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EVALUATION OF FRIESIAN CATTLE PERFORMANCE IN COMMERCIAL FARMS IN EGYPT

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SUMMARY

This study was carried out in two private Friesian farms located at Tamia district, El-Fayoum Governorate. A total number of 1797 reproduction and production records for the first four parities of 751 Friesian cows were collected during the period from 1982 to 1987. The aim was to evaluate milk production traits and some reproductive characteristics of the imported Friesian cattle raised under the private commercial farm conditions. Data were analyzed according to Harvey (1960). The main results obtained could be summarized as follows:

1. The first lactation milk yield averaged 4885 kg. The maximum total milk yield (TMY) of 5236 kg was attained at the 3rd lactation. Farm and year of calving exerted their significant influence on TMY in the 4 parities. Season of calving and farm x origin interaction affected TMY significantly only in the first two parities.

2. The averages of 305- day milk yield for the first four lactations were 4372, 4621, 4789 and 4735 kg, respectively. Difference between the two farms was significant only in the first and second lactations. The effects of the other factors on 305- day MY were the same as found for TMY.

3. The overall average of LP, measured on 1979 records, was 363 days. LP of cows in El-Tubgy farm was

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significantly longer than that of Eskander farm. The significant effect of year of calving on LP was found only during the last two lactations whereas, farm x origin interaction exerted its significant influence only on the 3rd lactation.

4. The average maximum monthly milk yield per cow in the first lactation was 555 kg and then gradually increased with advancing of parity. Farm and season of calving had significant effects on that trait in the four parities studied. Meanwhile, year of calving and farm x origin interaction affected significantly ($P<0.01$) during the 1st three lactations. However, the difference between the two origins reached the significance level during the last two lactations.

5. Cows attained maximum persistency during their 1st lactation and then decreased. The differences between the two farms as well as between the two origins in this trait were highly significant in all parities. Season of calving affected significantly ($P<0.01$) this trait during the third lactation only. Meanwhile, year of calving and farm x origin interaction significantly influenced that trait during the first two parities.

6. The overall mean of age at first calving (AFC) was 27.1 months. Season of birth of the cow affected significantly ($P< 0.05$) AFC where heifers born in autumn calved for the first time at younger ages (26.2 months) compared to those born during other seasons.

7. The overall mean of the first calving interval (CI) was 432 days which afterthen decreased gradually with the advancement of parity to reach 405 days for the third CI. The differences between the two origins and among the four seasons of calving were significant only in the first CI.

8. The overall mean of breeding efficiency measured on 517 cows was 89.4%. The significant influence was detected only among seasons of the first calving.

Keywords: Productive, reproductive, Friesian, commercial farms, Egypt

INTRODUCTION

The indigenous cattle in Egypt are considered to be low producing animals but they fit reasonably in the crop/livestock system under which the majority of the

cattle population is kept. In the last 20 years, commercial dairy farms were established where intensive production systems were applied. This required large scale importation of high producing breeds of cattle. The Friesian was the main dairy breed introduced into Egypt. The importation of that breed started in the early thirties of this century in limited numbers. More numbers of Dutch and Danish Friesian heifers and cows were imported at Tahreer province during the period from 1954 to 1964 (Ragab et al., 1973). In 1981, the General Cooperative for Developing Animal Wealth imported the Friesian for commercial herds from West Germany and Netherlands.

Many research workers studied the economic characteristics of the Friesian cattle in Egypt under the conditions of state farms (Ragab and Asker, 1959; Fahmy et al., 1963; Ragab et al., 1973; Badran,1978; Mohamed, 1979; Morsy et al., 1986; Mohamed,1987; El-Sedafy, 1989; Sadek et al., 1989; Abubakr, 1991 and Amin, 1992). Most of these studies emphasized the deterioration of reproductive and productive performance of the imported Friesian in state farms. However, no available reports were made to evaluate the Friesians kept in private commercial farms except those of Ahmed (1991) and El-Khashab (1993).

The aim of this study is to evaluate milk production traits as well as some reproductive performance of the Friesians raised in two commercial farms located at El-Fayoum Governorate.

