A Study of the Milking and Reproduction Performances of Grazing Indigenous Cattle at a Semi Urban Area of Bangladesh

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ABSTRACT : The study was conducted at semi urban area in Bangladesh. It was based on a field survey by a prepared questionnaire. Various milking and reproduction performance were analyzed. The effects of grazing hour were found significant on age at weaning (AW) ($p<0.001$), age at first heat (AFH) ($p<0.001$), age at first conception (AF conception) ($p<0.001$), age at first calving (AF calving) ($p<0.001$), post partum heat period (PPHP) ($p<0.001$), calving interval (CI) ($p<0.001$), lactation length (LL) ($p<0.001$) and total lactational production (TLP) ($p<0.001$). The effects of concentrate feed were significant on AW ($p<0.01$), AFH ($p<0.01$), AF conception ($p<0.001$), AF calving ($p<0.001$), PPHP ($p<0.001$) CI ($p<0.001$), LL ($p<0.001$) and TLP ($p<0.001$). The effects of management level were significant on AW ($p<0.001$), PPHP ($p<0.01$), CI ($p<0.001$), daily milk yield (DMY) ($p<0.05$) and TLP ($p<0.001$). The overall mean values were 251.88 ± 2.97 days for AW, 37.29 ± 0.33 months for AFH, 38.43 ± 0.34 months for AF conception, 47.62 ± 0.34 months for AF calving, 1.30 ± 0.02 number of services per conception (NSPC), 191.57 ± 3.92 days for PPHP, 17.02 ± 0.15 months for CI, 2.49 ± 0.06 kg for DMY, 247.23 ± 3.51 days for LL and 590.40 ± 15.00 kg for TLP. (*Asian-Aus. J. Anim. Sci. 2000. Vol. 13, No. 6 : 837-841*)

Key Words : Milking, Reproduction, Performances, Indigenous, Grazing Cattle

INTRODUCTION

Livestock sector in Bangladesh contributes 6.2% of Gross Domestic Product (GDP), however, the indirect contributions through draught, fuel and fertilizer are large (BBS, 1988). The indigenous (zebu type) cattle of Bangladesh can not describe under any particular bred type and thereby fall into a category of nondescriptive and their milking and reproduction performances are very low. The breeding program that is followed for the improvement of these nondescriptive indigenous cattle is mainly cross breeding or up grading with dairy breeds. The present work particularly in the context of indigenous grazing cattle of southern part of Bangladesh is important, because this region belongs a large number of cattle of low performance and a little work has done on them.

In the present study, efforts have been made to estimate some of the milking and reproduction performances of indigenous cows under different management conditions. The effect of grazing hour and concentrate feed on their performances has been duly emphasized.

MATERIALS AND METHODS

The study was based on a field survey to investigate the milking and reproduction performances of indigenous grazing cattle at semi urban areas of Khulna, Bangladesh. The semi urban areas namely Nirala, West Bania-Khamar, Sonadunga, Boira, Doulatpur, Mohessharpasha and Mohammad Nagar were selected for the study, which were adjacent to the Khulna City. The data were collected by a prepared questionnaire covering 112 farmers taken at random. Data were collected from October 1998 to January 1999.

The performances were studied on three different management levels. In Management-1, animals were kept in unplanned houses where sanitation and hygienic measures were largely ignored. Vaccination and other preventive measures against parasites and diseases were not adopted. Sick animals were not usually taken to the veterinary doctors rather treated traditionally.

In Management-2, housing condition, sanitation and hygienic conditions were moderate. Vaccination and other preventive measures against parasites and diseases were adopted but they were irregular. Treatment of sick animals was a mixture of traditional and modern methods and often veterinary doctors were consulted.

In Management-3, animals were kept in better houses, which were well ventilated and cleaned daily. Vaccination and other preventive measures were provided regularly and veterinary doctors usually provided medication for sick animals.

The animals under consideration were grazed regularly on natural grass grown on unusable government or private land and roadsides land. Grazing hours were variable from farmers to farmers.

