SOME FACTORS AFFECTING LENGTH OF CALVING INTERVAL IN A HERD OF FRIESIAN CATTLE IN THE U.A.R.

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Summary

Three hundred and fifty nine Friesian cows raised at the Tahreer Province having 832 calving were used in this study. Most of the animals were imported from the Netherlands either as pregnant heifers or as virgin ones ready for mating. A limited number of the imported stock was of more than two lactations. Animals were exposed to the environmental conditions prevailing at the Threer Province. The results obtained are summarized as follows :

The average calving interval length for 832 intervals investigated was 442.31 ± 1.21 days with a standard deviation of 111.1 days.

The first calving interval was 474.22 ± 6.21 days which is significantly longer than the intervals following. Second and third calving intervals were 399.33 and 392.80 days respectively. The difference between the latter two intervals was not statistically significant.

The first calving interval length decreased as the age at first calving increased until it reached an age of 900 to 1000 days. The average claving interval length, thereafter increased following the increase in age at first calving.

The correlation between calving interval length and service period length was + .766 which was statistically significant. The overall repeatability value for calving interval length (based on three successive intervals) was 0.165.

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INTRODUCTION

Regularity of breeding is important in obtaining the highest lifetime milk production from a cow. This could be attained through the shortening, within reasonable limits, of the interval between calvings. The components of calving interval length, however, include the interval from parturitions until involution of the uterus and to the first ovulation and first heat which are in turn dependent upon the post-partum condition of the cow.

The lorwered fertility observed in both native and imported cattle in the U.A.R. which is caused by the lengthening of the mentioned intervals, is regarded as one of the greatest and most persistent sources of economic loss in dairy industry in this country. Therefore, it is the purpose of this study to obtain some accurate informations on the length of calving intervals in Friesian cattle raised under the environmental conditions prevailing in the U.A.R.

MATERIAL AND METHODS

Breeding records of 359 Friesian cows having 832 calving intervals were included in the present work. These cows were kept at the Tahreer Province (Southern region) in well ventilated concrete barns and protected against the summer heat by frequent water sprinkling and night grazing. Most of the cows studied were imported from the Netherlands either as pregnant heifers or as heifer calves ready for mating.

The cows were fed according to their production and live weight. They grazed Egyptian clover (Trifolium Alexandrinum) and alfalfa (Medicago sativa) during the period from November to April and alfalfa or green corn during the rest of the year. Concentrates were given as a ration supplement when green feeding was not enough to suffice the necessities of milk production i.e. when it exceeded 10 kgs of milk per day.

Cows were hand milked twice a day. The average milk yield from cows included in the present study was 6326 pounds in 305 days (Ragab and Asker 1960).

Estrous symptoms were noted in the early morning, during the day when cows are in pasture, and in the late evening. Cows showing the signs of estrous early in the morning were mated twice, once in the morning and once in the evening. When cows showed the first signs of heat during the day they were served in the evening and mated again the next morning if still in heat. Cows showing the first signs of estrous in the evening heat check were mated in the early morning of the next day and rebred once more in the evening of the same day if still in heat. A post-partum service interval of 60 days was considered necessary for recovery and return of the animals reproductive system to a normal, non-pregnant state. Post-

partum service, however, was delayed for about one month
more in cases of retained placenta, prolapse of uterus,
pyometra and abortion. The above system of reproduction
was adopted only from 1958 and thereafter.   Natural
breeding was used during the period of this study except
in a few cases when artificial insemination was applied.
Sub-fertile cows were examined by rectal palpation at
frequent intervals to investigate the factors leading to
infertility.

    Breeding records were arranged in groups covering
four reproductive periods : 1955 - 1956, 1956 - 1957, 1957-
1958 and 1958 - 1959. Each period started at the begining
of September and ended by the end of August.

    Cows that settled within one reproductive period,
providing that they had at least three months post-calving
within the respective reproductive period, were considered
as regular breeders. Cows failing to conceive within the
reproductive period were treated separately as non-regular
breeders. Pregnancy was diagnosed routinely by rectal
palpation disregarding the post-conception estrous if occur-
ed. Statistical analysis of the data was carried out according
to Snedecor (1950).

