

Effect of management factors on the productive and reproductive performance of dairy cows

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Abstract

Context: Productivity of dairy cows indicate the status of management.

Objectives: The present study was undertaken to evaluate the effect of management on the productive and reproductive performance of dairy cows.

Materials and methods: A cross sectional study was conducted on six hundred and seventy one (671) dairy cows from 335 farmers at Barind tract at Bangladesh from July 2008 to June 2010. The existing record reserved following the structured, closed questionnaire. The influencing factors housing, ventilation, feeds and feeding on productive and reproductive parameters of dairy cows. The overall mean values of productive and reproductive status including age at puberty (month), age at first service, age at first calving (month), service per conception (s/c), post partum heat period (days), days open (days), wastage days (days), gestation length (days), milk yield per day (liter), lactation length (days), milk yield per lactation (liter), weaning period (days), dry period (days), calving interval (days) and birth weight of calves (kg) were studied. The secondary data were compiled tabulated and SPSS program to prepared result.

Results: Housing systems of cows had significant ($P < 0.05$) effect on age at puberty, age at first service, age at first calving, service per conception, milk yield per day, milk yield per lactation, dry period, and birth weight of calf. Ventilation of cow shed had significant ($P < 0.05$) effect on post partum heat period, days open, milk yield per day, milk yield per lactation, dry period, calving interval and birth weight of calf. Feeds and feeding had significant ($P < 0.05$) effect on age at puberty, age at first service, age at first calving, post partum heat period, wastage days, milk yield per day, lactation length, milk yield per lactation, weaning period and calving interval.

Conclusion: Finally the study recommended that sufficient amount of feed 'concentrate + straw + green grass', proper ventilated, semi-intensive housing system for the excellent productive and reproductive performance.

Keywords: Dairy cows, productive and reproductive performance, Barind tract and management.

Introduction

A wide scope still exists for profitable high milk producing and income generating dairy farming in the country, because we had deficit of milk production about 80%. Reproduction is an important consideration in the economics of cattle production. Economics of cattle production depends largely on the feeding and management of cattle. In order to obtain the maximum milk production from cow, maximum numbers of lactations have to be obtained with her economic life span. A calf birth is essential before successful lactation begins. Therefore, fertility and milk production are highly interrelated. To obtain more calves, calving interval (CI) should be as shortest as possible. In the absence of regular breeding and calving at the appropriate time, cattle rearing will not be profitable. This is possible only by increasing the reproductive efficiency of animals. Many factors influence the distribution of cattle farming in Bangladesh such as, the agro ecological zones, milk pocket zone and other zone especially in Barind region proximity to markets and feed resources, rainfall pattern and altitude from sea level. The profitability of dairying depends upon the sound management and age of animal which determine the level & duration of production either farm or individual level. As generally indicative to a better management index at farm level average age of first calving should be optimally around 2 years while the average interval between two calvings should ideally not exceed 13 to 14 months (Alam and Ghosh, 1988). Biologically potential for milk production depends on the age at puberty, early first calving, number of parity and shorter calving interval. However, the intensity of production traits differs according to the genotype of

breeds and between parities (Alam and Ghosh 1994). The productive and reproductive performance of indigenous crossbred cows with high yielding exotic may differ among different geographical areas (Djemali and Freeman 1987 & Butler and Smith 1989). However, the potential for milk production not only attributed with the genetic makeup of a cow, but also have an interaction with environment or variation of management could considerably limit the expected farm level production. Assessment of production and reproductive performance not only depends on a single parameter but also depends on composite parameters to assess overall performance evaluation. The productive and reproductive performance at both subsistence and semi-intensive or intensive farm level in dairy cows had been subjected to a number of studies elsewhere in Bangladesh (Jahan *et al.*, 1990; Hossain *et al.*, 2004 & Hossain *et al.*, 2005) where delayed puberty, long post partum intervals with or without gynecological disorders had been encountered. Although the results of reproductive traits of dairy cows are available, these often do not correspond with the real scenario. It has been well documented that both individual, cow level and farm level determinants influences the productive performance in dairy cows (Kokate and Tyagi, 1991). Mainly Intensive system of cattle farming is practiced in up-country, with permanent housing and feeding with concentrates (Martin 1982). This variation is supposed to be greater in larger farms. The present study is therefore undertaken to the management factors effect on productive and reproductive parameters of Dairy cows in Barind region, Bangladesh.

