

REPRODUCTIVE PERFORMANCE OF FRIESIAN COWS UNDER THE PALESTINIAN ENVIRONMENTAL CONDITIONS

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SUMMARY

The reproductive performance of 146 Friesian cows, raised in Jericho under the Palestinian Authority during the period from 1986 to 1996 was evaluated in this study.

Overall mean values (in days) for some reproductive parameters under the subtropical- semiarid conditions of Jericho were as follow: age at 1st service 547d, age at 1st conception 573d, gestation length 274d, age at 1st calving 825d, postpartum service interval 80d, days open 112d, and calving interval 386d.

Age at 1st calving in the cold season inseminated heifers was insignificantly younger than that of the hot season inseminated heifers (794 versus 852 days). Calving interval and its components; tended to decrease as parity advanced, but their differences among parties were insignificant. Overall mean of seven successive parities for number of services/ conception was 1.55 and for conception rate was 63.6%. Services per conception tended to increase ($P < 0.01$) while conception rate on the first service tended to decrease with progress of parity.

Keywords: Friesian, Palestine, reproduction, calving season, age

INTRODUCTION

Importation of high producing dairy cattle to a new environment will change their physiological functions, resulting in changes in their productive and reproductive performance. The larger the difference between the original and the new climate and management, the larger the expected effects (Yeates et al., 1975 and Vandeplassche, 1982).

In Jericho, a semi-arid climatic region under the Palestinian authority, the importation of high performance dairy cattle like Friesian may be associated

with decrease in their reproductive and productive performance.

Jericho is located about 700m under the sea level, mainly depending on a brackish water with 1800- 2000 ppm salinity, and its ambient temperature is moderately high during summer season.

Many investigators have proved that reproductive performance is economically important in dairy cattle because it affects milk yield per cow per day of herd life, number of replacements produced per cow, and culling rate. However, reproductive performance of Friesian cattle is still not studied under the Palestinian conditions. Therefore, the present study was conducted to evaluate reproductive performance of Friesian herd under the subtropical-semiarid conditions of Jericho.

MATERIALS AND METHODS

A total of 464 records of 146 Friesian cows obtained during the period from 1986 to 1996 was used in this study. This herd belongs to the Arab Development Society, Jericho- Palestinian authority. This herd was established and raised, under the environmental conditions of Jericho, where maximum and minimum range of ambient temperature was 35-40 and 20-25°C during hot season, and 15-20 and 12-15°C during cold season, with relative humidity of 40- 45 and 25-30% during the two seasons, respectively.

All cows were housed in semi-shaded pens and were milked and fed twice daily. Each cow daily received a concentrate ration, 10kg for lactating and 5kg for nonlactating cow, in addition to 10kg roughage containing hay, wheat straw and green fodder. Cycling cows were observed usually for mounting activity, vulva mucus discharge, and other signs of estrus. Besides, teaser was used twice daily for heat detection. Animals were artificially inseminated and pregnancy was detected by rectal palpation after 45 days of insemination.

Measurements of reproductive performance included ages at first service, first conception, and first calving.

On the other hand, conception rate for the first service, number of services preconception and length of calving interval, postpartum service interval, days open and gestation period were also determined. Data were classified into hot season and cold season inseminated heifers to study the effect of season of insemination on the age at first service, first conception and first calving. Data were also classified into seven successive parities to study the effect of parity on the calving interval and its components. Data were statistically analysed using one way analysis of variance, Pearson correlation coefficient, and Scheffe multiple range test (SPSS).

RESULTS AND DISCUSSION

Overall mean values for age at first service, age at first conception and age at first calving were 547, 573 and 825 days, respectively (Table 1). Age at first calving found in this study (about 27.5 mo.) was four months younger than that for Friesian cattle born and raised in Egypt (Ashmawy and Mokhtar, 1984, and Mohamed, 1987), and four months older than that for Dutch Friesian cattle imported to Egypt (Fahmy et al., 1963).

Age of cow at first calving is one of the major factors that affect longevity and productivity of dairy herds. Age at first calving is dependent of age at puberty, age at sexual maturity, and age at first conception. These ages are largely influenced by the environmental factors, mainly ambient temperature and nutrition.

Present results (Table 1) show that age of heifers at first service, conception and calving in the cold (or temperate) season were younger than those in the hot (or warm) season. However, differences in these parameters between the two seasons were insignificant. These results clearly indicate that heifers that were sexually mature and inseminated during the cold season (October to March) conceived earlier (528 vs. 610 days) than heifers that were inseminated during the hot season (April to September). Cavestany et al. (1985) reported in Holstein cows that increased maximum ambient temperature (29.7°C- 33.9°C) was accompanied by lower fertility. They added that fertility was consistently lower when maximum temperature on the day of breeding was $\geq 33^\circ\text{C}$. Previously, Ingraham et al. (1974) indicated that temperature humidity of individual days prior to breeding influenced breeding efficiency, and the second day prior to breeding was the most related to conception rate.

