



Original Research

Factors Affecting the Incidence of Repeat Breeding in Dairy Cows in Rajshahi district, Bangladesh

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Abstract

The objectives of the study were to determine the prevalence of repeat breeding and its associated risk factors in cows such as genotypes, age, parity and body condition at Rajshahi district. Data were collected by interviewing the owner of the cows using questionnaires from selected private dairy farms and Rajshahi Dairy and Cattle Improvement Farm (RDCIF) at Rajshahi district, Bangladesh during the period from January to December 2016. A total of 500 dairy cows were surveyed to find out the prevalence of repeat breeding in relation to genotypes, age parity and body condition of cows. The raw data were then sorted computed, coded and statistically analyzed with the help of SPSS (software 17.0 version) statistics software package. Our findings revealed that, the overall prevalence of repeat breeding in cows was 15.2%. The genotypes, age, parity and body condition of cows influenced the prevalence of repeat breeding in cows. The incidence of repeat breeding was highest in L×F (19.62%) and lowest in local cows (4.10%). Genotypes had highly significant ($p < 0.05$) effect on Rb problems in dairy cows. The age groups of 4 to <6 years showed the highest incidence of Rb (17.07%) and age groups of 6 to <8 years showed the lowest incidence of Rb (14.15%). Age groups had slightly significant ($P < 0.05$) effect on Rb. The incidence of Rb was higher in 3rd calving (22.22%) and lower was in 1st calving (7.24%). Parity had also significant ($P < 0.05$) effect on Rb. It was observed that, the prevalence of Rb was maximum in medium (17.30%) and minimum in good body condition score of cows (5%). The prevalence of Rb was not significantly ($p > 0.05$) influenced by the body condition score of cows.

Key words: Age and Parity, Cows, Genotype, Prevalence, Repeat Breeding (Rb)

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Introduction

Reproductive efficiency is essential for profitable dairy farms (Nebel and Jobst, 1998). Economy of dairy farming largely depends on good conception rates after insemination. Poor conception rate and delayed



conception have been identified as major constraints of profitable dairy farming in Bangladesh (Alam and Gosh, 1988; Shamsuddin *et al.*, 2001). Reproductive disorders have also been responsible for remarkable economic loss to the farmers and dairy industry in Bangladesh (Mia and Islam, 1967). Among reproductive disorders, repeat breeding syndrome may play a vital role in delayed conception in Bangladesh resulting in increased inter calving interval. The economic loss is due to delay in conception, that maintain the animals in a non-productive state for long period, increases number of services per conception, prolonged inter-calving intervals and increased culling rates (Bartlett *et al.*, 1986; Lafi and Keneene, 1992). Repeat breeding (RB), defined as a cow fail to conceive from 3 or 4 regularly spaced services in the absence of detectable abnormalities, is a costly problem for the dairy producer. The repeat breeding causes great economic losses for dairy farmers. The costs of herds management and rearing are increased by increment of expenses of unsuccessful frequent artificial insemination (AI), extended length of the days open (DO) as well as culling and replacement of those cows that can't conceive (Ahmadi and Dehghan, 2007). Repeat breeding in the cow is the main problem caused by different etiological agents. The etiologies of repeat breeding are numerous and are related to female, male, management factors (Wodaje and Mekuria, 2016). Usually about 9-12% cows are expected to be repeat breeder in a herd with normal fertility and with 50-55% conception rates (Reneau and Conlin, 1984). The occurrence of repeat breeding in Swedish dairy cattle was 10.1% and the cause was multifactorial involving a number of extrinsic factors as well as intrinsic factors associated with individual animals (Gustafsson and Emanuelson, 2002). Fertilization failure and early embryonic death are the major causes of repeat breeding those are influenced by uterine infection, genetics, ovulatory failure, error in estrus detection, improper timing of service. When artificial insemination is used, some of the animals might have been inseminated at wrong time (Shamsuddin *et al.*, 2001) leading to increased proportion of repeat breeding in Bangladesh. Moreover Jainudeen and Hafez (2000) reported higher incidence of repeat breeding in dairy herds using artificial insemination than that used natural services. Further, many risk factors such as breed of cows, herd body condition score (BCS), number of breedable cows in each farm may influence the occurrence of repeat breeding in population. Nevertheless, age, parity, BCS and milk yield of cows may affect the occurrence of repeat breeding in individual cows.

Materials and Methods

Study Area and Selection of Animals

Initially the dairy cows were selected from different places at Rajshahi district (Kazla, Bohrompur, Bullonpur, Kumarpara, Rajpara, Baneswar, Kashiadanga, Shalbagan, Shopura, Kathalbaria, Beelpukur, Nawdapara, Buthpara etc.) and RDCIF. Different breeds of dairy cows from heifer and up to 5 parities an absolutely for dairy purpose was considered as experimental materials for this study. Extensive survey and data

was collected from private dairy farms and RDCIF. A total of 500 dairy cows were surveyed among Rajshahi district and RDCIF, Rajabarihat for successful completion.