Materials and Methods

A cross sectional study was conducted on six hundred and seventy one (671) dairy cows from 335 farmers at Barind tract,

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Bangladesh from July 2008 to June 2010. Collected information in accordance with objectives of the study was done on prepared questionnaire. It has been considered to design in a simple manner to get accurate information from the dairy farmers. The researcher collected the information with the help of farm register and from dairy farm as well as visual observation. The experimental animal grouped on the basis of factors such as:

Housing pattern: group 1: intensive housing system, group 2: semi intensive housing, group 3: loose housing system; Ventilation were divided into proper, fair and poor; Feed quality were grouped as group 1: Concentrate+ straw + Green grass, group 2: Concentrate + straw, group 3: Concentrate + Green grass and group 4: Straw + Green grass.

The productive and reproductive parameters of dairy cows (age at puberty (month), age at first service, age at first calving (month), service per conception (s/c), post partum heat period (days), days open (days), wastage days (days), gestation length (days), milk yield per day (liter), lactation length (days), milk yield per lactation (liter), weaning period (days), dry period (days), calving interval (days) and birth weight of calves (kg)) were studied.

Statistical analysis

Data collected from dairy farm owners were compiled tabulated and analyses in accordance with the objectives of the study. General Linear Model analysis were done to measure the association and strength of association between the potential influencing factors genotypes, age, parity, body condition, body weight, housing, ventilation, feeds and feeding etc. Duncan Multiple Range Test (DMRT) was used for test of significance of means with unequal subclass number (Martin and Willeberg 1988). The outcomes variable were age at puberty, age at first service, age at first calving, service per conception, post partum heat period, gestation length, wastage days, dry period, days open, milk yield per day, lactation length, milk yield per lactation, dry period, calving interval and birth weight of calf.

Mean effects were systematically included in the model. Random effects were assumed independently and identically distributed. General Linear Model (GLM) test i.e. University (Post Hoc) for multiple comprises for observed mean was performed.

Results and Discussion

The influencing factors were housing, ventilation, feeds and feeding on productive and reproductive parameters viz., age at puberty, age at first service, age at first calving, service per conception, post partum heat period, days open, wastage days, gestation length, milk yield per day, lactation length, milk yield per lactation, weaning period, dry period, calving interval and birth weight of calf. Effect of housing system on productive & reproductive performance of dairy cows in Barind tract, Bangladesh has been shown in Table-1. The mean values of age at puberty in intensive, semi intensive and loose housing system were 28.14±0.47, 26.37±0.40 and 28.67±1.22 months, respectively. The average age at first service for the same housing systems were 29.05±0.47, 27.27±0.39 and 29.65±1.08 months, respectively. The average values of age at first calving were 38.35±0.48, 36.72±0.44 and 39.05±1.18 month,

respectively. The average services per conception were 1.50±5.61, 1.52±4.05 and 1.98±0.16, respectively. The average post partum heat period was 88.93±3.09, 90.09±2.22 and 82.98±7.51 days, respectively. The average days open were 106.70±3.77, 114.03±2.74 and 103.04±6.98 days, respectively. The values of wastage days were 19.44±1.83, 25.09±1.20 and 26.63±4.59 days, respectively. The average gestation length was 279.38±0.72, 280.16±0.72 and 281.72±0.97 days, respectively. The average milk yield per day was 7.00±0.32, 4.10±0.19 and 4.10±0.40 liter, respectively. The overall mean values of lactation length were 265.74±4.13, 263.14±5.22 and 258.40±5.62 days, respectively. The mean values of milk yield per lactation were 1866.98±91.06, 1299.65±53.25 and 911.15±95.87 liter, respectively. The average values of weaning period were 224.03±5.01, 221.11±3.41 and 228.47±8.86 days, respectively. The average dry period was 84.39±2.33, 98.51±2.83 and 90.23±5.68 days, respectively. The average calving interval was 387.17±5.59, 413.88±11.30 and 391.54±11.62 days, respectively. The mean values of birth weight of calf were 24.68±0.54, 22.62±0.40 and 21.89±0.79 kg, respectively. Housing systems of cows had significant (P<0.05) effect on age at puberty, age at first service, age at first calving, service per conception, milk yield per day, milk yield per lactation, dry period, and birth weight of calf.

