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Breeding Performance in Buffaloes and Friesian Cows in Egypt

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THE BREEDING records of 255 Egyptian buffaloes and 170 Friesian cows, for the period from 1979 to 1981, were analysed The intervals between calving and first postpartum estrus, between first postpartum breeding and conception and between calving and conception averaged 123.19 , 23.07 and 146.22 days, respectively, for buffaloes and 86.65, 34.05 and 120.70 days for Friesian cows. The highest values of the abovementioned parameters were reco rded for buffaloes calved in summer (147.91, 42.64 and 190.55 days respectively) and the lowest (116.97, 19.99 and 13695 days) were found for winter calvers. In Friesian cows, the longest intervals to the first postpartum estrus (98.44 days), between flrist breeding and conception (45.36 days) and between calving and conception (133.05 days) were obtained for cows who calved in summer, winter and summer respectively. The corresponding lowest estimat s (80.06, 18.97 and 105.08 days) were recorded for animals calved during spring, autumn and autumn respectively. Statistical analyses revcaled a significant ($P < 0.05$) seasonal influence on the interval between calving and first postpartum eatrus. The number of se rvices per concepion, gestation period, and the length of calving interval averaged 1.42, 311.81 days and 471.77 days for buffalse and 1.64, 275.28 days and 378.80 days for friesian cows, ersed-ectively. Season of cavling had a significont influancs ($P < 0.5$) on the length of calving interval. In the all porameters-studied, there was a highly significant (P 9.01) species differ ence.

Buffaloes are considered the most important farm animals in Egypt. However, little attention seems to have been paid to improve genetic quality and breeding potential of these animals.

Importation, from the temperate regions of Europe, of foreign breeds of cattle known by their high producing capacity such as Firesian has been thought to be the ideal solution for improving the dairy production in Egypt. However, the lowered fertility observed in this breed is regarded as one of the greatest and most persitent sources of economic loss in dairy industry in this country (El heikh and El-Fouly, 1962).

It is generally believed that, the reproductive performance of buffaloes, in Egypt is low and attempts for improving their performance should be preceded by a thorough investigation of their reproductive characters. One of the

most important used parameter of reproductive effeciency is the calving interval lenght. It includes the gestation and service periods. The latter includes the intervals between calving and the first postpartum esturs and between the latter and conception.

Regularity of breeding is impotant in obtaining the highest lifetime milk production from an individual. This could be gained through shortening, within reasonable limit, of the interval between calvings.

The aim of the present work was to study some breeding characteristics of Egyptian buffaloes and Friesian cows with particular emphasis on the influence of calving season.

Material and Methods

The breeding records of 255 Egyptain buffaloes and 170 Friesian cows were analysed during the period of 1979-1981. Data were collected from two private farms at Banni Helal village (Sharkia Province).

Buffaloes and cows were kept in a semi-open sheds throughout the year. They were fed on a concenterate mixtures (cotton seed cake, rice polish, wheat bran and common salt) and wheat or rice straw. Egyptian clover was offered during winter and spring and green corn was sometimes avaliable during summer. Buffaloes and cows were hand milked twice daily, early in the morning and late in the afternoon.

Estrous symptoms were checked by means of a bull twice daily, animals showing the signs of heat early in the morning were mated two times, the first in the morning and the second in the evening if the female still accepted the male. When animals showed the first signs of heat in the evening, they served in the early morning of the next day and rebred again in the evening if still in heat. The animals, that did not show heat symptoms following recorded mating were considered pregnant untill proved by means of rectal palpation 60-90 days dafter the last service.

The data were statistically analysed according to Snedecor and Conchran (1969). The diffrence between buffalo and Friesian cows as well as the influence of calving season on the breeding characters were interpreted.

Results and Discussion

Interval to the first postpartum estrus

The results obtained in the present study (Table 1) revealed that, the overall average length of the interval between calving and the first postpartum estrus was $123 \cdot 19 \pm 5 \cdot 54$ days for buffalo, which is similar to that given by EL-Fouly *et al.*, (1977) who reported 125·5 days as an average for that period. Longer average values (136-221 days) we recorded by other investigators (El-Wishy, 1965 ; El-Shiekh and Mohamed, 1965 ; El-Wishy and El-Sawaf,

1971 ; Mohamed, 1974 and Porwal *et al.*, 1981). However, shorter interval to the first postpartum heat (35 - 115 days) was found by Hafez (1953) ; Rao and Murari (1956) ; Luktuke and Roy (1964) and Raizada and Pandey (1981).

