A STUDY OF SOME CORRECTION FACTORS IN FRIESIAN RECORDS

By

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B.Sc. (Agric.)

THESIS

Submitted in Partial Fulfilment of the Requirements
for the Degree of

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Animal Production

AIN SHAMS UNIVERSITY
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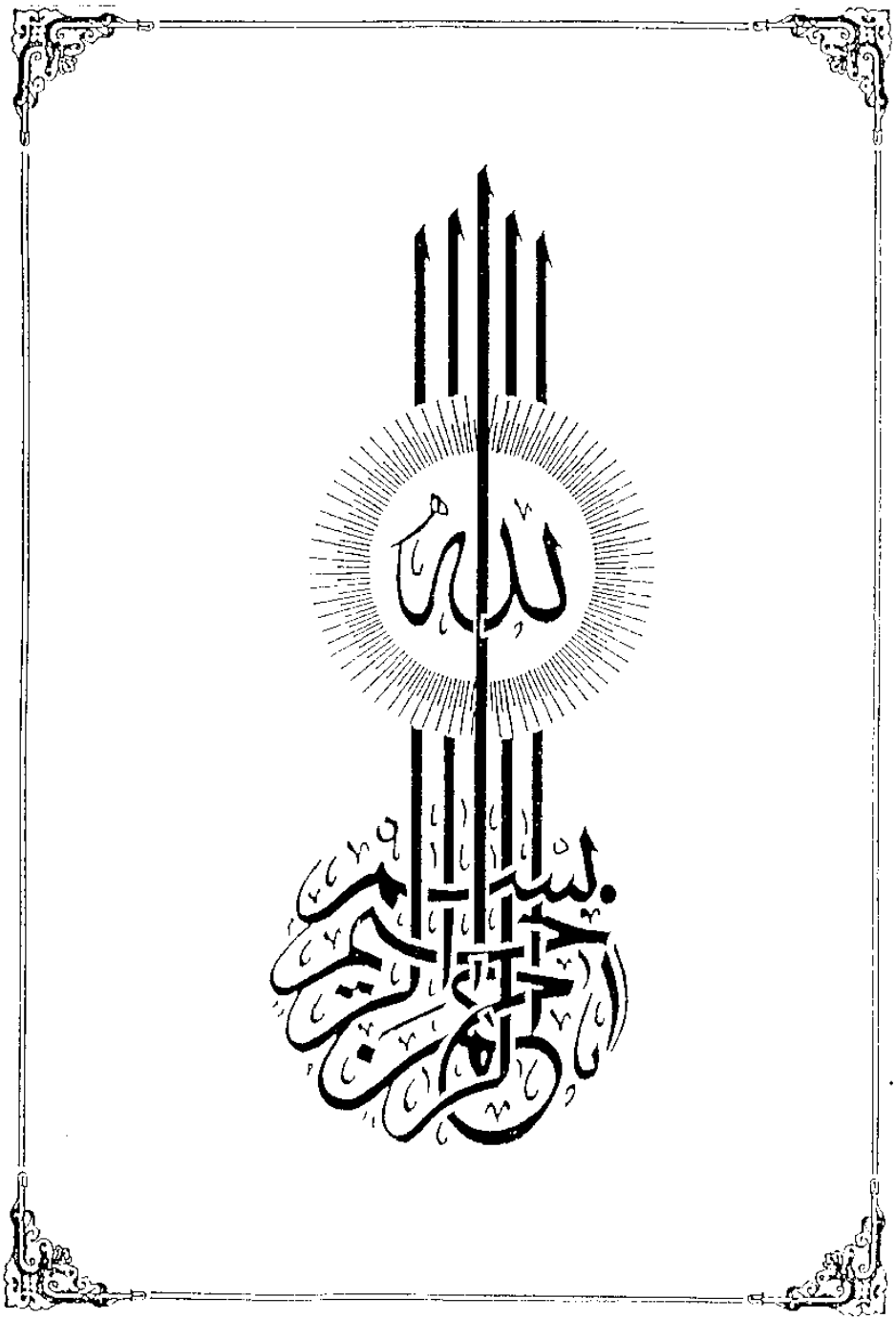


