

POSTCONCEPTION ESTRUS IN FRIESIAN CATTLE UNDER THE DESERT CONDITIONS OF THE U.A.R.

By

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SUMMARY

The present work was conducted at the Tahreer Province and included records of 441 imported Friesian cows and heifers having 1231 conceptions.

In 402 reproductive periods out of the 1231 periods studied, postconception estrus (P.C.E.) was observed one or more times. It was observed that 20.31% of the total number of estrual cycles exhibited in this herd were P.C.E. cycles. Percentage of cows calved once or more and showed signs of P.C.E. was significantly higher than the percentage for pregnant heifers. The average number of P.C.E. per one reproductive period for those periods with P.C.E. was 1.56 ± 0.92 and ranging from one to seven P.C.E. In 64.70 of the reproductive periods with P.C.E., estrus was observed only once after conception.

The average interval between conception and the first P.C.E. was 33.87 days with a modal length of 17-25 days.

The average interval of postconception estrual cycles was 33.10 days. Over 90% of p.c.e. occurred during the first 70 days postconception. No significant difference between reproductivity of cows with and without P.C.E. was shown. The percentages of P.C.E. occurring during winter, spring, summer and autumn were 29.71, 38.66, 21.08 and 10.55 respectively. The effect of season on the occurrence of postconception heats was discussed.

Introduction

The phenomenon of postconception estrus has been studied by a few number of investigators. Mirskaja and Smirnov (1941) using vaginal smear technique, showed that 21.7% of cows exhibited heat symptoms after conception. Donald (1949), Rickard (1955), Erb and Morrison (1958) and Hall *et al* (1959) gave lower estimates for percentages of

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pregnant cows showing signs of heat. Williams *et al* (1956), reported that 22% of pregnant ewes showed signs of heat. Donald (1943), Hall *et al* (1959) in cattle and Williams *et al* (1956) in sheep showed that such postconception cycles were not accompanied by ovulation.

The present study was carried to determine the effect of postconception heats on the reproductive performance of Friesian cattle at the Tahreer Province and factors that may affect the incidence of postconception estrus phenomenon. Such false heats are forming a serious problem in dairy cattle breeding as they cause a considerable waste in bull semen and subject cows to the hazards of abortion and such cases as maceration of fetus due to putrifactive bacteria introduced when inseminating the pregnant cows. Moreover, the dependance on the rate of non-returns should be considered an inaccurate estimate for conception rate. This is due to the fact that among those cows returning to heat within 60–90 days after service a considerable number of pregnant cows. Recording erroneous information concerning the date of fertile service and the date at which the cow should be dried off with their obvious bearing on the accuracy of pedigree records naturally occurs as a result of serving pregnant cows.

Materials and Methods

Records of 441 cows and heifers, imported from the Netherlands and located at three farms in the Tahreer Province were subjected to detailed statistical analysis for information on postconception estrus (P.C.E.). These records included 1231 reproductive periods during the seasons from 1955-1959. The average number of reproductive periods per cow was 2.79. The system of breeding in the province allows for breeding all the year around. Cows were served naturally or artificially after showing heat signs, providing that at least sixty days had elapsed after each calving. This postcalving service interval was, however, extended to 90 days or more in cases of retention of placenta or prolapse of the uterus. Heat was checked at least twice a day in the morning and in the evening and also during grazing time. Cows were served only once towards the end of heat periods. They may be rebred by the same sire if still in heat. Rectal palpation was made 45 days or more after the

last heat, providing that no signs of heat were noticed after the last service, to determine pregnancy. However, in such cases when pregnancy was suspected, rectal palpation was also performed irrespective of the date of last service.

Breeding records were kept for all cows and information on dates of service, interval between services, results of rectal palpation, the expected date of parturition and the actual date of calving were recorded. Calves were not allowed to suckle the mothers and were raised artificially on their dams' milk. During winter and spring months, cows were fed mainly on Egyptian clover (*Trifolium alexandrinum*) with or without concentrates, formed of mixture of cotton seed cakes, rice bran, wheat bran and barley or corn, depending on their daily milk production. During the summer and the fall months cows were fed on the above concentrates with or without green alfalfa (*Medicago sativa*) or clover hay or wheat straw. Cows were hand milked twice daily and the average milk yield for cows included in the present study was 6326 pounds in 305 days (Ragab and Asker, 1960).