In Friesian, the length of the interval to the first postpartum estrus averaged 86·65 ± 5·95 days. This value is nearly the same (85-88 days) as reported by Walther (1956) and EL-Sheikh and EL-Fouly (1963), but longer than the values (55-77 days) recorded by Korenic (1981) and Refsdal (1982).

From Table 4, it is clear that, the difference between species is highly significant ($P<0.01$). Discrepancy in the length of this interval in different studies for buffaloes and cattle could attributed to species, breed differences and / or varying managerial and feeding conditions (Wiltbank *et al.*, 1964).

A clear seasonal variation in the length of the interval between calving and the first postpartum estrus was observed in both species studied (Tabel 1), where the longest intervals were recorded after summer calving in buffaloes (147·91) and Friesian cows (98-44 days). Meanwhile, the lowest intervals to first estrus follows winter calving in buffaloes (116·97) and spring calving in Friesian cows (80·06 days).

Analysis of variance revealed that, the first postpartum estrus was significantely ($P < 0.05$) influenced by the calving season (Table 4), a finding which was previously emphasized by many workers (El-Sheikh and Mohamed, 1965; El-Wishy, and El-Sawaf, 1971; EL-Fouly *et al.*, 1977 and Raizada and Pandey, 1981) in buffaloes and (Buch *et al.*, 1955 ; Carman, 1955 ; Basu, 1962, and Baker, 1968) in cattle.

TABLE 1. Influence of seasons on the length of interval to the first postpartum estrus (days).

Seasons of the year	Species			
	Buffaloes		Friesian cows	
	No. of observ.	Mean ± SE	No. of observ.	Mean ± SE
winter	91	116.97± 8.41	47	84.68± 8.27
Spring	51	121.41±11.83	47	80.06±15.34
Summer	33	147.91±11.29	36	98.44±27.03
Autumn	80	121.20±11.88	40	86.10± 9.66
Total No. and mean	255	123.19± 5.54	170	86.65± 5.95

In the present work, the long interval to the first postpartum estrus observed in the summer for Egyptain buffalo and Friesian cows could be explained on the basis of high ambient temperature leading to suppression of heat signs (Hafez, 1955 ; Gangwar *et al.*, 1965 and El-Wishy, 1971) together with a high incidence of ovarian inactivity in buffaloes (El - Wishy, 1965).

Interval between first postpartum breeding and conception

Table 2 shows the overall average length of the interval between first postpartum breeding and conception in both species studied, as well as, the effect of sason of calving on this parametrs. For buffaloes and Friesian,.the average length of this interval were 23·03±3·36 and 34·05±4·60 days respectively, which are comparatively shorter than those stated by Hafez (1953); Luktuke and Roy (1964) and El-Wishy and El-Sawaf (1971) for buffaloes (33·78 - 38·20 days) and by Carman (1955) and Plasse *et al.*, (1968) for cattle (42 - 45 days). Our results (Table 4) proved a significant ($P < 0.05$) difference between buffaloes and Friesian cows in the length of the interval between first breeding and conception.

Concerning the effect of seasons, the longest intervals for buffalo (42·64 days) and Friesian (45·36 days) were observed in summer and winter respectively. Meanwhile, the shortest interval for buffalo (19·57 days) wash oticed for spring calvers and in Friesian cows for autumn calvers. Statistical analysis (Table 4) could not reveal any significant effect on the interval between first breeding and conception, which agrees with the finding of El-Wishy and EL-Sawaf (1971).

TABLE 2. Influence of seasons on the the length of interval between first breeding and conception (days).

