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Some Production Characteristics of Friesian and Jersey Cattle in Lybia

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DATA on 1972 records were collected on Friesian (1826 records) and Jersey (146 records) cattle raised on three locations in Lybia over a period of ten years starting 1974. Results obtained can be summarized as follows :

Least squares means of age at first, second and third calving (in respective order) were 33.9, 46.1 and 61.6 months for Friesian and 27.5, 41.8 and 54.2 months for Jersey. Means of first and second calving interval were 17.4 and 13.6 months for Friesian and 14.1 and 12.2 months for Jersey. The total milk yields of the first, second and third lactation averaged 3490, 3786 and 4067 kg. for Friesian and 3524, 3689 and 3579 kg. for Jersey. Milk yield per day of cow age estimated at the end of the first, second and third lactation (in respective order) averaged 3.62, 3.85 and 4.22 kg/day for Friesian and 3.20, 4.64 and 5.58 kg/day for Jersey.

Location and year of calving showed significant effects on milk production traits (in most cases) while season of calving had always insignificant effects on these traits.

KEY WORDS (Reproductive, Productive performance, Friesian, Jersey)

The development of animal production in Lybia is programmed to cover the sectors of poultry, sheep and cattle production. Plants for developing cattle production aim at increasing milk and meat production to reach self sufficiency. This proposed to be achieved through importation of improved dairy cattle to be distributed to small holders and public sector farms. The

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native cows in Lybia are poor producers; yielding about 1250 kg milk per lactation and attaining first calving at ages higher than three years. Calf mortality rates are also higher in native Lybian cows compared to exotic breeds (A.O.A.D., 1984).

Starting 1971 and up to the end of 1982, some 32 thousand heads of standard dairy cows have been imported to Lybia (A.O.A.D., 1984). Unfortunately very few reports, if any, examined the performance of these dairy animals under the Lybian environmental conditions.

The main objective of this study is to evaluate some of the reproductive and productive characteristics of Friesian and Jersey cattle in Lybia.

Material and Methods

Data used in the present study were collected on Friesian and Jersey cattle imported to Lybia as pregnant heifers in the early seventies. The Friesian data covered three locations, namely, Tripoli, Benghazi and Sebha; the Jersey data were on one location (Benghazi). Friesian cows were sired by bulls from eight different origins : Holland, Britain, Germany, Denmark, New Zealand, U.S.A., Canada and Argentine beside some Lybian born bulls.

Systems of management have been described in detail in the report of A.O.A.D. (1984). The report indicated that the limited supply of animal feed is the main problem facing cattle production in Lybia. Cows were fed mainly on alfalfa, barley, brans and to a small extent on clover, Sudan grass and Sorghums. Concentrates were offered according to cow productivity. Cows were inseminated artificially and machine milked.

The productive traits examined were : age at the first three calvings (in months) and the first two calving intervals (in months). The milk production characteristics studied were : total milk yield (T.M.Y.) in the first three lactations, lactation period (L.P.), dry period (D.P.) and cow index (C.I.). The last trait was calculated as the total milk produced by the cow (in kg) up to the end of a certain lactation divided by the then age of cow (in days).

Least squares analyses of variance were carried out according to Harvey (1960). Tests of significance for individual means were performed by applying the Duncan's multiple Range Test (Duncan, 1955).

For Friesians, the statistical model included location, season of calving and year of calving as the main effects used for analysing each trait. Season classes were : Winter (Dec.-Feb.), Spring (March-May), Summer (June-August), and Autumn (Sept.-Nov.), inclusive. For Jerseys, the same model was used after dropping the location term.

Results and Discussion

I The Friesians :

Reproductive Performance

Age at calving : Least squares means of age at calving are presented in table 1. The overall means were 33.9, 46.1, 61.6 and 71.6 months months for the age at the first four calvings, in respective order. The comparable estimates given by A.O.A.D. (1984) for Friesians in Egypt were 31.9, 49.6, 64.3 and 78.1 months. The estimates published on age at first calving of Friesian in Egypt ranged from 24.8 month reported for imported heifers (Fahmy *et al.*, 1963) to 34.2 months (El-Itriby and Asker, 1958).

