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# Effect of Month of Calving, on Some Reproductive Traits in Friesian Cows under Egyptian Environmental Conditions. Intervals Parturition to : Estrus, Service and Conception and Gestation period

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PURE Friesian cows (453) were used to study the effect of month of calving on the lengths of the post-partum to oestrus interval, the time to the first postpartum service, days open, and gestation length. The cows were imported from the Netherlands as pregnant heifers. The intervals from calving to first oestrus, first service and days open averaged 31.9, 61.0 and 90.9 days, respectively Gestation length was 275.5 days. Month of calving significantly ($P < 0.01$) affected the post-partum to oestrus interval. with cows calving in January having the longest interval, while cows calving in October having the shortest. Month of calving significantly ($p < 0.01$) affected the time to first post-partum service, the longest and shortest ones were attained with April and January calvers respectively. Month of calving had no significant effect on gestation length.

**Key words :** Friesian cows, Reproductive traits, month of calving .

More than thirty years ago Friesian cattle were introduced to Egypt on a large scale in order to improve milk and meat production. Several studies have shown that the productivity and reproductivity of Friesian cattle are lower under Egyptian environmental conditions than those of their contemporaries in their original countries. The reason may be due to the climate of the arid or semi-arid areas under which the cows exist or other managment conditions. Elevation of environmental temperature as well as the change in daily photoperiod length characterize the climatic conditions in arid and semi-arid areas. High environmental temperature causes decreased feed intake as well as changes in behavioural and physiological functions. This may affect efficiency of performance in mammals(Bonsma, 1949) Also it is well estabilished that changes in photoperiod induce marked alterations in the neuroendocrine activity of the animal (Turek & Campbell 1979).

In dairy cows decreasing the calving interval markedly improves their productivity. The components of this interval are very important and play a serious role in improving the reproductive performance. These components, however, include the interval from parturition to involution of the uterus, to first post-partum service, and to conception, The number of days required by the cow to conceive after parturition is one of the best criteria for determining reproductive efficiency.

The purpose of the present study was to determine the length of the post-partum to oestrus interval, the time to first service, to days open and gestation length. The impact of month of calving on these parameters was investigated.

## Material and Methods

Four hundred and sixty three pure friesian cows were used. The animals were imported from Holland as pregnant heifers and kept under natural environmental conditions in "Tonsy farm" in the Giza desert (west of Cairo). Meteorological date for the total duration of the experiment were obtained from the Governmental Meteorological Service in Giza.

All cows included in this study were in their third parity and were hand mated using pure bred fertile Friesian bulls. The cows were kept under the normal management practices of the farm. Food included Egyptian clover (Trifolium alexandrinum) and wheat straw with a concentrate ration in winter and a mixture of green corn and clover hay with a concentrate ration in summer. Cows were fed concentrate at a rate of 6 to 12 kg / cow / day according to their milk production. Water was always freely available. Cows were milked twice daily in milking parlors.

Oestrus detection was checked twice daily. Hand mating was practiced after complete uterine involution, which was verified by rectal palpation. Rectal palpation. for pregnancy diagnosis was made at 45 - 60 days post-mating providing that cows did not return to estrus.

The following reproductive traits were recorded:

1- Post-partum oestrus: This is the interval between the date of calving and the date of first detectable oestrus.
2- Post-partum service: This is the interval between the date of calving and the date of first service.
3- Days open : This is the interval between the date of calving and the date of fertile mating.
4- Gestation length : The length of geastation was calculated as the interval between the date of successful mating and the date of calving.

*Statistical Analysis*

Analysis of variance for the influence of month of calving on reproductive traits was carried out according to Snedecor and Cochran 1984. Usually data are expressed as mean ± SE.

$$Yi\ J = u + mi + e\,i\,j$$

Where U = is the overall mean.
m i = is the effect due to month of calving.
ei j = is the residual effect.

*Meteorological Data*

Environmental temperature and relative humidity percent fluctuate between the different months, with slight day length changes (Fig1) .

