

EFFECT OF AGE ON PRODUCTIVE AND REPRODUCTIVE PARAMETERS OF DAIRY COWS IN GREATER RAJSHAHI

Islam MA¹, Sarder MJU¹, Jahan SS¹, Mazed MA² and Hossain ZMA³¹Dept. Animal Husbandry & Vet. Sci., University of Rajshahi²Dept. Youth Development; ³Dept. Livestock Services**Corresponding Author: E-mail: maids07@yahoo.com

ABSTRACT

A total of 670 dairy cows from 335 farmers of greater Rajshahi were studied to evaluate the effect of age (<4, 4to<6, 6to<8, 8to<10 and >10 years) on productive (daily milk yield, lactation yield, lactation length and birth weight of calf) and reproductive (service per conception, post partum heat period, days open, wastage days, gestation length, dry period and calving interval). The highest and the lowest daily milk yield (6.33 ± 0.44 , 4.48 ± 0.22 liter) and lactation yield (1554.39 ± 89.13 , 1157.81 ± 62.03 liter) were found in age group 8 to <10 years & <4 years respectively. Most of the productive and reproductive parameters showed significant ($p < 0.05$) variation among age groups. From the study it may be concluded that age group 6 to <8 & 8 to < 10 years showed best performances considering most of the productive and reproductive parameters of dairy cows in greater Rajshahi.

Key words: Age, parity, productive and reproductive

INTRODUCTION

Bangladesh is one of the densely populated and the fourth largest agricultural country in the world (Habib, 2001). The economy of Bangladesh largely depends on agriculture. Livestock being one of the four major components (crops, livestock, fisheries and forestry) of agriculture plays a vital role in national economy. At present livestock contributes 6.5% to GDP on the basis of value added through production of milk, meat, hides, skins and eggs. The country earns about 13% of foreign exchange through hides and skins export (Alam, 1991). Rabbani *et al.* (2004) reported that the dairy enterprise provide additional income and gainful employment to the members of the family throughout the year are being practiced by many rural youth. Total milk production of the country from dairy cows was 1.89 million MT (Bangladesh Economic Survey, 2008). It is estimated that daily per capita requirement of milk is 250 ml and annual requirement stands at about 12.68 million MT in the country (DLS, 2006). But it is alarming that the present daily per capita availability of milk is only 45 ml and total annual production is estimated at 1.89 million MT. Hence, annual deficit of milk in the country is about 10.41 million MT (DLS, 2006). To meet the deficit of milk by establishing dairy farm at private level as well as improving high quality breeds or genotype of the dairy cattle under subsistence farming. Reproduction is essential for the production of milk, as well as to provide replacement of animals. Hence to increase the profitability of the dairy animals it is important to improve the breeding efficiency (Barwe *et al.*, 1998). From the viewpoint of

reproduction, the main factors, which contribute to economic losses, are delayed puberty, long calving intervals, short productive life and high calf mortality (Parera, 1999). Parera (1999) also reported that higher reproductive efficiency yields more calves for use as replacement or for the sale in the herd, as well as more lactations and therefore more milk. Therefore, the present study was undertaken with the view to study the effect of age on productive and reproductive traits of dairy cows, and to identify the best age group of dairy cows for the selective area.

MATERIALS AND METHODS

The experiment was conducted in greater Rajshahi covering four districts: Rajshahi, Chapai Nawabgonj, Natore and Naogaon for the period of July, 2008 to June, 2010. A total of 670 dairy cows from 335 farmers were studied to know the effect of age on productive and reproductive parameters of dairy cows. For collection information in accordance with objectives of the study, a prepared questionnaire has been followed. The researcher has conducted the experiment with the help of farm register and other documents from dairy farm as well as visual examination of experimental animals. During data collection careful attention was given to attain accurate and reliability of data.

Age: Age was determined by dentition, counting the number of horn rings and birth registration kept by the farmers. Cows were different age groups and those were divided into 5 groups: < 4 years, 4 to < 6 years, 6 to < 8 years 8 to < 10 years and 10 > years.

Different productive and reproductive parameters of

Dairy cows: Several productive and reproductive parameters of dairy cows were studied. These are mentioned below (According to Dairy herd fertility, Ministry of food and agriculture, U.K.)

Daily milk yield: It is the total milk yield in lactation divided by total number of days in that lactation

Lactation yield: The total quantity (liters) of milk produced throughout the lactation period.

Lactation length: The number of days from first milking to the end of milking of cows,

Birth weight of calf: The weight of calf just after parturition

Service per conception (S/C): It calculated the average number of services or inseminations required for each successful conception.