A marked significant trend towards reducing the age of cows at first calving with the progression of time could be observed. Season of the preceding calving influenced significantly age at the second calving. Winter and Summer calvers the second time earlier than the spring calvers.

Calving interval : Least squares means of calving interval are presented in table 2. The mean obtained for first calving interval was much the same as that reported by Mostageer *et al.* (1985), for the same trait in Friesian of Egypt (17.1 month).

Year of calving had highly significant effect on both first and second calving interval. Mostageer *et al.* (1985) reported highly significant effect for the year of calving on first calving interval of Baladi, Friesian and five Friesian grades.

Milk Production Traits :

First Lactation Milk Yield : Least squares means of first lactation traits are presented in table 3. The overall mean of total milk yield (T.M.Y.) was much higher than the published estimates on Friesian in Egypt (2710 kg by

Morad, 1967; 1955 kg by the A.O.A.D., 1984 and 2000 kg by Mostageer *et al.*, 1985).

Location showed highly significant effect ($P<0.01$) on first lactation T.M.Y. Benghazi had the highest mean followed by Tripoli. Both location had significantly higher means compared to Sebha. Also, year of calving influenced T.M.Y. but no marked trend could be observed.

The overall mean of lactation period (L.P.), is relatively lower than the 331 days, reported for Friesian in Egypt (A.O.A.D., 1984). Location, season of calving and year of calving had highly significant effect on L.P. Tripoli cows showed the highest milk yield/day of age (cow index, table 2). Contrary to T.M.Y. cow index values were statistically equal for Sebha and Benghazi.

Second Lactation Milk Yield : Means of second lactation traits are shown in table 4. The overall mean of T.M.Y. was 8.5% higher than that of first lactation. Cow index was 6% higher than the corresponding figure of the first lactation.

Location and year of calving influenced significantly T.M.Y., L.P. and cow index (at the 1% level). Tripoli location had significantly the highest estimates for the three traits. Season of calving and year of calving showed significant effects on dry period (at the 5% level). Spring calvers had longer D.P. than had those calving in summer and autumn.

Third Lactation Milk Yield : Productive traits of the third lactation are presented in table 5. The overall means of T.M.Y. and cow index were 7 and 10% higher than the corresponding means obtained in the second lactation.

Location showed significant effect on T.M.Y., L.P. and cow index; Tripoli location still having the highest means in the three traits. As seen in the first and second lactations, Benghazi location had higher T.M.Y. mean compared to Sebha location. However, the latter had higher cow index values in the first three lactations. Season of calving and year of calving influenced significantly the dry period of the third lactation.

Fourth Lactation Milk Yield : Tablee 6 shows the fourth lactation production characteristics. Means of T.M.Y. and cow index of this lactation

were higher than their corresponding figures of the preceding three lactations. Location still exerts significant effects on T.M.Y., L.P. and cow index. It should be noted here that Benghazi and Sebha location were gathered in one class. Tripoli, again, had the highest means of all traits studied. Year of calving differences were significant in cow index ($P < 0.01$). Cows calving after 1980 had a means some 30% higher than that of cows calving earlier.

II. *The Jersey :*

Reproductive Performance :

Age at calving : Least squares means of age at first, second and third calving of Jersey cattle are shown in Table 7. The overall mean of age at first calving is very similar to that reported for the Jerseys in Egypt (27.5 vs 28.2 month) (A.O.A.D., 1984). Abou-State (1975) reported higher estimate for the Jersey in Egypt (32.5 months).

Season of birth and year of birth showed significant effects on age at first calving, Winter born heifers had younger age at first calving compared to summer born ones.

The overall mean of age at the second calving was almost the same as that reported for Jerseys in Egypt (42 months; A.O.A.D., 1984). Season of the precending calving influenced age at second calving. Cows first calving in spring had significantly younger age at second calving compared to those calving in summer.