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Table 1. Summary of the data used and traits analysed

Traits	Number of observations			
	Management 1	Management 2	Management 3	Total
Age at weaning	127	244	256	627
Age at first heat	129	238	252	619
Age at first conception	127	246	259	632
Age at first calving	127	246	259	632
No. of services per conception	127	246	259	632
Post partum heat period	127	241	259	627
Calving interval	127	241	259	627
Daily milk yield	131	246	259	636
Lactation length	131	246	259	636
Total lactational production	131	246	259	636

Table 2. Results showing the effect of grazing hour, concentrate feed and management level on various traits as obtained from analysis of variances

Traits	p-values		
	Grazing hour	Concentrated feed	Management level
Age at weaning	0.000	0.009	0.010
Age at first heat	0.000	0.006	0.854
Age at first conception	0.000	0.001	0.990
Age at first calving	0.000	0.000	0.887
No. of services per conception	0.445	0.290	0.066
Post partum heat period	0.000	0.000	0.004
Calving interval	0.000	0.000	0.005
Daily milk yield	0.277	0.563	0.020
Lactation length	0.000	0.001	0.111
Total lactational production	0.000	0.000	0.001

Supplementation of rice straw and concentrate mixtures were carried out by the farmers. Overall mean grazing hour and concentrate feed per animal were allowed 6.88 hour per day and 1.99 kg per day respectively.

Both reproduction and milking performances were considered in the present study. The reproduction performances were age at weaning, age at first heat, age at first conception, age at first calving, number of services per conception, post partum heat period and calving interval and number of observations covered 627, 619, 632, 632, 632, 627 and 627, respectively. The milking performances were daily milk yield, lactation length and total lactatinal production and number of observations were 636 of each.

Data analysis was done by a statistical package MINITAB. Analysis of variances were done on each of the traits for different management levels, grazing hour and concentrate feed variances. The model used in this study was-

$$Y_{ijkl} = \mu + G_i + C_j + M_k + e_{ijkl}$$

Where μ = the overall mean
G_i = Effect of grazing hour
C_j = Effect of concentrate
M_k = Effect of management level
e_{ijkl} = Random error associated with each observation.
Y_{ijkl} = 1-th records of i-th grazing hour, j-th concentrate feed and k-th management

RESULTS AND DISCUSSIONS

The total features of the results of the analyzed traits showing the effect of grazing hour, concentrate feed and management level are presented in table 2. The mean values of the traits for different management level are given in table 3 and descriptive statistics of the traits are given in table 5.

Age at weaning (AW)

Grazing hour ($p<0.001$), concentrate feed ($p<0.01$) and management ($p<0.01$) effect was significant for this trait (table 2). The lowest AW was found in management 3 (243.65±4.14 days) and the highest value was found in management 1 (271.22±7.94 days). The overall mean value was 251.88±2.97 days, whereas Ashraf (1998) found lower AW (6.82±0.24 months) in indigenous cattle reared in farm condition.

Table 3. Results showing mean ± SE with comparison of management on various traits

Traits	Management system		
	1	2	3
Age at weaning (day)	271.22 ± 27.94[a]	248.40 ± 4.89[b]	243.65 ± 4.14[b]
Age at first heat (months)	36.79 ± 0.85	37.22 ± 0.45	37.47 ± 0.54
Age at first conception (months)	38.26 ± 0.92	38.22 ± 0.46	38.71 ± 0.54
Age at first calving (months)	47.29 ± 0.89	47.66 ± 0.45	47.73 ± 0.54
No. of services per conception (no)	1.26 ± 0.05	1.20 ± 0.03	1.41 ± 0.40
Post partum heat period (days)	232.30 ± 10.20[a]	192.90 ± 6.60[b]	168.58 ± 4.89[c]
Calving interval (months)	18.82 ± 0.43[a]	16.99 ± 0.24[b]	16.17 ± 0.18[c]
Daily milk yield (kg)	1.84 ± 0.09[a]	2.53 ± 0.10[a]	2.79 ± 0.09[a]
Lactation length (days)	275.20 ± 11.70	240.25 ± 5.26	239.69 ± 3.55
Total lactational production (kg)	457.20 ± 22.00[a]	581.30 ± 22.0[b]	666.40 ± 26.70[c]

Means with uncommon superscripts in the same row differ significantly ($p<0.05$).