Seasons of the year	Species			
	Buffaloes		Friesian cows	
	NO. Of observ.	Mean ± SE	No. of observ.	Means ± SE
Winter	91	19.99± 4.80	47	45.36± 9.27
Spring	51	19.57± 6.68	47	35.13±11.69
Summer	33	42.64±16.50	36	34.61±17.91
Autumn	80	20.60± 4.49	40	18.97± 8.08
Total No. and mean	255	23.03± 3.36	170	34.05± 4.60

Interval between calving and conception (Service period)

The overall average length of service period in buffaloes (Table 3) was 146·22±6·00 days which is close (141·6) to that recorded by EL-Fouly *et al.*, (1977). The obtained average in the present study was shorter than the estimates of Hilmy (1954) ; Gharib *et al.*, (1964); EL-Sheikh and Mohamed (1965) ; EL-Wishy and El-Shwaf (1971) and Mohamed (1974) for Egyptian buffalo (150 - 255 days), and Yadav (1980) ; Porwal *et al.* (1981) ; Raizada and Pandey (1981) and Sastry *et al.*, (1982) for Murrah buffalo in India (162-276 days). Meanwhile, EL-Ghannam and Zaghloul (1970); Creta and Camanici (1980); Bhalaru *et al.*, (1981); Bud *et al.* (1981) and Mostageer *et al.* (1981) recorded a shorter service period length (110-135) than the present average.

TABLE 3. Influence of seasons on the length of interval between calving and conception (Service period) (days)

Seasons of the year	Species			
	Buffaloes		Friesian cows	
	No. of observ.	Mean ± SE	No. of observ.	Mean ± SE
Winter	91	136.95± 8.82	47	130.04±15.80
Spring	51	140.98±13.51	47	115.19±21.79
Summer	33	190.55±17.65	36	133.05±29.26
Autumn	80	141.80±11.45	40	105.08±10.15
Total No. and mean	255	146.22± 6.00	170	120.70±77.23

Table 4 shows a highly siginficant ($P<0.01$) shorter service period for Friesian cows than that for buffaloes. The overall avrage length of this period was 120·70±7.23 days for Friesian cows, which is comparable (122·22 days) to that given by EL-Sheikh and EL-Fouly (1963) for the same breed (in Egypt) when females were first mated within 60 days postpartum. Shorter service periods (66-109·4 days) were given by many authors (Bodo *et al.*, 1980 ; Korenic, 1981 ; Swensson *et al*, 1981 and Refsdal, 1982) for different breeds of cattle, and also longer service periods were recorded (Barhat and Chowdhary, 1980; Bodo *et al.*, 1980; Arora and Sharma, 1981 and Swensson *et al.*, 1981) for other breeds of cattle (160-208·3 days).

TABLE 4. Analysis on variance concerning the influence of species and calving season on intervals to first postpartum estrus, between first breeding and conception and between calving and conception.

Source of variance	Interval to first postpartum estrus			Interval between breeding and conception			Interval between calving and conception		
	DF	Mean square	F.V.	DF	Mean square	F.V.	DF	Mean square	F.V.
Between species	1	158915.40	23.09**	1	12386.04	3.94*	1	66270.90	7.33**
Between seasons	3	19896.13	2.98*	3	5037.91	1.60	3	17350.17	1.93
Interaction	3	17097.00	2.48	3	5136.56	1.63	3	14782.87	1.65
Error	417	6882.12		417	3140.52		417	3976.77	

** $P<0.01$

* $P<0.05$

The great variation in the length of service period among different investigations may be due difference in breed, plane of feeding, system of management and climatic conditions under which the animals were raised (Mohamed, 1974).

Regarding the influence of season of calving on the length of the service period, present data (Table 3) showed a slight seasonal fluctuation. The values in winter, spring and autumm are nearly similar, but in the summer,the longest service periods were observed in both buffalo (190.55 days) and Friesian cows (133.05 days). This is in full agreemnet with the data of many workers in buffalo (EL-Fouly *et al.*, 1977) ; Porwal *et al.*, 1981 and Raizada and Pandey, 1981). Analysis of variance showed a nonsignificant seasonal effect on the length of the service period, a finding which has been previously reported, for buffalo by Mohamed (1974) and for cattle by Arora and Sharma (1981).