The mean age at third calving was one month younger than the mean reported for Jersey in Egypt (A.O.A.D., 1984). Year of the preceding calving showed significant influence on age at the third calving ($P<0.05$).

Calving Interval : Least squares means of the first and second calving interval of the Jersey are shown in table 8. The overall mean of the first calving interval was two months longer than the mean of second interval.

Season of calving influenced significantly second calving interval. Cows calving in winter had significantly longer interval than cows calving during the other three seasons.

TABLE 1 : Least squares means (X'), and mean squares (M.S.) of age at calving (month) of the Friesian

	Age at first calving				age at 2nd calving			age at 3rd calving			age at 4th calving		
	N	X'	S.E.	Classification	N	X'	S.E.	N	X'	S.E.	N	X'	S.E.
Overall	1826	33.9	1.46	Overall	1309	46.1	1.49	676	61.6	2.40	313	71.6	2.75
Location :				*Location :*									
Tripoli	653	33.8	2.35	Tripoli	550	48.5	2.27	305	63.0	3.15	160	75.1	3.49
Benghazi	520	34.6	2.80	Benghazi	353	46.4	2.93	266	59.5	3.77	153[2]	68.1	3.83
Sebha	653	33.3	2.62	Sebha	406	43.5	3.06	105	62.2	5.66			
Season of birth :				*Season of the preceding calving :*									
Winter	679	36.9	2.32	Winter	302	43.2a	3.11	197	57.2	4.10	92	66.4	4.58
Spring	478	30.8	2.81	Spring	470	52.1b	2.54	195	61.0	3.89	70	78.5	5.11
Summer	291	35.3	3.42	Summer	276	42.7a	3.15	131	64.4	4.99	69	70.9	5.37
Autumn	378	32.7	3.04	Autumn	261	46.5ab	3.37	153	63.8	4.81	82	70.4	4.94
Year of birth :				*Year of the preceding calving :*									
73 - 75	700	43.7a	2.45	75 - 79	520	47.5	2.47	421	63.9	3.24	232	72.7	2.80
76 - 79	442	30.1b	2.91	80 - 82	789	44.7	2.07	255	53.9	3.69	81	70.5	4.77
80 - 82	684	27.9b	2.44										

Source of variance	d.f.	M.S.	Source of variance	d.f.	M.S.	d.f.	M.S.	d.f.	M.S.
Location	2	185NS	Location	2	2474NS	2	791NS	1	3657NS
Season of birth	3	3754NS	Season of preceding calving	3	7007*	3	1705NS	3	1987NS
Year of birth	2	35204**	Year of preceding calving	1	1831NS	1	2555NS	1	269NS
Residual	1818	3372	Residual	1302	2624	699	2917	307	1785

1 Means (within classification) followed by different letters differ significantly at the 5% level.

2 Benghazi + Sebha NS = Not significant * = Significant at the 5% level ** = Significant at the 1% level.

X' = Mean

TABLE 2 : Least squares means (X')[1] and mean squares (M.S.) of calving interval (month) of the Friesian.

Classification	First calving interval			Second calving interval			Third calving interval		
	N	X'	SE	N	X'	SE	N	X'	SE
Overall	1309	17.4	1.33	676	13.6	0.42	313	16.1	2.54
Location :									
Tripoli	550	17.7	2.03	305	14.3	0.54	160	18.1	3.22
Benghazi	353	15.1	2.61	266	13.5	0.65	153[2]	14.1	3.53
Sebha	406	19.4	2.72	105	13.1	0.98			
Season of earlier calving :									
Winter	302	20.9	2.77	197	14.6	0.71	42	13.4	4.22
Spring	470	18.7	2.26	195	13.7	0.67	70	22.9	4.71
Summer	276	14.7	2 81	131	13.1	0.86	69	14.5	4.95
Autumn	261	15.3	3.01	153	13.2	0.83	82	13.6	4.56
Year of earlier calving :									
75 - 79	520	21.0a	2.20	421	14.9a	0.56	232	18.6	2.58
80 - 82	789	13.8b	1.84	255	12.3b	0.64	81	13.6	4.39
Source of variance	d.f.	M.S.		d.f.	M.S.		d.f.	M.S.	
Location	2	1166NS		2	77 NS		1	1191 NS	
Season of earlier calving	3	2315NS		3	75 NS		3	1488 NS	
Year of earliev calving	1	11649**		1	772 **		1	1391 NS	
Residual	1302	2082		699	86		307	1518	