Post partum heat period: It is considered as the interval between date of calving and the date of first heat shows.

Days open: Days open is measured as interval from parturition to conception of cows.

Wastage days: It is considered as the mean of first service to conception interval.

Gestation length: It was calculated as interval from conceived to parturition.

Dry period: It is measured the number of days from end of milking to next parturition of cows

Calving interval: The number of days between two successive calving of the same cows

Data collected from dairy farm owners were compiled, tabulated and analyses in accordance with the objectives of the study. The raw data (extracted from questionnaire response) were decoded, entered and sorted accordingly using the MS Excel. The data were then transferred to analytical software SPSS for doing descriptive analysis.

RESULTS AND DISCUSSION

Effect of age on productive parameters was presented in Table 1. The highest (6.33 ± 0.44 liter) and the lowest (4.48 ± 0.22 liter) daily milk yield were found in age groups 8 to <10 years and <4 years respectively and the highest (1554.39 ± 89.13 liter) and the lowest (1157.8 ± 62.03 liter) lactation yield were also in the same age groups (Table 1). Similar result found by Sarder *et al.* (1997) showed that the

cows of 7 to 12 years old yield the highest amount of milk (7.7 kg day^{-1}). Another finding of Sarder (2003) daily milk yield, lactation yield gradually increased with increasing age of cows up to 8 to < 10 years of age. Mostert *et al.* (2001) reported that the highest daily lactation yield in age group 7 to 9 years. Lactation length were the longest (266.0 ± 6.30) in age group > 10 years and shortest (245.56 ± 5.34) in age group 8 to < 10 years. The highest (24.17 ± 0.76 kg) and the lowest (20.25 ± 0.47 kg) birth weight of calf were found in age group < 4 years and 8 to < 10 years respectively. The daily milk yield, lactation yield, birth weight of calf showed significant difference but lactation length did not vary significantly in different age groups.

Effect of age on reproductive parameters was presented in Table 2. The highest (1.65 ± 0.41) and the lowest (1.34 ± 0.91) service per conception were found in age group 4 to < 6 years and >10 years respectively which varied significantly. Zu and Zun (1997) reported that the Conception rate was higher (63-71%) up to 6 to <8 years old. They also found conception rate was decreasing with increasing age. 6 to <8 years age group showed the longest (89.35 ± 3.54 days) and < 4 years age group showed the shortest (75.36 ± 2.75 days) post partum heat period respectively and showed significant difference. Similar findings also found by Darwash *et al.* (1996) who reported that post partum heat period increased with increasing age of dairy cows. The longest (107.88 ± 3.60 days) and the shortest (95.81 ± 2.94 days) days open were found in age group 4 to <6 years and <4 years respectively and no significant difference was found. Darwash *et al.* (1996) also reported similar findings. The highest (24.18 ± 2.54 days) and the lowest (21.30 ± 3.04 days) wastage days were found in age group 6 to <8 years and >10 years respectively.

This parameter also did not vary significantly. Age group <4 years showed the longest (299.88 ± 0.14 days) and age group 6 to <8 years showed the shortest (278.18 ± 0.92 days) gestation length respectively. No significant variation was found. The highest (97.24 ± 4.26 days) and the lowest (82.06 ± 3.85 days) dry period were found in age group 6 to <8 years and 8 to >10 years respectively and varied significantly. It was observed that the longest (413.88 ± 5.80 days) and shortest (372.81 ± 4.79 days) calving interval were in age group 4 to <6 years and <4 years respectively which was statistically difference. Singh *et al.* (1999) found that calving interval was longer in early and older ages and

shorter in intermediate ages which are more or less similar to the present findings. Sarder (2003) reported that age of cows had significant effect on the productive and reproductive parameters except

wastages days, birth weight of calf, lactation length and dry period which is similar to the present findings.

Table 1. Effect of age on productive parameters of dairy cows

Productive parameters	Age (years)					Overall	LS
	<4	4 to <6	6 to <8	8 to <10	> 10		
Daily milk yield (Ltr.)	4.48±.22 ^c n=176	4.63±.25 ^c n=175	5.38±.26 ^{bc} n=152	6.33±.44 ^a n=85	6.25±.41 ^{ab} n=80	5.24±.13 (n=668)	**
Lactation yield (liter)	1157.8±62.03 ^{bc} n=158	1182.0±67.82 ^c n=193	1503.7±96.50 ^a n=151	1554.3±89.13 ^{ab} n=86	1486.0±97.91 ^a n=82	1320.9±36.96 n=670	*
Lactation length (days)	258.5±4.55 ^{ab} n=156	253.9±4.22 ^b n=196	257.1±3.74 ^{ab} n=152	245.6±4.34 ^b n=86	266.0±6.30 ^a n=81	256.6±2.06 n=671	NS
Birth weight of calf (kg)	24.17±.76 ^a n=158	22.72±.55 ^{ab} n=193	21.97±.37 ^b n=152	20.25±.47 ^{bc} n=86	20.36±.61 ^c n=82	22.28±.27 n=671	**