MATERIAL AND METHODS

a. Source of data:

The data used in this study were collected on a total number of 1797 breeding and production records of 751 Friesian cows during the period from 1982 to 1987. The study comprised two Friesian herds located at Tamia district, El-Fayoum Governorate, Egypt. The herds started in 1981 with the importation of pregnant Friesian heifers from Germany and Netherlands.

The distribution of records according to farm, origin and parity are presented in the following table:

Parity	Farm:1		Farm:2		Total
	N	G	N	G	
1	350	202	146	53	751
2	176	178	132	54	540
3	152	81	102	48	383
4	20	22	37	44	123
Total	698	483	417	199	1797

Farm 1: El-Tubgy, Farm 2: Eskander
N : Netherlands, G: Germany.

b. Management:

The management in the two farms was different. In farm 1, animals were kept under the open sheds. Unified feed mixture was offered twice daily according to the animal weight and its milk production. The mixture was composed of 45% cotton seed cake, 26% wheat bran, 17% yellow maize, 7% rice bran, 2% molasses, 1% sodium chloride and 2% calcium carbonate. Whenever available, a supplement of yellow maize grains, barley grains and wheat bran was offered. The Egyptian clover (Trifolium alexandrinum) was available in winter and spring, while Drawa (green sorghum) was given in summer and autumn. Rice straw and blocks of mineral salts were available all the year round. Cows were watered three times daily and were fed in groups according to their milk production level and the stage of lactation. Cows were artificially inseminated about two months post-partum using either local fresh or the imported frozen semen. Pregnancy was determined by rectal palpation after about 60 days from insemination. Cows were machine milked and were vaccinated against the common diseases as scheduled by the General Organization for Veterinary Services.

In the farm 2, animals were hand milked. The same unified mixture of farm 1 was offered before milking to all cows as one group. Egyptian clover was also given during winter and spring and rice straw was available all the year round. Water was offered twice daily and animals were vaccinated according the same schedule. Cows were naturally mated about 60 days post-partum and the pregnancy test was done by rectal palpation after two months from mating.

c. Data collection:

In farm 1, daily milk yield was recorded on individual cows once every ten days throughout the lactation period. The ten day-milk yield was calculated using a PC-based program by multiplying the test-day milk yield by 10. Monthly milk yield was calculated as the sum of the three ten days milk yield. Total milk yield was taken as the sum of all the monthly milk production during the whole lactation period.

However, in farm 2, daily milk yield was manually recorded for each animal during the actual lactation period. Monthly milk yield and total milk yield were the sum of the milk yield during the lactation period. No animal was discarded due to its normal short lactation. Cows that were disposed because of accidents, diseases and selling during their lactations were eliminated from the analysis.

The milk production traits studied in the two farms were : (1) total milk yield, (2) 305-day milk yield (taken as the first actual 305-day milk yield), (3) lactation period (calculated as the difference between the drying-off period and the calving interval after subtraction of one week for colostrum), (4) maximum monthly milk yield and (5) persistency of lactation which was calculated according to Branton and Miller (1959), where milk yield during each one of the first 10 months of lactation was estimated as percentage from the peak yield. The average of these 10 percentages was the index of persistency.

The reproductive characteristics studied in the two farms were: (1) age at first calving. (2) calving interval and (3) breeding efficiency. Breeding efficiency was calculated according to Wilcox et al., 1957 using the following equation:

$$BE = [\{365 \times (n-1) \times 100\}/D]$$

Where : N=number of parturitions and D= number of days from the first to the last parturition.

d. Statistical analysis:

The analysis of data was carried out by the least squares method (Harvey, 1960). Duncan Multiple Range Test (Duncan, 1955) was used to test the differences among means. Data were collected on the imported animals only and analyzed for each parity separately by the least squares method. The effects of farm, origin, season and year of calving and the interaction between

farm and origin were studied. The model used in the analysis for milk production traits, age at first calving and calving interval was as follows:

$Y_{ijklm} = U + F_i + G_j + A_k + R_l + (FC)_{ij} + e_{ijklm}$

where:

Y_{ijklm} = the observation on the mth animal in the ith farm of the jth origin in the kth season of calving in the lth year of calving.

