STUDY OF ECONOMIC TRAITS OF HOLSTEIN FRIESIAN CATTLE IN U.A.R.

By

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B.Sc. Agric

THESIS

Submitted in Partial Fulfilment of
The Requirements For the Degree of

MASTER OF SCIENCE

in

Animal Production

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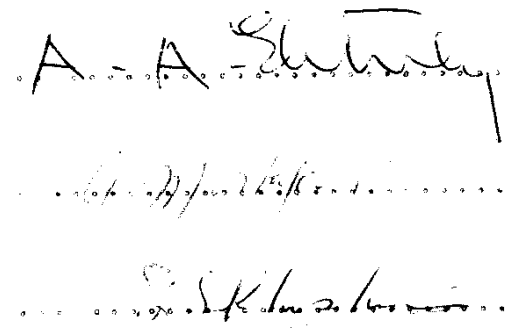

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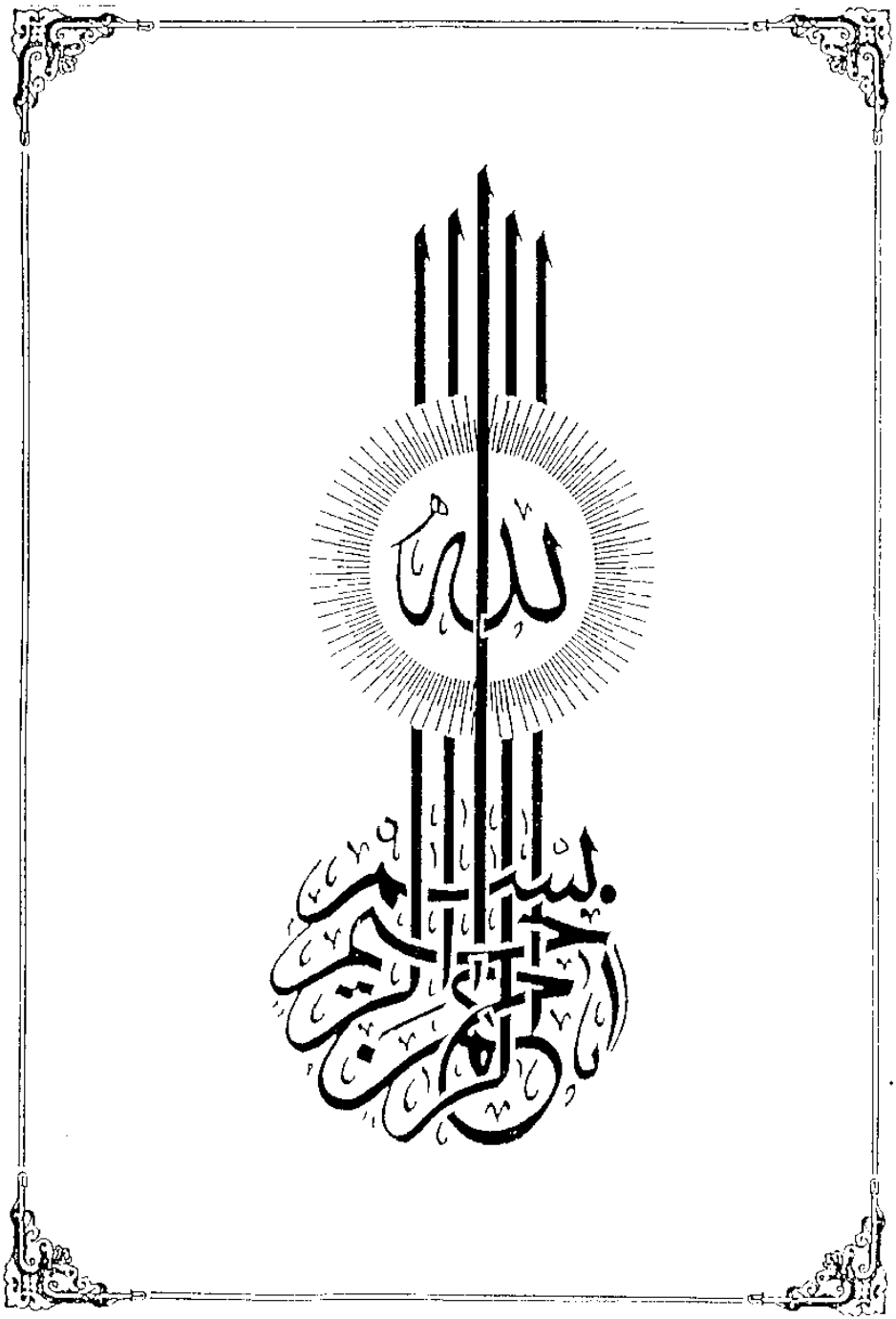

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CONTENTS

I. INTRODUCTION

The Friesian cattle became very popular in many countries of the world including those in the subtropical regions. Its popularity is actually due to the fact that it excells other breeds in milk production and that surplus males and dry cows can be fattened off for beef production quite successfully.