Number of services per conception

The present work indicates that, in the buffalo, the overall average number of services per conception was 1.42 ± 0.08, which is similar to the values (1.4-1.41) reported by Hafez (1953) and Bhalaru *et al.*, (1981). However, the values observed by many authors varied from 1.5 to 3.74 (EL-Wishy and EL-Sawaf, 1971 ; Mohamed, 1974 ; Yadav, 1980 ; Mostageer *et al.* 1981 and Raizada and Pandey, 1981). A low number (1.27) of services per conception was found by EL-Fouly *et al* (1977).

For Friesian cows, the average number of services required for conception was 1·64 ± 0·08 which is significantly ($P < 0.01$) higher than that of the buffalo. EL-Sheikh and EL-Fouly (1963) working on the imported Friesian, in Egypt, obtained a mean value of 2·80. A range from 2·01 to 3·19 was recorded by Bodo *et al.* (1980) and Swensson *et al.* (1981) for different breeds of cattle.

From Table 5 it was noticed that, the number of services required for conception was slightly influenced by the calving seasons. For buffaloes, the highest number (1·67) was found in the summer and the lowest (1·33) in the winter and spring. An observation which reported by Raizada and Pandey (1981) for Murrah buffalo. In Egypt the green fodder (clover) is usually offered to the animals in the winter and spring seasons, in addition to the good climatic conditions during these periods of the year, could be the possible explanation for the decreasing number of services per conception in winter and spring. In Friesian cows, the highest (1·79) and lowest (1·45) number of services per conception was found for spring and autumn calvers respectively. Statistical analysis (Table 8) revealed a nonsignificant seasonal influence on this parameter. Similar results were reported by El-Fouly *et al.* (1977) and Mostageer *et al.* (1981) in Egyptian buffaloes, but a contradicting finding was found by El-Wishy (1971) who mentioned that, there was a significant seasonal influence on the number of services per conception.

El-Sheikh and El-Fouly (1963, 1966) stated that, the wide range in the number of services per conception among investigations may be due to the several factors that cause variation in this character, they added that, the important factors reasonable for increasing or decreasing this number are the apparent quiet ovulation, nonovulatory heat, infertile services and embryonic mortality.

TABLE 5. Influence of seasons on the number of services per conception

Seasons of the year	Species			
	Buffaloes		Friesian cows	
	No. of observ.	Mean+SE	No. of observ.	Mean±SE
Winter	91	1.34+0.08	47	1.76±0.19
Spring	51	1.33±0.10	47	1.79±0.27
Summer	33	1.67±0.22	36	1.50±0.25
Atumun	80	1.48±0.10	40	1.45±0.15
Total No. and mean	255	1.42±0.08	170	1.64±0.08

Gestation period

Table 6 presents the influence of calving season on the length of gestation period. In the buffalo, the average length of gestation period was 311.81±0.65 days, which is slightly shorter than the values (315.1 - 316.8 days) obtained by Ragab and Asker (1951) ; El-Sheikh and Mohamed (1965); EL-Wishy (1971) and Mostageer *et al.* (1981). However, Porwal *et al.* (1981) and Sastry *et al.* (1982) reported averages of 306.95 and 309.00 days respectively. Working on eight herds of Egyptian buffaloes, El-Sheikh and Mohamed (1965) found a highly significant difference between herds in their gestation period.

For Friesian cows, the overall average length of the gestation period was 275.28 ± 0.97 days which is close to the figures given by Swensson *et al.* (1981) for Zebu (276.2) and Cross - bred (276.1) cattle. Longer gestation periods (277.8 - 289.8 days) for different breeds of cattle were obtained by many authors (Livesay and Bee, 1945 ; Alexander, 1950 ; Brakel *et. al*, 1952 and others).

Buffaloes calved in the summer had a shorter (305.43 days) gestation period than those calved in the other three seasons (311.81 - 313.19 days). In accordance, El-Sheikh and Mohamed (1965) found that, the gestation period was shorter for buffaloes calved during the period from May to November as compared to those calved during the rest of the year.

