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EVALUATION OF DIFFERENT PARAMETERS IN RELATION TO REPEAT BREEDING OF COWS AT THE COASTAL AREAS OF BANGLADESH

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The aim of this study was to evaluate the presumptive factors might be responsible for repeat breeding syndrome of cows in Bangladesh. The study was conducted in different villages around the Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University, Outer campus, Barisal during the period from July to September 2017. A total of 100 repeat breeder cows were evaluated considering different presumptive influencing factors such as breed, age, parity, body condition score (BCS), fetal death, retention of placenta, post-partum endometritis, abortion, dystocia and managemental practices of cows. It was found that there was no significance ($p>0.05$) effect of parity and age of cows on the occurrence of repeat breeding syndrome in local and crossbred cows. Repeat breeding syndrome was significantly higher in BCS 2.0 to 2.5 in local breed and 3.0 to 3.5 in crossbred cows than that of other groups. In the study animals, dystocia was 4.0%, fetal death was 58.2%, retention of placenta was 57.1%, post-partum endometritis was 4.1% in crossbred cows. Cows in semi-intensive system rearing had significantly ($P<0.05$) higher (53.1%) of repeat breeding than that of others systems. Animals that were not dewormed (73.5%) and vaccinated (92.9%) had 73.5 % and 92.9% repeat breeding syndrome affected cows, respectively. It may concluded that simultaneously multiple factors such as irregular deworming and vaccination, subclinical endometritis, hormonal imbalance, early embryonic death due to low progesterone level, failure of proper heat detection and so on, might be also responsible to the occurrence of repeat breeding syndrome in cows.

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INTRODUCTION

The cattle population in Bangladesh is rising day by day and getting the self-capability to meet up the demand of milk and meat protein for the nation. One calf per year is important factor for profitable dairying (Paul et al., 2011). According to the definition proposed by Zemjanis (1980), a repeat breeder (RB) cow is any cow that have failed to conceive after three or more services, showing normal estrous cycles, at least one calved before and no clinical pathologies. A RB cow looks apparently healthy and has regular estrus cycle (Warriach et al., 2008). The incidence of repeat breeding in dairy cows, worldwide, ranges from 3 to 10%, (Bartlett et al., 1986; Kimura et al., 1987). The potential causes of the repeat breeding mainly include subclinical endometritis (Rao et al., 1982; Ahmed et al., 2013), nutritional deficiency, specially trace minerals and vitamin A (Frances et al., 1977; Peters, 1996; Ahmed et al., 2009), age of the dam (Bartlett et al., 1986), improper heat detection (Dekriuf et al., 1978), and endocrine dysfunction (Gustafsson et al., 1986; Bage et al., 1997).

Usually about 9-12% cows are expected to be repeat breeder in a herd with normal fertility and 50-55%conception rates (Nebel and Jobst, 1998).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. Incorrect timing of artificial insemination might be one of the major causes of increased percentage of repeat breeding in Bangladesh (Shamsuddin et al., 2001). Moreover, Jainudeen and Hafez (2000) reported the higher incidence of repeat breeding in dairy herds using artificial insemination than that use natural services. Further, many risk factors such as breed, 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 (Gustafsson and Emanuelson, 2002).

When an additional insemination was performed under controlled conditions with good management, the normal pregnancy may achieve in repeat breeders (Mandefro and Negash, 2014). RB is a substantial problem in cattle breeding leading to large economic loss for the dairy producer due to more inseminations, increased calving interval and increased culling rates (Bartlett et al., 1986). Now a days repeat breeding syndrome in cows is the major constraint for the developing dairy industry in Bangladesh. The environmental difference in different part of Bangladesh as well as the management practices and availability of green grass may affect the cows for repeat breeder syndrome. However, there is no published data of repeat breeder cows at the Coastal areas of Bangladesh. Therefore the aim of the study is to evaluate the presumptive factors which might responsible for repeat breeding syndrome of cows at the Coastal areas of Bangladesh.

MATERIALS AND METHODS

Study area

This study was conducted during the period from July to September 2017 in different villages around the Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University, Outer campus, Barisal, Bangladesh.

Collection of data

The data were collected directly from the farmers by direct interview and physical observation the cow. A questionnaire had been prepared for data collection. The questionnaire included the information about breed, parity, age, BCS, number of artificial insemination (AI), history of dystocia in last calving, retention of placenta after calving, visible post partum endometritis, abortion, feeding system, oestrus sign, calf feeding, deworming, vaccination and showering of cow.

Selection of cows

The cows were diagnosed as repeat breeders depending on their failure to conceive after three consecutive services with bulls of known fertility and/or insemination with excellent semen. A total of 100 repeat breeders cow's data were collected from different farmers. Most of the farms were small holder farms. The cows were categorized in the following groups-

Breed

- According to the breed of animals, the cows were classified into
- Local: Native non descriptive animals with well developed hump.
 - Crossbred: Breed between local and others foreign breed.

