1. INTRODUCTION

The majority of cattle in Egypt are in hands of small farmers owning less than 5 heads. Sires in such small scale ownership are not selected on their productive or inherent merits and, therefore, no genetic improvement is expected. Because milk is an important protein source for human consumption in this country, Ministry of Agriculture has endeavoured to improve the genetic potential of dairy cattle through the distribution of superior bulls (produced in governmental farms) to be used for breeding cows of small farmers throughout the country. To design an effective breeding plan, it is necessary to develop national recording system to get the sires' pedigree, performance recording and progeny testing programme. Since few bulls are needed as breeding males (compared to the cow population) and if bulls of high transmitting ability would be accurately chosen, there would be greater opportunity for a higher intensity of selection to be attained.

From the economical and practical point of view, dairy cattle producers are faced with the task of choosing sires for artificial insemination that will produce the most profitable daughters. When estimates of sire's breeding values for all economic important traits are available, it is then appropriate to evaluate the profitability of sires on their daughter's average within the available possibilities of the dairy farm (Sivarajasingam et al., 1984).

In Egypt, two attempts were made by Fahmy (1970) and El-Chafie (1981) to evaluate the sires of dairy cows. Fahmy (1970) estimated the breeding value of the sire as an index proposed by

Johansson and Robertson (1952), while El-Chafie (1981) used the mixed models to obtain the best linear unbiased prediction (BLUP) solutions for the sires. Other non-Egyptian attempts (Henderson, 1973; Schaeffer et al. 1973; Hintz et al. 1978; Quaas et al. 1979; Agyemang et al. 1985; Abubakar et al. 1986; Abubakar et al. 1987b; Vij and Tiwana, 1988) used the best linear unbiased prediction (BLUP) procedure to evaluate their sires. This method has the ability to account for systematic differences among sires and to adjust for fixed effects simultaneously.

The objectives of this study were: (1) to determine the non-genetic factors affecting some reproductive and productive traits of a Friesian herd raised in Egypt, (2) to quantify the genetic, phenotypic and environmental variation and covariation of such traits. Best Linear Unbiased Prediction (BLUP) procedure was an attempt to evaluate the Friesian sires produced in Egypt through 27 years from 1960 to 1986.

2. REVIEW OF LITERATURE

2.1. Non-genetic Aspects

2.1.1 Factors affecting milk yield

Milk yield per lactation is an important element in determining productivity in dairy cattle herds. It was investigated under the prevailing conditions of Egypt and other countries. Table 1 shows the averages of total and 305 day milk yield previously reported in the available literature. Estimates in this table indicate that the average of 305-day milk yield for Friesian cattle ranged from 1468 to 3237 Kg in Egypt, from 2502 to 3927 kg in Iraq, from 5822 to 7227 kg in Mexico, from 4859 to 5082 kg in Columbia and from 5549 to 7581 kg in USA.

Milk production is greatly affected by many factors, such as sire, year of calving, season of calving, age at calving, days open and other different factors.

Year of calving:

Nagarcenkar (1964) found that the effect of year of calving on milk yield was highly significant ($P< 0.01$). Quawasmi (1971) with Friesian cows in Egypt detected a highly significant ($P<0.01$) effect for year of calving on milk yield of the first and second lactations. Similarly, Khanna and Bhat (1972), Mohamed (1979), Ashmawy (1981), Kabuga and Agyemang (1984), Abdel-Glil (1985), Arafa (1987) and El-sedafy (1989) with Friesian cattle raised in different countries reported highly significant effects for year of calving on total and /or 305-day milk yield. Also, significant effects ($P<0.05$) of year of calving on total and 305-day in first and second lactation milk yield were reported

Table 1. Reviewed averages of total and 305-day milk yield (Kg) for different breed groups of dairy cattle.