U = The overall mean.

F_i = the effect of the ith farm, (i=1,2)
where:
1= El-Tubgy 2= Eskander

G_j = the effect of jth origin, (j=1,2)
where:
1= Netherlands 2= Germany

A_k = the effect of kth season of calving (k=1,2,3,4)
where:
1=winter (Dec.- Feb.), 2= spring (march- May), 3= summer (June- August), 4= autumn (Sept.- Nov.)

R_l = the effect of lth year of calving, (l=1,2, ..n)
where:
n=4 for the first three lactations, n=2 for the fourth lactation.

$(FC)_{ij}$ = the effect of interaction between farm and origin.

e_{ijklm} = the error term.

The same model described above was used for the statistical analysis of breeding efficiency after replacing the year of calving by the effect of age at first calving. The age classes were: ≤24 months, >24-≤27, > 27 - ≤30 and > 30 months.

RESULTS AND DISCUSSION

A. Milk production traits

1. Total milk yield (TMY):

Table 1 shows the least squares means of the total

Table 1. Least squares means[1] (±S.E.) and test of significance[2] of total milk yield (kg)

	Parity											
	First			Second			Third			Fourth		
	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.
Overall mean:	751	4885	72	540	5117 a	80	383	5236	74	123	4883	94
Farm:		**			**			*			*	
El-Tubgy	552	5469 a	63	354	5800 a	73	233	5379 a	73	42	5035 a	113
Eskander	199	4300 b	118	186	4433 b	126	150	5094 b	120	81	4730 b	127
Origin:		NS			NS			NS			NS	
Netherlands	496	4802 a	71	308	5116 a	79	254	5266 a	73	57	4909 a	105
Germany	255	4968 a	119	232	5118 a	124	129	5207 a	115	66	4856 a	131
Season of calving		**			**			NS			NS	
Winter	236	5177 a	95	128	5195 a	119	72	5228 a	129	19	4918 a	169
Spring	159	4773 b	112	168	5304 a	115	122	5302 a	110	37	4885 a	139
Summer	143	4418 c	143	135	5179 a	130	98	5274 a	119	32	4749 a	148
Autumn	213	5171 a	110	109	4790 b	132	91	5142 a	124	35	4977 a	143
Year of calving		**			**			**			*	
Farm X origin		**			**			NS			NS	

1- Means in each column followed by different letters differ significantly at the 5% level .
2- The test of significance is located at the same line of each factor, * (P< 0.05), ** (P<0.01) and NS= not significant.

milk yield (TMY) in the four lactations studied. The overall mean of the first lactation milk yield was 4885 Kg. Although, in this work none of the animals was discarded because of low milk production or normal short lactation, this value was higher than other estimates reported by Egyptian authors on Friesian cattle for the 1st lactation (Fahmy et al., 1963, 1508 kg; Afifi 1969, 3572 kg; Mokhtar, 1971, 1578 kg; Morsy et al., 1986, 3490 kg and Sadek et al., 1989, 2220 kg). This discrepancy in milk production may be attributed to the system of management and feeding regime where, the present study was conducted on commercial herds whereas most of the other estimates were obtained from state farms. The maximum total milk yield (5236 Kg) was attained at the third lactation. Milk production declined to 4883 kg at the 4th lactation. The TMY of farm 1 was significantly higher than that of farm 2 in the four parities studied. The differences represented about 27%, 31%, 8% and 6% in the four parities in favour of farm 1, respectively. No significant differences were detected between the Dutch and German cows in TMY through the four parities studied. However, season of calving exerted its significant effect only on the first two parities in which, first calvers scored the highest TMY during autumn and winter (5171 and 5177 kg, respectively). Meanwhile, in the second parity, spring calvers recorded the highest TMY (5304 Kg). The significant influence of season of calving on TMY may be due to the climatic conditions and food availability. Year of calving affected significantly TMY in all lactations studied. This effect may be mainly attributed to differences in feeding and management practices prevalent over different years. The interaction of farm x origin was found to be highly significant only in the first two lactations.

