Egyptian J. Anim. Prod. 35, Suppl. Issue, Dec. (1998):597-607.

ANALYSIS OF NON-GENETIC FACTORS AFFECTING CALVING INTERVAL AND POST-PARTUM TRAITS IN EGYPTIAN BUFFALOES

S.A. Ibrahim

Department of Animal Production, Faculty of Agriculture, Cairo University

SUMMARY

In this study 3926 records for 666 buffalo cows, covering the period from 1967 till 1994 were used. Data were analysed for the effect of calving season, parity, milk production level throughout the first 100 days post-partum and calving year on calving interval (CI), days open (DO), service period length (SPL), and post-partum service interval (PPSI).

All traits were significantly affected by all factors except for the effect of year of calving on PPSI, which was not significant. CI, DO and SPL were significantly ($P<0.05$) the longest for buffaloes calved during winter and spring. All traits tended to be significantly shorter with parity progress. CI decreased from 583.6±4.6 days in the first parity to 461.1±4.5 days in the parities >4. High milk producers showed poor reproductive characteristics. The shortest CI was recorded when buffaloes produced low milk (494.7±4.7 days).

DO and SPL decreased significantly from 205±4.4 and 142.2±4.1 days in winter to 174±4.3 and 112.8±4.0 days in autumn, respectively. The shortest DO and SPL were recorded when buffaloes had >4 parities (143.2±4.5 and 85.0±4.3 d) and produced low milk (176.8±4.7 and 115.8±4.5 d), respectively. The shortest PPSI was obtained when buffaloes calved during autumn (61.2±0.5 d), had >4 parities (58.3±0.5 d) and produced low milk (61.0±0.5 d).

It could be concluded that CI of buffalo cows decreased for autumn and summer calvers and with the progress of parity. Milk production level during the first 100 days of the lactation period affects significantly CI length.

Keywords: Buffalo, calving season, milk production, parity, calving interval, post-partum

INTRODUCTION

Determining the post-partum reproductive performance of buffaloes is one of the effective ways to evaluate buffalo reproductive potentiality. Calving

interval is the most considerable character to evaluate reproductive efficiency. So, it is important to achieve as short as calving interval.

In Egyptian buffaloes, wide variation of estimated calving interval was reported ranging from 375 to 605 days (Youssef *et al.*, 1988, Mourad *et al.*, 1989, Afifi *et al.*, 1992, Barkawi *et al.*, 1995, and El-Wardani, 1995). Such wide variation seems to be due to physiological (e.g. suckling, parity, milk production, ... etc) and/or environmental factors (e.g. season of calving, year, nutrition, ... etc).

Accordingly, this study was designed to analyze some of the non-genetic factors (calving season, parity, year of calving and milk production level throughout the first 100 days post-calving) affecting post-partum reproductive activities and calving interval in Egyptian buffaloes.

MATERIALS AND METHODS

Records

Data of 3926 lactation and reproductive records, for 666 buffalo cows, covering the period from 1967 to 1994, were obtained from the buffalo farm of Mahallet Mousa, Kafr El-Sheikh Governorate and belonging to Animal Production Research Institute (APRI), Ministry of Agriculture, Egypt. The records ranged between the 1*st* and 12*th* parity.

Farm management practices

Animals were fed and managed according to APRI standards. In winter and spring (December - May), feed requirements were covered from grazing on the Egyptian clover (*Trifolium alexandrinum*). During summer and autumn (June - November), animals were housed under open-sheds and fed a concentrate mixture in addition to wheat or rice straw, while Egyptian clover hay was offered whenever available. Animals were hand-milked twice daily and milk yield was weekly recorded. Buffaloes were checked twice daily for the purpose of heat detection. Animals which came in heat were served by fertile bulls and conception was diagnosed after 60 days by rectal palpation.

Categories according to factors

According to season of calving, records were divided into: winter (December - February), spring (March - May), summer (June - August) and autumn (September - November), while records were divided into 5 groups (1*st*, 2*nd*, 3*rd*, 4*th* and >4*th*) to study the effect of parity. According to milk production level throughout the first 100 days post-partum, records were divided into high (> 900 kg), medium (700 - 900 kg) and low (< 700 kg) milk producers. Concerning year at calving, records were divided into 5 groups (1: the period before 1976, 2: from 1976 to 1980, 3: from 1981 to 1985, 4: from 1986 to 1990 and 5: the period from 1991 to 1994). The number of records for

each season, parity, year of calving and milk production groups is shown in Table (1).