Parity

- According to the parity (number of calving) of cows, Cows were divided into following groups-
- Parity-1: One time calved
 - Parity-2: Two times calved and
 - Parity 3: Three times calved

Age

According to the age of cows, the cow had been divided into ≤ 3 years, >3 to ≤ 4 years and >4 to ≥ 5 years.

Body Condition Score (BCS)

- According to the BCS (five scale point system) of cows, the cow were grouped into following groups-
- 2.0 to 2.5: Backbone visible, hips and shoulder bone visible, ribs visible faintly and tail head area slightly recessed.
 - >2.5 to ≤ 3.0 : Hip bones visible faintly, ribs generally not visible and tail head area not recessed.
 - >3.0 to ≥ 3.5 : Hip bones not visible, ribs well covered and tail head area slightly lumpy

Statistical analysis

The collected data were input in the Microsoft Excel sheet for coding and analysis. The rate different variable was expressed as percentage (%). The analysis of variance was analyzed by using SPSS® statistical software (version 20.0). Differences were considered significant at the level of $P < 0.01$ and $P < 0.05$.

RESULTS AND DISCUSSION**Effect of cow's entity on occurrence of repeat breeding**

The occurrence of repeat breeding in parity 1, parity 2 and parity 3 were 21.4, 21.4 and 15.3%, respectively in local breed and 13.3, 18.4, 12.2%, respectively in crossbred cows (Table 1). In case of local breed cows, the parity 1 and parity 2 were shown comparatively higher RB syndrome than that of parity 3 because of low energy supplement after calving to meet up the normal demand. According to Bonneville-Hebert et al. (2011) from Quebec cows in second, third, and fourth parities had significantly higher odds of being a repeat breeder: in first parity 18%, in second parity 24% and in third parity 42% respectively. Asaduzzaman et al. (2016) found significantly ($P < 0.05$) lower proportion of cows (29.1%) was affected with repeat breeding at 2nd – 3rd parity than that of cows at 1st parity (33.1%) and 4th – 9th (47.7%).

According to the age, the rate of repeat breeding in ≤ 3 years, 3-4 years and ≥ 5 years old cows were 19.4, 15.3 and 23.5%, respectively in local breed and 10.2, 15.3, 18.4%, respectively in crossbred cows (Table 1). There is no significance ($P > 0.05$) difference of age factors for repeat breeding at less than 3 years but respectively higher responsible more than 5 years. This results is supported by the study of Asaduzzaman et al. (2016) who recorded the effects of age of cows on occurrence of repeat breeding significantly lower proportion of cows (29.7 to 33.1%) was affected with repeat breeding at 3-6 years of age than that of 7-13 years of age (37.1 %; $P < 0.05$). 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).

According to the BCS, the rates of RB between 2.0 to 2.5 BCS were 45.9% in local breed and 3.1% in crossbred whereas BCS between 3.0 to 3.5 were 12.2% in local breed and 40.8% in crossbred cows (Table1). These results had shown that BCS between 2.0 to 2.5 in local breed was more responsible for repeat breeding compare with cross breed however between 3.0 to 3.5 cross breed was comparatively more responsible for repeat breeding than that of local breed. In this study, crossbred cow shows significantly lower RB syndrome than that of local breed which may due to the management system of crossbred cows in the coastal areas much better than that of local cows. According to Shamsuddin et al., (2001) who recorded the occurrence of repeat breeding was lower in herds with BCS 3.0 (9.0%) and the occurrence was higher in herds with BCS 1.0 to 2.0 (13.9%). It is likely that the cows of herds with low BCS suffer more from negative energy balance resulting in inadequate secretion of reproductive hormones causing fertilization failure or early embryonic death followed by repeat breeding. Accordingly poor BCS caused low conception rate in cows in Bangladesh. Asaduzzaman et al. (2016) advised to the farmer of Bangladesh to keep at least 2.5 herd BCS by providing adequate balance diet for reducing the occurrence of repeat breeding.

Table 1. Effect of cow's entity on occurrence of repeat breeding

Parameter		Breed	
		Local, N (%)	Crossbred, N (%)
Parity	P-1	21 (21.4)	13 (13.3)
	P-2	21 (21.4)	18 (18.3)
	P-3	15 (15.3)	12 (12.2)
Age	≤3 years	19 (19.4)	10 (10.2)
	>3 to ≤4 years	15 (15.3)	15 (15.3)
	≥ 5 years	23 (23.5)	18 (18.4)
BCS	2.0-2.5	45 (45.9) ^a	3 (3.1) ^a
	3.0-3.5	12 (12.2) ^b	40(40.8) ^b

^{a,b} Values with different superscripts within same column differed significantly from each other (P<0.05).