2. 305-day milk yield:

The least squares means of 305-day milk yield are shown in Table 2. A few cows produced milk for a period longer than 350-day. The percentages of 305-day milk yield to TMY are 89, 90, 91 and 97% for the first, second, third and fourth lactations, respectively.

It may be of interest to note that standard deviations of 305-day milk yield represent about one fifth of the mean in the first two parities. However, the standard

Table 2. Least squares means[1] (±S.E.) and test of significance[2] of 305-day milk yield (kg)

	Parity											
	First			Second			Third			Fourth		
	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.
Overall mean:	751	4372	48	540	4621	56	383	4789	52	123	4735	73
Farm:		**			**			NS			NS	
El-Tubgy	552	4666 a	42	354	4983 a	51	233	4762 a	52	42	4663 a	88
Eskander	199	4078 b	79	186	4260 b	87	150	4817 b	84	81	4807 a	99
Origin:		NS			NS			NS			NS	
Netherlands	496	4308 a	48	308	4629 a	54	254	4792 a	51	57	4769 a	81
Germany	255	4436 a	80	232	4614 a	86	129	4786 a	81	66	4701 a	101
Season of calving		**			**			NS			NS	
Winter	236	4612 a	63	128	4711 ab	83	72	4860 a	90	19	4794 a	131
Spring	159	4392 b	75	168	4799 a	80	122	4851 a	77	37	4753 a	108
Summer	143	3944 c	96	135	4586 bc	90	98	4748 a	83	32	4639 a	115
Autumn	213	4541 ab	74	109	4389 c	92	91	4698 a	87	35	4754 a	111
Year of calving		**			**			**			NS	
Farm X origin		**			**			NS			NS	

1- Means in each column followed by different letters differ significantly at the 5% level .
2- The test of significance is located at the same line of each factor, ** (P<0.01) and NS= not Significant.

deviations recorded about one sixth and one ninth of the mean in the last two parities, It could be observed from Table 2 that the variance (residual MS) decreases with the advancement of parity, This would point out to the fact that the amount of expected genetic progress, expressed as a function of the means, would be much higher in earlier parities than later ones.

The averages of 305-day- milk yield of farm 1, were highly significant than those of farm 2, for the first two lactations. The effects of season and year of calving, origin and farm x origin interaction on 305-day milk yield followed the same pattern of the TMY.

3. Lactation period (LP):

Table 3 shows the least squares means of lactation period (LP). The overall average of LP, measured on 1797 records, was 363 days. It is of interest to note that the average lactation length did not change much during the first three lactations (365,367 and 363 days,resp.).

As found in the TMY, the analysis of variance showed a highly significant influence of farm on lactation period. In all parities studied, lactation period of farm 1 was longer than that of farm 2. This might be due to the calvings regularity of cows in farm 2 since farm 1 used A.I. whereas farm 2 applied natural mating. The effects of season of calving and origin on the length of lactation period of all parities studied was not significant. However, the differences in lactation period due to year of calving were significant only in the third and fourth lactations. The influence of farm x origin interaction on LP was found to be significant only in the third lactation.

4. Maximum monthly milk yield:

The average maximum monthly milk production in the first lactation was 555 kg (Table 4) and the time required to reach this peak was 5.3 months. Monthly milk yield gradually increased with advancing parities, reaching a maximum of 645 kg at the third lactation (4.4 months were required to reach this peak). No available reports were found concerning the maximum monthly milk yield in Friesians in Egypt, However, Abubakr (1991), obtained an estimate of 79.3 kg peak for weekly milk yield of Friesian cows in Egypt which was attained at almost the 7th week from calving.

Table 3. Least squares mean[1] (±S.E.) and test of significance[2] of lactation period (day)