Results and Discussion

Incidence of the Occurrence of Postconception Estrus:

In 402 reproductive periods out of 1231 periods, or in 32.66% of total reproductive periods investigated, post-conception estrus was observed one or more times (Table 1). Rickard (1955) and Erb and Morrison (1958), studied postconception heat phenomenon in Friesian cattle in the United States and gave a comparatively lower percentages of reproductive periods with postconception heats. Their estimates were 5.6% and 6% respectively. The present investigation showed that 20.31% of the total number of estrual cycles exhibited in this herd were postconception estrus cycles. Postconception heat was observed in 38.40% of the reproductive periods for cows calved once or more (Table 1). This percentage was significantly higher ($P < 0.01$) than the percentage for pregnant heifers (18.54%). This findings agreed well with those of Erb and Morrison (1958) as they showed that pregnant heifers have significantly a lower rate of estrus after conception

when compared with second and third reproductive period cows. The difference between the two parous groups in the present study may be attributed to the fact that cows, especially the lactating ones, were kept under more critical heat observation than heifers. As shown in table (1), the percentages of reproductive periods with P.C.E. for cows in their second, third, fourth and fifth gestation periods were 42.05, 49.19, 45.00 and 66.67 respectively. Differences between these percentages were statistically insignificant. The average number of postconception heats per one reproductive period for those periods with p.c.e. was 1.56 ± 0.92 (table 1). The analysis of data showed that the number of P.C.E. per one reproductive.

TABLE 1.—Effect of parity on the Occurrence of P.C.E.

Observation	Sequence of gestation						ALL
	1	2	3	4	5	Unkn	
Total number of R.P.* with and without P.C.E.**		271	185	80	9	230	
	356	875					1231
Number of R.P. with P.C.E.		156	91	36	6	47	
	66	336					402
Percentage of R.P. with P.C.E. to total R.P.		42.05	49.19	45.00	66.67	20.43	
	18.54	38.40					32.66
Average number of P.C.E. per R.P.		1.67	1.64	1.44	1.33	1.55	
	1.27	1.61					1.56

* R.P. = reproductive period.

** P.C.E. = postconception estrus

period for all periods studied (with and without P.C.E. was 0.51). Table 1 showed also, that the average number of P.C.E. per one reproductive for cows was 1.61 which was significantly higher ($P < 0.01$) than the average number of P.C.E. for pregnant heifers (1.27).

In 64.70% of the reproductive periods with post conception heat, was observed only once after conception. This estimated percentage appeared lower than the 82.10% reported by Erb and Morrison (1958). Data from pregnant heifers showed that in 78.8%, 16.7% and 4.5% of their reproductive periods, p.c.e. was observed once, twice and three times, respectively. Percentages of reproductive periods for cows exhibiting p.c.e. were 61.9%, 24.4% and 13.7% in the same mentioned order respectively (table 2).

TABLE 2.—Number and Percentages of Reproductive Periods (R.P.) Having Postconception Heats (P.C.E.) as Affected by Parity

Parity	R.P. with P.c. h	Number and percentage of R.P. having					
		One	P.C.E.	Two	P.C.E.	Three	more P.C.E.
		No.	%	No.	%	%	No.
Pregnant heifers R.P. . . .	66	52	78.8	11	16.7	3	54.
Parous cows R.P.	336	308	61.9	82	24.4	46	13.7
All R.P.	402	260	64.7	93	23.1	49	12.2

Post-conception heat interval:

The average interval between conception and the first postconception heat for all reproductive periods studied was 33.87 days (Table 3) and ranging from 3 to 217 days with a modal length of 17-25 days. This investigated average interval length appeared shorter than the 43.3 days obtained by Erb and Morrison (1958). As shown in table (3), the average length of intervals between conception and the first postconception heat for pregnant heifers and parous cows were 33.00 and 33.06 days respectively. Differences between the two averages was not significant and thus parity appeared to have no effect on the average length of interval from conception to the first P.C.E. The overall average for all postconception cycles studied as shown in table (3) was 33.10 days. The average for length of intervals between conception and first P.C.E.

and also between those postconception heats for pregnant heifers was 37.46 days and for parous cows was 32.56 days (table 3). Average interval from first to second, second to third, third to fourth, fourth to fifth, fifth to sixth and sixth to seventh postconception heat for pregnant heifers, cows and both groups combined were shown in table (3). Differences between these averages were not statistically significant.

TABLE 3.—Postconception Heat Interval, for Pregnant Heifers and Parous Cows.