Table 1. Reproductive traits (least squeres means ± S.E) as affect by season of calving, parity at calving, level of milk production and year of calving

Factors / Traits	No. of records	PPSI (days)	SP (days)	NS/C	DO (days)	CI (days)
Season of calving						
winter	1140	62.9 ± 0.5 ^{b}	142.2 ± 4.1 ^{a}	4.6 ± 0.1 ^{b}	205.1 ± 4.4 ^{b}	523.3 ± 4.4 ^{a}
spring	996	64.8 ± 0.5 ^{a}	147.0 ± 4.4 ^{a}	4.8 ± 0.1 ^{a}	211.9 ± 4.6 ^{a}	529.9 ± 4.6 ^{a}
summer	591	62.5 ± 0.6 ^{b}	114.9 ± 5.3 ^{b}	4.1 ± 0.1 ^{c}	177.4 ± 5.6 ^{c}	495.6 ± 5.6 ^{b}
autumn	1199	61.2 ± 0.5 ^{c}	112.8 ± 4.0 ^{b}	4.0 ± 0.1 ^{c}	174.1 ± 4.3 ^{c}	492.0 ± 4.3 ^{b}
Parity at calving						
1st	925	68.4 ± 0.5 ^{a}	196.7 ± 4.4 ^{a}	5.8 ± 0.1 ^{a}	265.1 ± 4.6 ^{a}	583.6 ± 4.6 ^{a}
2nd	741	64.9 ± 0.6 ^{b}	151.7 ± 4.8 ^{b}	4.9 ± 0.1 ^{b}	216.5 ± 5.1 ^{b}	534.8 ± 5.1 ^{b}
3rd	603	62.7 ± 0.7 ^{c}	116.4 ± 5.4 ^{c}	4.2 ± 0.1 ^{c}	179.1 ± 5.7 ^{c}	497.0 ± 5.7 ^{c}
4th	484	60.2 ± 0.7 ^{d}	96.4 ± 6.0 ^{d}	3.7 ± 0.1 ^{d}	156.6 ± 6.3 ^{d}	474.6 ± 6.3 ^{d}
>4th	1173	58.3 ± 0.5 ^{e}	85.0 ± 4.3 ^{e}	3.4 ± 0.1 ^{e}	143.2 ± 4.5 ^{e}	461.1 ± 4.5 ^{e}
Milk production level						
L: <700 kg	1048	61.0 ± 0.5 ^{a}	115.8 ± 4.5 ^{b}	4.0 ± 0.1 ^{c}	176.8 ± 4.7 ^{b}	494.7 ± 4.7 ^{b}
M: 700-900 kg	505	63.0 ± 0.7 ^{a}	117.1 ± 5.5 ^{b}	4.2 ± 0.1 ^{b}	180.1 ± 5.8 ^{b}	498.4 ± 5.8 ^{b}
H: > 900 kg	2373	64.6 ± 0.3 ^{a}	154.9 ± 2.9 ^{a}	5.0 ± 0.1 ^{a}	219.5 ± 3.1 ^{a}	537.6 ± 3.1 ^{a}
Year of calving						
before 1976	413	62.7 ± 0.8 ^{b}	146.0 ± 6.6 ^{a}	4.7 ± 0.1 ^{a}	208.6 ± 6.9 ^{a}	526.5 ± 6.9 ^{a}
1976 - 1980	1199	63.2 ± 0.5 ^{b}	137.8 ± 4.0 ^{b}	4.5 ± 0.1 ^{b}	201.1 ± 4.2 ^{b}	519.1 ± 4.2 ^{b}
1981 - 1985	1356	63.2 ± 0.4 ^{b}	127.0 ± 3.6 ^{c}	4.4 ± 0.1 ^{c}	190.2 ± 3.8 ^{c}	508.7 ± 3.8 ^{c}
1986 - 1990	717	62.0 ± 0.6 ^{b}	127.3 ± 4.7 ^{cd}	4.3 ± 0.1 ^{d}	189.3 ± 5.0 ^{cd}	507.4 ± 5.0 ^{cd}
1991 - 1994	241	63.3 ± 0.9 ^{b}	108.1 ± 7.9 ^{d}	4.0 ± 0.2 ^{d}	171.3 ± 8.3 ^{d}	489.4 ± 8.3 ^{d}
Overall mean	3926	63.4 ± 0.2	143.5 ± 2.1	4.7 ± 0.1	206.9 ± 2.2	525.0 ± 2.2

a,b,c,d, e; difference between the corresponding values within each column is significant at 5% level.