	Parity											
	First			Second			Third			Fourth		
	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.
Overall mean:	751	365	5	540	367	6	383	363	6	123	331	16
		**			**			**			**	
Farm:												
El-Tubgy	552	382 a	5	354	392 a	5	233	379 a	6	42	440 a	20
Eskander	199	348 b	9	186	343 b	9	150	346 a	9	81	223 b	22
		NS			NS			NS			NS	
Origin:												
Netherlands	496	367 a	5	308	368 a	6	254	367 a	6	57	344 a	18
Germany	255	364 a	9	232	367 a	9	129	358 b	9	66	318 a	23
		NS			NS			NS			NS	
Season of calving												
Winter	236	365 ab	7	128	367 a	9	72	354 a	10	19	341 a	30
Spring	159	355 b	8	168	372 a	8	122	359 a	9	37	304 a	24
Summer	143	364 ab	11	135	375 a	9	98	380 a	9	32	338 a	26
Autumn	213	378 ac	8	109	355 a	10	91	357 a	10	35	342 a	25
Year of calving		NS			NS			*			**	
Farm X origin		NS			NS			**			NS	

1- Means in each column followed by different letters differ significantly at the 5% level .
2- The test of significance is located at the same line of each factor, * (P < 0.05), ** (P<0.01) and NS= not significant .

Table 4. Least squares means[1] (±S.E.) and test of significance[2] of maximum monthly milk yield (kg)

	Parity											
	First			Second			Third			Fourth		
	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.
Overall mean:	751	555	6	540	615 a	8	383	645	7	123	640	10
Farm:		**			**			**			**	
El-Tubgy	552	604 a	5	354	697 a	7	233	681 a	7	42	678 a	12
Eskander	199	506 b	10	186	534 b	12	150	609 b	11	81	602 b	13
Origin:		NS			NS			*			*	
Netherlands	496	558 a	6	308	624 a	8	254	658 a	7	57	658 a	11
Germany	255	552 a	10	232	606 a	12	129	631 b	11	66	622 b	14
Season of calving		**			**			**			*	
Winter	236	579 a	8	128	615 a	12	72	653 a	12	19	658 a	18
Spring	159	551 b	9	168	645 a	11	122	664 a	10	37	647 a	15
Summer	143	511 c	12	135	617 a	13	98	618 b	11	32	606 b	15
Autumn	213	578 a	9	109	583 b	13	91	645 ab	12	35	648 a	15
Year of calving		**			**			**			NS	
Farm X origin		**			**			**			NS	

1- Means in each column followed by different letters differ significantly at the 5% level.
2- The test of significance is located at the same line of each factor, * (P< 0.05), ** (P<0.01) and NS= not significant .

Farm influenced significantly (P< 0.01) the maximum monthly milk yield in all parities studied which might be due to the different managerial levels used in both farms.

The effect of origin on this trait was significant only at the third and fourth lactations. The differences due to season of calving were significant in all parities studied. However, the effects of year of calving and farm x origin interaction on this trait were significant (P< 0.01) at the first three lactations.

5. Persistency of lactation :

The results indicated that cows attained maximum persistency during their first lactation and then decreased with advancing age (Table 5). This result was in agreement with that reported by Mostafa (1989). In the present study, the persistency of lactation for the first lactation (79%) was about 5% higher than those in the subsequent lactations.

Cows of farm 2 had a significantly higher persistency values than those of farm 1 in the four consecutive parities studied. This would probably be expected since milk production per cow was considerably lower for farm 2. Cows imported from Germany were more persistent than those from Netherlands in all parities. The differences in persistency due to season of calving were not significant in all lactations except that of the third one. However, year of calving affected significantly (P< 0.01) persistency of lactation only in the first two parities. The effect of interaction of farm by origin on this traits was also highly significant in the first three successive parities.

B. Reproductive traits

1. Age at first calving (AFC):

The overall mean of age at first calving (AFC) was 27.1 months (Table 6), which is close to that found by Morad (1967, 27.9 months), Ahmed (1991, 27.5 month), and El-Khashab (1993, 27.2 months).

The differences in AFC due to farm and origin were not significant. This is expected because these animals were imported as pregnant heifers. Season of birth of the cow had a highly significant effect on AFC. It could be seen that heifers born in Autumn calved for the first time at a statistically younger age (26.2 months) than those

Table 5. Least squares means[1] (±S.E.) and test of significance[2] of persistency of lactation.

