Comparative Effects of Different Feeds on Production and Reproduction of Crossbred Heifers in Gangachara Upazila, Rangpur, Bangladesh

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Abstract—*The present study was conducted from January to June 2014, in Gangachara Upazila of Rangpur District, Bangladesh. A sample of 60 cross-bred dairy cows: Local × Holstein Friesian (L×HF) = 30 and Local × Sahiwal (L×Sh) = 30 were selected for in depth study. The average age at first heat, services per conception, age at first calving, post-partum heat period, the average milk production, the average lactation period were observed after feeding three types of feed: type-I (Sweet jamboo grass), type-II (Jomjom Dairy feed) and type-III (Advance Chemical Industry) feeding system. Local × Holstein Friesian (L×HF) cross and Local × Sahiwal (L×Sh) cross cows showed significantly (p<0.05) better results by type-III feeding system compare with the type-I and type-II feeding system.*
**Keywords— ***Cross-bred, Dairy, Local, Holstein Friesian, Sahiwal.*

I. INTRODUCTION

Livestock is one of the major components of Bangladeshi agricultural output which plays a vital role in national economy. In 2013, the contribution of livestock sub-sector to the GDP was 2.95 %, which was estimated about 17.32 % GDP to agriculture [1]. Livestock population in Bangladesh is currently estimated about 25.7 million cattle, 0.83 million buffaloes, 14.8 million goats, 1.9 million sheep, 118.7 million chickens and 34.1 million ducks. The density of livestock population per acre of cultivable land is 7.37 [2]. Despite such a high density of cattle population, the country suffers from an acute shortage of livestock products like milk, meat and eggs. The shortage is so acute that alternative protein sources like rabbit meat is under research to fulfill the deficiency [3]. However there is a paucity of information about productive and reproductive performance of dairy cattle in Bangladesh. Comprehensive reports on productive potentials of indigenous Zebu cattle (Desi) and crossbred cattle under various management conditions in Bangladesh are lacking [4].

To remove these problems from rural areas of Bangladesh, different non-government organization (NGO) working intensely. Rangpur Dinajpur Rural Services (RDRS), a NGO established for implementing and developing projects, skills, awareness, capacities and technologies designed to raise the living standards of the rural poor in north-west part of Bangladesh. With the help of RDRS this research was conducted with the following objectives:

i.   To evaluate the comparative effects of different feeds on productive performance of cross bred heifer.
ii. To evaluate the comparative effects of different feeds on reproductive performance of cross bred cows.

II. MATERIALS AND METHODS

2.1. Questionnaire development:
Most easy, simple and direct questions were used to obtain information from the respondent farmers. The

questionnaire was pre-tested in order to judge its suitability for the respondents then finalized and necessary modifications have been made. It was carefully designed keeping the purposes of the study in mind. It contained both open and closed form questions.

2.2. Sampling technique:

Data for this study were collected from a sample rather than the whole population. In this connection, proportionate random sampling method was followed in order to select the representatives. The Core Participants House Hold (CPHHs) of RDRS, Gangachara upazila, who received asset/money from the organization, were considered as the owner of the population of the study.

2.3. Breed selection and management system:

A total of 30 Local $\times$ Holstein Friesian and 30 Local $\times$ Shahiwal cross bred heifer were selected for the present study. There were three types of feeding was practiced. In type-I feeding system animals were provided sweet jamboo grass @5kg/cattle/day with no concentrate feed. In type-II feeding system animals were grazing in the field from early morning up to afternoon with 3-4 kg straw daily as evening meal and additionally given 1 kg/day/heifer JDF feed (Jomjom Dairy feed- Jomjom Agro Industries Ltd.). In type-III feeding system animals were allowed to graze same as type-II feeding system but additionally supplied ready feed @1kg/day/heifer formulated by ACI (Advance Chemical Industry - Godrej feed company). Other management practices were uniform throughout the experimental period for all the animals. All cows and heifers access to *ad libitum* fresh drinking water with iodized salt.