Table 4. Correlation co-efficient of grazing hour, concentrate feed and management level on various traits

Traits	Grazing hour	Concentrate feed	Management level
Age at weaning (days)	0.077	0.026	-0.124
Age at first heat (months)	0.043	0.011	0.030
Age at first conception (months)	0.043	-0.002	0.023
Age at first calving (months)	0.027	-0.002	0.018
No. of services per conception (no)	-0.028	0.025	0.117
Post partum heat period (days)	0.072	-0.013	-0.235
Calving interval (months)	0.155	-0.035	-0.250
Daily milk yield (kg)	-0.052	0.006	0.070
Lactation length (days)	0.204	0.010	-0.132
Total lactational production (kg)	-0.246	0.154	0.205

Table 5. Descriptive statistics of milking and reproduction traits

Traits	Mean ± SE	Median	Range	Standard Deviation	Coefficient of variation (%)
Age at weaning (days)	251.88 ± 2.97	240.0	120.0 - 730.0	74.40	29.54
Age at first heat (months)	37.29 ± 0.33	36.0	16.0 - 96.0	8.08	21.68
Age at first conception (months)	38.43 ± 0.34	37.0	18.0 - 96.0	8.49	22.08
Age at first calving (months)	47.62 ± 0.34	46.3	27.3 - 105.3	8.44	17.74
No. of services per conception (no)	1.30 ± 0.02	1.0	1.0 - 5.0	0.59	45.47
Post partum heat period (days)	191.57 ± 3.92	180.0	30.0 - 730.0	98.18	51.25
Calving interval (months)	17.02 ± 0.15	16.0	10.0 - 36.5	3.80	22.38
Daily milk yield (kg)	2.49 ± 0.06	2.0	0.25 - 10.0	1.49	60.14
Lactation length (days)	247.23 ± 3.51	240.0	84.0 - 720.0	88.48	35.79
Total lactational production (kg)	590.40 ± 15.00	525.0	52.0 - 3150.0	377.30	63.91

This variation may be due to variation in management. Positive correlations were found in AW between grazing hour (0.077), concentrate feed (0.026) and negative correlation and management level (-0.124), which indicates that the weakly correlated with grazing hour, concentrate feed and management.

Age at first heat (AFH)

There were significant effect of grazing hour ($p<0.001$) and concentrate feed ($p<0.05$) on the trait (table 2). The overall mean value was 37.29 ± 0.33 months (table 5). The result was consistent with the findings of Ashraf (1998) (37.87 ± 1.44 months), Islam (1995) (35.24 ± 10.78 months) and Rahman et al. (1993) (35.0 ± 5.2 months).

Age at first conception (AF conception)

There were highly significant effects ($p<0.001$) of grazing hour and concentrate feed on this trait, wheres, management effect was found insignificant

($p<0.05$) (table 2). Average AF conception was found 38.43 ± 0.34 months (table 5), which was closer to the findings of Ashraf (1998) (39.48 ± 1.51 months) but it was inconsistent with the findings of Husain and Mostafa (1985) (22.3 ± 3.8 months). This variation my be due to poor management and scarcity of feed in southern part of Bangladesh.

Age at first calving (AF calving)

The effect of grazing hour and concentrate feed were found highly significant ($p<0.001$) on AF calving but management effect was found insignificant ($p>0.05$). The overall mean value was 47.62 ± 0.34 months, which was consistent with the findings of Nahar et al. (1992). They found AF calving in Sindhi $\times$ Indigenous cows as 1452.50 ± 33.80 days. Although Husain and Mostafa (1985) found much lower value (35.20 ± 2.48 months) in indigenous cattle.

Number of services per conception (NSPC)

Insignificant effects ($p>0.05$) were found on the trait by all factors under consideration. The average values were 1.30 ± 0.02. Almost similar result was found by Islam (1995) (1.37 ± 0.56) but much higher values were obtained by Ashraf (1998) (1.60 ± 0.18), Bhuiyan and Sultana (1994) (1.76 ± 0.22), Majid et al. (1998) (1.76 ± 0.08) and Chaudhry et al. (1994) (2.5 ± 1.3) in indigenous cows. These variations may be due to inaccurate insemination techniques, neglected heat detection, using low quality semen for AI and low fertility of cows.