Grouping of Selected Cows

To achieve the goal, animals were grouped according to following considering factors-

Genotype of Cows & Age Group

Selected cows were grouped into their genetic composition and their ages. These were-

Group I : Local (n = 73)	Group I : <4 years (n = 201)
Group II : Local × Friesian (n = 270)	Group II : 4 to <6 years (n = 123)
Group III : Local×Sahiwal (n = 109)	Group III : 6 to <8 years (n = 113)
Group IV : Local× Jersey (n = 48)	Group IV : >8 years (n = 63)

Parity

The cows those did not give any calf considered as heifer (P_0), those gave 1st calf considered as parity 1 (P_1), those gave 2nd calf consider as parity 2 (P_2), 3rd calf as parity 3 (P_3) and so on. Cows were different parities and up to 5 parities cows were considered for the study. The cows were divided in the following groups considering parity-

Group I	Heifer (n = 136)
Group II	1 st calving (n = 69)
Group III	2 nd calving (n = 117)
Group IV	3 rd calving (n = 90)
Group V	4 th calving (n = 44)
Group VI	5 th calving and above (n = 44)

Body Condition Score (BCS)

Cows of different body condition were considered for the study and BCS were determined by Nicholson and Butterworth (1986) with some modified technique. The cows were divided in the following groups considering body conditions-

Group I	Poor (n = 180)
Group II	Medium (n = 260) and
Group III	Good (n = 60)

Selection of Repeat Breeding Cows

The cows with the complaint of repeated conception failure were identified in the farms and the owners were interviewed for history of the problem and the cows were examined clinically for diagnosis of repeat breeding. A cow was regarded as a repeat breeder when it failed to conceive after three or more services, had normal estrus cycle, was free from palpable abnormalities, showed no abnormal vaginal discharges, delivered at least once before and had less than ten years old.

Data Collection Procedure

Firstly a pretested questionnaire was developed for data collection. The survey and data was collected from the selected farms of Rajshahi district and Govt. dairy farm using questionnaires to find out the prevalence of Rb problems in relation to genotypes, age, parity and BCS of cows. The data was collected directly from farmers using questionnaire and diagnosis of Rb was made on the basis of the history, clinical signs and gynaecological examination by rectal palpation (RP).

Statistical Analysis

The raw data were sorted, computed, coded and statistically analyzed to calculate the prevalence of Rb due to genotypes, age, parity and body condition of cows. Collected data were compiled by Statistical Package for Social Science (SPSS) software 17.0 version. Statistically analyzed by Duncan Multiple range test used to know the association between different groups in respective cases. $P < 0.05$ was considered as significant.

Result and Discussion

Among reproductive disorders, repeat breeding syndrome may play a vital role in delayed conception in Bangladesh resulting in increased inter calving interval. In present study, the overall prevalence of repeat breeding in cows was 15.2% in relation to genotypes, age parity and body condition of cows. Shamsuddin (1995) reported 5% repeat breeding cases in Bangladesh but Sarder *et al.* (2010) reported 20.2% repeat breeding cases in Bangladesh. Incidence of repeat breeding in various countries ranged from 10 to 18% (Kimura *et al.*, 1987). The prevalence of repeat breeding was 20.2% in 10 different Upazilas (sub-district) of Rajshahi District (Sarder *et al.*, 2010). Serur *et al.* (1982) reported the prevalence of Rb 15.1% in cows which is almost similar with the present study.

Prevalence of Rb in Cows with Respect to Genotypes

The Prevalence of Rb in cows with respect to genotypes is presented in Table 1.

Table 1: Prevalence of Rb in cows with respect to genotypes (n = 500)

Genotype of Cows	Normal Cows n (%)	Repeat Breeding Cows n (%)
L (n = 73)	70 (95.89)	3 (4.10) ^c
L×F (n = 270)	217 (80.37)	53 (19.62) ^a
L×SL (n = 109)	97 (88.99)	12 (11.0) ^b
L × J (n = 48)	40 (83.33)	8 (16.66) ^b
Total (n = 500)	424 (84.8)	76 (15.2)

Values are %, n= Number of observation; the values a, b and c with different superscript letters in same column differ significantly with each other's ($P < 0.05$).

The lowest occurrence of Rb was observed in local cows (4.10%) and the highest occurrence was observed in L×F (19.62%). Genotypes had highly significant ($p < 0.05$) effect on Rb in dairy cows. Higher prevalence

of Rb has also been reported in cross breed cows than those of local breed counterpart (Mandefro and Negash, 2014). The reasons for lower occurrence of Rb in local cows can be explained by the fact that local cows are more tolerant to prevailing environment of Bangladesh than that by Friesian cross cows.