1 Means (within classification) followed by different letters differ significantly at the 5% level.
2 Including Benghazi + Sebha NS = not significant ** Significant at the 1% level.
X' = Mean

TABLE 3 : Least squares means (X')[1] and mean squares of first lactation performance of the Friesian.

Classification	N or d.f.	T.M.Y. (kg) X'	T.M.Y. (kg) S.E.	L.P. (day) X'	L.P. (day) S.E.	D.P. (day) X'	D.P. (day) S.E.	Cow index (kg/day) X'	Cow index (kg/day) S.E.
Overall	1073	3490	53.3	306.2	3.49	128.4	7.85	3.62	0.09
Location :									
Tripoli	358	3687a	75.6	722.7a	4.94	129.8	11.13	4.22a	0.12
Benghazi	312	3747a	77.4	292.9b	5.06	135.6	11.40	3.23b	0.12
Sebha	403	3035b	86.3	303.0b	5.65	119.7	12.71	3.41b	0.14
Season of calving :									
Winter	189	3550	90.6	313.3a	5.93	122.0	13.34	3.53a	0.14
Spring	385	3476	74.4	312.1a	4.87	126.1	11.00	3.44a	0.12
Summer	251	3457	92.9	310.0a	6.08	125.1	13.70	3.56a	0.15
Autumn	248	3475	92.4	289.6b	6.05	140.2	13.60	3.95b	0.15
Year of calving :									
74 - 78	272	2963a	79.4	302.4a	5.19	151.5	11.69	2.82a	0.13
79	99	3729b	121.1	344.7b	7.93	132.7	17.83	3.66b	0.19
80	48	3738bc	174.0	322.3ab	11.93	115.1	25.62	5.37c	0.28
81	566	3720b	58.8	308.1a	3.85	126.1	8.70	3.16b	0.09
82 & 83	88	3298c	132.8	253.8c	8.69	116.3	19.55	3.19ab	0.21
Source of variance				Mean squares					
Location	2	40835146**		69523**		15283		89.6**	
Season of calving	3	302477		25402**		12939		11.2**	
Year of calving	4	21722350**		93778**		32573		68.1**	
Residual	1063	1408669		6036		30546		3.6	

1 Means (within classification) followed by different letters differ significantly * ($P < 0.05$) ** ($P < 0.01$)

X' = Mean

TABLE 4 : Least squares means (X')[1] and mean squares of second lactation performance of the Friesian.

Classification	N or d.f.	T.M.Y. (kg) X'	T.M.Y. (kg) S.E.	L.P. (day) X'	L.P. (day) SE	D.P. (day) X'	D.P. (day) SE	Cow index (kg/day) X'	Cow index (kg/day) SE
Overall	529	3786	53.5	309.7	3.04	127.8	9.31	3.85	0.11
Location :									
Tripoli	131	4334a	99.5	339.5a	5.66	137.1	17.30	4.43a	0.21
Benghazi	244	3849b	85.0	280.9b	4.83	125.7	14.80	3.26b	0.18
Sebha	154	3176c	109.2	308.7c	6.21	120.8	19.00	3.84ab	0.23
Season of calving :									
Winter	153	3781	95.9	308.9	5.46	133.1ab	16.68	3.77	0.20
Spring	178	3849	92.1	303.9	5.24	175.8a	16.02	3.90	0.20
Summer	78	3655	127.6	312.8	7.27	100.8b	22.22	3.66	0.27
Autumn	120	3861	109.1	313.1	6.21	101.7b	18.98	4.05	0.23
Year of calving :									
74 - 79	191	3773a	94.2	318.4a	5.36	155.1a	16.39	3.93a	0.20
80	99	3659a	117.8	313.8a	6.70	146.2a	20.50	3.59a	0.25
81	92	4190b	116.3	319.2a	6.62	140.5a	20.23	5.10b	0.24
82 & 83	147	3523a	124.0	287.4b	7.06	69.7b	21.57	2.76c	0.26
Source of variance		Mean squares							
Location	2	36200004**		131969**		8542		52.9**	
Season of calving	3	824805 NS		1938		130000*		2.9	
Year of calving	3	7655204**		16958**		110686*		83.4**	
Residual	520	1224695		3966		37069		5.5	