Effect of cow's disorder on occurrence of repeat breeding

In case of dystocia, the occurrence of RB was 1% in local breed and 4% in crossbred cow. It revealed that dystocia is also a responsible factor for repeat breeding in crossbred cows than that of local breed cows. Regarding fetal death, there is no data in case of local breed however 58.2% in crossbred cow (Table2). In case of retention of placenta, it was found the rate of RB in crossbred cows were 58.2% whereas not occurred in local breed. Retention of placenta has great significance in case of crossbred than local breed and incase of post partum endometritis, the rate of RB was 4.1% in crossbred cow. The occurrence of repeat breeding for post partum endometritis has higher significance in cross breed than that of local breed. In this study, it is also found the rate of RB in case of abortion were 1.0% in local breed and 57.1% in crossbred cow (Table2). This result has the similarity of the study of Zemjanis et al.,(1961) who recorded that the endometritis and pyometra are the most commonly encountered anomalies causing infertility in cattle under field or farm conditions. The incidence of endometritis has been reported to be 3 to 13.97 % in cattle. According to Bonneville-Hebert et al. (2011), dystocia is increased the risk of repeat breeding in crossbred cows which was about 1.4%.

Table 2. Effect of cow's disorder on occurrence of repeat breeding

Parameters		Breed	
		Local, N (%)	Crossbred, N (%)
Dystocia	Happened	1 (1.7)	4 (9.3) ^a
	Not happened	56 (98.3)	39 (90.7) ^b
Fetal death	Happened	0 (0.0)	57 (58.2)
	Not happened	2 (2.0)	41 (41.8)
Retentions of placenta	Happened	0 (0.0)	57 (58.2)
	Not happened	0 (0.0)	43 (43.9)
Post-partum endometritis	Happened	0 (0.0)	4 (4.1) ^a
	Not happened	57 (58.2)	39 (39.8) ^b
Abortion	Happened	1 (1.0)	56 (57.1)
	Not happened	1 (1.0)	42 (42.8)

^{a,b} Values with different superscripts within same column differed significantly from each other (P<0.05).

Table 3. Effect of management practices of cows on repeat breeding

Parameter	Variable	N (%)
Feeding system	Stall feeding	46 (46.9) ^b
	Semi-intensive	52 (53.1) ^a
	Extensive	0 (0.0) ^c
Calf feeding	Freely directly from mother	98 (98.0)
	Bottle feeding	0 (0.0)
De-worming	Regularly	18 (18.4) ^c
	Irregularly	8 (8.2) ^b
	None	72 (73.5) ^a
Vaccination	Regularly	2 (2.0) ^b
	Irregularly	5 (5.1) ^b
	None	91 (92.8) ^a
Showering	Regularly	30 (30.6) ^b
	Irregularly	68 (69.4) ^a
	None	0 (0.0) ^c

^{a,b,c} Values with different superscripts within same column differed significantly from each other (P<0.05).

Effect of management practices of cows on repeat breeding

According to the feeding system the rate of repeat breeding with related to stall feeding, semi-intensive and extensive system were 53.1, 46.9 and 0%, respectively (Table 3). Cow rearing in semi intensive system has higher significance than other rearing system. In case of calf feeding (freely directly from mother is 98% and there is no data in case of bottle feeding). In case of de-worming of cows, the rate of RB in regularly, irregularly and not administered was 8.2, 18.4 and 73.5%, respectively (Table 3). The data shows cows that are not dewormed regularly are very much susceptible for the occurrence of repeat breeding. In case of vaccination, the rate of RB in regularly, irregularly and non-vaccinated were 2.0, 5.1 and 92.8%, respectively. It is found that non-vaccinated animals have shown high of repeat breeding than vaccinated animals. In case of showering of cows, the rate of showering in cows at regularly, irregularly and not showered were 30.6, 69.4 and 0%, respectively (Table-3). This study was partially agreed with Khan et al., (2016) who recorded 24.61% (n=48) repeat breeding occurs under semi-intensive rearing system. According to Tesfaye et al. (2013) cattle usually were not routinely dewormed and vaccinated got a high risk for repeat breeding.

CONCLUSIONS

It is concluded that repeat breeding syndrome is a multifactorial problem involving a number of extrinsic factors as well as intrinsic factors coupled to the individual animal. The prevalence of repeat breeding is higher in cross breed cows which may be due to the susceptibility to environmental influence e.g. nutrition, climate; inherently lower fertility, more sensitive to housing and other managerial practices. Endometritis and retained placenta are the most commonly encountered anomalies causing repeat breeding in cattle under field or farm conditions.

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