Table 1. Effect of housing system on productive and reproductive parameters of dairy cows

Productive and reproductive parameters	Housing system			Overall	Significant level
	Intensive	Semi intensive	Loose		
Age at Puberty (month)	28.14±0.47 ^{ab} n=220	26.37±0.40 ^b n=386	28.67±1.22 ^a n=46	27.13±0.30 n=652	*
Age at first service (month)	29.05±0.47 ^{ab} n=220	27.27±0.39 ^b n=389	29.65±1.08 ^a n=48	28.04±0.29 n=657	*
Age at first calving (month)	38.35±0.48 n=220	36.72±0.44 n=394	39.05±1.18 n=48	37.43±0.32 n=662	*
Service per conception (S/C)	1.50±5.61 ^b n=222	1.52±4.05 ^b n=396	1.98±0.16 ^a n=47	1.55±3.28 n=665	**
Post partum heat period (days)	88.93±3.09 n=222	90.09±2.22 n=388	82.98±7.51 n=49	89.17±1.76 n=659	NS
Days open (days)	106.70±3.77 n=221	114.03±2.74 n=384	103.04±6.98 n=48	110.74±2.12 n=653	NS
Wastage days (days)	19.44±1.83 n=219	25.09±1.20 n=396	26.63±4.59 n=48	23.33±1.38 n=663	NS
Gestation length (days)	279.38±0.72 n=221	280.16±0.72 n=387	281.72±0.97 n=47	280.01±.50 n=655	NS
Milk yield per day (liter)	7.00±0.32 ^a n=221	4.10±0.19 ^b n=386	4.10±0.40 ^b n=47	5.61±.16 n=655	***
Lactation length (days)	265.74±4.13 n=220	263.14±5.22 n=386	258.40±5.62 n=47	263.67±3.41 n=653	NS
Milk yield per lactation (liter)	1866.98±91.06 ^a n=220	1299.65±53.25 ^b n=388	911.15±95.87 ^c n=47	1461.48±45.94 n=656	***
Weaning period (days)	224.03±5.01 n=221	221.11±3.41 n=386	228.47±8.86 n=47	222.65±2.70 n=656	NS
Dry period (days)	84.39±2.33 ^b n=221	98.51±2.83 ^a n=383	90.23±5.68 ^{ab} n=47	93.11±1.90 n=652	**
Calving interval (days)	387.17±5.59 n=219	413.88±11.30 n=381	391.54±11.60 n=47	403.20±6.97 n=648	NS
Birth weight of calf (kg)	24.68±0.54 ^a n=219	22.62±0.40 ^{ab} n=388	21.89±0.79 ^b n=47	23.25±.30 n=654	*

Figure indicate Mean ± SE Value, n = Number of observation, ^{abc} values having different superscripts differed significantly. NS = Non significant * = Significant at 5% levels ** = Significant at 1% levels *** = Significant at 0.1% levels DF = Degree of freedom