In recent years a number of studies has been carried out in less developed dairy countries with a view to ascertaining the extent to which genetic and environmental factors affect milk yields of dairy cattle and buffaloes in warm climates. Such studies can provide basic information for herd improvement.

As water buffalo is the dominating dairy animal in Egypt and as it is more efficient than native cattle in milk production, the present study was delicated to study some of its dairy characteristics, especially those of milk composition. Information about factors affecting the milk yield, fat content and the different constituents of milk are still relatively short.

The main objective of the present investigation is to assess milk production and milk composition characteristics of the Friesian cattle and buffaloes. It

involves the study of the inheritance of some dairy traits in Friesians and buffaloes under the Egyptian conditions, and in the same time to investigate the interrelationships between milk yield and its major constituents. The effect of some environmental factors, such as age at first calving, year of calving, and season of calving upon 305 day milk yield is also determined.

II. REVIEW OF LITERATURE

A. Non-genetic Factors Affecting Lactation Milk Yield, Age At First Calving, Year And Season Of Calving

Milk production is influenced by both heredity and environment. However, environment is directly responsible for the expression of production, but the potential ability of the animal to produce milk is influenced by heredity. Knowledge of the extent to which various environmental influences affect the yield of the animal is therefore important when estimating the potential for improvement through selection. When attempts are made to estimate the genetic parameters of the population as accurate as possible, the effect of some environmental factors upon the character, has to be considered. Adjusting the records of lactation milk yield for known causes of variation is a way of making culling and selection of breeding individuals more precise.

Among the numerous identified non-genetic-within-herd influences on milk and milk fat yield are age at first calving, year of calving and season of calving which seem to be the most important. Hence, to attain a reasonable degree of accuracy in the estimation of the genetic

merit of an animal, it is advisable to try to eliminate most of the variability which is due to these environmental effects.

The relative effect of age at first calving, year of calving and season of calving upon dairy records has been the object of a great many investigations.

Ragab et al. (1954) studied the effect of some important environmental factors upon milk yield in Egyptian cattle. They reported non-significant regression and correlation coefficients between age at first calving and first lactation milk yield as 0.088 and 0.034, respectively. On the other hand, the variation in milk yield of all lactations that is due to month of calving was found to be highly significant where it accounted for 5.3 % of the total variance.

Gravert and Langlet (1959) corrected dam groups to differences in the age, found that 13.8 % of the total variation of milk yield was attributed to the variation between the mean of the various dam groups in age.

The effect of age at first mating upon milk yield was studied by Holl (1959) in Czechoslovakia. He found that the yields of milk during the first 3 lactations were significantly higher for the group mated at 27 months than

for those mated at 18 months of age. Moreover, he showed no significant difference between the age groups when the total milk production up to the age of 6½ years was considered.

In Italy, Magarcenkar(1964) working on the first 3 lactations of 495 Friesian cows, found that year effects accounted for 26.3, 6.9, and 11.0 % of the total variance in 1st, 2nd, and 3rd lactation milk yield, respectively. He also noted that age at calving was not correlated with milk production.

Sankunny (1964) in India reported that Murrah buffaloes which calved in March - July gave the highest yields of milk compared to those calved in Oct. - Feb.

The effect of some environmental factors upon 305-day lactation milk yield of Friesian crosses in Iraq were studied by Asker et al. (1965). They obtained non-significant correlation coefficient between first lactation yield and age at first calving being 0.057. On the other hand, month and season of calving were found to have highly significant effects upon milk yield.

Age at first calving was significantly correlated with milk yield giving coefficients of 0.940 and 0.393 for

two origins of Friesian cattle as reported by Cerutti et al. (1965).

In India, Dutt et al. (1965), from their work upon Murrah buffaloes, obtained significant positive correlation coefficient of 0.169 between age at first calving and first lactation milk yield.

For 5 major dairy breeds, Gacula et al. (1965) estimated variance components from least squares analysis, showed that age differences accounted for 14 - 30 % of the total variability in milk yield.