Author(s)	Milk Yield (Kg)		Remarks
	Total	305-day	
		Friesian	
Rendel et al. (1957)		3849	553 records of 1st lactation.
El-Itriby and Asker (1958)	2682		177 records of 1st lactation.
Ragab and Sourour (1963)	2858		678 records of 1st lactation.
Abdel-Ghani and Hathout (1966)		1468	1st lactation in Egypt.
Abdel-Ghani and Fahmy (1966)	2334		1st lactation in Egypt.
Morad (1967)	2712		1126 records of 1st lactation.
Morad (1967)	3192		742 records of 2st lactation.
Kassir et al. (1969)		2484	1st lactation.
Fahmy (1970)		1760	1st lactation in Egypt.
Mokhtar (1971)		1578	1st lactation (dams).
Mokhtar (1971)		1765	1st lactation (daughters).
Mokhtar (1971)		1878	2nd lactation (dams).
Mokhtar (1971)		2122	2nd lactation (daughters).
Ragab et al. (1973)		2304	1126 records of 1st lactation.
Ragab et al. (1973)		3000	742 records of 2nd lactation.
Ashmawy (1975)		3237	1946 records in Egypt.
Dib and Linkova (1975)		3266	In Syria.
El-Tawil et al. (1977)		2727	In Iraq.
Badran (1978)		2780	Cows having < 400 days calving interva
Badran (1978)	2918		Cows having > 400 days calving interva
Hanatlow (1978)	2446	2186	Danish Friesian in Iraq.
Mohamed (1979)	2178	1873	1337 records of 1st lactation.
Mohamed (1979)	2468	2203	851 records of 2nd lactation.
Al-Rawi and Alani (1981)	3180	2722	674 records.
Lennart and Anderson (1981)		5167	In Sweden.
Wood and Frappell (1982)	4440		583 records of 1st lactation.
Wood and Frappell (1982)	4888		641 records of 2nd lactation
Sohn et al. (1983)	4820		1429 records in Korea.
Wood and Wilson (1983)		6165	375 records of 1st lactation.
Wood and Wilson (1983)		7815	387 records of 2nd lactation.
Cicogna et al. (1984)	5174		In Italy.
Osterhoff (1984)		4300	3417 records.
Abdel-Glil (1985)		2131	1794 records in Egypt.
Arafa (1987)		2286	714 records in Egypt.
Khattab and Ashmawy (1988)	3423	3045	700 Friesian cows calving during 1969 through 1979.
		Holstein Friesian	
Miller et al. (1973)	5405		548 records of 1st lactation.
Miller et al. (1973)	6289		356 records of 2nd lactation.
Olds et al. (1979)		5412	17693 records.
Bagrii et al. (1980)		5492	In Russia.
Berger et al. (1981)		6017	1st lactation.
		6837	2nd lactation.

Table 1. Cont.

Author(s)	Milk Yield (Kg)		Remarks
	Total	305-day	
Combellas et al. (1981)	4213	4041	412 records.
Milli et al. (1981)		5549	1st lactation in USA.
Martinez et al. (1982)	4293	4153	540 records.
Cassell et al. (1983)		7699	In Beltsville in USA.
Madalena et al. (1983)	4149		At high level of management.
Kabuga and Agyemang (1984)		3878	In the forest zone of Ghana.
Van Duc and Taneja (1984)	2889		178 records of 1st lactation.
Abubakar et al. (1986)		4281	31777 records in Columbia.
Perez et al. (1986)	5259		In Chile.
Abubakar et al. (1987)		5822	In Mexico.
Meyer and Burnside (1987)		2784	In Canada.
Norman et al. (1987)		7553	In USA.
	Friesian Crosses		
El-Itriby and Asker (1958)	2110		1/2 Friesian x 1/2 Domiati in Egypt.
El-Itriby and Asker (1958)	2299		3/4 Friesian x 1/4 Domiati.
Kassir et al. (1969)		2475	Friesian x Native cattle in Iraq.
Kassab et al. (1976)		2651	1/2 Friesian x 1/2 Janubi cattle in I
Kassab et al. (1976)		2821	3/4 Friesian x 1/4 Janubi.
Kassab et al. (1976)		2546	7/8 Friesian x 1/8 Junubi.
Kassab et al. (1976)		2380	15/16 Friesian x 1/16 Janubi.
Alberro (1980)		2548	Friesian x Africander in Mozambic.
Deshpande and Bonde (1982)	2010		(<1/8 Friesian (F) x Sahiwal (S)).
Deshpande and Bonde (1972)	2230		1/8 F. x 7/8 S.
Deshpande and Bonde (1972)	2486		1/4 F. x 3/4 S.
Deshpande and Bonde (1972)	2482		3/8 F. x 5/8 S.
Deshpande and Bonde (1972)	2785		1/2 F. x 1/2 S.
Deshpande and Bonde (1972)	2776		5/8 F. x 3/8 S.
Deshpande and Bonde (1972)	2684		3/4 F. x 1/4 S.
Deshpande and Bonde (1972)	2567		7/8 F. x 1/8 S.
Nagarcenkar and Roa (1982)	3685	3392	Friesian x Tharparkar (1st lactation)
Nogarcenkar and Roa (1982)	3497	3373	Friesian x Tharparker (2nd lactation)
Raheja and Balaine (1982)		2735	Holstein Friesian x Hariana.
Raheja and Bhat (1982)		2213	Friesian x Sahiwal.
Alberro (1983)	2031		Friesian x Zebu.
Mostageer et al. (1982)		1300	Friesian x Egyptian Baladis.
Pandey et al. (1983)	1599		Holstein Friesian x Hariana.
Arafa (1987)		2114	1/2 Friesian (F) x 1/2 Domiati (D).
Arafa (1987)		2144	3/4 F. x 1/4 D.
Arafa (1987)		2143	7/8 F. x 1/8 D
Arafa (1987)		2274	15/16F. x 1/16 D.
Arafa (1987)			
	Jersey		
Rendel et al. (1957)		3076	218 records of 1st lactation.
During (1959)	3530		1st lactation in Sweden.
El-Itriby et al. (1963)		1726	31 records of 1st lactation.
Malik et al. (1976)	2120		At Bassi, Kajasthan, Indian.