1 Means (within classification) followed by different letters differ significantly * ($P < 0.05$) ** ($P < 0.01$)

X' = Mean

TABLE 5 : Least squares means (X')[1] and mean squares of third lactation performance of the Friesian.

Classification	N or d.f.	T.M.Y. (kg) X'	T.M.Y. (kg) S.E.	L.P. (day) X'	L.P. (day) SE	D.P. (day) X'	D.P. (day) SE	Cow index (kg/day) X'	Cow index (kg/day) SE
Overall	333	4067	85.2	317.1	4.84	127.5	8.35	4.22	0.16
Location :									
Tripoli	86	4849a	131.7	324.4a	7.48	118.5	12.91	4.75a	0.25
Benghazi	210	4036b	88.1	301.3b	5.01	150.1	8.63	3.42b	0.16
Sebha	37	3316c	204.6	325.4ab	11.63	114.0	20.05	4.48a	0.38
Season of calving :									
Winter	95	4083	136.9	320.9ab	7.78	118.8a	13.42	4.37	0.26
Spring	66	4194	161.2	335.1a	9 16	97.0a	15.80	4.79	0.30
Summer	72	3996	149.0	310.4ab	8.47	162.1b	14.61	3.78	0.28
Autumn	100	3994	131 4	301.9b	7.47	132.1ab	12.89	3.93	0.25
Year of calving :									
74 - 80	200	4187	111.8	320.8	7.35	145.4a	10.96	4.34	0.21
81 - 83	133	3947	109.8	313.3	6.24	109.6b	10.76	4.09	0.21
Source of variance				Mean squares					
Location	2	34410548**		20236*		39997		58.7**	
Season of calving	3	641664		15992*		51240*		14.8	
Year of calving	1	4234462		4126		93056*		4.7	
Residual	326	1470250		4750		14139		5.1	

1) Means (within classification) followed by different letters differ significantly * ($P < 0.05$) ** ($P < 0.01$)

X' = Mean

TABLE 6 : Least squares means (X')[1] and mean squares of fourth lactation performance of the Friesian.

Classification	N or d.f.	T.M.Y. (kg) X'	T.M.Y. (kg) SE	L.P. (day) X'	L.P. (day) SE	D.P. (day) X'	D.P. (day) SE	Cow index (kg/day) X'	Cow index (kg/day) SE
Overall	251	4526	91.6	312.8	4.51	151.2	15.40	4.42	0.15
Location :									
Tripoli	85	4725a	148.3	321.9a	7.30	167.2	24.98	4.82a	0.25
Benghazi & Sebha	166	4327b	107.6	303.7b	5.29	135.2	18.11	4.02b	0.18
Season of calving :									
Winter	88	4488	144.3	304.7	7.10	145.8	24.29	4.46	0.24
Spring	54	4673	191.8	317.2	9.44	157.5	32.29	4.78	0.32
Summer	52	4323	188.6	303.1	9.28	168.6	31.75	4.26	0.32
Autumn	57	4620	176.2	326.2	8.67	133.1	29.70	4.19	0.30
Year of calving :									
74 - 80	144	4399	118.9	320.7	5.85	154.2	20.02	3.84a	0.20
81 - 83	107	4653	133.3	304.8	6.56	148.2	22.44	5.00b	0.22
Source of variance				Mean squares					
Location	1	8340997*		17443*		53748		3.6	
Season of calving	3	1311209		7258		12360		77.9**	
Year of calving	1	3777591		14715		2091		5.0	
Residual	245	1768833		4284		50136		34.5**	

1 Means (within classification) followed by different letters differ significantly * ($P < 0.05$) ** ($P < 0.01$)

X' = Mean

TABLE 7 : Least squares means (X') and mean squares of age (month) at calving of the Jersey.

