribute to some extent (Hafez, 1993).

Service per conception

Service per conception of different genetic groups were found to be 1.40±0.69, 1.80±0.63, 1.64±0.74, 1.70±0.67 and 1.50±0.70 under the genotypes AFS, SL×F, L×F,

Table 1. Reproductive performance of different cross bred cows.

Parameter	Genotypes					Overall (Mean±SD)
	AFS (Mean±SD)	SL×F (Mean±SD)	L×F (Mean±SD)	LF_1×F (Mean±SD)	LF_2×F (Mean±SD)	
Gestation length (days)	274.5±6.83	281.0±3.26	277.0±5.21	279.3±4.54	277.2±3.93	277.8±2.46
Service per conception	1.40±0.69	1.80±0.63	1.64±0.74	1.70±0.67	1.50±0.70	1.60±0.15
Postpartum heat period (days)	177.6±10.24	182.0±12.40	135.5±10.58	201.7±17.40	181.1±11.74	175.58±24.3
Calving interval (days)	478.6±8.52	542.0±9.87	436.07±9.87	530.4±16.19	508.6±12.01	499.13±42.7

LF_1×F, LF_2×F, respectively. The highest performance in AFS (1.40±0.69) and lowest performance in SL×F (1.80±0.63) cows were recorded in terms of services required per conception. The results of this study are similar with the findings of Majid et al. (1995) who observed almost similar service per conception for different genotypes where the value of service per conception of Sahiwal (SL), Friesian (F), Local (L), ½ L- ½ F (F_1), ½ SL- ½ F (F_1), ¼ L- ¾ F (F_2), ½ L- ½ F (F_2), 1/4 L- ¼ SL- ½ F (F_2), ¼ L- ¼ F- ½ SL and L- ½ F- SL (F_3) were 1.90±0.12, 1.27±0.19, 1.76±0.08, 2.20±0.49, 2.21±0.23, 2.00±0.37, 1.73±0.18, 2.00±0.39, 1.53±0.19 and 1.25±0.25, respectively. Islam and Bhuiyan (1997) found that service per conception was 1.23±0.17 in JR, 1.46±0.19 in JR×SN, 1.45±0.12 in SL×PMC and 1.23±0.10 in ¼ PMC × ¾ SL cows at Baghabarighat milk shed area. Hossen et al. (2012) observed the lowest service per conception (1.22) in PMC cows. A number of other factors, which influences service per conception are the quality and quantity of semen used in artificial insemination, improper detection of heat, failure to inseminate at appropriate time and skill of the inseminator. The other related factors are the level of fertility, which may be influence by diseases, semen handling techniques and other environmental factors.

Postpartum heat period

Postpartum heat period of different genetic groups were found 177.6±10.24, 182.0±12.40, 135.5±10.58, 201.7±17.40, 181.1±11.74 days under the genotypes AFS, SL×F, L×F, LF_1×F, LF_2×F, respectively. The highest average post-partumm heat period was obtained in LF_1×F (201.7±17.40) and lowest in L×F (135.5±10.58) crossbred cows. The results of the study corroborates with the findings of Majid et al. (1995) who found longest average postpartum heat period (223.5±40.14 days) in ¼ Local-Friesian cross-breed and the lowest (117.24±7.2 days) in ½ Local – ½ Friesian cows at the Central Cattle Breeding and Dairy Farm, Savar, Dhaka. Postpartum heat period is an important economic reproductive trait in a dairy herd. Hafez (1993) suggested that the postpartum breeding delayed up to 60 to 70 days after parturition, when the uterus under goes recovery and preparation for the next conception. Chowdhury et al. (1994) was found the postpartum heat period 154.8 days in FN×SL crossbred cows. Hossen et al. (2012) observed that the shortest postpartum heat period (133.23 days) was in PMC cows. A period after calving to next heat and ovulating is considered anestrous or postpartum heat interval of cows. The length of the postpartum interval is influenced by nutrition, body condition, age, genetics and presence of the calf.

Calving interval

Calving interval of AFS, SL×F, L×F, LF_1×F and LF_2×F cows were 478.6±8.52, 542±9.87, 436.07±9.87, 530.4±16.19 and 508.6±12.01 days, respectively. The highest value of calving interval was observed in SL×F (542.0±9.87 days) cows and the lowest value was in L×F (436.07±9.87 days) cows. These results are more or less similar with the findings of Ghose et al. (1997) who recorded calving interval of 489.52 days for Pabna, 524.00 days for Dhaka, 430.86 days for Red Chittagong, 491.16 days for Sahiwal, 490.00 for Sindhi, 571.00 days for Sindhi × Pabna, 457.00 days for Sindhi × Local and 485.25 days for Sahiwal × Local cows. Hossen et al. (2012) found the shortest calving interval (414.90 days) in PMC cows. The differences in calving interval observed in the present study may be due to different environment, feeding, management and also due to irregularity in estrous.

Conclusion

In this study the considered genotypes were Australian Friesian Sahiwal (AFS), Sahiwal × Friesian (SL×F), Local Friesian (L×F), Local Friesian (LF_1×F) and Local × Friesian × Friesian (LF_2×F). The length of gestation period was more or less close to each other. The lowest gestation period was AFS cows followed by and highest gestation length SL×F. Minimum number of services was required for the conception of AFS cows. Maximum services were required for SL×F. The highest value of calving interval was obtained from SL×F cows and the lowest value was obtained from L×F cows.

The highest postpartum heat period was observed in $LF_1 \times F$ and the lowest was obtained from L×F crossbred cows. The pure exotic breed (e.g. Holstein Friesian) is not suitable in context of Bangladesh in terms of environmental condition. It may require low temperature, better feeding and management. The disease prevention capacity is also lower than that of native cattle. On the other hand, the local cattle are well adapted as well as high disease resistance than exotic pure breed. The crossbred cattle performed better than that of exotic and native cattle in terms of adaptability and production. So, it is necessary to improve native cattle by selective breeding to increase the productive and reproductive performance. Considering the above perspective it is concluded that L×F crossbred cows are most suitable for Bangladesh.

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