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# PLAGIARISM CERTIFICATE

I, MohamamdAl mamun, would like to strongly assure you that I have performed all works furnished here in this report. The information has been collected from different books, national and international journals, websites and references. All the references have been acknowledged duly. Therefore, I reserve entire responsibility of this report.

…………………….

Author

# LIST OF ABBREVIATIONS

|  |  |
| --- | --- |
| **Abbreviations**  | **Elaborations**  |
| BBS  | Bangladesh Bureau of Statistics  |
| eg  | Example  |
| FAO  | Food and Agricultural Organization  |
| L | Local  |
| HF  | Holstein Friesian  |
| B | Breed  |
| MY  | Milk yield  |
| %  | Percentage  |
| Lac | Lactation  |
| SE  | Standard error  |
| CP | Crude protein  |

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**Author**

**november , 2016**

# ABSTRACT

A study was done to find out the milk production performance of different genetic groups of crossbred cows at different farming condition in Chittagong, Bangladesh from September 2016 to October 2016. About 62 crossbred cows were selected from Jarip, Mulla and Nahar dairy farms those already completed 3rd lactation. The numbers of animals of each of the genetic groups were 22 for 50% HF × 50% SL cross, 27 for 62.5% HF × 37.5% SL cross and 13 for 75% HF × 25% SL cross. The overall productive performance of different crossbred cows of Nahar and Mulla dairy farm were superior to the Jarip dairy farm. In addition the milk production of different breeds of cows were depends on genetic and environmental variances.

**Key words:** Crossbred, milk production, breeds, variances**.**

# CHAPTER-I

## INTRODUCTION

There are many commercial dairy farms in Bangladesh and more than 93% of the milk is produced by the rural households. There are various types of breeds are available in the rural areas of Bangladesh. The available breeds are Holstein, Jersey, Sahial and their crossbreds and non-descriptive deshi, local. The productive and reproductive performance of the indigenous cattle is not so good, therefore the farmersimporting or purchasing the high yielding varieties. It was reported that the number of milking cows in Bangladesh is 3.79 million, which is 16 per cent of all cattle and 35 percent of all cows. Only 10 percent of our cows were reported to be crossbred (BBS, 2012).The total cattle population of Bangladesh is 25.7 million of which 3.79 million is dairy cows yielding 2.28 million metric ton milk per year whereas demand is 12.82 million metric ton milk per year which indicates the importance of the requirement for increasing the milk production in Bangladesh (Banglapedia, 2012).Bangladesh is importing powder milk for meeting the deficit. The volume of imported milk has increased over the year due to faster domestic demand and costs of importation have exerted pressure on the countries balance of payments and have depressed the local initiative for milk production. About two-third of the total population in Bangladesh suffers from malnutrition. The magnitude of malnutrition can be substantially reduced by the consumption of milk or dairy products (FAO, 2009).

The average milk production of local cows is very low and it varies between 300-400 liters per lactation period of 180 to 240 days. But there is a great variation of milk production among cows (Khan *et al.,* 2005). Generally crossbred cows under village condition yield from 600 to 800 liters per lactation of 210 to 240 days (Uddin *et al.*, 2008). The low productivity of a milking cow in the country is due to shortage of feeds and fodder, poor genetic potentiality and wide spread of diseases.

The economic condition of a dairy farm depends to a greater extent on productive performance of the animal. We know that productive performance of the cows mostly depends on genetic merits of cows. Researchers shown that, the productive performances of the cows are changed along with the variation of genotype. But the productive performances of the cows are also controlled by feeding, hygienic condition, biosecurity and other management in different farms.

Hence the present study was undertaken to know the productive performance of the different genotypes cows at different farming conditions of Chittagong.

### ***Objectives:***

* To observe the managemental factors affecting the milk yield performance of different genotype at different farming condition.
* To know the productive performance of different genotype at different farming condition.
* To estimates the genotypic and phenotypic variances of milk yield in different lactations.

# CHAPTER-II

## MATERIALS AND METHODS

The present study was conducted to know the productive performance of different genetic groups of cows at different farms in Chittagong, Bangladesh fromSeptember 2016 to October 2016.

### ***2.1 Study area***

The study was conducted on three dairy farms in Chittagong district of which one farm was within Chittagong Metropolitan areas and another two farms were outside of Metropolitan areas. They were Jarip dairy farm, Mulla dairy farm and Nahar dairy farm.

