Article

Identification of possible causes of repeat breeding in dairy cows at Baghabari milk shed areas, Sirajgonj, Bangladesh

Mohammed Sirajul Islam[1], GK Deb[2], Talukder Nurunnahar[2], Md. Ershaduzzaman[2], MA Habib[2], Md. Yousuf Ali[1], Md. Humayun Kabir[1], Md. Abu Yousuf[2], Most. Farhana Afroz[2] and Tahera Yeasmin[3]

[1]Bangladesh Livestock Research Institute, Regional Station, Baghabari, Sirajgonj-6770, Bangladesh
[2]Bangladesh Livestock Research Institute, Savar, Dhaka-1341, Bangladesh
[3]Department of Dairy and Poultry Science, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh

*Corresponding author: Md. Yousuf Ali, Bangladesh Livestock Research Institute, Regional Station, Baghabari, Shahjadpur, Sirajgonj, Bangladesh. E-mail: 113yousuf.bau@gmail.com, myousuf@blri.gov.bd

Abstract: The present study was conducted at milk pocket areas Sahjadpur Upazila under Sirajgonj district and Shathia and Bera Upazila under the Pabna district, respectively. A total number of one hundred ninety (190) dairy farmers were surveyed randomly selecting twenty farmers from each village. All data collected were statistically analyzed using Univariate General Linear Model (GLM) procedure of SPSS computer program. Lack of balanced feed was the highest cause of repeat breeding claimed by about sixty (60%) percent farmers in this study. The highest incidence of RB was obtained in Local×Holstein Friesian crosses (69%) and lowest in Local×Sahiwal crosses (8%). From the study of present findings; it can be concluded that genotype, nutrient of feed, quality of semen, frequency of insemination and reproductive problems are the main possible causes for RB in the studied areas.

1. Introduction

Baghabari is one of the most important and the largest milk producing area of Bangladesh. Farmer's rear about 98% crossbred dairy cattle for milk production contributing two-third milk production of the country. Normally cow's conception rate is 50 to 60 percent within 1-3 consequent insemination. Repeating breeding (RB) means a cow not to conceive after three regular artificial insemination (AI) services by an inseminator or natural services by a breeding bull. It always causes a great economic loss increasing the cost of production like AI, treatment, feed, labour and other management cost. It reduces milk production while increases days open of a cow. As a result, repeat breeding has been made a major concern to dairy farmers of milk vita areas. However, repeat breeding is a multi-factorial problem in dairy cows. Very few works have so far been done on repeat breeding of dairy cows in Bangladesh. So, scope of in-depth works associated with the repeat breeding problem in dairy cows to identify real causes is still there. Repeat breeding is a significant problem in dairy farmers because it increased production cost of insemination, treatment, feed, labour and management, increase calving interval, culling rates and decreased calf and milk production (Lafi *et al.*, 1992). The detrimental influence of repeat breeding is increased the number of services per conception due to frequent heat stress incidence in dairy cows (Macmillan *et al.*, 1996; Roche *et al.*, 2000; Royal *et al.*, 2000; Lucy, 2001). It is typically defined that a cow isn't conceived after three or more artificial insemination by an inseminator or natural services by a breeding bull. Repeat breeding is a major reproductive disorder always caused a great economic loss in dairy herds (Katagiri and Takahashi, 2004). All most all cows are crossbred (viz. Local X Sahiwal, Local X Holstein Friesian, Local X Jersey, Local X Sahiwal X Friesian etc.) in Baghabari milk shed areas. Presently, dairy

Asian J. Med. Biol. Res. **2017**, 3 (2)

187

farmers have been suffered a lot due to this problem. However, these farmers produce two-third milk to meet up the demand of milk of the country. It is necessary to solve the RB problems for producing more milk to achieve the vision 2021 of Bangladesh. But none is worked to minimize causes of repeat breeding problems in the aforesaid areas. Hence it is crying need to minimize the RB problems for profitable and sustainable for dairy farming in the milk pocket areas. That's why this study was undertaken with the objective to identify the causal factors associated with repeat breeding in dairy cows.

2. Materials and methods
2.1. Study areas
The present study was conducted at milk pocket areas Sahjadpur Upazila under Sirajgonj district and Shathia and Bera Upazila under the Pabna district, respectively. Nine (9) villages consisting three villages in each Upazilla were selected on the basis of livestock density. A total number of one hundred ninety (190) dairy farmers were surveyed randomly selecting twenty farmers from each village.