C O N T E N T S

		Page
I.	INTRODUCTION	1
II.	REVIEW OF LITERATURE	3
	A. Age Effect	3
	B. Season, Year and Origin Effects	12
III.	MATERIAL AND METHODS	16
	A. Experimental Data	16
	B. Feeding and Management	18
	C. Statistical Methods	19
	1. Adjustment of the data	19
	2. Age-correction-factors methods	22
	a. The gross comparison method	22
	First method (gross comparison-1)	23
	Second method (gross comparison-2)	26
	b. The paired comparison method	27
IV.	RESULTS AND DISCUSSION	31
	A. Season, Year and Origin Effects	34
	B. Age Effects	39
	Age-correction factors	46
	1. Gross comparison method	47
	2. Paired comparison method	57
	3. Comparison between methods used	65
V.	SUMMARY	72
VI.	REFERENCES	75
VII.	APPENDIX	82
VIII.	ARABIC SUMMARY.	

LIST OF TABLES

Table		Page
1	Frequency distribution of all records	17
2	Number of records of cows from different origin	21
3	Distribution of records and pairs in different ages (month).	24
4	Analysis of variance of milk yield in different lactations	35
5	Average milk yield for cows calving in different season of the year	36
6	Average production of Friesian cows from different origins in different lactations, (305-day) over all years	42
7	Average of lactation period of Friesian cows in different lactation.	44
8	Average production of Friesian cows in different lactation	45
9	Age-correction factors for 305-day milk production records using gross-comparison method-1.	50
10	Age-correction factors for 305-day production records using gross-comparison method-2. ...	53
11	Age-correction factors for 305-day production records using paired comparison method.....	61

LIST OF FIGURES

Figure		Page
1	Ratio of production at one age to production twelve months earlier for different ages ...	31
2	The relationship between milk yield in different years for each lactation	40
3	Ratio between maximum production and actual production at different ages.	48
4	Relationship between age and production expected according to calculated R'_j values.	51
5	Relationship between actual milk production and age at calving.	54
6	Regression of production on age at calving..	58
7	Regression of production on age at calving-paired method	66
8	Relationship between actual and age-corrected milk production	67
9	Regression of production on age at calving..	69

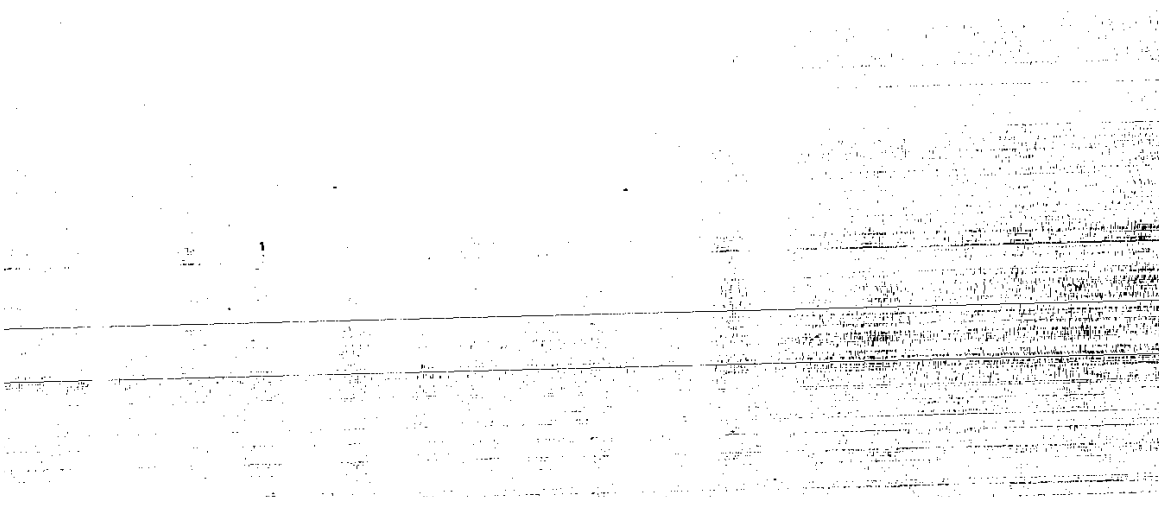
I. INTRODUCTION

Milk production records in dairy cattle are influenced by many nongenetic factors such as age, livebody weight, number of times milked daily ..... etc. In any genetic improvement programme, e.g., proving sires, milk records are usually standardized or adjusted for as many of these factors as it is practically feasible.