The effect of season of calving upon first lactation milk yield of Indian buffaloes was studied by Goswami and Nair (1965). They found that summer calvers (Feb. - June) yielded significantly more milk than winter calvers (Oct. - Feb.) for two farms. Moreover, they also showed that buffaloes which calved during the "off season" (April-June) were found to have higher milk yields than average, whilst those calved during the rainy season had lower milk yields than average.

Montemurro and Cianci (1965) reported that the average age at first calving of 324 Italian Friesian cows was 28.28 months with 84 % of calving between 25 and 30 months.

They also showed that no significant correlation existed between age at 1st calving and milk production.

For Norwegian Red-and-White cows, Syrstad (1965) found that age and season of calving, respectively, accounted for 12.3 and 4.1 % of the within herd milk yield variance.

Abdel-Ghani and Hathout (1966) reported significant effect of month of calving upon first and second lactation milk yield of pure Friesian cows being accounted for 30 % of the variance in this trait.

Negative phenotypic correlation coefficient between age at first calving and milk yield was reported by Acharya (1966).

Using standardized partial regression coefficients, Conrad and Gravert (1966) suggested the order of causes of variation in 1st lactation milk yield to be length of lactation, age at 1st calving, herd average of preceding year, dam's yields and season of calving.

Gaunt et al. (1966) studied 2322 lactations of 5 breeds, found that year of calving, season of calving and age accounted for 1.6, 1.4, and 20.2 % of the variance in milk yield, respectively.

Based on data from 203 Haryana cows, Mehlon and Mehlon (1966) were able to show that age at first calving was nonsignificantly correlated with first lactation milk yield having a coefficient of -0.07 while the corresponding regression coefficient was significant being 0.17.

Fischer (1966) showed that non-genetic factors such as year, month of calving and age at first calving had only a limited effect on milk, milk fat yields and content for lactations of 100 - and 305 day lengths.

In Sudan, Khalifa (1966) observed seasonal effects upon yields of milk and its constituents of Sudanese cow where summer clavers had lower yields than winter ones.

Rossi (1966) in Italy, observed a significant correlation coefficient of 0.224 between age at first calving and milk yield.

Alim (1967) from his work upon 2738 lactations of Egyptian buffaloes reported that year of calving accounted for 3.19 % of the total variance in milk yield which represents a significant effect. On the other hand, the same author found that season of calving had a relatively small effect and the dam's age had no marked influence.

For first lactation records of Hariana cattle, Chandiramani and Dadlani (1967) obtained genetic and phenotypic correlation coefficients between milk yield and age as -0.28 and -0.07, respectively.

The effect of season of calving upon lactation milk yield was observed in Ayrshire cows by Makela (1967). He found that lactation yields of spring and summer calvers were approximately equally high, but those of comparable autumn calvers were approximately 10 % higher. Moreover, he noted that season effects were similar for cows of different age groups.

On a within-herd-year-season-sire basis, Sargent et al. (1967) found that age at calving accounted for 21.7% of the variance in milk yield. In addition, they reported significant differences between months of calving for milk yield with most of the seasonal variation accounted for by two six-month seasons of calving.

Sharda et al. (1967) observed that season of calving had a significant effect on lactation milk yield, but month of calving had not. On the other hand, Singh and Singh (1967) from their work upon lactation milk yield of Murrah buffaloes found no significant effect of season of calving on this character.

A least-square analysis was employed by Gacula et al. (1968) to study the effect of some environmental factors upon yields and percentages of milk constituents of 5 major dairy breeds. From the total variance in yields and percentages of constituents, resp., they found that age, season and year of calving accounted for 14.6 and 7.3, 1.9 and 1.4 and 1.0 and 1.6 %, in the same order.

In Poland, Karlowicz (1968) observed significant effects of season of calving and age at calving upon milk yield, but no interaction was reported.

For 459 Sahiwal cows grouped according to production level, Kavitkar et al. (1968) found that 1st lactation milk yield was significantly correlated with age at 1st calving for the high-yielding group giving a correlation coefficient of 0.2005.

Khishin et al. (1968) studied the effect of age at 1st calving, month and season of calving upon total milk yield of Egyptian buffaloes. When animals were grouped according to age at 1st calving into 5 classes of 3 months intervals, they were able to show that animals in class 2 (35 - 37 months of age at 1st calving) excelled the other 4 groups in milk production, but the differences were not