Studied traits

Data were analysed to calculate the post-partum service interval (PPSI, the period from parturition to first service), service period (SP, the period from the first service to conception), number of services per conception (NS/C), days open (DO, the period from calving to the next successful conception and calving interval (CI, the period from one calving to the next).

Statistical analysis

Data were analysed using General Linear Model (GLM) and regression procedures of SAS (1990) to estimate the effects of season of calving, parity, year of calving and lactation length (as covariate terms) on the previous stated reproductive traits. Another regression model was applied to find out the effect of SP and PPSI as covariates affecting DO. To test the differences among levels of all main factors, Duncan's Multiple Range test (1955) was performed.

RESULTS AND DISCUSSION

1- Post-partum service interval (PPSI)

The obtained overall mean of PPSI (63.4 ± 0.2 days, Table 1) is lower than the averages (165.7 - 214.3 days) reported by Mourad *et al.* (1985), Zeidan (1990), Afifi *et al.* (1992). However, it is slightly greater than that (42.5 - 47 days) stated by Khattab (1980), El-Wardani (1995) and El-Rigalaty (1995) in Egyptian buffaloes. Under the assumption of buffalo cows are served at the first time manifesting estrus post-partum, PPSI could be considered as the interval from parturition to the first detected heat. So, the wide variation in PPSI might be explained as the differences in resumption of post-partum ovarian activity and in the efficiency of heat detection.

Even though differences in PPSI among seasons were statistically significant ($P<0.0001$), the variability was in a very narrow scale. The shortest PPSI was observed for autumn calvers, while the longest was for spring ones. This is mainly due to those of autumn season most probably started their sexual activity (first ovulation and estrus) in the next winter where the sexual activity is usually at its maximum, while spring calvers resume their sexual activity during the next summer where the sexual activity is at its minimum (El-Fouly *et al.*, 1976). The present results are consistent with those of Ahmed *et al.* (1981) who stated that Nili-Ravi buffaloes calving in summer or fall resume ovarian cyclicity earlier than those in winter or spring. PPSI appeared to decline significantly with the advancement of parity (Table 1). This finding agrees with that found by Stevenson *et al.* (1983) who stated that interval to first service for older Holstein cows was significantly shorter than younger cows.

High milk producing group did not differ significantly from the other two groups (Table 1). Berger *et al.* (1981) found that high milk producing cows took longer periods to conceive than did low producers. Singh *et al.* (1972) in Murrah buffaloes, El-Fouly *et al.* (1977) and Youssef *et al.* (1988) in Egyptian buffaloes reported that PPSI was significantly correlated with milk yield and lactation length. Year of calving affected PPSI non-significantly (Tables 1 & 2).

Partial regression of PPSI on DO significantly affected DO by only 6%. This humble contribution of PPSI might be attributable to the internal environment of the individual animals represented in the period required for the involution of the uterus and resumption of post-partum ovarian activity. Youssef *et al.* (1988) indicated that one day increase in the PPSI was associated with an increase of 0.9 day in the length of SP and in CI.

2- Service period (SP)

The overall mean of SP (143.5 ± 2.1 days) obtained in the present study (Table 1) is close to that found by Youssef *et al.* (1988, 127.9 days). However, it is greater than the estimates reported by the majority of the

studies in Egyptian buffaloes (El-Shafie *et al.*,1983, El-Menoufy *et al.*, 1984, Zeidan, 1990, Ayesh, 1992, El-Wardani, 1995 and El-Rigalaty, 1995, 15.7 - 75.4 days). This discrepancy in SP could be attributable to the variation in heat checking procedures, bull fertility, proper time of insemination and season of calving.

Table 2. Degrees of freedom and F-values for factors affecting reproductive traits in Egyptian buffaloes

S. V	df	PPSI	SP	NS/C	DO	CI
Season	3	15.32***	26.23***	36.17***	27.74***	27.74***
Parity	4	57.11***	111.0***	122.78***	118.04***	118.64***
MPL	2	20.73***	53.0***	76.5***	54.93***	54.77***
Year	4	1.17 NS	4.54**	3.99*	4.09**	4.0**
Residual MS	3912	201.5	14249.2	5.2	15756.7	15789.3

NS = Non significant.
* = significant at 0.05.
** = significant at 0.001.
*** = significant at 0.0001.