Post partum heat period (PPHP)

Significant effects of grazing hour ($p<0.001$), concentrate feed ($p<0.001$) and management ($p<0.01$) were found on PPHP. The lowest value was found in management 3 (168.58 ± 4.89 days) and highest value was in management 1 (232.30 ± 10.20 days), whereas the overall mean value was 191.57 ± 3.92 days. Relatively lower values were obtained by Ashraf (1998) (3.37 ± 0.30 months), Majid et al. (1998) (120.04 ± 7.84 days), and Islam (1995) (3.93 ± 2.15 months) in indigenous cows and Nahar et al. (1992) (165.7 ± 6.9 days) in Sindhi $\times$ Indigenous cows. The variations in PPHP caused by various genetic, environmental, physiologic and metabolic factors such as breed, nutritional level, suckling and milk production (Hafez, 1993).

Calving interval (CI)

This trait was found significant for grazing hour effect ($p<0.001$), concentrate feed effect ($p<0.001$) and management effect ($p<0.01$). The lowest CI was found in management 3 (16.17 ± 0.18 months) and highest in management 1 (18.82 ± 0.43 months). The overall mean value was 17.02 ± 0.15 months. Nearly similar results were found by Majid et al. (1998) (484.21 ± 11.50 days), Husain and Mostafa (1985) (436.60 ± 10.81 days), Bhuiyan and Sultana (1994) (449.78 ± 27.87 days) in indigenous cows and Nahar et al. (1992) found 485.80 ± 3.90 days of CI in Sindhi $\times$ Indigenous cows whereas Hossain and Routledge (1982) found CI as 536 ± 110 days in indigenous cows.

Daily milk yield (DMY)

Effects of grazing hour and concentrate feed were found insignificant ($p>0.05$) on DMY but the effect of management level on this parameter was found significant ($p<0.05$) (table 2). DMY was found the highest in management 3 (2.79 ± 0.09 kg) followed by management 2 (2.53 ± 0.10 kg) and management 1 (1.84 ± 0.09 kg), whereas the overall mean value was 2.49 ± 0.06 kg. This result was closer to the findings of Husain and Mostafa (1985) (2.60 ± 0.23 kg), Bhuiyan and Sultana (1994) (3.00 ± 0.15 kg) in indigenous cows. Rahman et al. (1987) as 3.10 ± 0.13 kg in the same genetic group. These variations may be due to variation in quality and quantity of feed supplied and management level differences.

Lactation length (LL)

Effects of grazing hour and concentrate feed were found significant ($p<0.01$) on LL, but management had insignificant effect ($p>0.05$) on this trait (table 2). The longest LL was found in management 1 (275.20 ± 11.70 days) followed by management 2 (240.25 ± 5.26 days) and management 3 (239.69 ± 3.55 days) (table 3). The average LL was (247.23 ± 3.51 days) (table 5), which was in closer agreement to the findings of Bhuiyan and Sultana (1994) (241.18 ± 10.53 days), Ashraf (1998) (244.63 ± 10.16 days) and Hossain and Routledge (1982) (240 ± 63 days). Whereas lower LL was found by Islam, (1995) (200.50 ± 63.48 days) and the highest LL was found by Rahman et al. (1987) (323.0 ± 8.90 days) and Jahan et al. (1990) (317.18 ± 11.18 days). These dissimilarities may be due to variation in management such as nutrition and suckling.

Total lactation production (TLP)

All the factors under consideration had highly significant effect ($p<0.001$) on TLP (table 2). Maximum value was obtained from management 3 (666.40 ± 26.70 kg) followed by management 2 (581.30 ± 22.60kg) and management 1 (457.20 ± 22.00kg). The overall mean value was 590.40 ± 15.00 kg, whereas a lower TLP was found by Hossain and Routledge (1982) (213 ± 88 kg) in indigenous cows but much higher values were found by Jahan et al. (1990) (1148.59 ± 97.99 kg) and Ashraf (1998) (937.0 ± 183.0 kg) in indigenous cows. These variations may be due variation for LL or other environmental factors. The

correlation co-efficient of grazing hour, concentrate feed and management were -0.246, 0.154 and 0.205 respectively (table 4). Positive correlations indicate that increased TLP with improving concentrate feed supply and management level.

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