Observation	R.P. of pregnant heifers		R.P. of parous cows		All R.P.	
	No.	\bar{x}	No.	\bar{x}	No.	\bar{x}
Average interval from conception to 1st P.C.E.	52	38.00	208	33.06	260	33.87
Average interval from 1st. to 2nd P.C.E.	11	30.92	82	32.72	93	32.55
Average interval from 2nd. to 3rd. P.C.E.	3	23.00	28	25.50	31	25.80
Average interval from 3rd. to 4th. P.C.E.	0	—	9	37.60	9	37.60
Average interval from 4th. to 5th, 5th to 6th, and 6th to 7th P.C.E.	0	—	9	42.60	9	42.40
Average postconception cycle	66	37.46	336	32.56	402	33.10

The frequency distribution for the length of postconception heat cycles and normal estrual cycles were shown in table (4). Over 90% of all postconception heats occurred during the first 70 days after conception. This finding agreed well with that of Donald (1943) who showed that estrus was more frequent during the first three months of pregnancy. The percentage of postconception estrual cycles that were less than 16 days in length in the present investigation was 22.5 and the percentage of all estrual cycles of the same length was

TABLE 4.—Frequency Distribution for the Interval Length from Conception to the First Postconception Estrus, Postconception Estrual Cycle Length, and the Intervals between Recorded Services for All Reproductive Periods with and without P.C.E.

Observation	Class Interval (days)								TOTAL
	Less than 16	17-25	26-34	35-43	44-52	53-61	62-70	71 or more	
Average length of interval from conception to the first p.c.e.	No. 94 % 23.4	No. 113 % 28.1	No. 70 % 17.4	No. 40 % 10.0	No. 32 % 8.0	No. 17 % 4.2	No. 7 % 1.7	No. 29 % 7.2	402 100
Average length of all post-conception estrual cycles	No. 141 % 22.5	No. 175 % 28.0	No. 108 % 17.2	No. 75 % 12.0	No. 51 % 8.0	No. 23 % 3.7	No. 11 % 1.7	No. 42 % 6.7	626 100
Average intervals between all recorded services.	No. 332 % 13.5	No. 704 % 28.7	No. 302 % 12.3	No. 271 % 11.0	No. 162 % 6.6	No. 148 % 6.0	No. 131 % 5.3	No. 407 % 16.6	2457 100

only 13.5%. The percentage of postconception cycles falling within 17-25 days (28.0) was slightly less than the 28.7% investigated for all estrual cycles having the same interval length (Table 4). Erb and Morrison (1958) observed that short postconception estrual cycles (2-17 days) were proportionally three times more as frequent and that 18-25 estrus intervals after conception was one half as frequent.

Some Reproductive Data for Cows with and without p.c.e.:

Table (5) shows that the average postpartum service interval length for cows that exhibited P.C.E. was 77.37 ± 2.94 days and for those that did not show signs of postconception heat was 94.00 ± 3.21 days. Difference between the two investigated averages was significant. The average number of services per conception for cows with postconception heats was significantly higher ($P < 0.01$) than for cows exhibited no signs of postconception heat. This higher number of services per concept for cows with postconception heats, coincided with the shorter postpartum service interval. Vandemark and Salisbury (1950), and Touchberry (1959) reported that the number of services per conception tends to increase as postpartum service interval decreases.

The number of services per conception for heifers expressing postconception estrus (2.41 ± 0.21) tended to be higher, though not significant, than the number for pregnant heifers with no p.c.e. This coincided with younger age at first service for the former group than the latter. Cows showing p.c.e. probably have higher estrogenic levels or being more sensitive to estrogens than normal cows. This is shown by the fact that they have a higher percentage of short heat cycles and higher number of services per conception. Erb and Morrison (1958) found that cystic tendency was observed at some time during the reproductive life of 70.5% of cows showing P.C.E.

Differences between averages of calving interval length, age at first calving for reproductive periods in which postconception heats were observed and those periods involving no signs of postconception heats (Table 5) were statistically in-

TABLE 5.—Comparison of Some Reproductive Data for Cows with and without Postconception Estrus.

Observations	Reproductive periods with P.C.E.				Reproductive periods without P.C.E.			
	No.	Mean	σ	C.V.	No.	Mean	σ	C.V.
	Postpartum service Interval (days)	334	77.37 ± 2.94	53.80	69.50	50	94.00 ± 3.21	69.95
Number of services per conception for cows	402	2.93 ± 0.12	2.34	79.86	392	2.47 ± 0.12	2.34	94.74
Number of services per conception for heifers	61	2.41 ± 0.21	1.66	68.88	239	2.13 ± 0.11	1.65	77.47
Service period Length (days)	334	161.86 ± 6.21	113.70	70.24	457	162.06 ± 4.21	89.30	55.12
Calving Interval Length (days)	315	435.92 ± 6.41	113.50	26.04	517	446.20 ± 4.82	109.65	24.57
Age at first service (days)	61	645.34 ± 5.14	40.10	6.21	288	693.63 ± 10.47	178.00	25.66
Age at first calving (days)	60	1023 ± 32.62	248.40	41.18	283	1018 ± 18.79	315.60	23.01

significant. The percentage of male calves for cows exhibiting p.c.e. was 53.72% and for normal cows was 49.70%. The difference was not significant. Donald (1943), showed that the occurrence of postconception estrus did not affect the sex ratio of calves. The findings of Erb and Morrison (1958), however, indicated that the percentages of males, born after postconception estrus was significantly higher when compared with the herd average.