2.2. Questionnaire preparation
Focal Group Discussion (FGD) with relevant stakeholders and informal survey were done before preparing questionnaire. Emphasis were given on breeding system, conception rate, age, parity, feeds and feeding systems, seasonal variation, management, and associated constraints in relation to repeat breeding condition in the study areas. Collected information's were used as a basis to prepare semi-structured questionnaire to quantify the most important part of the study. A semi-structured questionnaire were prepared based on cattle population, production, reproduction, feeds and feeding system, breeding system, housing, de-worming, vaccination, diseases condition, management and seasonal factor associated with repeat breeding in dairy cows. The different genetic makeup of breed, crossbred, age of Repeat breeder cows (RBC), parity, lactation length, calving interval, number of services per conception, breeding system like natural services and artificial insemination etc were considered for making the questionnaire. Single and multiple responses questions were considered for preparing the questionnaire. Single response questions are those questions where the sample household was asked a single reply and multiple response questions are those questions where the individual households were asked more than one answer to a given question. Before conducting the formal survey the questionnaire was pre-tested by interviewing some households and subsequently refine for finalization of the semi-structure questionnaire.

2.3. Data collection through survey work
A total number 190 farmers were surveyed under this study. Data were collected directly with face to face interview method in respective farm household with the semi structured questionnaire. Along with the principal investigator (PI), scientific officers/co-authors and trained personnel were collected data by visiting respective household.

2.4. Quality test of concentrate mixture feed and frozen semen sample
All possible causes in relation to repeat breeding problems were identified by survey in the studied areas. For identifying the root causes of RB, concentrate mixed feed and frozen semen samples were tested from different sources. Initially forty five concentrate mixed feed samples were collected from different farm households of three locations. Then three feed samples were taken finally after proper mixing, grinding by grinder machine at the Animal Nutrition Laboratory of BLRI, Regional Station, Baghabari, Sirajgonj. Later on feed samples were analyzed in different three Nutrition Laboratories of BLRI. Forty two frozen semen samples of different sources consisting six samples from each source were taken from the farmer's field. Then all collected semen samples were tested in the Artificial Insemination (AI) Laboratory of the Central Cattle Breeding and Dairy Farm (CCBDF), Savar, Dhaka and AI Laboratory of Rural development Academy (RDA), Bogra.

2.5. Rectal palpation
Rectal palpation was also done in 46 repeat breeder cows to identify reproductive disorders and anatomical defects. Disposable hand gloves were used as protector. Cervix, uterine body, uterine horns were checked for uterine infection, pyometrial and endometrial, pregnancy and abnormal contents. Ovaries were carefully palpated for the presence and size of normal follicles corpus leutium or abnormal structures.

Asian J. Med. Biol. Res. **2017**, 3 (2)

188

2.6. Statistical analysis

All data collected from different events were statistically analyzed using Univariate General Linear Model (GLM) procedure of SPSS computer program version 17.00 for windows (SPSS Ins. 1998). The differences among means were tested using Least Significance Difference (LSD).

3. Results and Discussion

Farmer's opinions on different causal factors of repeat breeding are shown in Table 1. The possible causes of repeat breeding in dairy cows were 59.47, 51.58, 43.68, 31.05, 22.63, 20.53, 20.00, 18.95, 18.42, 9.47, and 7.37 percent for balanced feed, semen quality, reproductive diseases, unskilled AI workers, maltreatment of RBC, genotype, high milk production, timely AI, seasons, an-thelmentics and general diseases, respectively. No comments on possible causes of RB were made by the near about fifteen percent farmers during the survey. Heuwieser *et al.,* 1997; Pursley *et al.,* 1998; Yousuf *et al*., 2010a, Hallap *et al.,* 2006 and Morrel, 2006 were agreed within the results of present findings who reported the quality feed, semen quality, inadequate heat detection, timing of insemination, insemination technique and reproductive diseases in dairy cows were the main factors of RB. Garge *et al.* (2008) reported that balanced feeding is the mandatory factor for successful breeding in dairy cattle production. Lack of balancd feed was the higest cause of repeat breeding claimed by about sixty (60%) percnt farmers in this study. Availibity of concentrate feed ingredients and green grasses round the year may effect to provide the balanced feed for dairy cows. Quality of different concentrate feed ingredients may be one the major constraint of balanced feeding of dairy cattle production in the Baghabari milk pocket areas.