Classification	Age at first calving			Classification	Age at second calving			Age at third calving		
	N	X'	SE		N	X'	SE	N	X'	SE
Overall	145	27.5	0.35	Overall	48	418	1.17	34	54.2	0.84
Season of birth :				*Season of the preceding calving :*						
Winter	64	26.6a	0.42	Winter	7	43.1ab	2.24	5	55.2	1.54
Spring	29	27.6ab	0.55	Spring	19	40.0a	1.49	14	52.6	0.90
Summer	21	28.4b	0.61	Summer	12	45.0b	1.85	9	54.3	1.36
Autumn	31	27.4ab	0.53	Autumn	10	39.1a	1.87	6	54.7	1.57
Year of birth :				*Year of the preceding calving :*						
73 - 77	46	27.9a	0.38	75 - 79	41	42.8	0.91	38	52.8a	0.65
78	7	28.8a	0.94	80 - 82	7	40.8	2.12	6	55.6b	1.53
79 - 82	92	25.8b	0.28	*Source of variance :*		d.f.	M.S.		d.f.	M.S.
Source of variance :				Season of the preceding calving		3	88*		3	11
Season of birth		3	19*	Year of the preceding calving		1	25		1	33*
Year of birth		2	79**							
Residual		139	6	Residual		43	30		29	10

1 Means (within classification) followed by different letters differ significantly * ($P < 0.05$) ** ($P < 0.01$)

X' = Mean

Milk Production Traits :

First Lactation Milk Yield : First lactation productive characteristics are presented in table 9. The overall mean of T.M.Y. was more than double the estimate (of 1725 kg) reported for the Jerseys in Egypt El-Itriby *et al.*, 1963 and A.O.A.D., 1984). The effects of both season and year of calving on T.M.Y. were not significant. However, year of calving influenced significantly lactation period. There was an obvious trend towards decreasing L.P. in later years; the same picture observed earlier for calving interval (Table 8).

Second Lactation Milk Yield : The overall mean of T.M.Y. of second lactation (Table 10) was 5% higher than the corresponding mean in first lactation. This estimate was 224% of that (1645 kg) reported for Jerseys in Egypt (A.O.A.D., 1984).

Again, the effect of both season and year of calving on T.M.Y. of the second lactation was not significant. Table 10 shows that year of calving had highly significant effects on cow index ($P < 0.01$). Cows calving before 1981 had higher milk/day of age compared to those calving later.

Third Lactation Milk Yield : Least squares means of third lactation characteristics are shown in Table 11. The T.M.Y. mean was 165% of the mean estimated for the same trait for the Jersey in Egypt (A.O.A.D., 1984).

The mean lactation period of third lactation was only 271 days. El-Itriby *et al.* (1963) reported 284 days as the average L.P. of the first five lactations of Jerseys in Egypt. However, the A.O.A.D., report (1984) gave the estimate of 323 days for the average L.P. of the first six lactations for the same breed in Egypt.

III. *General Discussion*

Importation of the improved dairy breeds is the quickest means for raising milk production in the third world. Lybia adopted this procedure to achieve self sufficiency in milk production. To compare the two breeds, results of the Friesian in Benghazi could be matched with those of the Jersey (raised in the same environment).