TABLE 6. **Influence of calving seasons on the length of gestation period (days)**

Seasons of the year	Species			
	Buffaloes		Friesian cows	
	No. of observ.	Mean±SE	No.of observ.	Mean ± SE
Winter	79	313.19±0.86	34	274.79±2.13
Spring	43	311.81±1.27	31	276.64±2.07
Summer	21	305.43±2.44	16	278.00±4.17
Autumn	28	312.68±1.33	23	272.26±2.48
Total No. and mean	171	311.81±0.65	104	275.28±0.97

In Friesian cows, the longest gestation period (278·00 days) was noticed for summer calvers. Seasonal variation in pregnancy duration, however, statistically nonsignificant in both species, which agrees with the data reported by Ahmed and Tantawy (1956), Khishin *et al.* (1963), Porwal *et al.* (1981) and Sastry *et al.* (1982) for buffaloes and Ahmed and Tantawy (1956) and Singh and Roy (1961) for cattle. Meanwhile, in buffaloes (Ragab and Asker, 1951 ; EL-Sheikh and Mohamed, 1965 ; EL-Wishy, 1971 and Mostageer *et al.* 1981) as well as in cattle (Ragab and Asker, 1951, and Stallcup *et al.* 1960) were found a significant effect of calving season on the gestation period.

Calving interval

Table 7 presents the lengths of calving interval in both species studied and the influence,.on it, of calving season. The mean length of calving interval for buffalo was 471·77 ± 5·88 days, which is close to the values given for Murrah buffalo by Gupta *et al.* 1981 (477 days) and Sastry *et al.* ; 1982 (467 days). Lower estimates were recorded for Murrah buffaloes (419 - 444 days) by Singh *et al.* (1958) and Rife (1959) ; for Romanian buffalo (421·5-433·29) by Creta and Camanici (1980) and Bud *et al.* (1981) and for Egyptian buffalo (452·2 days) by Mostageer *et al.* (1981). On the contrary, longer calving intervals have been reported by Hilmy (1954) ; Khishin *et al.* (1963) and EL-Sheikh and Mohamed (1965) for Egyptian buffalo (480-650 days) and by Rao and Murari (1956) ; Yadav (1980) ; Porwal *et al* (1981) and Raizada and Pandey (1981) for Murrah buffalo (496·34-636 days).

TABLE 7. **Influence of calving seasons on the length of calving interval (days)**

Seasons of the year	Species			
	Buffaloes		Friesian cows	
	No.of observ.	Mean±SE	No.of observ.	Mean±SE
Winter	73	468.62± 8.96	36	410.03±27.44
Spring	40	484.82±13.63	35	359.17±11.36
Summer	26	517.31±18.10	23	377.48±17.09
Autumn	62	474.98± 9.85	32	366.13± 9.29
Total No. and mean	201	471.77± 5.88	126	378.80± 6.97

Statistical analysis (Table 8) revealed a highly significant species difference ($P < 0.01$) in the interval between calvings. This may partially due to the fact that, the service period is longer in buffaloes than in Friesian cows and the gestation period is nearly a month longer in the former species than in the latter as earliarly suggested by Hilmy (1954).

TABLE 8. **Analysis of variance concerning the influence of species and calving season on the number of services per conception, gestation period and calving interval.**

Source of variance	Number of Services per conception			Gestation period			Calving interval		
	DF	Mean square	F.V.	DF	Mean square	F.V	DE	Mean square	F.V
Between species	1	4.83	5.22**	1	83725.78	1061.60**	1	669380.00	106.63**
Between seasons	3	0.27	0.29	3	120.93	1.53	3	20717.66	3.30**
Interaction	3	2.10	2.27	3	352.41	4.47**	3	29384.66	4.68
Error	417	0.93		267	78.87		319	6277.59	

**P<0.01

*—P <0.015

The overall average length of calving interval for Friesian cows (378.80± 6.97 days) was significantly ($P < 0.01$) shorter than the length of the same interval in buffaloes. The value reported herein is almost similar to the average values mentioned by Zorning, 1955 (381.2 days) and Bodo *et al*, 1980 (375) for other breeds of cattle. El-Etriby and Asker (1958), EL-Sheikh (1960) ; Ragab and Asker (1960) and EL-Sheikh and EL-Fouly (1962) working on Friesian cows in Egypt reported longer lengths (442.31- 464.00 days of calving interval. For other breeds of cattle, a range from 386.1 to 516.00 days was found by many investigators (Barhat and Ch- owdhary, 1980 ; Dominguez and Menendez, 1980 ; Arora and Sharma, 1981; Baliero *et al*, 1981 ; Sharma. 1981 ; Swensson *et al*, 1981 :and Oyedipe, 1982). Knapp (1956) claimed that, different managerial conditions may influence the calving interval length.