Effect of ventilation on productive & reproductive performance of dairy cows in Barind tract, Bangladesh has been shown in Table-2. The mean values of age at puberty in proper ventilated, fairly ventilated and poor ventilated were 26.46±.55, 26.80±.37

and 26.31±.66 months, respectively. The average values of age at first service for the same ventilations were 27.80±.47, 28.15±.41 and 27.09±.72 months, respectively. The overall mean values of age at first calving were 37.39±.48, 37.7±.48 and 36.83±.76 months, respectively. The average service per conception was 1.76±1.49, 1.61±5.50 and 1.64±.10, respectively. The average post partum heat period was 78.61±3.41, 84.13±2.44 and 87.20±5.79 days, respectively. The average days open were 116.32±2.95, 108.88±2.83 and 122.13±5.92 days, respectively. The mean values of wastage days were 23.32±1.75, 21.59±1.67 and 26.79±3.85 days, respectively. The average gestation length was 280.61±.69, 279.89±.76 and 280.72±1.46 days, respectively. The average milk yields per day were 6.34±.26, 4.67±.18 and 4.88±.43 liter, respectively. The average values of lactation length were 261.01±2.93, 259.08±3.01 and 260.48±8.41 days, respectively. The average milk yields per lactation were 1675.77±76.12, 1367.72±54.02 and 1227.62±119.87 liter, respectively. The mean values of weaning period were 224.22±3.63, 235.85±7.99 and 233.27±8.14 days, respectively. The mean values of dry period were 94.35±2.38, 92.22±2.41 and 107.98±8.98 days, respectively. The average calving interval was 401.25±3.75, 390.23±4.04 and 428.31±7.84 days, respectively. The values of birth weight of calves were 24.10±.26, 22.15±.30 and 18.96±.50 kg, respectively. Ventilation of cow shed had significant ($P<0.05$) effect on post partum heat period, days open, milk yield per day, milk yield per lactation, dry period, calving interval and birth weight of calf.

Table 2. Effect of Ventilation on productive and reproductive parameters of dairy cows

Productive and reproductive Parameters	Ventilation			Overall	Significant level
	Proper ventilated	Fair ventilated	Poor ventilated		
Age at Puberty (month)	26.46±.55 n=231	26.80±.37 n=318	26.31±.66 n=64	26.62±.29 n=613	NS
Age at first service (month)	27.80±.47 n=287	28.15±.41 n=317	27.09±.72 n=65	27.90±.29 n=669	NS
Age at first calving (month)	37.39±.48 n=310	37.79±.48 n=318	36.83±.76 n=64	37.52±.29 n=692	NS
Service per conception (S/C)	1.76±1.49 n=318	1.61±5.50 n=317	1.64±.10 n=65	1.88±4.32 n=701	NS
Post partum heat period (days)	78.61±3.41 n=351	84.13±2.44 n=317	87.20±5.79 n=65	83.75±1.76 n=733	*
Days open (days)	116.32±2.95 ^{ab} n=330	108.88±2.83 ^b n=294	122.13±5.92 ^a n=63	113.67±1.95 n=687	*
Wastage days (days)	23.32±1.75 n=304	21.59±1.67 n=319	26.79±3.85 n=64	22.79±1.15 n=687	NS
Gestation length (days)	280.61±.69 ^a n=353	279.89±.76 ^c n=321	280.72±1.46 ^{ab} n=64	280.31±.48 n=738	NS
Milk yield per day (liter)	6.34±.26 ^a n=314	4.67±.18 ^b n=315	4.88±.43 ^b n=65	5.45±.15 n=694	**
Lactation length (days)	261.01±2.93 n=329	259.08±3.01 n=284	260.48±8.41 n=65	260.15±2.06 n=678	NS
Milk yield per lactation (liter)	1675.77±76.12 n=334	1307.72±54.02 n=287	1227.62±119.87 n=63	1480.07±45.46 n=684	**
Weaning period (days)	224.22±3.63 n=334	235.85±7.99 n=283	233.27±8.14 n=62	229.89±3.85 n=679	NS
Dry period (days)	94.35±2.38 ^{ab} n=326	92.22±2.41 ^b n=283	107.98±8.98 ^a n=64	94.75±1.76 n=673	*
Calving interval (days)	401.25±3.77 ^b n=327	390.23±4.04 ^b n=293	428.31±7.84 ^a n=64	399.06±2.62 n=684	**
Birth weight of calf (kg)	24.10±.26 ^a n=336	22.15±.30 ^b n=293	18.96±.50 ^c n=65	22.80±.19 n=694	***