2.4. Insemination and medication:

In heated heifers and cows were inseminated by artificial insemination (AI) through trained AI technicians. The farmers were treated all heifers and cows with deworming tablets and injection, alternately contained tetramisole hydrochloride (2.0g) and oxyclozanide (1.2g) per 100-150 kg body weight in every four month interval. All the animals which were in this study received vaccination against infectious diseases like Foot and Mouth Disease, Anthrax, Hemorrhagic Septicemia and Black Quarter etc.

2.5. Statistical analysis:

The collected data in this study was analyzed and presented using simple statistical techniques. The raw data were entered and sorted into MS Excel spread sheet then the data was transferred to analytical software SPSS (version 16.0) for descriptive analysis. Compare means pair sample T- test to know the reproductive performance considering different factors. All data are expressed as mean $\pm$ SEM. Differences were considered significant at the level of ($P<0.05$).

III. RESULTS AND DISCUSSION

3.1. Age at first heat:

Effect of different feeding systems on the age at first heat is shown in Figure 1. The present result revealed the average age at first heat of Local $\times$ Holstein Friesian (L$\times$HF) cross and Local $\times$ Sahiwal (L$\times$Sh) cross cows were 26.32 and 28.18 months, respectively in type-I (Sweet jamboo grass) feeding system, 23.12 and 25.51 months, respectively in type-II (Jomjom Dairy feed) feeding system, where it was 20.10 and 22.61 months, respectively in type-III (Advance Chemical Industry) feeding system. The ages at first heat of Local, Local $\times$ Holstein Friesian (L$\times$HF) cross and Local $\times$ Sahiwal (L$\times$Sh) cross cows were 27.4, 23.9 and 26.2 months, respectively [5].
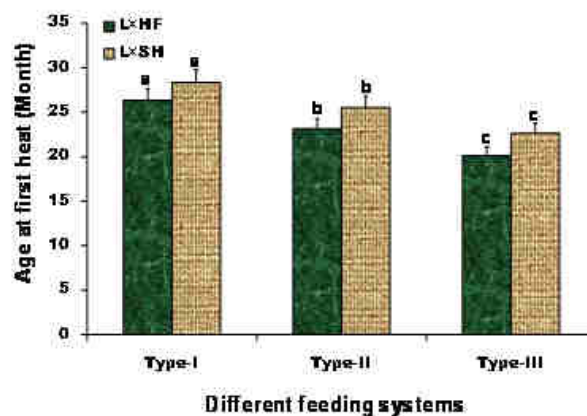

Fig.1: Effect of different feeding systems on age at first heat of cross bred (L$\times$HF) and (L$\times$SH) heifers. Each bar with error bar represents Mean $\pm$ SEM value. Without a common lowercase letter on error bars indicate significant differences (P<0.05) between the treatment groups.

3.2. Services per conception:

The present result showed that the average services per conception of Local $\times$ Holstein Friesian (L$\times$HF) cross and Local $\times$ Sahiwal (L$\times$Sh) cross cows were 1.9 and 1.7, respectively in type-I (Sweet jamboo grass) feeding system, 1.7 and 1.45, respectively in type-II (Jomjom Dairy feed) feeding system, but 1.30 and 1.41, respectively in type-III (Advance Chemical Industry) feeding system. Effect of different feeding systems on service per conception is presented in Figure 2. Productive and reproductive performance of dairy cows that the service per conception was 1.84 $\pm$0.80, 1.32$\pm$0.48 respectively, in Local $\times$ Holstein Friesian (L$\times$HF) cross and Local $\times$ Sahiwal (L$\times$Sh) cross cows [6].
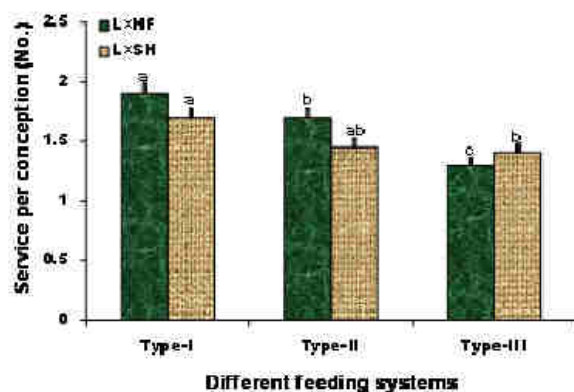
Fig.2: Effect of different feeding systems on service per conception of cross bred (L×HF) and (L×SH) heifers. Each bar with error bar represents Mean ± SEM value. Without a common lowercase letter on error bars indicate significant differences (P<0.05) between the treatment groups.