Regarding the effect of calving season on the length of calving interval (Table 7). In buffaloes, the longest interval (517.31 days) was noticed for summer calver, while, the shortest (468.62 days) was found for winter calvers. However, in Friesian cows, the longest calving interval (410.03 days) was obtained for winter and the shortest (359.17 days) for spring calvers. The calving interval appeared to be influenced significantly ($P < 0.05$) by the season of calving (Table 8). This is in agreement with the observation

of EL-Sheikh and Mohamed (1965); EL-Wishy (1971); Creta and Camanici (1980) ; Gupta *et al* (1981), Raizada and Pandey (1981) and Sastry *et al* (1982) for buffaloes and Dominguez and Menendez (1980) ; Balieiro *et al.* (1981) and Oyedipe *et al.* (1982) for cattle. On the contrary, Mostageer *et al.* (1981) and Porwal *et al.*, (1981) working on buffaloes and Arora and Sharma (1981) and Sharma (1981) using cattle failed to find any significant effect of calving season on the length of calving interval.

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مظاهر التربية (الخصب) فى الجاموس والبقر الفريزيان فى مصر

عفيفى المتوفى ، محمدى الطيب ، محمد ايوب ، حسنى يوسف وسامى عبده

كلية الطب البيطرى ـ الجيزة ـ مصر

اشتملت هذه الدراسة على سجلات ٢٢٥ جاموسة ، ١٧٠ بقرة فريزيان فى المدة ما بين ١٩٧٩ ـ ١٩٨١ ، وقد اتضح أن الفترة من الولادة حتى ظهور أول شبق (الفترة الأولى) والفترة من التلقيح الأول بعد الولادة حتى الاخصاب (الفترة الثانية) وكذلك الفترة من الولادة حتى الاخصاب (الفترة الثالثة) هى ١٩ر١٢٣ ، ٠٧ر٢٣ ، ٢٢ر١٤٦ يوما فى الجاموس على التوالى ٠ أما بالنسبة للأبقار الفريزيان فكانت كالتالى : الفترة الأولى ٦٥ر٨٦ ، الثانية ٠٥ر٣٤ والثالثة ٧٠ر١٢٠ يوما ٠ وقد لوحظ بالنسبة للجاموس أن هذه الفترات كانت أطول ما يمكن فى فصل الصيف وأقصرها كان فى فصل الشتاء ٠ أما بالنسبة للأبقار الفريزيان فكانت الفترة الأولى والثالثة أطول ما يمكن فى الصيف والفترة الثانية كانت أطول فى الشتاء ٠

كما أن أقصر طول للفترة الأولى قد ظهر فى الربيع أما بالنسبة للفترة الثانية والثالثة فقد قصرت فى فصل الخريف وقد أظهر التحليل الاحصائى تأثيرا معنويا لفصول السنة على طول الفترة الأولى فقط ٠

وكان متوسط عدد التلقيحات المطلوبة للاخصاب فى الحيوان الواحد ومتوسط مدة الحمل وكذلك متوسط الفترة بين ولادتين متتاليتين فى الجاموس كالتالى :

٤٢ر١ ، ٨١ر٣١١ يوما ، ٧٧ر٤٧١ يوما ٠ أما بالنسبة للأبقار الفريزيان فكانت ٦٤ر١ ، ٢٨ر٢٧٥ يوما ، ٨٠ر٣٧٨ يوما على التوالى ٠

وقد أظهر التحليل الاحصائى أن لفصول السنة تأثيرا معنويا على طول الفترة بين الولادتين ٠ فى جميع الصفات التى درست كان هناك فرق معنوى بين الجاموس والأبقار الفريزيان ٠