Considering all parameters it may be concluded that there was good reflection of different housing system on productive and reproductive performance. The cows reared in intensive system

showed better performance. Hossain *et al.* (2005) observed only 10 percent of the farmers provide half building and rest 90% of the farmers used tin shed and straw shed to house their cattle. Highest percentage of farmers (80%) provided open house, 13% provided closed and rest used semi-closed house. On the basis of floor type, 65% of farmhouse was found with pacca (with bricks) and the rest had unpaved floor. In another region of the same district, Hossain *et al.* (2004) observed that 63% farmers provided closed house and 37% farmers used paved floor. Shamsuddin *et al.* (1995) studied the body condition scores and reproductive performance of animals reared on different types of stable-floors. The nutrition condition and fertility of the animals were not affected markedly by the floor of the house. However, the incidence of reproductive diseases was lower in animals reared all the time on concrete floor (19%) than in animals on concrete floor only during night time (20%) and those always on the muddy (kacha) floor (23%). The cows rearing under good ventilation showed better performance. Shamsuddin *et al.* (1995) reported the effect of ventilation of the house on the condition scores, fertility and the incidence of reproductive disorders of the animals living. The duration of postpartum anoestrus, days open, wastage days and service per conception were lower in animals at the free ventilation houses than those at restricted ventilation system. Accordingly, the animals at the ventilation system had higher conception rate than those at the restricted ventilation system; however, the difference was not significant ($p=0.12$). Sainsbury (1981) observed that well ventilated houses get more light, remain drier and cooler than the poor ventilated house. There is ample evidence that dry and cool environment favors the reproductive efficiency of the cow. Contrary, the damp and humid environment caused by poor ventilation result in poor fertility. The high incidence of reproductive disorder in the animals of badly (poor) ventilated houses may be due to high microbial activity and a stressful environment for the animals concerned. The types of stable – floors were considered as influencing factors to general health and fertility for several reasons. Firstly, in the traditional farming, the farmer prepares the muddy (kacha) floor as dry as possible for the night time; during the day, the animals usually enjoy rather big area for their movement. In the mini-dairy farm the animals are usually confined in a particular area. Animals standing on muddy floor in a confined area may develop foot diseases and such animals often show poor reproductive performance (Benzamin and Ansari, 1992). Martin *et al.* (1998) noted that animals standing always on the concrete floor may also develop foot problems leading in worst cases to lameness. These animals are reluctant to move and thereby consume less food and receive limited exercise. Animals living on concrete and slippery floor show less pronounced signs of behavioral oestrus resulting in poor heat detection (Martin, 1982). Effect of feed quality on productive & reproductive performance of dairy cows at Barind tract, Bangladesh has been shown in Table-3. The average values of feed quality at puberty in concentrate + straw + green grass, concentrate + straw, concentrate + green grass and straw + green grass feed quality were 26.37±.36, 28.90±.52, 27.38±1.11 and 25.69±.61 months, respectively. The mean values of age at first service for the same quality of feeds were 27.24±.33, 29.98±.51, 35.84±111.8 and 26.22±.59 months, respectively. The average age at first calving were 36.71±.38, 39.73±.52, 38.0±1.87 and 35.56±.64 months,

