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A Study of the Milking and Reproductive Performances of Indigenous Cattle at Urban Area of Bangladesh

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Abstract: Various milking and reproductive performances were analyzed. The effects of concentrate feed were found significant on age at weaning AW ($p< 0.001$) age at first heat (AFH) ($P< 0.05$) age at first conception (AFH) ($P< 0.001$) No. of services per conception ($P< 0.05$), age at first calving ($P< 0.001$) post partum heat period (PPHP) ($P< 0.001$), calving interval (CI) ($P< 0.001$), daily milk yield ($p< 0.05$) and lactation length LL ($P< 0.001$). The effects of management level were significant on AW ($P< 0.001$), PPHP ($P< 0.01$), CI ($P< 0.001$) and daily milk yield ($P< 0.05$). The overall mean values were 245.80± 3.80 days for AW, 35.30± 0.40 months for AFH, 37.20± 0.70 monthly for conception, 46.20± 0.40 monthly for AF calving, 1.30± 0.10 for no. of services for conception, 182.90± 4.80 days for PPHP, 15.50± 0.20 months for CI, 2.50± 0.30 kg for daily milk yield and 250.60± 4.50 days for lactation length.

Key words: Concentrate, reproductive, management, milking, indigenous

Introduction

Livestock sector in Bangladesh contributes 9% of Gross Domestic Product (GDP), however, the indirect contributions through draught, fuel and fertilizer are large (BBS, 1998). The indigenous (Zebu type) cattle of Bangladesh can not be described under any particular breed type and thereby fall into a category of nondescriptive and their milking and reproduction performances are very low. It is reported that 75% of the world's cattle population is in the developing countries (Asia,Africa and latin America) but it contributes only 21% of the world's milk production and 34% of beef production (Rahman, 1992). Amongst the developing countries the condition of livestock in Bangladesh is worst. There are 23.7 million heads of cattle in Bangladesh. Among the cattle population of Bangladesh only about 0.25 million are purebred and therir crosses and the rest are indigenous low producing Zebutype (Sultana, 1995).The breeding program is followed for the improvement of these nondescriptive indigenous cattle mainly crossbreeding or upgrading of dairy breeds. The present work particularly in the context of indigenous cattle of northern parts of Bangladesh is important because these regions belong to a large number of cattle of low performance and a little work has been done on them.

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

Materials and Methods

The study was based on field survey to investigate the milking and reproduction performances of indigenous cattle of urban areas of Pabna, Bangladesh. The urban areas namely Ishurdi, Atgoria, Pabna, Chatmohor, and Ataicula were selected for study, which were included under pabna district. Data were collected from September, 1999 to February, 2000.

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 taken to the veterinary doctors rather treated traditionally.

In management-2, 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. Supplementation of rice straw, green grasses and concentrate mixtures were carried out by the farmers. Overall concentrate feed per animal were allowed 2.99 kg per day respectively.

Both production and milking performances were considered in present study. The number of observations of reproduction performances were age at weaning, age at first heat, age at first conception, age at first calving, no. of services per conception, post partum heat period, calving interval covered 625, 626, 624, 622, 630, 628 and 630. The milking performances were daily milk yield, lactation length total lectational production and member of observations were 638, 637, 637 and 657 respectively (Table 1). Analysis of variances was done on each of the traits for different management levels and concentrate feed variances. The model used in this study was:

$$Y_{ij}K_l = \mu + G_i + C_j + M_k + E_{ij}K_l$$

Where, μ = The overall mean.
G_i = Effect of grazing hour.
C_j = Effect of concentrate.
M_k = Effect of management level.
$E_{ij}K_l$ = Random error associated with each observation.
$Y_{ij}K_l$ = l-th records of jth concentrate feed and k-th management.

Results and Discussions

The total features of the results of the analyzed traits showing the effect of concentrate feed and management level are presented in Table 3 and descriptive statistics of the traits are given in Table 5.

Age at weaning (AW): 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 (230.50± 5.45 days) and the highest value was found in management 1(260.55± 7.50 days) (Table 3). The overall mean value was 245.80± 3.80 days. Whereas Ashraf (1998) found lower AW (6.82± 0.24) months in indigenous cattle reared under farm conditions.

