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Article

Effect of feeding concentrate on the reproductive efficiency of repeat breeder cows at Baghabari milk shed area

MS Islam[1]*, Gk Deb[2], MA Habib[2], M. Ershaduzzaman[2], Md. Yousuf Ali[1], MH Kabir[1], Most. Sumona Akter[4], M Aktaruzzaman[3], M Salah Uddin[3], SM Rahman[1] and MF Afroz[2]

[1]Bangladesh Livestock Research Institute, Regional Station, Baghabari, Sirajgonj-6770, Bangladesh
[2]Bangladesh Livestock Research Institute, Savar, Dhaka-1341, Bangladesh
[3]Milkvita, Baghabarighat Branch, Shahjadpur, Sirajgonj – 6770, Bangladesh
[4]Central Cattle Breeding and Dairy Farm, Savar, Dhaka-1341, Bangladesh

*Corresponding author: MS Islam, Bangladesh Livestock Research Institute, Regional Station, Baghabari, Sirajgonj-6770, Bangladesh. E-mail: siraj_blri@yahoo.com

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Abstract: A total of nine Repeat Breeder (RB) cows consisting three cows in each of the three treatment groups were selected at farmer's house of Nukali village of Sahjadpur Upazila under Sirajgonj district to know the feeding effect of concentrate feed on reproductive efficiency of RB cows. Concentrate feeds were given to the RB cows based on their body weight and milk production. Same management like housing, watering and quantity of green grasses and straw were ensured during the experimental period. Heat detection of cow was done by Draminski Estrous Detector (DRAMINSKI) to perform artificial insemination in standing heat period. Experimental diet samples were tested for chemical compositions in the laboratories. Data were statistically analyzed by the computer software program of SPSS. Days open or calving to conception interval were 13.00±3.51, 9.33±1.20 and 15.33±1.45 months for treatment group T_1, T_2 and T_3, respectively. All experimental cows (100%) of treatment group one (T_1) were become pregnant whereas no cows (0%) were conceived in treatment group (T_3). Mean conception rate of all experimental cows was 0.56±0.18 with no significant difference. The results from the present study showed that dietary status of crossbred dairy cow can improve the reproductive efficiency like the conception rate RB cows. It's would be concluded that diet containing optimum level of CP, Ca and P might be played a vital role for maximum conception rate of RB cows which clearly indicates the dietary intervention effect for improving the breeding efficiency of repeat breeder cows.

Keywords: concentrate feed; repeat breeder cows; reproductive efficiency; conception rate

1. Introduction

Repeat breeding (RB) is a significant problem in dairy farmers under artificial insemination (AI) programs especially in the developing countries of the world like Bangladesh. It is typically defined that a cow isn't conceived after three or more artificial insemination by an inseminator. Incidence of repeat breeding in dairy cows has been reported by several studies ranging from 11.8% to 62% resulting economic loss in dairy cattle production (Lafi *et al.*, 1992; Katagiri and Takahashi, 2004; Yosuf *et al.*, 2012). Dairy farmers have been suffering a lot due to this evolving trouble. Severity of the RB are extending gradually by increasing insemination, treatment, feed, labour and management cost, increase calving interval and culling rates and decreasing calf and milk production (Lucy, 2001; Islam *et al.*, 2017). The detrimental influence of repeat breeding is increased the number of services per conception ranging from 4 to 24 services per conception in crossbred dairy cows (Islam *et al*., 2017). Milk shed area of Baghabari is environmentally most favorable places for commercial dairy cattle production in Bangladesh. Repeat breeding problem is always caused a great economic loss by increasing the cost of production. As a result, reproductive life of dairy cattle especially