The following table shows the main traits for comparison :

Parity	Age at calving (months)		T.M.Y. (kg)		Cow Index (kg/day)	
	FR	JR	FR	JR	FR	JR
1	34.6	27.5	3750	3525	3.23	3.20
2	46.4	41.8	3850	3690	3.26	4.64
3	59.5	54.2	4040	3580	3.42	5.58

It can be seen that the Jersey were younger when first calving, *i.e.* they start the productive life earlier than the Friesian. However, the Friesians yielded considerably greater amount of milk in all lactations. The cow index combines properly the two traits in indicative measure. The advantage of Jersey is clear in the second and third lactations, *i.e.* the Jersey cow yields more milk per day of life than the Friesian cow. The advantage of Jerseys could be more clear if fat corrected milk is used in estimating cow index.

The results showed also the contribution of different sources of variation to the total variance in T.M.Y. and cow index (C.I.). The following table presents the variance percentage of each source :

Source of variation	Trait	Order of lactation			
		1	2	3	4
Location	T.M.Y.	8.4	17.7	20.9	3.4
	C.I.	7.0	5.7	10.9	4.8
Season of	T.M.Y.	0.0	0.0	0.0	0.0
Calving	C.I.	0.7	0.0	2.0	0.0
Year of	T.M.Y.	8.9	4.2	1.0	1.0
calving	C.I.	10.9	11.7	0.0	10.5
Residual	T.M.Y.	82.7	78.1	78.1	95.6
	C.I.	81.4	82.6	87.1	84.7

The table shows that among the factors studied location had the greatest contribution to the total variation in T.M.Y. The percentage of the contribution of location ranged from 3.4% in the fourth to about 21% in the third lactation. The contribution of the year of calving ranged from 1% (in the *3rd* and the *4th* lactations) to 9% in the first lactation. Season of calving, however, showed no contribution to the total variation in T.M.Y. in any of the studied lactations.

TABLE 8. Least squares means (X')(1) and mean squares of calving interval (in month) of the Jersey.

Classification	First calving interval			Second calving interval		
	N	X'	S.E.	N	X'	S.E.
Overall	48	14.1	0.94	34	12.2	0.34
Season of earlier calving :						
Winter	7	14.7	1.79	5	13.7a	0.63
Spring	19	12.6	1.19	14	11.9b	0.37
Summer	12	16.5	1.48	9	11.6b	0.55
Autumn	10	12.4	1.50	6	11.6b	0.64
Year of earlier calving :						
75-79	41	15.1	0.73	38	12.6	0.26
80-82	7	13.1	1.70	6	11.8	0.62
Source of variance :	d.f.	M.S.		d.f.	M.S.	
Season of earlier calving	3	46		3	5.8*	
Year of earlier calving	1	23		1	2.8	
Residual	43	20		29	1.7	

(1) Means (within classification) followed by different letters differ significantly. ($P < 0.05$) ($P < 0.01$)

X' = Mean

TABLE 9. Least squares means (X')(1) and mean squares of first lactation performance of the Jersey.

Classification	N or d.f.	T.M.Y. (kg) X'	S.E.	L.P. (day) X'	S.E.	Cow index (kg/day) X'	S.E.
Overall	146	3524	84.2	290.9	9.5	3.21	0.07
Season of calving :							
Winter	58	3635	114.2	298.2	12.9	3.32	0.10
Spring	42	3679	119.1	295.3	13.4	3.31	0.10
Summer	26	3431	147.1	291.7	16.6	3.03	0.12
Autumn	20	3352	153.8	278.2	17.4	3.20	0.13
Year of calving :							
1979	45	3805	96.9	333.4a	10.9	3.21	0.08
1980	5	3036	288.3	232.8b	32.5	2.93	0.24
1981	37	3679	107.5	303.3ab	12.1	3.42	0.09
1982	59	3577	101.6	293.9b	11.5	3.30	0.09

Source of variance		Mean squares		NS
Season of calving	3	596692	1684	0.65
Year of calving	3	1034744	21206**	0.50
Residual	139	406871	5187	0.29

(1) Means (within classification) followed by different letters differ significantly. ($P < 0.01$)
X' = Mean

With respect to the variation in cow index, year of calving contributed the highest and was responsible for 12% of the variation in C.I. (in the 2*nd* lactation). Location was responsible for 5 to 11% of the total variation in cow index in the different lactations. Season of calving showed almost no significant contribution, except to variation of the cow index in the third lactation (2%).