Table (1) shows that SP is significantly shorter in summer and autumn calvers than those calved during winter and spring. This finding agrees with that of Ayesh (1992) who reported that SP in Egyptian buffaloes during hot was shorter than that during cold season (43.4 and 61.0 days, respectively).

Regarding the effect of parity, the same trend observed with PPSI was more pronounced with SP. Buffaloes produced more milk during the 100 days post-partum interval had significantly the longest SP. Year of calving significantly ($P<0.001$) affected SP where the shortest SP was recorded during the period 1991-1994. The descending trend of SP means that the managerial level was improved with increasing year of calving.

SP significantly affected DO by 94% estimated as a partial regression of SP on DO which means that SP is considered as the main determining factor of DO, hence, it is reflected on CI.

SP tended to decrease significantly with parity progress. It decreased from 196.7 days at the first parity to 85.0 days for those having >4 parities. SP seems to be negatively correlated with MPL. High milk producers had significantly longer SP compared to low and medium producers (Table 1).

3- Number of services per conception (NS/C)

The overall mean of NS/C is 4.7 ± 0.1 (Table 1), which is higher than most of values (1.5 - 2.2) reported by other researchers in the Egyptian buffaloes (Ayesh, 1992, El-Rigalaty, 1995 and El-Wardani, 1995). The higher NS/C obtained here might be attributed to its calculation under the common practices in the farm not under experimental conditions.

The NS/C was significantly higher during winter than in summer which was in an agreement with the finding of Ayesh (1992) who reported that the means of NS/C during cold and hot seasons were 2.1 and 1.8, respectively. Table (1) shows that NS/C decreased with parity progress. This is consistent with the same trend observed before with PPSI and SP.

High milk producing buffaloes required significantly more services per conception than did low milk producing animals. This finding along with that of PPSI and SP, confirm the fact that milk yield appears to be antagonistic to reproductive performance. Year of calving had a significant ($P<0.05$) influence on NS/C where a slight decrease was observed with year progress.

4- Days open (DO)

Table (1) shows that the overall mean of DO is 206.9 ± 2.2 which appeared to be very close to the average reported by Zeidan (1990, 202.7 days) and the mean of McDowell *et al.* (1995) in Murrah buffaloes (203 days). It was also not too far from that found by Metry *et al.* (1994, 181 days). Meanwhile, it was lower than that obtained by Barkawi *et al.* (1995, 289.6 days) but longer than that reported by El-Wardani (1995, 60.4 days) and Mohamed (1995, 82.1 days) in Egyptian buffaloes.

As shown in Table (1), DO was significantly ($P<0.05$) shorter in summer than in winter. This finding was in accordance with that reported by Ayesh (1992) who found that DO was 103.8 and 164.6 days for hot and cold season calvers, respectively. Also, the results of Metry *et al.* (1994) supported this finding where the values were 168 and 181 days for hot and cold seasons, respectively.

In terms of the effect of parity and MPL on DO, the same trend observed in PPSI, SP and NS/C was also true. Year of calving had a significant ($P<0.001$) effect on DO. The shortest DO was that of the period from 1991 to 1994.

5- Calving interval (CI)

The overall mean of CI obtained here (525±2.2 days) was slightly longer than that of Cady *et al.* (1983, 506 days) for buffaloes in Pakistan, McDowell *et al.* (1995, 491 days) and Zeidan (1990, 500 days) in Egyptian buffaloes. But it was highly longer than reported by Metry *et al.* (1994, 477 days) in Egyptian buffaloes, Gogoi *et al.* (1984, 430 days) in Murrah buffalo and El-Rigalaty (1995, 446 days) in Egyptian buffaloes. However, it was shorter than that obtained by Mourad *et al.* (1989, 594 days) and Barkawi *et al.* (1995, 604 days) in Egyptian buffaloes.

These differences in CI among breeds and localities are most likely attributable to herd environment effects and management practices.

In the present study, about 60% of calvings had occurred during winter and autumn seasons indicating seasonal patterns in time of breeding. Similar finding was reported by Metry *et al.* (1994). The shortest CI was that of

autumn while, the longest was that of spring with a difference being 38 days (Table 1). Calving interval was significantly ($P<0.05$) longer in winter than in summer which agreed with Kotby *et al.* (1988) who reported values of 527.7 days and 505.3 days for cold and hot seasons, respectively. Also, Afifi *et al.* (1992) estimated CI for Egyptian buffaloes to be 584 days and 575 days for cold and hot seasons, respectively. In autumn calvers, CI was the shortest due to buffalo cows of this season had the shortest PPSI, SP and DO as well as they needed the least services per conception compared to the other three seasons.