Table 1: Summary of the data used and traits analyzed

Traits	Number of observations			
	Management 1	Management 2	Management 3	Total
Age at weaning	125	240	260	625
Age at first heat	130	238	258	626
Age at first conception	125	241	258	624
Age at first calving	125	239	258	622
No. of services per conception	125	245	260	630
Post partum heat period	125	245	258	628
Calving interval	125	247	258	630
Daily milk yield	135	245	258	638
Lactation length	135	245	257	637
Total lactational production	134	258	265	657

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

Traits	P-Values	
	Concentrated feed	Management level
Age at weaning	0.007	0.20
Age at first heat	0.005	0.950
Age at first conception	0.001	0.995
Age at first calving	0.000	0.985
No. of services pre conception	0.300	0.650
Post partum heat period	0.001	0.501
Calving interval	0.002	0.005
Daily milk yield	0.653	0.003
Lactation length	0.001	0.121
Total lactational production	0.001	0.001

Table 3: Results showing mean± SF with comparison of management on various traits

Traits	Management system		
	1	2	3
Age at weaning (day)	260.55± 7.50	240.30± 3.98	230.50± 5.45
Age at first heat (months)	35.60± 0.96	36.75± 0.56	35.68± 0.80
Age at first conception (months)	37.20± 0.80	36.25± 0.45	36.20± 0.40
Age at first calving (months)	46.20± 0.85	46.25± 0.50	46.25± 0.45
No. of services per conception (no)	1.45± 0.03	1.30± 0.06	1.21± 0.05
Post partum heat period (days)	220.40± 8.50	180.50± 7.5	150.40± 5.7
Calving interval (months)	17.80± 0.50	15.7± 0.54	14.50± 0.20
Daily milk yield (Kg)	1.90± 0.50	2.80± 0.20	3.10± 0.08
Lactation length (days)	270.30± 10.50	250.20± 6.4	248.54± 4.60
Total lactational production	459.20± 24.0	588.30± 24.06	670.40± 28.40

Table 4: Correlation co-efficient of concentrate feed and management level on various traits

Traits	Concentrate feed	Management level
Age at weaning (days)	0.025	-0.120
Age at first heat (months)	0.010	0.035
Age at first conception (months)	0.001	0.020
Age at first calving (months)	0.002	0.015
No. of services per conception (no)	0.024	0.112
Post partum heat period (days)	0.011	-0.205
Calving interval (months)	-0.032	-0.230
Daily milk yield (Kg)	0.004	0.060
Lactation length (days)	0.011	-0.130
Total lactational production	0.159	0.235

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± 0.1. 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), Majidetal (1998) (1.76± 0.08) and Chaudhury *et al.* (1994) (2.5± 1.3) for indigenous cows. This variation may be due to inaccurate insemination techniques, improper heat detection, using low quality semen for Artificial Insemination (AI) and low fertility of cows.

Post partum heat period (PPHP): Significant effects of concentrate feed ($P < 0.001$)and management ($P < 0.01$) were found on PPHP. The lowest value was found in management 3 (150.40± 5.7) and highest value was in management 1(220.40± 8.50). Whereas the overall mean value was (182.90± 4.80) days. Relatively lower values were obtained by Ashraf (1998) (3.37± 0.30 months), Majidet *et al.* (1998)(120.04± 7.80 days) and Islam (1995) (3.93± 2.15 months) in case of indigenous cows and Nahar *et al.* (1992) (165.7± 6.9 days) is Sindhi indigenous cows. The variation may be PPHP caused by various genetic, environmental, physiologic and metabolic factors such as breed, nutritional level, Suckling and milk production (Hafez, 1993).

Calving iterval (CI): This trait was found significant for concentrate feed effect ($P < 0.001$) and management effect ($P < 0.01$). The lowest CI was found in management 3(14.50± 0.20 months) and highest in management 1(17.80± 0.50 months). The overall mean value was 15.50± 0.20 months. Similar results were also found by Majid *et al.* (1998) (484.21± 11.5 days). This variation may be due to variation in management. Positive correlation's were found in AW between concentrate feed (0.025) and negative correlation were found in management level (-0.120) (Table 4), which indicates the weekly correlation of AW with concentrate feed and management.