managing the repeat breeding problem for obtaining regular conception is a great challenge for dairy cattle production because of repeat breeding reduces the productivity and profitability of dairy farming. Intensification of the incidence rate of RB problems in cows reduces the milk and calf production in their lifespan (Butler, 2000; Lean *et al*., 2008; Thatcher *et al*., 2011). However, repeat breeding is a great problem in dairy cows in the studied areas. That's why; a preliminary work was done to identify the possible causes for repeat breeding problems in Baghabari milk shed area. Finally major causes associated to repeat breeding problems in dairy cows were identified by survey, rectal palpation of RB cows, nutritional analysis of concentrate feed and frozen semen quality analysis. Incidence of repeat breeding problems was found about 29 percent in the studied areas by that recent preliminary study. Poor nutrition was found one of the most important factors among all possible causes those were identified by (Islam *et al*., 2017). Nutritional deficiency was observed from poor nutrient density in the diet or poor quality diet, inadequate quantity of diet fed and insufficient to diet. Repeat breeding causes a great loss to the farmers in terms of milk and calves production. Hence, it is necessary to minimize the RB problem for producing more milk to achieve the Sustainable Development Goals (SDGs) of Bangladesh. A few works are done to know the effect of concentrate feeding on breeding efficiency of repeat breeder cows. Therefore, this study was undertaken with the objective to know the effect of concentrate feeds on the reproductive efficiency of repeat breeder cows at Baghabari milk shed areas.

2. Materials and Methods

A total of nine RB cows consisting three cows in each of the three treatment groups were selected at farmer's house of Nukali village of Sahjadpur Upazila under Sirajgonj district to know the feeding effect of concentrate feed on reproductive efficiency of dairy cows. Previous history of breeding system, health status, productive and reproductive performances were considered before selecting RB cows. Experimental cows were checked by rectal palpation to identify the cows free from any defect of reproductive organs and reproductive diseases. Concentrate feeds were given to the RB cows based on their body weight and milk production. Same management like housing, watering and quantity of green grasses and straw were ensured during the experimental period. Heat detection of cow was done by Draminski Estrous Detector (DRAMINSKI) to perform artificial insemination in standing heat period. Same quality semen was used for artificial insemination of the RB cows. Pregnancy test was performed after artificial insemination (AI) on 50 days. Data were recorded on feeds, semen, previous breeding history, health status, reproductive performances, conception etc. A total of nine feed samples randomly taken and three samples from each of the treatment groups were analyzed at the Nutrition Laboratory under Animal Production Research Division of BLRI and Animal Nutrition Laboratory of the Department of Livestock Services (DLS), Farmgate, Dhaka. Data were statistically analyzed by the computer software program of SPSS. Feed ingredients and their chemical composition were shown in Table 1 and Table 2, respectively.

3. Results and Discussion

Different productive and reproductive performances of experimental cows in three treatment groups are given in Table 3. Body weight was 374.67±4.37, 323.67±46.56 and 352.33±21.61 kg respectively with no significant difference among different treatment groups of T_1, T_2 and T_3. Mean age of experimental cows were ranged from more than 48 to 56 month in different treatment groups. Almost all experimental cows were in same parity in three treatment groups. Peak milk production was found lowest (9 l/d/c) in treatment group (T_1) while highest in T_2 and T_3 groups (17 l/d/c). Milk production of cows was highest in T_1 and T_3 groups while lowest in T_2 group during dietary intervention. First heat after calving were 7.67±4.70, 6.00±0.58 and 5.33±0.67 months in treatment group T_1, T_2 and T_3, respectively. Days open or calving to conception interval were13.00±3.51, 9.33±1.20 and 15.33±1.45 months for treatment group T_1, T_2 and T_3, respectively. These results are fully contradicts with the findings of Ferguson *et al*., 1980; Garcia Bojalil *et al*., 1998; Hotler *et al*., 1992; Hutchinson *et al*., 2011; Moallem *et al*., 2010; Salfer *et al*.,1995 and Sklan *et al*., 1989 who reported the calving to pregnancy interval ranging from 73 to 123 days.