	Parity											
	First			Second			Third			Fourth		
	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.
Overall mean:	751	79	0.4	540	76 a	0.4	383	75	0.5	123	75	0.7
Farm:		**			**			**			**	
El-Tubgy	552	77 a	0.3	354	72 a	0.4	233	70 a	0.5	42	69 a	0.9
Eskander	199	81 b	0.6	186	80 b	0.7	150	80 b	0.8	81	80 b	0.9
Origin:		**			**			**			**	
Netherlands	496	77 a	0.4	308	75 a	0.4	254	73 a	0.5	57	73 a	0.8
Germany	255	81 a	0.6	232	77 b	0.7	129	77 b	0.8	66	76 b	0.9
Season of calving		NS			NS			**			NS	
Winter	236	80 a	0.5	128	77 a	0.7	72	75 a	0.9	19	74 a	1.0
Spring	159	80 a	0.6	168	75 b	0.6	122	74 a	0.7	37	74 ab	1.0
Summer	143	78 b	0.7	135	75 ab	0.7	98	78 b	0.8	32	77 b	1.0
Autumn	213	79 ab	0.6	109	76 ab	0.7	91	74 a	0.8	35	74 a	1.0
Year of calving		**			**			NS			NS	
Farm X origin		**			**			**			NS	

1- Means in each column followed by different letters differ significantly at the 5% level .
2- The test of significance is located at the same line of each factor,
** (P<0.01) and NS= not significant.

Table 6. Least squares means[1] (±S.E.) and test of significance[2] of age at first calving (month)

	N	X	±S.E.	
Overall mean:	734	27.1	0.19	
Farm:				NS
El-Tubgy	528	27.5 a	0.19	
Eskander	206	26.8 a	0.33	
Origin:				NS
Netherlands	451	26.8 a	0.23	
Germany	283	27.6 a	0.34	
Season of calving				*
Winter	152	27.3 ab	0.35	
Spring	266	28.0 a	0.31	
Summer	129	27.1 bc	0.39	
Autumn	187	26.2 c	0.33	
Year of calving				NS
Farm X origin				NS

1- Means in each column followed by different letters differ significantly at the 5% level .
2- The test of significance is located at the same line of each factor, * (P< 0.05), and NS= not significant.

born during winter (27.3 mo.) and spring (28.0 mo.). The same trend was obtained by Mohamed (1979) and El-khashab (1993). However, the effect of year of birth, as well as that of the farm by origin interaction was not significant which was in agreement with Galal et al. (1981).

2. Calving interval (CI):

The overall mean of first calving interval was 432 days, which was longer than the second and third intervals (418 and 405 days, respectively) (Table 7). Many Egyptian reports came to the same conclusion. However, their published estimates based on the state farms, in which the values for calving interval were longer than those obtained here. Their values ranged

between 357 days (Badran, 1978) and 522 days (Morsy et al., 1986 and Mostageer et al., 1987).

Table 7. Least squares means[1] (±S.E.) and test of significance[2] of calving interval (kg)

	Parity								
	1st - 2nd			2nd - 3rd			3rd - 4th		
	N	X	±S.E.	N	X	±S.E.	N	X	±S.E.
Overall mean:	639	432	7.6	423	418	6.5	205	405	19
Farm:		NS			NS			NS	
El-Tubgy	442	442 a	6.8	272	413 a	6.1	124	430 a	19
Eskander	197	422 a	11.6	151	423 a	10.4	81	380 a	31
Origin:		*			NS			NS	
Netherlands	387	445 a	7.3	279	416 a	6.1	177	378 a	22
Germany	252	418 b	12.0	144	420 a	10.3	88	432 a	27
Season of calving		*			NS			NS	
Winter	186	450 a	9.9	98	436 a	9.6	36	331 a	33
Spring	128	429 ab	12.2	128	405 b	9.4	59	429 b	29
Summer	165	401 b	13.9	111	420 ab	10.5	54	442 b	30
Autumn	160	448 a	10.7	86	411 ab	10.7	56	418 b	31
Year of calving		NS			*			NS	
Farm X origin		NS			NS			NS	

1- Means in each column followed by different letters differ significantly at the 5% level .
2- The test of significance is located at the same line of each factor, * ($P < 0.05$), and NS not= significant .

No significant differences were found between the two estimates of the two farms in the first three calving intervals. The first calving interval of Friesian cows imported from Netherlands was significantly longer than those imported from Germany, However, the differences between the two values did not reach the level of significance for the second and the third calvers.