Effect of Age on Occurrence of Rb in Cows

Effect of age of cows on occurrence of repeat breeding is presented in Table 2. The age groups of 4 to <6 years showed the highest incidence of Rb (17.07%) and age groups of 6 to <8 years showed the lowest incidence of Rb (14.15%). Age groups had slightly significant ($P < 0.05$) effect on Rb in dairy cows. It has been widely documented that age impacts negatively on fertility (Hodel *et al.*, 1995) and higher repeat breeding rates have been reported in older cows (Hewett, 1968). This may be due to variations in hypothalamic or pituitary hormonal levels or different ability of the ovarian response between different age groups (Bullman and Lamming, 1978). Sarder (2008) reported that the incidence or repeat breeding was higher in >8 years old cows and lower in <4 and 4-6 years old cows.

Table 2: Effect of age on occurrence of Rb in cows (n = 500)

Age of Cows	Normal Cows	Repeat Breeding Cows
	n (%)	n (%)
<4 years (n = 201)	172 (85.57)	29 (14.42) ^b
4-<6 years (n = 112)	102 (82.92)	21 (17.07) ^a
6- <8 (n = 113)	97 (85.84)	16 (14.15) ^b
>8 years (n = 63)	53 (84.12)	10 (15.87) ^a
Total (n = 500)	424 (84.8)	76 (15.2)

Values are %, n= Number of observation; the values a & b with different superscript letters in same column differ significantly with each other's ($P < 0.05$).

Effect of Parity on the Prevalence of Rb in Cows

Effects of parity of cows on occurrence of repeat breeding are presented in Table 3.

Table 3: Effect of parity on the prevalence of Rb in cows (n = 500)

Parity of Cows	Normal Cows	Repeat Breeding Cows
	n (%)	n (%)
Heifer (n = 136)	113 (83.08)	23 (16.91) ^b
1st Calving (n = 69)	64 (92.75)	5 (7.24) ^d
2nd Calving (n = 117)	104 (88.88)	13 (11.11) ^c
3rd Calving (n = 90)	70 (77.77)	20 (22.22) ^a
4th Calving (n = 44)	35 (79.54)	9 (20.45) ^a
>5th Calving (n= 44)	38 (86.36)	6 (13.63) ^c
Total (n = 500)	424 (84.8)	76 (15.2)

Values are %, n= Number of observation; the values a, b, c and d with different superscript letters in same column differ significantly with each other's ($P < 0.05$).

It was observed that, 3rd calving had the highest occurrence of Rb problems (22.22%) and the lowest in 1st calving (7.24%). Parity had significant ($P < 0.05$) effect on Rb in dairy cows. Coleman *et al.* (1985) reported a higher conception rate in multiparous cows than that in primiparous cows. Moreover, Boyd and Reed (1961) reported an increased conception rate with advancing parity from parity 2 up to 6, and then declined at parities 7 and 8.

Prevalence of Rb in Cows with Respect to BCS

Effects of BCS of cows on occurrence of repeat breeding are presented in Fig.1. It was observed that, the prevalence of repeat breeding was highest in medium (17.30%) and minimum in good body condition score of cows (5%). The prevalence of Rb was not significantly ($P > 0.05$) influenced by the body condition score of cows. Similar to herd BCS, individual cows with low BCS suffer more from negative energy balance resulting in increased occurrence of repeat breeding. Accordingly, negative effect of poor BCS on conception rate in cows has been documented elsewhere (Shamsuddin *et al.*, 2001).

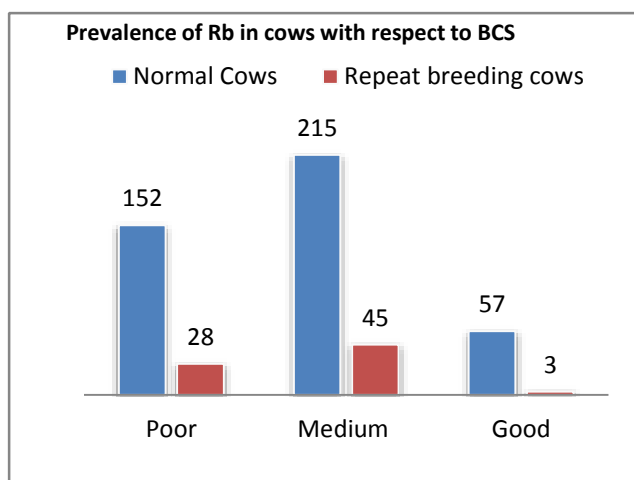


Fig. 1: Prevalence of Rb in cows with respect to BCS (n = 500)

Conclusion

Finally from the experiment we concluded that occurrence of repeat breeding was significantly ($P < 0.05$) interlinked with genotypes, parity and age but that association was found to be insignificant ($p > 0.05$) in relation to body conditions of dairy cows.

- The prevalence of Rb was the highest in L×F (19.26%) and lowest in Local cows (4.10%).
- The age groups of 4 to <6 years showed the highest incidence of Rb (17.07%) and age groups of 6 to <8 years showed the lowest incidence of Rb (14.15%).
- 3rd calving had the highest occurrence of Rb problems (22.22%) and the lowest in 1st calving (7.24%).
- The prevalence of Rb was maximum in medium (17.30%) and minimum in good body condition of cows (5%).

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