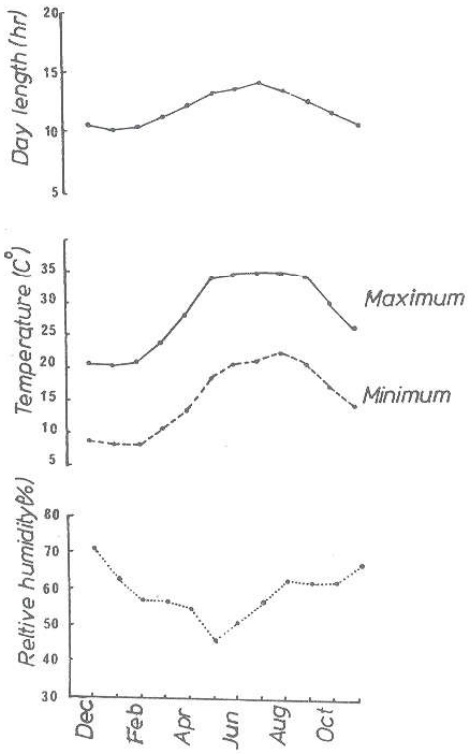


**Fig.1 . Monthly Variations in day length; environmental temperature and relative humidity throughout the study.**

## Results and Discussion

*Post-Partum Oestrus*

The overall mean interval from parturition to first observed heat was 31.9 ± 1.22 days and ranged from 21.5 to 43.5 days (Fig. 2 A,B) The mean value is comparable to that observed by Ben-David (1980) for Israelian Friesian cows (36.5 days) and somewhat higher than that found by sharpe & King (1981) for Canadian Holstein Friesian (19.8 days) in Jamaica.

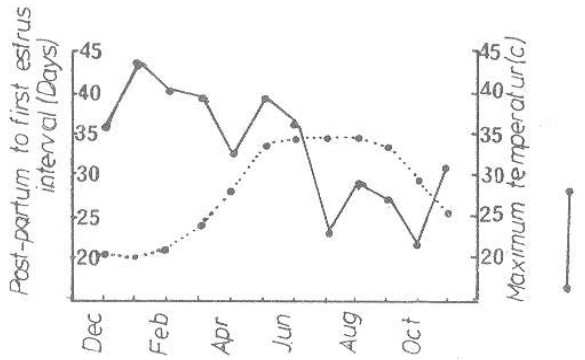


**Fig . 2 A. Effect of month of calving and temperature on post-partum to first estrus interval.**

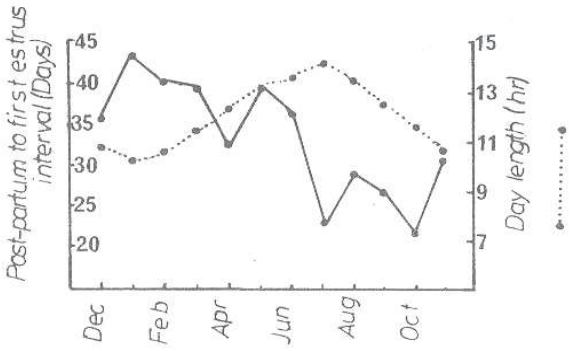


**Fig . 2B. Effect of month of calving and day length on post-partum to first estrus interval.**

Month of calving significantly ($p<0.01$) affected the post-partum to oestrus interval. Cows calving in January had the longest interval (43.5 + 2.99 days) while those calving during October had the shortest (21.5 ± 2.88 days) These results are in general agreement with those previously reported by Feo (1982) Hansen and Hauser (1983) and Manzano *et al.* (1987) for different breeds. The interval to first post-partum estrus was longer for cows with high genetic potential for milk production than for genetically low producers and longer for cows on high nutrition compared to average nutrition (Whitmore *et al.*., 1974)

A negative significant correlation coefficient was found between length of post-partum to oestrus interval and maximum environmental temperature ($r = -0.61$) and daily photoperiod length ($r = -0.43$) Fig.3A and B).