Season of calving had significant effect only on the first calving interval where, summer calvers had shorter intervals (401 days) compared to those born in the other three seasons. However, for the second and third calvers, the differences among means were not significant. No significant effect of year of calving or farm x origin interaction on calving interval in the first three parities except the effect of calving year

on the second CI (P<0.05) was detected.

3. Breeding efficiency (BE):

The overall mean of BE measured on 517 cows was 89.4% (Table 8). Sadek et al. (1989) using 258 friesian cows obtained a lower estimate (84.4%) than that found in this study which could be explained by the good management, close supervision and the appropriate feeding in the two commercial farms as compared to that of Sadek et al. (1989) using the same method of calculation.

Table 8. Least squares means[1] (±S.E.) and test of significance[2] of breeding efficiency (%)

	N	X	±S.E.	
Overall mean:	517	89.4	1.1	
Farm:				NS
El-Tubgy	360	89.3 a	1.2	
Eskander	157	89.6 a	1.6	
Origin:				NS
Netherlands	368	89.1 a	1.1	
Germany	149	89.7 a	1.7	
Season of first calving				**
Winter	170	89.9 a	1.4	
Spring	94	89.7 ab	1.8	
Summer	126	93.8 b	1.9	
Autumn	127	85.4 a	1.7	
Age at first calving				NS
≤24 months	39	90.4 a	2.7	
>24 & ≤27	256	89.1 a	1.1	
>27 & ≤30	162	89.5 a	1.4	
>30	60	88.6 a	2.2	
Farm X origin				NS

1- Means in each column followed by different letters differ significantly at the 5% level .

2- The test of significance is located at the same line of each factor, ** P<0.01 and NS not Significant.

Differences in BE due to farm or origin were insignificant. Significant differences were detected only among seasons of first calving, where cows calving for the first time in autumn were the least efficient breeders (85.4%, $P<0.05$) and the summer calvers were the highest efficient (93.8%). This result might be due to that the imported pregnant heifers that calved during summer for the 1st time were exposed to autumn conditions where green fodder and mild climatic conditions were prevailing. Summer calvers, will also face appropriate autumn environmental conditions during the critical lactation months after calving. A higher conception rate was also obtained. Close results were reported by Sadek et al. (1989) on imported Brown Swiss and locally born FR cows.

The effect of age at first calving on BE of Friesian heifers was not significant. However, heifers calved for the first time at an age of 24 month or less showed the highest BE (90.4%). Eventhough, age at first calving had no significant effect on BE, it seems that BE declined relatively with increasing age at first calving. Results of Sadek et al. (1989) supported the finding obtained in this study.

It could be concluded from the present study that the managerial level as well as the appropriate environmental conditions have great impacts on milk productivity and breeding efficiency of the imported Friesian cattle raised under the private farms in Egypt.

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تقييم أداء ماشية الفريزيان بمزارع القطاع الخاص فى مصر

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أجريت هذه الدراسة على قطيعين من أبقار الفريزيان لمزرعتين من مزارع القطاع الخاص بمركز طامية - محافظة الفيوم ، وقد شملت الدراسة ٧٥١ بقره فريزيان لها ١٧٩٧ سجلا تناسليا وإنتاجيا للأربع مواسم الأول جمعت خلال الفتره من ١٩٨٢ وحتى ١٩٨٧.

وكان الهدف من االدراسة هو تقييم صفات إنتاج اللبن والخصائص التناسلية لماشية الفريزيان المستوردة تحت ظروف القطاع الخاص ، وتم تحليل البيانات إحصائيا بطريقة الحد الأدنى للمربعات ، وتتلخص أهم النتائج المتحصل عليها فيما يلى :

أولا: الصفات الأنتاجية:

١- كان متوسط إنتاج اللبن فى موسم الحليب الأول هو ٤٨٨٥ كجم ، وتحقق أقصى إنتاج لبن كلى (٥٢٣٦ كجم) فى موسم الحليب الثالث . وكان لكل من المزرعة وسنة الولادة تأثيرا معنويا على صفة إنتاج اللبن الكلى فى المواسم الأربعه ، بينما أثر كل من فصل الولادة والتداخل بين المزرعة ومنشأ البقره معنويا على تلك الصفه فى أول موسمين فقط .