respectively. The average service per conception were 1.55 ± 0.01 , 1.51 ± 0.04 , 1.69 ± 0.20 and 1.35 ± 0.88 , respectively. The overall mean values of post partum heat period were 92.80 ± 2.88 , 98.96 ± 3.78 , 74.61 ± 11.50 and 78.44 ± 3.34 days, respectively. The average days open were 109.93 ± 2.95 , 110.54 ± 3.64 , 101.23 ± 8.40 and 102.33 ± 4.16 days, respectively. The mean values of wastage days were 22.71 ± 1.49 , 17.12 ± 1.87 , 42.84 ± 10.49 and 21.02 ± 2.46 days, respectively. The average gestation length were 280.07 ± 0.76 , 279.48 ± 1.12 , 282.69 ± 1.34 and 279.54 ± 0.80 days, respectively. The average milk yield per day was 6.55 ± 0.58 , 5.22 ± 0.28 , 5.53 ± 0.85 and 3.07 ± 0.20 liter, respectively. The mean values of lactation length were 264.69 ± 2.56 , 263.33 ± 5.70 , 263.46 ± 6.94 and 240.03 ± 4.26 days, respectively. The average milk yield per lactation were 1680.78 ± 61.54 , 1374.58 ± 86.03 , 1456.93 ± 85.3 and 736.89 ± 51.4 liter, respectively. The average weaning period was 221.94 ± 3.31 , 233.20 ± 6.13 , 256.00 ± 10.19 and 204.15 ± 4.65 days, respectively. The average dry period was 95.94 ± 2.36 , 88.68 ± 3.09 , 85.30 ± 11.12 and 86.63 ± 2.76 days, respectively. The average values of calving interval were 405.4 ± 3.61 , 399.61 ± 5.55 , 435.84 ± 13.31 and 394.05 ± 7.93 days, respectively. The average values of birth weight of calf were 21.66 ± 0.25 , 22.88 ± 0.59 , 20.30 ± 0.73 and 21.73 ± 0.88 kg, respectively. Feeds and feeding had significant ($P < 0.05$) effect on age at puberty, age at first service, age at first calving, post partum heat period, wastage days, milk yield per day, lactation length, milk yield per lactation, weaning period and calving interval. The findings are nearly similar to the findings of Sarder and Rashid (2005) found that three quality of feed (Good, Fair, Poor) had significant ($P < 0.05$) effect on reproductive and productive performance of dairy cows but good quality feed had shown the excellent performances, post partum heat period, days open, wastage days, service per conception, dry period and calving interval values were increased in feed quality of fair and poor. Shamsuddin *et al.* (1995) observed the body weight, milk production and the fertility parameters following feeding of different grades of concentrate. Feeding grade 3 concentrate resulted in the lowest body weight. Daily average milk yield was highest in animals fed with grade-1 concentrate. The fertility parameters were best in animals fed with grade-1 concentrate and worst in grade-3 concentrate-fed animals. However, the difference in the body weight, milk production and fertility parameters was not significant between animals fed with different grades of concentrate. The feed supplied, in particular to the post-partum cows should be enough to maintain the cow, to support milk production, as well as to initiate the ovarian cyclicity (Montgomery *et al.* 1985; Butler and Smith, 1989). Kokate and Tyagi (1991) stated that 22% of respondents supplied concentrate feeds. About 95% farmers fed colostrums of their new born calves and only 20% rural farmers' supply concentrate mixture to their cows for increase milk production and reproductive efficiency in the study areas. They also observed that only 23% of respondents on grazing. Accordingly the interval between calving to first post-partum service varies between the cows with or without supplementation of concentrates (Shamsuddin *et al.* 1988). Sarder (2003) found the weaning period for L×F cross, L×SL×F, L×SL, L×S×SL and L×F×S×SL was 10.6 ± 1.5 , 10.7 ± 1.4 , 10.3 ± 1.3 , 11.0 ± 1.9 and 10.3 ± 1.0 months respectively. The mean value of some parameters were not exactly similar results to the above authors

due to genetic combination of dairy cows, small sample size, data collection error, feeding, breeding and management error etc.

Table 3. Effect of Feeds and feeding (Feed quality) on productive and reproductive parameters of dairy cows