On the basis of the reproductive data presented in table (5), it can be concluded that no significant differences between reproductivity of cows with and without postconception heats. This conclusion is in agreement with the work of Williams *et al* (1956) on sheep and Erb and Morrison (1958) on Friesian cattle but not in agreement with Donald (1943) who showed that cows exhibiting postconception estrus are of higher fertility.

Effect of Season on the Occurrence of Postconception Estrus:

The distribution of services showed that a significantly ($P < 0.01$) higher percentage of services were in the spring than in the other seasons of the year (table 6). This of course

TABLE 6.—Season Effect on the Occurrence of Postconception Estrus.

Observation	Winter	Spring	Summer	Autumn
Distribution of services.	30.82	33.04	17.78	18.36
Percentage of fertile services to all services	35.10	38.50	33.20	26.80
Distribution of postconception heats	29.71	38.66	21.08	10.55
Percentage of postconception heats to all heats	17.50	19.50	21.50	10.50
Proportion of conceptions that were followed by P.C.E.	31.80	33.40	42.10	33.30

was affected by the feeding conditions in the Tahreer Province where more lush green fodder was available in the spring time. It was noted too, as shown in the same table, that the percentage of fertile services to all services was significantly higher ($P < .01$) in the spring season. The distribution of postconception estrus showed that such heats were more frequent in the spring season too. This trend follows the same trend for the distribution of services, being more frequent in the spring months. However, when estimating the percentage of estrus cycles that occurred after conception to all cycles in each season, it was noted that this percentage was higher in the summer time. Moreover the percentage of conceptions that were followed by heats was more in the summer season (Table 6).

This may mean that the climatic elements in the summer time are responsible for the appearance of postconception estrus Table (7) showed that higher averages for daily temperatures, daily vapour pressure and day light were during the summer season.

TABLE 7.—Average Daily Temperature, Vapour Pressure and Day Light Hours in the Four Seasons

Climatic Observation	Winter	Spring	Summer	Autumn
Average daily temperature (°C)	12.85	19.75	25.76	20.39
Average vapour pressure . . .	8.41	9.48	15.24	12.68
Average day light (hours) . .	10.40	12.70	12.90	11.30

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الملخص

دورات الشبق التي تحدث بعد الحمل في ماشية الفريزيان تحت الظروف الصحراوية في الجمهورية العربية المتحدة

أجرى هذا البحث في مديرية التحرير على السجلات الخاصة لـ ٤٤١ بقرة وعجلة فريزيان لها ١٢٣١ حالة حمل . وفي ٤٠٢ فترة تناسلية من الـ ١٢٣١ درست دورات الشبق التي تحدث بعد الحمل والتي لوحظ حدوثها مرة أو أكثر - ولوحظ أيضاً أن ٣١,٢٠٪ من العدد الكلي لدورات الشبق في القطيع كانت دورات شبق بعد الحمل .

والنسبة المئوية للأبقار التي ولدت مرة أو أكثر وأظهرت علامات شبق بعد الحمل كانت أعلى بنسبة معنوية عن النسبة المئوية للعجلات الحامل .

وكان متوسط عدد دورات الشبق التالية للحمل لكل فترة تناسلية $1,56 \pm 0,92$, وتتفاوت ما بين مرة واحدة إلى سبع مرات .

وفي ٦٤,٧٪ من فترات التناسل لوحظ أن دورة الشبق التي تحدث بعد الحمل كانت تحدث لمرة واحدة .

ومتوسط الفترة بين الحمل وأول دورة شبق بعد الحمل كانت $33,87$ يوم .

ومتوسط الفترة بين دورات الشبق التي تحدث بعد الحمل كان $33,1$ يوم وأكثر من ٩٠٪ من دورات الشبق التي تحدث بعد الحمل تحدث في خلال الـ ٧٠ يوماً الأولى من الحمل ولم يوجد فرق معنوي في الكفاءة التناسلية بين الأبقار التي تحدث بها دورات شبق بعد الحمل والتي لا يحدث بها .

والنسبة المئوية لدورات الشبق التي تحدث بعد الحمل في خلال الشتاء والربيع والصيف والحريف كانت $29,71 - 38,66 - 21,08$ ، $10,55$ على التوالي .