RESULTS AND DISCUSSION

A.—*Average length of calving interval.*

    The overall average length for 832 calving intervals
investigated was 442.31 ± 1.21 days (Table I).   This
estimate for Friesian cattle is longer than that reported by
Lewis and Horwood (1950), Rognoni and Pasti in Milano
(1955), and Zornig (1955). These investigators showed an
average calving interval length of 401.0, 394.6, and 381.2
respectively.   However, the present estimate agrees well
with those obtained by El-Sheikh (1960) and Ragab and

TABLE 1.—Means, Standard Deviations, and Coefficients of Variability for Calving Intervals of Regular and Non-regular Breeders.

Observations	Seasons				Regular breeders	Non-regular breeders	All herd
	1955/1956	1956/1957	1957/1958	1958/1959			
No of Calving Intervals	79	130	222	239	670	162	832
Means (days)	363.91 ±5.64	402.58 ±6.55	413.46 ±2.45	401.39 ±2.90	401.20 ±2.47	612.31 ±8.06	442.31 ±1.21
Standard deviation	50.2	74.7	73.9	44.6	64.3	102.4	111.1
Coefficient of variability ...	13.79	18.55	17.87	11.11	16.03	16.72	25.12

Asker (1960) on Friesian cattle in Egypt, and slightly
lower than the estimate by El-Etriby and Asker (1958).
The latter investigation showed that the average calving
interval length for 175 Friesian cows in Egypt was 464 days.
Table I also shows that non-regular breeders have a longer
calving interval (612.31 ± 8.06 days) than the regular
breeding cows (401.2 ± 2.47 days). The difference between
these two groups in the average calving interval length
is about 211 days. The percentage of calving intervals
belonging to the non-regular breeding cows from the
total calving intervals investigated was 19.47. This
high percentage explains the high calculated average
calving interval length in this herd of Friesian cattle.

The average calving interval lengths for the regular
breeders were : 363.91 ± 5.64, 402.58 ± 6.55, 413.46 ± 2.54
and 401.39 ± 2.90 days in the seasons of 1955 - 1956,
1956 - 1958 and 1958 - 1959 respectively (Table I). A
comparatively smaller number of cows was used in calculat-
ing the calving interval length in 1955 - 1956. These
cows were from newly imported stock that was not fully
subjected to the Egyptian environment which could be
the reason for their significantly (P 0.01) shorter calving
interval. Differences between the last three seasons were
not statistically significant. The values obtained for
standard deviations and coefficients of variability indicated
a marked variation among the lengths of calving intervals.

B.—*The Effect of Calving Sequence on Calving Interval*

   Length :

The average lengths of calving intervals were 474.22 ±
6.21, 399.33 ± 5.59, 392.80 ± 8.04, 354.47 ± 8.81 and
426.50 days for first, second, third, fourth, and fifth calving

TABLE 2.—The Effect of Calving Sequence On Calving Interval Length

Observation	Calving Sequence						
	First	Second	Third	Fourth	Fifth	Un-known	All
No. of Calving intervals ...	410	220	89	17	2	94	832
Mean calving interval ...	474.22 ±6.21	399.33 ±5.59	392.80 ±8.04	344.47 ±8.81	326.00 —	470.73 ±7.08	442.31 ±1.21
Standard devration	126	82.7	75.6	36.1	—	69.4	111.1
Coefficient of Variability ...	26.57	20.71	19.25	10.48	—	14.74	25.12

intervals respectively as shown in Table 2. Difference between first and second calving interval length was statistically significant (P 0.01). This finding agrees well with those of Zornig (1955), and Ragab and Asker (1960). However, Lewis and Horwood (1950) showed that the first calving interval for Friesians was slightly, longer than later intervals up to the 9th calving but not significantly. Second and third calving intervals in the present investigation did not differ significantly.

C.—*The effect of age at first calving on the First Calving Interval Length* :

The interval between the first and second calvings decreased as age at first calving increased until it reached an age of 900 to 1000 days. The average calving interval length thereafter increased following the increase in the age at first calving. However, The differences between age groups in this respect were not statistically significant. The incomplete body development of young calvers may be the reason for the longer first calving interval length The prolonged first calving interval length of old calvers could be attributed to lowered fertility.