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

Table 2. Effect of age on reproductive parameters of dairy cows

Reproductive parameters	Age (years)					Overall	LS
	<4	4 to <6	6 to <8	8 to <10	> 10		
Service per conception (S/C)	1.48±5.13 ^{ab} n=161	1.65±6.41 ^a n=191	1.53±7.23 ^{ab} n=151	1.46±.10 ^{ab} n=86	1.34±6.91 ^b n=81	1.51±.14 n=670	*
Post partum heat period (days)	75.36±2.75 ^b n=167	84.50±3.17 ^{ab} n=186	89.35±3.54 ^a n=149	78.44±3.81 ^{ab} n=86	81.87±5.59 ^{ab} n=80	82.21±1.60 n=668	*
Days open (days)	95.81±2.94 n=160	107.8±3.68 n=190	106.9±4.07 n=153	99.30±5.33 n=86	103.8±6.47 n=81	103.1±1.87 n=668	NS
Wastage days (days)	22.44±1.99 n=177	23.52±2.16 n=194	24.18±2.54 n=150	23.07±3.54 n=85	21.30±3.04 n=82	23.66±1.12 n=688	NS
Gestation length (days)	299.8±14.62 n=169	278.2±1.28 n=189	278.1±.92 n=151	278.7±1.17 n=85	280.9±1.05 n=79	284.6±3.70 n=671	NS
Dry period (days)	92.45±2.96 ^{ab} n=157	85.63±2.41 ^{ab} n=194	97.24±4.26 ^a n=152	82.06±3.85 ^b n=86	91.76±5.10 ^{ab} n=81	90.14±1.59 n=670	*
Calving interval (days)	372.8±4.79 ^b n=158	413.8±5.80 ^a n=196	401.8±5.30 ^a n=150	397.3±7.62 ^a n=86	401.6±8.19 ^a n=80	397.9±2.78 n=670	**

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

REFERENCES

- Alam J. 1991. Livestock development strategies in Bangladesh The socioeconomic perspective proceeding of workshop on livestock development in Bangladesh. BLRI, Savar, Dhaka.
- Mostert BE, Theron HE and Kanfer FHJ. 2001. The effect of calving season and age at calving on production traits of South.
- Bangladesh Economic Survey. 2008. Ministry of Finance. Dhaka, Bangladesh.
- Barwe VK, Dhingra MM and Tomar SS. 1998. Factors affecting breeding efficiency, it genetic and phenotypic relationships with age at first calving in gir cows. Indian J. Dairy Sci. 51: 395-398
- Darwash AO, Lamming GE and Williams JA. 1996. Estimate of genetic variation in the interval from calving to post partum ovulation of dairy cows. J. Dairy Sci. 80: 227-234
- Department of Livestock Service (DLS). 2006. Annual Report. Ministry of Fisheries and Livestock, Government of Bangladesh, Dhaka, Bangladesh
- Habib MS. 2001. Study on the red Chittagong Cattle an animal genetic resource of Bangladesh. M.S. Thesis Dept. of Animal Breeding and Genetics, BAU Mymensingh,
- Parera O. 1999. Management of reproduction in small holder dairying in the tropics (Ed. by, Falvey, L. and Chantalakhana, C.), ILRI, Nairobi, Kenya. pp. 241-264.

Rabbani MS, Alam MM, Ali MY, Rahman SMR and Saha BK 2004. Participation of Rural People in Dairy Enterprise in a Selected Area of Bangladesh. *Pakistan. J. Nutri.* 3: 29-34.

Sarder MJU 2003. Genetic Variation in Semen Characters in Relation to Fertility of Some Pure and Crossbred AI Bulls. Ph.D thesis. Department of Genetics and Breeding, Rajshahi University, Bangladesh.

Sarder MJU, Shamsuddin M, Bhuiyan MMU and Rahman MA 1997. Individual Cow as determinant of the fertility and productivity in mini dairy farms. *Bangladesh Vet. J.* 31: 91-98.

Singh A, Taylor CM and Sighth BN 1999. Factors affecting calving interval in Malvi cattle. *Livestock Advisor.* 8: 9-11.