Productive and reproductive parameters	Concentrate+ straw + Green grass	Feed quality			Overall	Significance level
		Concentrate + straw	Concentrate + Green grass	Straw + Green grass		
Age at Puberty (month)	26.37 ± 0.36^b n=352	28.90 ± 0.52^a n=184	27.38 ± 1.11^{ab} n=43	25.69 ± 0.61^b n=111	27.38 ± 0.27 n=660	***
Age at first service (month)	27.24 ± 0.33^b n=350	29.98 ± 0.51^a n=184	28.84 ± 1.11^{ab} n=43	26.22 ± 0.59^b n=112	27.97 ± 0.27 n=659	**
Age at first calving (month)	36.71 ± 0.38^b n=348	39.73 ± 0.52^a n=182	38.30 ± 1.87^{ab} n=43	35.56 ± 0.64^b n=114	37.50 ± 0.28 n=657	**
Service per conception (S/C)	1.55 ± 0.01^{ab} n=347	1.51 ± 0.04^b n=185	1.69 ± 0.20^a n=112	1.35 ± 0.88^b n=112	1.51 ± 0.88 n=657	NS
Post partum heat period (days)	92.80 ± 2.88^{ab} n=348	98.96 ± 3.78^a n=184	74.61 ± 11.50^b n=43	78.44 ± 3.34^b n=112	91.76 ± 1.98 n=657	*
Days open (days)	109.93 ± 2.95 n=352	110.54 ± 3.64 n=173	101.23 ± 8.40 n=43	102.33 ± 4.16 n=113	109.58 ± 2.02 n=661	NS
Wastage days (days)	22.71 ± 1.49^b n=352	17.12 ± 1.87^b n=182	42.84 ± 10.49^a n=43	21.02 ± 2.46^b n=111	21.32 ± 1.07 n=658	*
Gestation length (days)	280.07 ± 0.76 n=350	279.48 ± 1.12 n=183	282.69 ± 1.34 n=43	279.54 ± 0.80 n=112	279.8 ± 0.53 n=662	NS
Milk yield per day (liter)	6.55 ± 0.58 n=350	5.22 ± 0.28 n=179	5.53 ± 0.85 n=43	3.07 ± 0.20 n=117	5.73 ± 0.33 n=659	*
Lactation length (days)	264.69 ± 2.56 n=386	263.33 ± 5.70 n=130	263.46 ± 6.94 n=43	240.03 ± 4.26 n=91	260.45 ± 2.12 n=620	*
Milk yield per lactation (liter)	1680.78 ± 61.54^a n=352	1374.58 ± 86.03^b n=153	1456.93 ± 85.30^b n=43	736.89 ± 51.40^c n=114	1472.84 ± 436.3 n=662	***
Weaning period (days)	221.94 ± 3.31^b n=354	233.20 ± 6.13^b n=170	256.00 ± 10.19^a n=43	204.15 ± 4.66^b n=113	222.58 ± 2.58 n=660	*
Dry period (days)	95.94 ± 2.36 n=349	88.68 ± 3.09 n=175	85.30 ± 11.12 n=43	86.63 ± 2.76 n=113	92.35 ± 1.63 n=660	NS
Calving interval (days)	405.40 ± 3.61^{ab} n=351	399.61 ± 5.55^b n=173	435.84 ± 13.31^a n=43	394.05 ± 7.93^b n=110	402.66 ± 2.81 n=647	*
Birth weight of calf (kg)	21.66 ± 0.25 n=388	22.88 ± 0.59 n=158	20.30 ± 0.73 n=43	21.73 ± 0.88 n=109	21.93 ± 0.25 n=668	NS

Conclusions

Intensive housing system was best considering most of the productive and reproductive parameters except age at puberty and age at first calving whereas the loose housing system showed poor performance.

Proper ventilated, half building and Concrete floored housing ranked first considering all the productive and reproductive parameters at Barine tract in Bangladesh whereas Poor ventilated, Straw shed and Kacha floored housing showed worst result.

Sufficient amount and 'concentrate + straw + green grass' feed had best result considering all the productive and reproductive parameters but Insufficient amount and 'straw + green grass' feed showed poor result. From the research findings, the farmer should be achieve productive and reproductive performance for profitable dairy industry more attentive in management like housing, ventilation and feed quantity on their reasons.

Author's contribution

It was the PhD thesis experiment of first author. Other authors contributed equally. All authors read and approved the final manuscript.

Ethical Implication

The study was no human subject will be analyzed directly. We will always keeping in mind the Biosafety regulation in Bangladesh. So, it have not needed ethical permission from the ethical committee of Bangladesh.

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