As for as age is concerned, it is generally recognized that milk production increases with the advancement of age until it reaches a maximum at approximately six to eight years of age where it declines thereafter. An age-correction factor is, thus, a factor to be multiplied by the actual production at certain age to render mature equivalent, i.e., to estimate what a cow of an earlier age would have produced if she were mature. However, since milk production records are influenced by both heredity and environment, age-correction factors must not remove any other differences which may not be really due to age.

Many workers have investigated the economic characteristics of the Friesian dairy cattle in U.A.R.. Few reports have discussed the effect of age, mainly represented by the number of lactation on milk production but none, however, derived age-correction factors for Friesian cattle under the local conditions.

This investigation was carried at in an attempt to estimate age-correction factors for the Friesian cattle herd of the Tahreer Province, U.A.R.. Such factors could of use in planning any selection programme.



II. REVIEW OF LITERATURE

Milk production gradually increases with age and most of the milking cows reach then maximum production at six to eight years of age. Then, production starts to decrease with the advancing age. Thus, it is of importance to compare production of animals at different ages to reveal age influence on production.

When comparisons are made among cows of different age groups for breeding purposes, it is desirable to make such comparisons independent of age effect. To secure this age-correction factors are estimated to help in assessing what a cow of an earlier age would have produced if she were mature. An age correction factor is, thus, a factor to be multiplied by the production at a certain age to convert to mature equivalent. However, since milk production records are influenced by both heredity and environment, age-correction factors must not remove any other difference which may not really be due to age. Beside age, many other factors affect the yield such as number of daily milkings, length of lactation period, seaso feeding level, housing, care, ...etc.

A. Age Effect

Age as affecting milk yield is expressed in the literature as the absolute age in years and months or as the sequen of lactation. Methods applied for studying age effect will be reviewed more critically in Chapter III. However, it suffices

here to mention that they are mainly two methods. The paired comparison method which depends upon the comparison of production by the same cows in consecutive lactations and the gross comparison method which is based mainly on the comparison between the yield at the age in months of maximum production and monthly production of all available records.

Askar, El-Itriby and Bedier (1958) analysed data including 308 Native Egyptian cows having more than 900 lactations belonging to the Ministry of Agriculture, at Gemizah and El-Sirw Experimental Farms. They found that cows attained their maximum production at the third and fourth lactation, respectively, when the lumped and paired comparison methods were applied. They also found, that there were no-significant differences between the results obtained by the two methods. The work of Askar et al. (1958) showed that native cows attain their maximum production at 6 to 7 years of age.

Ragab and Sourour (1963) analysed the records of 187 native cows and 103 of buffaloes of the herd belonging to the Faculty of Agriculture, Cairo University and 391 of Friesian cows of the herd record at the Tahreer province. Their data comprised 1244 lactations, recorded during a period of 24 year for buffaloes, 18 years for native cows and 4 years for Friesi cattle. They used the lumped and paired lactation in their comparisons. They found that, the peak production was attaine at the third, the fourth and the fifth lactation for native,

those made by cows milked three times daily (3x). The ratio of 2x to 3x milk production seems not to be constant at age below 36 months but at the ages older than 36 months no obvious trend in 2x : 3x ratio could be observed with advance in age.

Rognoni and Pasti (1955) and Rognoni and Brambilla (1956) working on Friesian and Brown Alpina cattle analysed records of 151 Brown Alpina and 400 Friesian cattle and found that cows from both breeds reached their maximum milk production in the 5th lactation. The authors tabulated correction factors for lactations one to eight.

Ragab and Asker (1959), Asker, El-Itriby and Fahmy (1959), Badreldin, Maghrabi and Zaki (1960), Mahadevan (1956) and Morad (1967) calculated the average milk yield for the first four lactations and found that milk production increases with advancing age.