Calving interval appeared to be the longest when buffalo cows were in first and second parities. With the advancement of parity, CI was significantly ($P<0.05$) decreased, since the shortest CI was recorded when animals had more than four parities (461 ± 4.5) (Table 1). This may be attributed to the insufficient hormonal control of the hypothalamo-pituitary ovarian axis throughout the first two parities. Also, CI decreased when buffalo cows were producing less milk. This most probably attributed to the negative energy balance of high yielders throughout the first part of lactation curve which may negatively affect both ovulatory and estrous activities.

Year of calving significantly ($P<0.001$) affected the CI. The same trend observed with SP and DO is also true with CI. This means that the managemental practices and nutritional status of the buffalo herd were improved, with the progress of calving year.

It could be concluded that CI of buffalo cows was shortened when calvings occurred during autumn and summer seasons, when buffaloes had ≥ 4 parities during years 1991- 1994 and when less milk was produced.

REFERENCES

Afifi, E. A., M. H. Khalil, L. H. Bedeir and S. M. Zeidan, 1992. Genetic analysis of reproductive traits in Egyptian buffaloes. Egypt. J. Anim. Prod., 29 (2) :139-154.

Ahmed, N., R.A. Chaudhry and B. B. Khan, 1981. Effect of month of season of calving on the length of subsequent calving interval in Nili-Ravi buffaloes. Anim. Reprod. Sci., 3:301-309.

Ayesh, H., 1992. Some reproductive aspects of female buffaloes fed on dry feeds. Ph.D. Thesis, Fac. Agric. Ain-Shams Univ., Egypt.

Barkawi, A. H.; H. M. Farghaly and A. M. El-Borady, 1995. Effect of treatment with GnRH analogue on post-partum reproductive performance of suckling Egyptian buffalo cows. Buffalo J. 11:117-123.

Berger, P.J., R.D. Shanks, A.E. Freeman and R.C. Laben, 1981. Genetic aspects of milk yield and reproductive performance. J. Dairy Sci., 64:114-122.

Cady, R.A., S.K. Shah, E.C. Schermerhorn and R.E. McDowell, 1983. Factors affecting performance of Nili-Ravi buffalo in Pakistan. J. Dairy Sci., 66:578.
Duncan, D. B., 1955. Multiple range and multiple " F " tests. Biometrics 11:1.
El-Fouly, M.A., E.A. Kotby and H.E. El-Sobhy, 1976. The functional reproductive peak in Egyptian buffalo cow is related to day length and ambient temperature. Archivo Veterinario Italiano, 27:123-129.
El-Fouly, M. A., Y. Afifi and A. K. Kirrella, 1977. Service period length in a herd experimental buffaloes. Egypt. J. Anim. Prod., 17 (1) :63-73.
El-Menoufy, A.A., M.M. El-Tayeb, M.M. Ayoub, I.H. Youssef and M.S.S. Abdou, 1984. Breeding performance in buffaloes and Friesian cows in Egypt. Egypt. J. Anim. Prod., 24 (1-2) :193-206.
El-Rigalaty, H. A., 1995. Effect of seasonality and milk productivity on the reproductive performance of Egyptian buffaloes from parturition to conception. M. Sc. Thesis, Fac. Agric., Cairo Univ., Egypt.
El-Shafie, M.M., A.M.A. Borady, H. Mourad and R. Khattab, 1983. Physiological and seasonal factors affecting reproductive performance of Egyptian buffalo heifers. Egyptian J. Anim. Prod., 23 (1-2) :1-14.
El-Wardani, M. A., 1995. Reproductive efficiency of buffalo cows in relation to managerial practices. Ph. D. Thesis, Fac. Agric., Cairo Univ., Egypt.
Gogoi, P. K., P. K. Johar and A. Singh, 1984. Effect of genetic and non genetic factors on calving interval in Murrah buffalo. Ind. Vet. Med. J. 8:107.
Khattab, R. M., 1980. Study of some reproductive performance of Egyptian buffalo heifers. M. Sc. Thesis, Fac. Agric., Cairo Univ., Egypt.
Kotby, E.A., L.H. Bedier; H. E. El-Sobhy and L. N. Eid, 1988. The reproductive performance of Egyptian buffaloes as influenced by season environmental factors. Proc. 1*st* Conf. Agric. Develop. Res., Egypt. 9:1-11.
McDowell, R. E., J.C. Wilk, S.K. Shah, D.S. Balain and G. H. Metry, 1995. Potential for commercial dairying with buffalo. North Carolina State Univ., USA.
Metry, G.H., J.C. Wilk, R.E. McDowell and H. A. El-Rigalaty, 1994. Factors affecting the performance of Egyptian buffalo. Annals of Agric. Sc., Moshtohor, Vol. 32(2):827-841.
Mohamed, H. B., 1995. Productive and reproductive performance of Egyptian buffaloes as affected by feeding level during MID-pregnancy and early stage of lactation. M. Sc. Thesis, Fac. Agric., Moshtohor, Zagazig Univ., Egypt.
Mourad, K.A., A.S. Khattab and M.A.R. Ibrahim, 1989. Effect of genetic and non-genetic factors on reproductive traits in Egyptian buffaloes. Buffalo Bulletin, 8(1):9-17.
Mourad, K.A., R.H. Youssef and A.S. Khattab, 1985. Individual factors affecting the interval between calving to first service in Egyptian buffaloes. Egypt. J. Anim. Prod., 25 (2) :319-333.