### ***2.2 Study population***

About 62 crossbred cow’s lactation wise daily milk yield data were collected. The studied genotype were 50% HF × 50% SL (8 cows), 62.5% HF × 37.5% SL (10 cows) and 75% HF × 25% SL (5 cows) from Jarip dairy farm, 50% HF × 50% SL (9 cows), 62.5% HF × 37.5% SL (9 cows) and 75% HF × 25% SL (4 cows) from Mulla dairy farm and 50% HF × 50% SL (5 cows), 62.5% HF × 37.5% SL (8 cows) and 75% HF × 25% SL (7 cows) from Nahar dairy farm. Genotype that means blood percentage was determined by observing AI record book that denotes the percentage of foreign blood which was used in the cow

### ***2.3 Methods of data collection***

The data was collected from the record book of the respective farms.

### ***2.4 Preparation of the questionnaire***

The questionnaire was prepared according to the objectives of the investigation. The questionnaire included questions to collect information on farm management average daily milk yield of cows in lactation wise upto three lactations.

### ***2.5 Management practice of farm***

Nahar dairy farm was an organized dairy farm situated in Mirsarai, Chittagong. Cows were reared in tin shed building. Face out and face in stanchion barn housing system was practiced in this farm. They had available fodder land and provided adequate amount of green grass to the cows. Concentrate feed (ME=1871.9 kcal/kg, CP=19.56 %) was also provide to the cows. Biosecurity was strictly maintained and the overall management system was better than the others farm. Hygienic condition was better that’s why animals were less affected by diseases specially mastitis. Drying off was strictly maintained in case of some cows those produced milk up to calving. All record books were available in this farm.

Mulla dairy farmwas an organized dairy farm situated in Patenga, Chittagong. Cows were reared in half tin shed building. Face out and face in stanchion barn housing system was practiced in this farm. They had available fodder land and also provided green grass to the cows but less than Nahar dairy farm. Concentrate feed (ME=1874.13 kcal/kg, CP=18.86 %) was also provided to the cows. Biosecurity was not satisfactory but the overall management system was better than Jarip dairy farm. Hygienic condition was better that’s why animals were less affected by diseases specially mastitis. Drying off was not maintained in case of some cows those produced milk up to calving. All record books were available in this farm.

Jarip dairy farm was situated in Hathajari, Chittagong. It was not so organized farm as like as Nahar and Mulla dairy farm. Concentrate feeding (ME=1894.19 kcal/kg, CP=17.86 %) was more or less similar to other farms but green grasses were not available. In comparison to other farms the biosecurity of this farm was poor and drying off was not maintained in case of some cows those produced milk up to calving. All record books were also available in this farm.

### ***2.6 Statistical analysis***

The parameter mean values were analyzed by SAS (SAS 2008) using the following statistical design.

Yijk = µ + Fi+gj+eijk

Where, Yijk = Parameter value

µ = Overall mean

Fi = Different types farms

gj = Different types genotype

eijk = Residual values, distributed as N(0, σ2)

 The mean differences as separated by least significant difference test (LSD at 5% level of significance (Steel *et al,*. 1997).

The variance components of the milk yield according to genotypes over lactation as calculated usingunivariate, animal model by AIREML, based on Restricted Maximum Likelihood (REML) using the average information (AI) matrix as second derivatives in a quasi-Newton procedure (Johnson and Thompson 1995). The animal model for analysis was as:

Y= Xb + Zu +e

Where, Y is the vector of all observations;

b is the vector of fixed effects considering the effect of location and does age;

u is the vector of breeding value of the animal's, random; and

e is vector of residual effects.

X and Z is design matrix connecting to the fixed and random effect, respectively.

There was no sire, dam and grand sire information only the individual cow’s daily milk yield was considered in this analysis.

# CHAPTER-III

## RESULT AND DISCUSSION

The different lactation daily milk yield (litre/day) of cows according to farm and breeds is presented in Table 1. From the Table 1, it can be seen that the Third lactation produced more daily average milk yield than other two lactations. However, there were no significant differences found between lactations. Farm-2 produced more daily average milk yield than other two farm in different lactation where there were found significant differences among the farms. Breed-1 produced more daily average milk yield than other two breed in different lactation in farm 1 where there were found significant difference among the breeds.