٢- كانت متوسطات إنتاج اللبن فى ٣٠٥ يوم هى ٤٣٧٢ ، ٤٦٢١ ، ٤٧٨٩ ، ٤٧٣٥ كجم خلال الأربعة مواسم على التوالى . ولقد كان هناك إختلافا معنويا بين المزرعتين فى تلك الصفة لموسمى الحليب الأول والثانى فقط، بينما كان لباقى العوامل (فصل الولادة ، سنة الولادة ومنشأة البقره والتداخل بين المنشأ والمزرعه) نفس الأثر الذى وجد مع صفة إنتاج اللبن الكلى.

٣- بلغ المتوسط العام لطول موسم الحليب ٣٦٣ يوما مقدرا على ١٩٧٩ سجلا ، ولقد كان للمزرعة تأثيرا معنويا على تلك الصفه حيث كان موسم الحليب أطول فى أبقار مزرعة الدلوبجى عنه فى مثيلتها لمزرعة إسكندر . وأثرت سنة الولادة معنويا على طول موسم الحليب خلال أخر موسمى حليب فقط (الثالث والرابع) ، أما التداخل بين المزرعة ومنشأ البقره فكان له أثرا غير معنويا على هذه الصفه فى جميع المواسم بإستثناء الثالث .

٤- كان المتوسط العام لصفة أقصى إنتاج لبن شهرى للبقره فى موسمها الأول هو ٥٥٥ كيلو جرام ثم إزداد تدريجيا بعد ذلك مع تقدم الموسم ، وكان للمزرعة وفصل الولادة أثرا معنويا على تلك الصفه فى المواسم الأربعه التى درست ، بينما كان لكل من سنة الولادة والتداخل بين المزرعة ومنشأ البقره نفس الأثر فى الثلاثة مواسم الأولى فقط ، هذا ولم تصل الفروق فى هذه الصفه بين مصدرى المنشأ لمستوى المعنويه إلا فى أخر موسمين فقط .

٥- حققت أبقار الموسم الأول أعلى قيم للمثابرة على إنتاج اللبن ثم تناقصت تلك الصفه بعد ذلك بتقدم العمر ، ولقد اختلفت قيم المثابرة بين المزرعتين وكذا بين مصدرى المنشأ معنويا فى جميع المواسم الأربعه ، بينما لم يؤثر فصل الولاده معنويا إلا فى الموسم الثالث فقط ، أما سنة الولاده والتداخل بين المزرعة والمنشأ فكان لكل منهما أثرا معنويا على تلك الصفه فى أول موسمين فقط.

ثانيا: الصفات التناسلية:

١- كان المتوسط العام لصفة العمر عند أول ولادة هو ٢٧,١ شهرا ، ولقد كان لفصل ولادة البقره تأثيرا معنويا على تلك الصفه حيث أن العجلات التى تمت ولادتها فى موسم الخريف قد وضعت لأول مرة عند عمر أصغر (٢٦,٢ شهرا) بالمقارنة مع مثيلتها التى تمت ولدتها فى فصول السنه الأخرى .

٢- كان المتوسط العام لأول فتره بين ولادتين هو ٤٣٢ يوما ثم تناقص تدريجيا مع تقدم الموسم ليصل إلى ٤٠٥ يوما فى الموسم الثالث ، ولم تصل الفروق بين مصدرى المنشأ وبين فصول الوضع الأربعة لمستوى المعنوية إلا فى الموسم الأول فقط.

٣- بلغ المتوسط العام للكفاءة التناسليه ٨٩,٤٪ مقدرا على ٥١٧ بقره ، وكان لفصل أول ولادة فقط أثرا معنويا على هذه الصفة .

يستنتج من هذا البحث أن لمستوى الرعايه وتوفير الظروف البيئيه المناسبه أهمية كبيرة فى الأداء الإنتاجى والتناسلى لأبقار الفريزيان تحت ظروف المزارع الخاصة بجمهورية مصر العربيه.