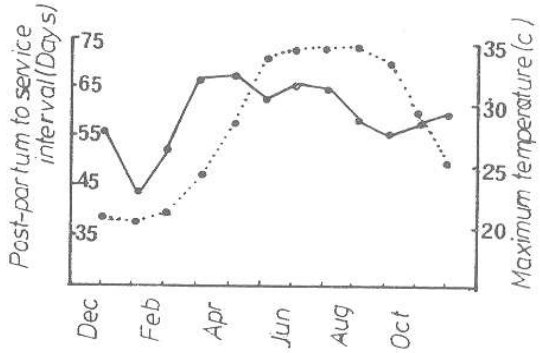


**Fig. 3A. Effect of month of calving and temperature on post-partum to service interval.**

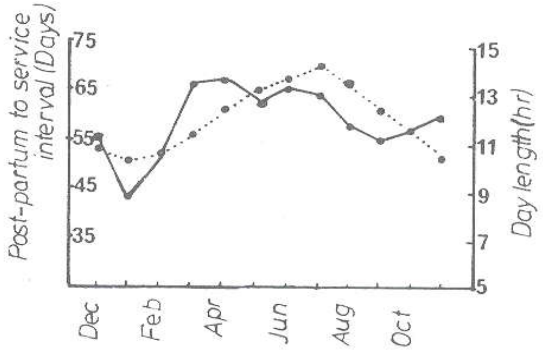


**Fig. 3B. Effect of month of calving and day length on post-partum to service interval.**

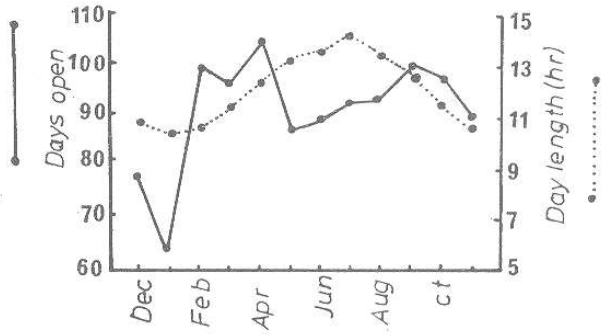


**Fig. 4B. Effect of month of calving and day length on days open.**

As shown in Fig. 3A and B, the differences in post-partum to first service interval among the different months of calving were associated with differences in both environmental temperature and daily photoperiod length (Fig. 5)

Positive correlation coefficients were calculated between the post-partum to first service interval and environmental temperature (r = 0.57) and daily photoperiod length (r = 0.61).

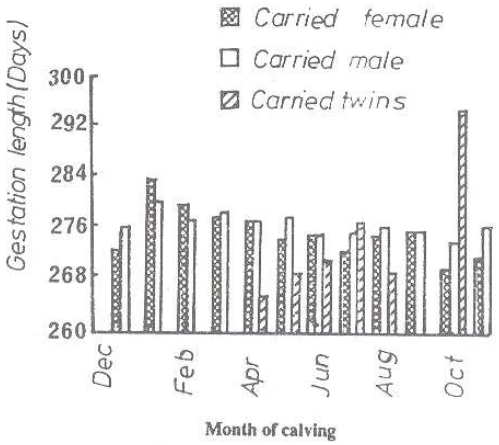


**Fig . 5. Effect of month of calving and sex of calf on gestation length.**

*Days Open.*

The overall mean length of days open of Friesian cows under Egyptian environmental conditions was 90.9 ± 2.09 days (Fig. 4) Many authors had studied this trait because of its economical importance associated with the reproductive efficiency and fertility in dairy cows.

In the present study days open was shorter than that obtained by Menendez *et al.*, (1984) for Holstein Friesian (138.8 days) in France, whereas days open in the present study was longer than that estimated by Machnai *et al.*, (1972) in Israel Friesian cows (71.7 days).

Cows which calved in January exhibited the shortest days open (64.12 + 6.6 days) in association with the decrease in both environmental temperature and daily photoperiod length, (Fig. 4A and B) while cows which calved during April have the longest days open(104 ± 0.07 days) when the temperature and photoperiod length began to increase.

These differences may be attributed to the different management practice between different herds, variation in milk yield and lactation length between the local and foreign herds (Abdel-Ghany and Fahmy, 1966; Hillers, 1984).