Table 2 shows the incidence of repeat breeding for different genotypes. The highest incidence of RB was obtained in Local×Holstein Friesian crosses (69%) and lowest in Local×Sahiwal crosses (8%). Similar results were obtained from Nuru and Dennis (1976) who found the incidence of repeat breeding ranged from 16.6 to 58.8% in Fulani herds of Nigeria. Kaikini *et al.* (1983) were found 21.9% incidence of repeat breeding in 411 Holstein × Gir cross cows in India between 1972 and 1980. The incidence of repeat breeding by Singh *et al*. (1983) who reported 7.4 to 18.6 % in Hostein, Danish Red and Sahiwal cows and their crosses that also same within the present findings. Table 3 shows the quality of frozen semen of different sources taken from the farmer's field. Maximum motile sperm was found 71.46 percent while minimum zero. Total motile sperm in frozen semen were significantly difference among different sources. Overall mean sperm concentration was found about 47 million per ml whereas motile sperm was around 32 percent only. The results of the present findings indicate that live sperm percent was obtained very low in spite of the higher concentrate of sperm (million/ml) which may be due to various sources of semen, semen processing, preservation and shortage of liquid N_2 in cryo-cane etc. About 30% RB cows had reproductive problems in which about 40% of the RB cows of Local×Holstein Friesian crosses were the highest (Table 4). Cystic ovaries contain one or more persistent fluid –fluid cavities bigger than a follicle (Arthur, 1964). The incidence of cystic ovaries were found about nine percent in the present study that were almost similar with the findings of Kumi-Diaka *et al.*, 1981; Pandey *et al*, 1982; Husain and Muniraju, 1984 who were found 1-13% ovarian cystic incidence in Zebu Cattle. The present status of AI services were found 44.94, 31.01 and 24.05 percent ranging from the frequency of 4-8, 9-12 and above 12 times, respectively (Table 5). More than twelve times of AI services were given in about 25% of RB cows which clearly indicates that the malpractices of AI works as well as bad situation of reproduction of dairy cows in the studied areas. Table 6 shows the nutrient composition of concentrate mix feed which seem to be less crude protein (about 10.5% CP) in diet. Trace minerals can cure the problems of repeat breeding in dairy cows reported by Garge *et al.* (2008). Ca and P were 1.67 and 1.06 percent respectively in the concentrate mixture feed which clearly indicates that farmers were provided poor quality feeeds to their dairy cows in the studied areas.

Table 1. Farmer's opinion on causal factors in repeat breeding (N=190).

SN	Causal factors	No. of farmers	Percent (%)	SN	Causal factors	No. of farmers	Percent (%)
1	Balanced feed	113	59.47	7	High milk production	38	20.00
2	Semen quality	98	51.58	8	Timely AI	36	18.95
3	Reproductive diseases	83	43.68	9	Seasons	35	18.42
4	Unskilled AI worker	59	31.05	10	Anthelmentics	18	9.47
5	Maltreatment of RBC	43	22.63	11	General diseases	14	7.37
6	Genotype	39	20.53	12	No comments	29	15.26

Asian J. Med. Biol. Res. **2017**, 3 (2)

189

Table 2. Incidence of RB in different genotypes.

Types of genotypes	No. of RB cows	Incidence (%)
Local×Holstein Friesian (L×HF)	209	68.52
Local ×Jersey (L×J)	35	11.48
Local ×Sahiwal	24	7.87
Local ×Jersey×Holstein Friesian (L×J×HF)	37	12.13
Total	305	100

Table 3. Quality of frozen semen samples taken from different sources.

Sample Source	Concentr. (million/ml)	Type of motility (%)					Motile sperm	Immotile sperm
		Progr.	Circle	Fast	Slow	Local		
		Mean ±SE (N=6)						
A	33.90±15.45	17.38± 9.75	0.00	15.16±8.59	2.18± 1.25	3.14 ±1.66	20.42±11.41	79.61±11.39
B	63.75±21.87	14.76±4.03	0.78±0.06	9.23±2.55	4.8±1.44	5.9±1.67	20.65 ±5.69	79.35±5.69
C	52.44±11.15	41.14±6.94	0,25±0.02	31.37±4.90	9.47±2.21	7.57±0.65	48.43±7.26	51.17±7.26
D	34.06±9.71	23.10±2.71	0.03±0.01	17.00±2.53	5.04±0.45	5.84±0.70	27.95± 1.77	72.39±1.85
E	12.56 ±6.39	25.57±6.55	0.11±0.11	15.98±5.38	9.49±1.38	10.36±1.34	35.90± 7.82	64.09±7.81
F	46.95±9.18	40.99±8.31	0.16±0.08	31.72±6.03	9.12±2.30	9.00±1.97	50.02±10.22	50.13±10.14
G	60.78±20.67	12.47±5.07	0.03±0.02	8.98±3.68	3.47±1.42	4.54±1.82	17.03± 6.77	82.97±6.77
Min.	5.44	0	0	0	0	0	0	28.67
Max.	116.77	58.3	0.4	43.7	15.9	14.03	71.46	100
Overall mean	46.50±6.18	25.40±3.17	0.10±0.02	18.87±2.48	6.22±0.80	6.54±0.68	31.86± 3.73	68.20±3.72
CV (%)	72.80	68.42	132.0	72.03	70.65	57.12	64.08	29.87
Sig.	NS	*	*	**	*	NS	*	*

**p<0.001, *P<0.05, NS= Non significant, SE=Standard Error, Sig.= Significant, CV=Coefficient of variation, Min.=Minimum, Max.=Maximum.