Table 5: Descriptive statistics of milking and reproduction traits

Traits	Mean± SE	Median	Range	Standard Deviation	Co-efficient of Variation (%)
Age at weaning (days)	245.80± 3.80	238.0	115-700	70.50	27.50
Age at first heat (months)	35.30± 0.40	34.0	15-90	7.50	19.45
Age at first conception (months)	37.20± 0.70	35.0	16-95	8.10	20.50
Age at first calving (months)	46.20± 0.40	45.2	25-104	8.30	16.54
No. of services per conception (no.)	1.30± 0.10	1.0	1-4	0.50	43.50
Post partum heat period (days)	182.90± 4.80	175.0	30-700	97.20	48.50
Calving interval (months)	15.50± 0.20	14.0	10-35	3.50	21.30
Daily milking (Kg)	250.40± 0.30	2.0	0.30-10	1.45	62.14
Lactation length (days)	250.60± 4.50	230.0	90.0-700	85.80	33.55
Total lactational production	599.40± 15.0	528.0	54-316	378.40	64.94

Value in indigenous cattle is 35.20± 2.48 months.

Age at first heat: (AFH): There was a significant effect of concentrate feed ($P< 0.05$) on the trait (Table 2). The mean value was (35.30± 0.40) (Table 5). The result was similar 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: There was a highly significant effect ($P< 0.001$) of concentrate feed on this trait whereas management effect was found not highly significant ($P< 0.05$). Average age at first conception was found (37.20± 0.70 months) (Table 5), Which was closer to the findings of Ashraf (1998) (39.48± 1.51 months) but it was not similar to the findings of Hussain and Mostafa (1985) (22.3± 3.8 months). This variation may be due to poor management and scarcity of green grass in this study area.

Age at first calving: The effect of concentrate feed was found highly significant ($P< 0.001$) on AF calving but management effect was found insignificant ($P> 0.05$). The overall mean value (46.20± 0.40 months), which was similar to the findings of Nahar *et al.* (1992), who found AF calving in Sindhi x Indigenous cows as 1452.50± 33.80 days. Bhuiyan and Sultana (1994) found 449.78± 27.87 days in indigenous cows and Nahar *et al.* (1992) found 485.80± 3.90days in Sindhi x Indigenous cows where as Hossain and Routledge (1982) found CI as 536± 10 days in indigenous cows.

Daily milk yield (DMY): Effects of concentrate feed were found significant ($P< 0.05$) on DMY and the effect of management level was also found significant ($P< 0.05$). DMY was found the highest in management 3 (3.10± 0.08Kg.) and lowest in management level 1 (1.90± 0.50Kg). The overall mean value was 2.50± 0.30 Kg. This result was similar to the findings of Husain and Mostafa (1985) (2.60± 0.23Kg), and Bhuiyan and Sultana (1994) (3.00± 0.5 kg.) in indigenous cows. Rahman *et al.* (1987) found 3.10± 0.13 kg. in the same genetic group. These variations may be attributed to variation in quality and quantity of feed supplied and management level differences.

Lactation length (LL): Effect of 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(270.30± 10.50 days) and shortest in management level 3 (248.54± 4.60 days). The average LL was 250.60± 4.50 days, which was similar to the findings of Bhuiyan and Sultana (1994) (241.18± 10.53 days), Ashraf (1998) (244.63± 10.16 days), 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 (670.40± 28.70kg) followed by management 2 (588.30± 24.06 kg) and management 1 (495.20± 24.00kg). The overall mean value was 599.40± 15.00kg , whereas a lower TLP was found by Hossain and Routledge(1982) (213± 88kg) in indigenous cows but much higher values were found by Johan *et al.* (1990) (1148.59± 97.99kg) and Ashraf (1998) (937.00± 183.00kg) in indigenous cows. These variations may be due to variation for LL or other environmental factors.

From the above discussion it may be concluded that the reproductive and milking performance of indigenous cows under management 3 was better than management 2 and management 1.

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