Table 1- Effect of season of insemination on some reproductive parameters in Friesian cattle in Jericho

Rep. Parameter	$\bar{x} \pm \text{SE (no.)}$		Overall mean
	Hot season	Cold season	
- age at first service (days)	574.7 \pm 42.37 (79)	513.8 \pm 15.22 (67)	546.8 \pm 24.03 (146)
- age at first conception (days)	609.6 \pm 59.43 (79)	528.2 \pm 14.86 (66)	572.5 \pm 33.15 (145)
- age at first calving (days)	852.2 \pm 44.74 (77)	793.9 \pm 15.98 (66)	825.3 \pm 25.23 (143)

- 1- Hot season from April to Septembers. 2- Cold season from Octobers to March.
 - Differences between hot and cold seasons of insemination were not significant for all parameters.
 - Number of records is shown in parenthesis.

It is of importance to mention that ten animals in the herd under study exhibited lower reproductive performance. Mean age at first service (\pm SE) in this group was 1345 ± 206.9 days, age at first conception was 1386 ± 210 days, and age at first calving was 1667 ± 210.5 days. Lowered reproductive performance in this group is probably due to some defects in their reproductive tracts.

As shown in Table 2, postpartum service interval, days open and calving interval tended to decrease as the parity or age of cow increased. However, differences in these reproductive parameters among parities were insignificant.

Number of services per conception increased significantly ($P < 0.01$) with parity (Table 2), and this was associated with a gradual decrease in the conception rate for the first service from 78.6% in the first parity to 40% in the seventh parity.

Table 3 shows that calving interval was positively correlated ($P < 0.01$) with the interval from calving to first service ($r = 0.60$), days open ($r = 0.98$), and services per conception ($r = 0.43$).

Overall mean calving interval was found in this study to be 386 days, with 80 days elapsed from calving to first service, 112 days from calving to conception and 274 days gestation (Table 2). Vandeplassche (1982) suggested that up to 390 days calving interval is a most reasonable target in cattle. Additionally, substantial evidence indicates that a calving interval of 12 months or less for dairy cows results in more milk produced per day in the herd and maximum production of replacements during herd life (Louca and Legates, 1968, and Speicher and Meadows, 1967).

Since the gestation period is almost fixed variable and genetically determined for each species, the changes in calving interval are due to change in days open. Therefore, improving service period by better management particularly good and careful heat detection (Ghallab, 1997), and adequate feeding (Howard et al., 1987) should improve calving interval.

Reproductive parameters estimated in this study are in agreement with those reported by Salah and Mogawer (1990) in imported Friesian cows in Saudi Arabia. Longer average length of calving interval (432 days) was reported in Friesian in Egypt (Mohamed, 1987). In USA the average calving interval in dairy cattle is approximately 13.5 months (Britt, 1981). The present results indicate that calving interval and its components, i.e. post partum service interval and days open, were not significantly influenced by parity, however it tended to decrease with advance of parity. These results clearly indicate that reproductive performance of imported Friesian cows in Jericho was relatively improved throughout seven parities, probably due to adaptation of the imported cattle to the new environment. Salah and Mogawer (1990) reported that imported Friesian cows in Saudi Arabia had longer calving interval and days open than the local-born cows. In addition, these authors

Table 2- Effect of Parity on some Reproductive parameters in Friesian cattle raised in Jericho.

Parity	No. of records	C. R. (%)	Services / conception $\bar{x} \pm SE$	Postpartum service interval (days) $\bar{x} \pm SE$	Days open $\bar{x} \pm SE$	Gestation Length (days) $\bar{x} \pm SE$	Calving interval (days) $\bar{x} \pm SE$	Problems during gestation or parturition (%)
1	140	78.57	1.25 ± 0.044			272.7 ± 1.33		10.71
2	111	63.96	1.50 ± 0.074	87.7 ± 6.17	113.6 ± 8.27	275.5 ± 1.50	390.4 ± 8.60	7.20
3	85	49.41	1.71 ± 0.091	80.1 ± 5.95	115.7 ± 9.07	274.0 ± 1.77	389.5 ± 9.46	11.76
4	54	66.66	1.70 ± 0.182	77.3 ± 4.92	114.4 ± 15.45	278.1 ± 0.86	391.1 ± 15.98	7.40
5	41	51.21	1.78 ± 0.146	67.0 ± 6.06	106.0 ± 12.37	274.5 ± 1.55	377.5 ± 12.59	12.19
6	23	47.82	2.13 ± 0.351	73.1 ± 6.31	105.5 ± 11.69	276.6 ± 1.62	374.2 ± 10.23	17.39
7	10	40.00	1.90 ± 0.314	62.9 ± 3.14	86.3 ± 9.41	275.9 ± 2.65	363.9 ± 7.07	10.00
Overall mean		63.60	1.55 ± 0.043	79.6 ± 2.88	111.9 ± 4.81	274.4 ± 0.69	385.8 ± 5.11	10.34

- C R = Conception rate for the first service.