Kendrick (1955) studied age effect on yield (72,860 DHIA(Dairy Herd Improvement Association) and 211,678 (Herd Test), 305-day lactation records of Holstein Friesian cows milking twice a day) reported during the period from 1945 through 1952. The results of the two sets of data which were made simultaneously and independently, were practically identical. Thus, it was decided to combine the two sets, to provide one set of Holstein Friesian age-correction factors based on DHIA and Herd Test records. These age correction

factors are shown in Appendix 1. Kendrick (1955) found that the maximum production was reached at six to eight and five months of age. The difference between these age factors and those of Lush and Shrode (1950) factors was small at different ages.

Miller (1964) used 405,330 lactations of Holstein Friesian cattle calving between 1951 and 1962 in five U.S. geographical regions to study the biases in the estimation of the regression of milk production on age to check the standard age correction factors widely used by DHIA in U.S.A. The regression of production on age was computed by the paired and gross comparison methods. Miller (1964) concluded that the standard DHIA age correction factors (Appendix 1),appeared acceptable for most purposes in all regions, except for cows of 11 years old. The maximum production differed from one region to another but it was reached at five to seven years of age. The deviation between the paired and gross curves was greater for some regions than the others. In most instances, bias due to selection was assumed to be the primary cause of variation between the paired and the gross comparison regressions. In most instances, particularly at ages beyond maturity, the standard DHIA age correction factors offered were a compromise between these results from the paired and gross comparison methods.

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Lush and Shrode (1950) derived from 43,573 Herd Improvement Registry (HIR) lactation of 11,001 cows multiplicative age-correction factors shown in the Appendix 2. Both 2x and 3x records were included, 20,893 being 2x records from 5,374 cows and 22,68[illegible] being 3x records from 5,627 cows. Each record was the tota milk yield within 365-day after freshening. They found that the gross comparison curve lies beneath the paired curve at immature ages. Assuming that the true curve to be intermediate, gross age factors tend to overestimate the production at immature ages while underestimating the mature equivalent yield of aged cows. In other words, the two common methods of computing age conversion factors are biased in opposite directions, due to the effects of among-cow selection for yield on immature lactation production. The gross comparison procedure is biased because this selection causes the older age groups to be represented by records from cows of somewhat higher genetic merit than the younger age groups. In the other direction, when the paired comparison method was employed, the apparent rate of increase in production with age is biased downward, due to selection and the incomplete repeatability of records. In this case, the ratio of the bias in the paired method to the bias in the gross method equals to $-\frac{1-t}{t}$, where t is the repeatability of the individual records. The maximum production as shown in Appendix 2 was reached at 73 to 92 months of age. Lush and

in Friesian cows and that cows born in the first half year produced less than those born in the second. They reasoned such difference due to climate and system of feeding.

Khishin (1957) studied the effect of some tangible causes of variation on the early stages and the 305-day of lactation using 1566 Friesian lactations. He found that the month of calving had a little effect on the intensity of production and there is no effect of the month of calving on the total milk yield, this attributing only 1.4 % of the total variance.

Piana and Mainordi (1949) studied milk production in relation to age in the Brown Alpina cattle. They found that age correction factors calculated for other breeds, or for the same breed under dissimilar conditions, do not generally apply to all cases. The factor relating to the first lactation is especially influenced by breed or type of management, and seems to be strikely correlated with milking quality and age at first calving.

III. MATERIAL AND METHODS

A. EXPERIMENTAL DATA

In 1956, the Tahreer Province imported large numbers of Friesian cattle from both Holland and Denmark. A total number of 1442 heads of Friesian were imported between 1956 and 1964. A high percentage of the imported stock was either heifers in calf or heifers ready for service. The total number of imported Friesian into the U.A.R. by Tahreer Province came to about 3000 heads, while the total population of the Friesian in the country is estimated as 8000 heads in 196[illegible]

The data used in this investigation are the records of the cows belonging to the Friesian herd kept by the Animal Production Department at the Southern Region of the Tahreer Province. The records were collected over a period of fifteen years inclusively from 1954 to 1968. The 2146 cows included in this investigation are considered of three origins. The first and the second groups of cows were imported from Holland and Denmark, respectively. The third were those Friesians born in Egypt named as the local herd. Although there were a total of 5269 lactations, only 1720 cows having 4253 normal lactation were included in the analyses for age effect. The remaining 1016 lactations were excluded from the present study for the lack of complete information or for being unsound, e.g., short lactation period or diseased animals. Records used represent the total amount of milk producted by cows milked