3.4. Gestation Period:

The average gestation period of Local × Holstein Friesian (L×HF) cross and Local × Sahiwal (L×Sh) cross cows were 283.21 and 285.15 days, respectively in type-I (Sweet jamboo grass) feeding system, 281.01 and 280.30 days, respectively in type-II (Jomjom Dairy feed) feeding system, where it was 282.23 and 280.11 days, respectively in type-III (Advance Chemical Industry) feeding system. Gestation period of Local × Holstein Friesian (L×HF) cross and Local × Sahiwal (L×Sh) cross cows were 276.2 and 277.4 days, respectively [6].

3.5. Daily milk yield:

Effect of different feeding systems on daily milk yield is shown in Figure 3. The present result revealed the average daily milk production of Local × Holstein Friesian (L×HF) cross and Local × Sahiwal (L×Sh) cross cows were 5.6 and 4.3 litres, respectively in type-I (Sweet jamboo grass) feeding system, 6.8 and 5.2 litres, respectively in type-II (Jomjom Dairy feed) feeding system, but it was 9.51 and 7.12 litres, respectively in type-III (Advance Chemical Industry) feeding system. The average daily milk production of Local × Holstein Friesian (L×HF) cross and Local × Sahiwal (L×Sh) cross cows were 8.36 and 4.53 litres, respectively [6].

3.6. Calving interval:

The present result expressed that the average calving intervals of Local × Holstein Friesian (L×HF) cross and Local × Sahiwal (L×Sh) cross cows were 451.6 and 432.2 days, respectively in type-I (Sweet jamboo grass) feeding system, 460.7 and 453.20 days, respectively in type-II (Jomjom Dairy feed) feeding system, where it was 413.3 and 430.31 days, respectively in type-III (Advance Chemical Industry) feeding system. The present result of

calving intervals of Local × Holstein Friesian (L×HF) cross and Local × Sahiwal (L×Sh) cross cows were significantly (p<0.05) reduced by type-III feeding system compare with the type-I and type-II feeding system
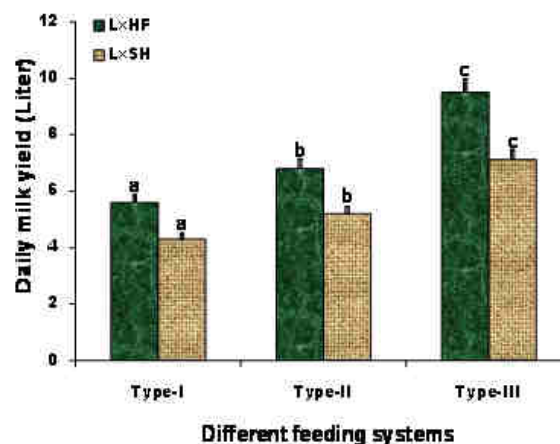

Fig.3:Effect of different feeding systems on milk yield of crossbred (L×HF) and (L×SH) cows. Each error bars indicate significant differences (P<0.05) between the treatment groups.

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IV.   SUMMERY AND CONCLUSION

In the socio–economic aspects of Bangladesh we are to improve the productive and reproductive performance of cross bred dairy cows in order to have an aid from this sector to national economy. In the result of the present study the productive and reproductive performance of cross bred dairy cows is higher in type-III feeding system compare with other feeding systems. So it may be suggested that the farmers of Rangpur District should be provided type-III feeding to their cross- bred heifers and cows.

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