Table 4. Reproductive disorders observed in rectal palpation of RBC in different genotypes.

Reproductive organs	Condition	Genotype				Sig.
		L×HF	L×J	L×J×HF	Overall	
Cervix	Normal	100 (30)	100 (09)	83.3 (05)	97.80 (45)	*
	Thin	0	0	16.7 (01)	02.20 (01)	
Ovary	Normal	90.00 (27)	88.90 (08)	100 (06)	91.10 (41)	NS
	Cystic	10.00 (03)	11.1 (01)	0	08.90 (04)	
Uterus	Normal	70.00 (21)	77.80 (07)	100 (06)	75.60 (34)	
	Metritis	23.30 (07)	22.20 (02)	0	20.00 (09)	NS
	Pyometra	6.70 (02)	0	0	04.40 (02)	
Overall	Normal	60.00 (18)	66.60 (06)	83.30 (05)	70.00 (29)	**
	Problem	40.00 (12)	33.40 (03)	16.70 (01)	30.00 (16)	

*P<0.01, NS= Non significant, SE=Standard Error, Sig.= Significant, L=Local, J=Jersey, HF=Holstein Friesian

Table 5. Frequency of AI services given to RB cows in the studied areas.

Frequency of AI services	No. of RB cows	Percent (%)
4-8	137	44.94
9-12	95	31.01
above 12	73	24.05
Overall	305	100

Asian J. Med. Biol. Res. **2017**, 3 (2)

190

Table 6. Chemical composition of concentrate mixture feed used in farmers filed.

DM	Ash	ADF	CP	EE	Ca	P
91.23	8.23	28.91	10.51	4.27	1.67	1.06

4. Conclusions

From the findings of this study, it can be concluded that genotype, nutrient of feed, quality of semen, frequency of insemination and reproductive problems are the main possible causes for Repeat Breeding in the studied areas.

Conflict of interest

None to declare.

References

Arthur GH, 1984. Veterinary reproduction and obstetrics. 5th edition. Bailleire Tindall, London, UK. p. 616.

Hallap TS, O Nagy, A Jaakma, Johannission and Rodrguez-Martinez, 2006. Usefullness of a triple fluorochrome combination merocyanine 540/Yo-pro1/Hoechst 33342 in asssessing membrane stability of of viable frozen-thawed spermatozoa from Estonian Holstein AI bulls. Theriogenology, 65: 1122-1136.

Heuwieser W, PA Oltenacu, AJ Lendor and RH Foote, 1997. Evaluation of different photocols for prostaglandin synchronization to improve reproductive performance in dairy herds with low estrous detection efficiency. J. Dairy Sci., 80: 2766-2774.

Katagiri S and Y Takahashi, 2004. Changes in EGF concentrations during estrous cycle in bovine endometrium and their alterations in repeat breeder cows. Theriogenology, 62: 103-112

Lafi SQ and JB Kaneene, 1992. Epidemiological and economic study of the repeat breeder syndrome in Michigan dairy cattle. I. Epidemiological modelling. Prev. Vet. Med., 14: 87-98.

Lucy MC, 2001. Reproductive loss in high-producing dairy cattle: where will it end? J. Dairy Sci., 84: 1277-1293

Morrell JM, 2006. Update on semen technologies for animal breeding. Reproduction of Domestic Animal, 41: 63-67.

Macmillan KL, IJ Lean and CT Westwood, 1996. The effects of lactation on the fertility of dairy cows. Aust. Vet. Journ., 73: 141-147

Pursley JR, RW Silcox and MC Wiltbank,1998. Effect of time of artificial insemination on pregnancy rates, pregnancy loss and gender ratio after synchronization of ovulation in lactating dairy cows. Journal of Dairy Science, 80: 2139-2144.

Roche JF, D Mackey and MD Diskin, 2000. Reproductive management of postpartum cows. Anim. Reprod. Sci., 60-61: 703-712.

Royal MD, AO Darwash, APF Flint, R Webb, JA Woolliams and GE Lamming, 2000. Declining fertility in dairy cattle: changes in traditional and endocrine parameters of fertility. Anim Sci., 70: 487-501.

Yousuf M, T Nakao, RMSBK Ranasinghe, G Gautam, ST Long, C Yoshida, K Koike and A Hayashi, 2010a. Reproductive performances of repeat breeders in dairy herds. Theriogenology, 73: 1220-1229.