A positive correlation coefficient was observed between days open length and environmental temperature (0.48). In consideration of the positive relationship between elevation in ambient temperature and the prolongation of days open, several workers have reported this fact (Gwazdauskas *et al.*, 1973) Stott and williams (1962) indicated that high environmental temperature causes prolongation of anestrus in cows.

The results of the present study revealed that days open length was positively correlated with milk yield. This is in agreement with other investigators who found that the length of days open had a significant positive correlation with milk yield (Anantakrishnan and Lazarus, 1953; Abdel-Ghany and Fahmy, 1966).

Tomar and Balaine (1973) reported that milk production was lowest for cows which conceived early. Marion and Gier (1968 also reported that intervals from parturition to breeding and conception were significantly longer in the high than in the low producing cows.

From the previous results, it was clear that cows calving in January had the longest post-partum to first estrus interval, while the post-partum to first service and days open were longest for cows calving in April. It is established from the previous finding on the same animals that estrous cycle length was longest during February, March and April, in addition cows calving in April required 2.25 services per conception (Abdel-Bary *et al.*, 1991) Consequently this would lead to longer post-partum estrus and days open during April.

The effect of month of calving was significant on the length of post-partum estrus and post-partum service, while it was not significant on days open. This is referred mainly to the greater variability noticed within days open, besides that post-partum estrus and post-partum service are two criteria that are dependent primarily on the climatic factors while days open is dependent on the degree of uterine involution.

*Length of Gestation*

The overall mean value for gestation length in Friesian cows obtained in the present study is 275.5 ± 0.89 days. Among months, the longest time was obtained for cows calving during January (280.0 ± 1.87 days) While the shortest time (272.8 ± 1.52 days) obtained was for cows calved during October (Fig. 5) However these differences were not significant.

Rao and Taylor (1971) indicated that April calvers had a longer gestation period. It may probably be due to plenty of green fooder during their pregnancy. They also indicated that month of calving had no significant effect on length of gestation period, and seem to have little or no effect in bringing variation in the length of gestation period.

Observations reported in the present study indicate that the difference between gestation period length for cows bearing males or females was statistically not significant. This result agrees closely with those of Gianola and Tyler (1974) and Madhaven *et al.*, (1979). On the contrary Rao and Taylor (1971) Tomar *et al.*, (1972) Fisher and williams (1978) indicated definite variation in the length of gestation due to the sex of calf. They reported that male calves were carried longer than female calves.

In placental mammals, the length of gestation is also related to placental weight (Kihlstrom, 1972) and with litter size (Dewar, 1968) Pregnancy lasts longer for male fetuses in cow and horse, and longer for female fetuses in man (Mckeown and Macmahon, 1956) where the difference is attributed to the fact that male fetuses achieve full size before females (Ounsted and Ounsted, 1973) In general the gestation length has proved remarkably resistant to alterations by environmental factors.

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# تأثير شهر الولادة علي بعض الخصائص التناسلية في الأبقار الفريزيان تحت ظروف البيئة المصرية

محمود محمد محمود ، حسين طلعت عبد البارى ، حسن اسماعيل زكي و علي عباس محمد

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أجريت الدراسة علي (٤٥٣) بقرة فريزيان لدراسة تأثير شهر السنة علي طول الفترة من الولادة حتي الشبق الأول – والفترة من الولادة حتي التلقيح المخصب الأول .

كانت هذه الأبقار مستوردة من هولندا كعجلات حوامل . الفترة من الولادة حتي الشياع الأول – والفترة من الولادة حتي التلقيح الأول والفترة من الولادة حتي التلقيح المخصب كانت (٩ . ٣١) ، (٦١ ، ٩٠ . ٩٠) يوم علي الترتيب . كان طول فترة الحمل (٥ . ٢٧٥) يوم . كان تأثير شهرالولادة معنوى علي طول الفترة من التلقيح حتي الشياع الأول حيث أن الأبقار التي ولدت في يناير كان أطول في هذه الفترة من تلك التي ولدت في أكتوبر كذلك كان تأثير شهر الولادة معنوى علي طول الفترة من الولادة حتي التلقيح الأول ،كانت أطولها في الأبقار التي ولدت في أبريل وأقصرها في تلك التي ولدت في يناير.