**Table 3.1:** Different lactation daily milk yield (litre/day) of cows according to farm and breeds

|  |  |  |
| --- | --- | --- |
| **Milk yield** | **Farms** | **Lac Ave Milk yield** |
| **Farm 1** | **Farm 2** | **Farm 3** |
| **B-1** | **B-2** | **B-3** | **B-1** | **B-2** | **B-3** | **B-1** | **B-2** | **B-3** |
| First lactation milk yield (litre/day/cow) | 16.40b ±1.51 | 13.75b±1.58 | 15.0a±1.41 | 16.44b±1.94 | 14.56a±2.35 | 19.14b±2.26 | 15.50±2.07 | 13.40a±1.34 | 19.14b±2.26 | 15.74±1.68 |
| Second lactation milk yield (litre/day/cow) | 17.20b±1.75 | 14.50a±1.41 | 16.0ab±1.41 | 17.56b±3.24 | 15.11a±2.26 | 21.0c±2.82 | 16.25ab±4.13 | 15.40a±0.89 | 20.57c±2.93 | 17. 06±2. 32 |
| Third lactation milk yield (litre/day/cow) | 17.50b±2.27 | 14.87a±1.46 | 16.0ab±00 | 17.78b±2.82 | 15.89ab±2.89 | 21.0c±0.00 | 16.63ab±3.89 | 14.40a±0.89 | 19.71c±2.75 | 17. 09±1.89 |
| Breed average | 17.03±1.84 | 14. 37±1.48 | 15.66±0.94 | 17.26±2.66 | 15.19±2.5 | 19.83±1.17 | 16.13±3. 36 | 14.40±1.04 | 19.81±2.65 |  |

**Legends** B1 = 62.5 HF + 37.5L, B2= 50 HF+50 L and B3= 75HF + 25L.

The sequence a, b and c indicated the significant differences at 5% level of significance.

In farm-2 and farm-3 breed-3 produced more daily average milk yield than other two breed at different lactations where significant differences were found (P<0.05). It can be seen that breed-1 of farm-2 produced more daily average milk yield than same breed of other two farm in different lactations where no significant differences found were among breeds at first and third lactation. However, in second lactation there were found significant difference. It can also be seen that breed-2 of farm-2 produced more daily average milk yield than the same breed of other two farm at first and third lactation but in case of second lactation breed-2 of farm-3 produced highest daily average milk yield than the same breed of other two farms. There were significant differences found in breed-2 at third lactation. Breed-3 of farm-2 and farm-3 produced similar daily average milk which was higher than the same breed of farm-1 at first lactation and found to be significant among farms. But in second and third lactation, breed-3 of farm-2 produced more daily average milk yield than the same breed of other two farms. Milk yield can be different with the differences of breeds and lactation. Similar factors were reported by other researcher elsewhere (e.g. Khan *et al*,. 2012, Khan *et al.,* 2005, Bhuiyan *et al.,* 1998).

The Genotypic and environmental variation of milk yield according to lactation is shon in Table 2. In Table-2 it can be seen that the genotypic variance of second lactation was higher than the genotypic variance of other two lactations where there were no significant difference between lactations. Environmental variance of second lactation was higher than the environmental variance of other two lactations where there were found high significant difference between the lactations It can be seen that the environmental variance influence the milk yield highly than the genotypic variance at different lactation where there were found significant difference between genotypic variance and environmental variance. Genotype and environment variances are accounts for the milk production similar factors are determined by Gebregziabher *et al,.* 2013 and Bajwa *et al.,* 2014.

**Table 3.2:** G**enotypic and environmental variation of milk yield according to lactation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Traits** | **Lactation-1** | **Lactation-2** | **Lactation-3** |
|  |  |  |  |
| Average | 15.72±2.46 | 16.78±3.15 | 16.78±3.15 |
| Genotypic Variance | 1.231 | 1.572  | 1.478 |
| Environmental Variance | 4.832 | 8.316 | 7.256 |

Gebregziabher *et al*.,(2013)

# CHAPTER IV

## CONCLUSION

In this study an attempt was made to find out the comparison of productive performance of different genetic groups of cows at different farming condition in Chittagong, Bangladesh. We know that productive performance of cows mostly depends on their genetic merits. This study showed that though same genotypic crossbred present in different farms, they vary in milk yield at different farming condition. So it may be depended on farm management, feeding management and environment. In Mulla dairy farm, overall management system and environment were good, so for this result milk yield of crossbred cows were highest among the farms. So for getting better performance, emphasize have to be given on farm management practices, feeding and environment.

# CHAPTER V

## LIMITATIONS

In this study comparison of productive performance of different genetic groups of crossbred cows at different farming conditions are shortly discussed. Due to lack of sufficient data of each of the specific genotypes of animal, precision of the results might be lesser or more. So, more studies are suggested to drawing an absolute conclusion.

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# BIOGRAPHY

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