Number of artificial insemination (AI) done in experimental repeat breeder cows before and after intervention are shown in Table 4. No significant difference was found among different treatment groups for the number of artificial insemination before and after intervention. It was clearly seen that about 6 times AI services were done in the experimental cows of three treatment groups before intervention which ultimately increasing long calving interval and decreasing milk and calf production.

Table 1. Feed ingredients used in different dietary groups.

Sl. No	Feed ingredients	Treatment groups		
		T_1	T_2	T_3(Control)
1	Wheat bran	40	55	33
2	Khesari bran	26	26	-
3	Lentil bran	5	-	7
4	Matikalai	5	-	-
5	Rice polish	5	-	60
6	Til oil cake	13	13	-
7	DCP	4.50	4.5	-
8	Fish meal	1	1	-
9	Salt	0.50	0.5	-
10	Vitamin mineral premix	0.70	-	-
Total		100.00	100.00	100.00

Table 2. Chemical composition of experimental diets among different treatment groups.

Treatment groups	DM (% fresh)	Chemical composition (% DM)					
		Ash	CP	ADF	NDF	Ca	P
T_1	88.34	12.98	14.14	29.77	57.13	2.16	0.53
T_2	87.22	11.43	13.21	46.14	58.80	1.48	0.47
T_3	88.53	9.42	10.49	45.84	62.44	0.60	0.33

Table 3. Productive and reproductive status of experimental cows.

Traits Parameters	No	Treatment group			Level of significance
		Mean ± SE			
		T_1	T_2	T_3(Control)	
Body weight (kg)	3	374.67±4.37	323.67±46.56	352.33±21.61	NS
Age (m)	3	52.00±1.53	48.33±10.10	56.67±3.18	NS
Parity	3	1.00±0.00	1.00±0.577	1.33±0.33	NS
Peak milk production (l/d/c)	3	17.67±0.88	9.00±4.51	17.66±2.60	NS
Milk production during intervention (l/d/c)	3	10.67±0.67	5.00±2.52	10.00±1.15	NS
First heat after last calving (m)	3	5.33±0.88	3.67±0.33	6.00±0.58	NS
Days open/calving to pregnancy interval (m)	3	13.00±3.51	9.33±1.20	15.33±1.45	NS

NS=Non-significance

Table 4. Number of AI service in experimental cows before and after intervention.

Traits Parameters	No	Treatment group			Level of significance
		Mean ± SE			
		T_1	T_2	T_3 (Control)	
No of AI service before intervention	3	7.67±4.70	6.00±0.58	5.33±0.67	NS
No of AI service after intervention	3	2.33±0.33	2.67±0.33	1.67±1.20	NS

NS=Non-significance

Table 5. Conception rate among three treatment groups.

Treatment group	No. of cows pregnant	% pregnancy	Mean ± SE	Level of significance
T_1	3	100		
T_2	2	66.67	0.56±0.18	NS
T_3	0	0		

NS=Non-significance

Table 5 shows conception rate of experimental cows among treatment groups. All experimental cows (100%) of treatment group one (T_1) were become pregnant whereas no cows (0%) were conceived in treatment group (T_3). On the other hand, about 67 percent of cows were become pregnant in the treatment group (T_2). The results of the present study may be the effect of dietary intervention in experimental cows. The result is agreed with the findings of Lamond., 1970; Ferguson *et al.*, 1989; Blanchard *et al.*, 1990; Chagas *et al*., 2007 and Rodney *et al*., 2015 who opined that nutritional status of animal alter the reproductive efficiency of cow. Mean conception rate of all experimental cows was 0.56±0.18 with no significant difference that might be the small of cows in each treatment group.

4. Conclusions

The results from the present study it can be concluded that dietary status of crossbred dairy cow can improve the reproductive efficiency like the conception rate RB cows. It's clearly indicated that diet containing optimum level of CP, Ca and P might be played a vital role for maximum conception rate of RB cows. It's also observed that vitamin-mineral premix based cattle fertility pack might be influenced the maximum pregnancy rate in treatment group (T_1) compared to other treatment groups.

Conflict of interest

None to declare.

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