D.—*The Relation Between Service Period and Calving Interval Length* :

The estimation of simple correlation using 820 paired variables showed that there was a positive highly significant correlation (+ 0.766) between service period length and calving interval length. Consequently variations in calving interval length are due to the fluctuations in the service period length. The shortening of such period, undoubtedly, could keep calving the interval within the desirable length.

E.—*Repeatability of Calving Interval Length* :

The repeatability of calving interval length was estimated for all animals having two or three successive

calving intervals. The correlation coefficient between calving intervals were : $+ 0.076$ (n 149), $+ 0.233$ (n 49), and $+ 0.344$ (n 49) between first and second, second and third and first and third calving intervals respectively. Although the simple correlation between the first two combinations was not statistically significant yet the correlation between first and third calving intervals was significant (P 0.05).

The low correlation between the first and second calving intervals is due to the fact that most of the first calvers were imported and their calving time was fixed so as to meet the begining of the grazing season in Holland which starts in March. In the U.A.R., calving is prefered to take place from October to December when clover is ready for grazing and to give the animals a better chance to enjoy the green pasture as long as possible as it ends by May. Therefore rearranging calving in the next season according to such considerations would end in longer first calving intervals.

Using the Chi Square technique, it was noted that the differences between the simple correlation values of the three investigated combinations were not statistically Significant (X^2 : 3.264, D. F. : 244).

The average repeatability value was .165 which was statistically significant (P .05). Although this repeatability value was slightly higher than the averages obtained by Legates (1954) for dairy cattle and El-Itriby and Asker (1958) for native cattle in Egypt yet it was comparatively higher than the estimates of the latter investigators on European cattle and their crosses in Egypt. It can be concluded that the shortening of calving interval length could be attained both by selection and by improving the environmental conditions.

ACKNOWLEGDEMENTS

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الملخص

دراسة لبعض العوامل التى تؤثر على طول الفترة بين الولادات
فى الماشية الفريزيان فى مصر

أجرى هذا البحث فى مديرية التحرير بوصفها المكان الذى يضم أكبر قطيع من الماشية الفريزيان المستوردة . وشملت هذه الدراسة ٣٩٥ بقرة لها ٨٣٢ ولادة وكانت معظم الأبقار تحت الدراسة مستوردة من هولندا واقتصرت فترة البحث عن المدة المحصورة بين ١٩٥٥ — ١٩٥٩، وتتلخص نتائج البحث فيما يلى :

١ — وجـد أن متوسط طول الفترة بين الولادات للأبقار الفريزيان تحت الدراسة ٤٤٢ر٣١ ± ٢١ر١ يوماً بانحراف قياسى قدره ١١١ر١ يوماً وكان متوسط طول الفترة بين الولادتين الأولى والثانية (٤٧٤ر٢٢ ± ٢١ر٦) يوماً يزيد زيادة مؤكدة عن الفترات الأخرى التى تليها ويجب الإشارة بأن فترتى بين الولادتين الثانية والثالثة ، والثالثة والرابعة والتى كان طولهما ٣٩٩ر٣٣ ، ٣٩٢ر٨٠ يوماً على التوالى لا تختلفان اختلافاً معنوياً من حيث الطول .

٢ — كلما كان سن العجلة عند الوضع الأول صغيراً كلما طالت فترة ما بين الوضع الأول، والثانى وهـذه العلاقة عكسية وصحيحة إلى أن يبلغ متوسط سن المجلات عند الوضع الأول ما بين ٣٠ر٠ إلى ٣٣ر٢ شهراً .

٣ — وجد ارتباط معنوى موجب بين مدة التلقيح المخصب والفترة بين ولادتين قدرت قيمته ب ٧٦٦ر٠ .

٤ — وجد أن قيمة المعـامل التكرارى لفترة مابين الولادتين ولو أنها ذات قيمة صغيرة إذ تساوى ١٦٥ر٠ إلا أنها ذات دلالة إحصائية .