TABLE 10. Least squares means (X')(1) and mean squares of second lactation performance of the Jersey.

Classification	N or d.f.	T.M.Y. (kg) X'	S.E.	L.P. (day) X'	S.E.	Com index (kg/day) X'	S.E.
Overall	52	3689	109.2	288.4	8.96	4.64	0.13
Season of calving :							
Winter	8	3715	253.4	295.9	20.8	4.77	0.30
Spring	17	3917	174.9	292.4	14.4	4.89	0.20
Summer	15	3683	196.3	306.4	16.1	4.36	0.23
Autumn	12	3442	214.0	258.9	17.6	4.52	0.25
Year of calving :							
1980	35	3759	127.5	290.5	10.5	5.01a	0.15
1981	17	3619	177.4	286.6	14.6	4.27b	0.21

Source of variance		Mean squares		NS
Season of calving	3	521977	5327	0.80
Year of calving	1	209508	145	5.90**
Residual	47	513736	3458	0.70

(1) Means (within classification) followed by different letters differ significantly. ($P < 0.01$)
X' = Mean

These results may refer to the importance of improving managerial standards and selecting the region in which a certain foreign breed would be kept.

TABLE 11. Least squares means (X')(1) and mean squares of third lactation performance of the Jersey.

Classification	N or d.f.	T.M.Y. (kg) X'	T.M.Y. (kg) S.E.	L.P. (day) X'	L.P. (day) S.E.	Cow index (kg/day) X'	Cow index (kg/day) S.E.
Overall	41	3579	184.4	270.8	12.96	5.58	0.20
Season of calving :							
Winter	6	3796	339.3	293.3	23.86	5.42	0.37
Spring	16	3877a	229.7	268.1	16.15	6.10	0.25
Summer	10	3025b	327.8	249.0	23.04	5.14	0.36
Autumn	9	3618	339.3	272.6	23.85	5.66	0.37
Year of calving :							
1981	34	3805	156.2	292.3	10.98	5.94	0.17
1982	7	3353	346.9	249.3	24.40	5.22	0.38
Source of variance				Mean squares			NS
Season of calving		3		1423817	2223		2.01
Year of calving		1		915755	8321		2.29
Residual		36		690940	3414		0.84

(1) Means (within classification) followed by different letters differ significantly. ($P < 0.01$)
X' = Mean

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بعض الصفات الانتاجية لماشية الفريزيان والجرسى فى ليبيا

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أجريت هذه الدراسة بتحليل سجلات الفريزيان والجرسى فى ليبيا خلال فترة حوالى عشر سنوات تبدأ بسنة ١٩٧٤ وكانت أهم نتائج هذه الدراسة :

كانت متوسطات (محسوبة بطريقة الحد الأدنى للمربعات) العمر عند الوضع الأول ، الثانى والثالث (على الترتيب) ٩ر٣٣ ، ١ر٤٦ ، ٦ر٦١ شهرا للفريزيان مقابل ٥ر٢٧ ، ٨ر٤١ ، ٢ر٥٤ شهرا للجرسى • كانت متوسطات الفترة بين الولادتين (الأولى والثانية ثم الثانية والثالثة ، على الترتيب) ٤ر١٧ ، ٦ر١٣ شهرا للفريزيان مقابل ١ر١٤ ، ٢ر١٢ شهرا للجرسى •

كانت متوسطات انتاج اللبن فى المواسم الأول ، الثانى ، والثالث (على الترتيب) ٣٤٩٠ ، ٣٧٨٦ ، ٤٠٦٧ كجم للفريزيان مقابل ٣٥٢٤ ، ٣٦٨٩ ، ٣٥٧٩ كجم للجرسى فى نفس المواسم •

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كان للموقع وسنة الوضع تأثير معنوى على صفات انتاج اللبن (فى معظم الحالات) بينما لم يظهر فصل الوضع تأثيرا معنويا على هذه الصفات •