- Differences among parities were significant (P < 0.01) only for the number of services / conception

found that mean calving interval and days open became progressively shorter in the imported cows as parity advanced. On the other hand, Abdel- Ghany and Fahmy (1966) in Egypt, reported that calving interval was significantly influenced by the age of cow at calving. They found that calving interval tended to decrease with the increase of age. Moreover, Badran (1978) found that the regression of calving interval on age of cow at calving was negative but nonsignificant. Previously, El- Sheikh and El- Fouly (1962) reported that the first calving interval was significantly longer than the subsequent intervals. Mohamed (1987) found a significant effect of parity on the length of calving interval.

Table 3- Correlation coefficients among different reproductive parameters in Friesian cattle

Reproductive parameter	Correlation coefficient
1. Calving interval and services / conception.	0.43 ** (p< 0.01)
2. Calving interval and calving to first service.	0.60 ** (p< 0.01)
3. Calving interval and days open.	0.98 ** (p< 0.01)
4. Calving interval and parity.	0.042 n. s.
5. Parity and services / conception.	0.23 ** (p< 0.01)
6. Days open and services / conception.	0.47 ** (p< 0.01)
7. Days open and calving to first service.	0.60 ** (p< 0.01)
8. Days open and parity.	0.048 n. s.
9. Gestation length and male calf.	0.14 ** (p< 0.01)

n.s. not significant (P>0.05).

** significant (P<0.01)

Reproductive difficulties may occur during gestation or at parturition, such as early or late abortion, dystocia and retained placenta, which ranged between 7.2 and 17.4% in this study (Table 2) during the seven successive parturitions. Present study also revealed that male calf born was significantly (P<0.01) associated with longer length of gestation (r= 0.14).

Salisbury et al. (1985) reported that male calves are carried about one day longer than females. Mean gestation length in this study varied between 272.7 and 278.1 days with overall mean of 274.4 days. Salah and Mogawer (1990) in imported Friesian cows in Saudi Arabia showed that overall mean gestation length was 276.7 days. Salisbury et al. (1985) reported that length of gestation in cattle varies with the breed, sex and number of calves being carried, and probably with other factors such as age of the cow, season of the year, and the geographical location of the cattle from which the data are obtained.

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المظاهر التناسلية لأبقار الفريزيان تحت ظروف البيئة الفلسطينية

حاتم عايش الشنطي

قسم الإنتاج الحيواني - كلية الزراعة - جامعة الأزهر - غزة - فلسطين

- يهدف هذا البحث إلى دراسة بعض المظاهر التناسلية لأبقار الفريزيان تحت ظروف البيئة الفلسطينية وبالذات في منطقة (أريحا) التي تتميز بأنها منطقة شبه جافة منخفضة عن سطح البحر بحوالي ٧٠٠م وتتميز بارتفاع درجات الحرارة صيفاً.
- شملت الدراسة سجلات معظم الأبقار الموجودة في محطة المشروع الإنشائي العربي وعددها حوالي ١٤٦ بقرة في المدة المحصورة بين ١٩٨٦ - ١٩٩٦ وتتلخص نتائج البحث فيما يلي:
- ١- كان متوسط العمر عند أول تلقيحه $٥٤٦,٨ \pm ٢٤,٠٣$ ومتوسط العمر عند أول تلقيحه مخصبة $٥٧٢,٥ + ٣٣,١٥$ ومتوسط العمر عند أول ولادة $٨٢٥,٣ \pm ٢٥,٢٣$ ولا يوجد فروق معنوية لتأثير مواسم السنة على هذه القياسات.
 - ٢- كان متوسط عدد مرات التلقيحات اللازمة للحمل حوالي $١,٥٥ \pm ٠,٠٤٣$ وكان متوسط معدل الإخصاب $٦٣,٦\%$ ويوجد فروق معنوية لتأثير عدد مواسم الوضع على عدد مرات التلقيح اللازمة للحمل.
 - ٣- كان متوسط طول الفترة من الولادة حتى أول تلقيحه $٧٩,٦ \pm ٢,٨٨$ وكان متوسط طول الفترة من الولادة حتى التلقيح المخصبة $١١١,٩ \pm ٤,٨$ وكان متوسط طول مدة الحمل $٢٧٤,٤ \pm ٠,٦٩$ وكان متوسط طول الفترة بين الولادتين $٣٨٥,٨ \pm ٥١١$ ويلاحظ أنه لا يوجد فروق معنوية لتأثير مواسم الوضع المختلفة ولكن يقل طول الفترة بين ولايتين مع تقدم عمر الحيوان.