Singh, G., V. K. Tameja, L.D. Bajpai and P.N. Bhat, 1972. Studies in Murrah buffaloes. IV- Service period. Indian J. Ainm. Prod., 3:159-162.

SAS : Statistical Analysis System Institute, 1990. SAS User's Guide. Statistics, Version 5 Edition, SAS Institute Inc., Cary, NC, USA.

Stevenson, J.S., M.K. Schmidt and E.P. Call, 1983. Factors affecting reproductive performance of dairy cows first inseminated after five weeks post-partum. J. Dairy Sci., 66:1148-1154.

Youssef, R.H., Kawthar A. Mourad and A. El-Taweel, 1988. The effect of post-partum service interval and early breeding on the reproductive efficiency and milk production in normal Egyptian buffaloes. Buffalo J. 1:69-77.

Zeidan, S. M., 1990. Study of productive performance of Egyptian buffaloes. M. Sc. Thesis, Fac. Agric., Moshtohor, Zagazig Univ., Egypt.

تحليل للعوامل غير الوراثية المؤثرة على الفترة بين الولادتين وصفات مابعد الولادة فى الجاموس المصرى

صالح عبد الحميد إبراهيم

قسم الإنتاج الحيوانى- كلية الزراعة - جامعة القاهرة - الجيزة - مصر

إستخدم فى هذه الدراسة ٣٩٢٦ سجلا لعدد ٦٦٦ جاموسة خلال الفترة من ١٩٦٧ حتى ١٩٩٤م ، وتم تحليل البيانات لدراسة تأثير موسم الولادة وترتيب موسم الولادة ومستوى إنتاج اللبن خلال المائة يوم الأولى بعد الولادة وسنة الولادة على الفترة بين الولادتين، فترة الأيام المفتوحة ، طول فترة التلقيح، و الفترة من الولادة حتى أول تلقيحة.

ولقد كان لجميع العوامل المدروسة تأثير معنوى على جميع الصفات سابقة الذكر ، ما عدا تأثير سنة الولادة على صفة الفترة من الولادة حتى أول تلقيحة . ولقد كانت الفترة بين الولادتين ، وفترة الأيام المفتوحة ، وفترة التلقيح أطول معنويا فى ولادات فصلى الشتاء (٥٢٣,٣، ٢٠٥,١، ١٤٢,٢ يوما) والربيع (٥٢٩,٩ ، ٢١١,٩ ، ١٤٧,٠ يوما) على الترتيب . ومع تقدم موسم الولادة كانت جميع الصفات المذكورة أقصر معنويا حيث إنخفضت الفترة بين الولادتين من ٥٨٣ يوما فى موسم الولادة الأول إلى ٤٦١ يوما فى الموسم الخامس للولادة ومايليه. و بصفة عامة إتسمت الحيوانات ذات إنتاج اللبن العالى بإنخفاض خصائصها التناسلية. ولقد سجلت أقصر فترة بين ولادتين (٤٩٤ يوما) للحيوانات ذات إنتاج اللبن المنخفض.

ولقد إنخفضت فترة الأيام المفتوحة وطول فترة التلقيح إنخفاضا معنويا من ٢٠٥,٠ ، ١٤٢,٢ يوماً فى ولادات فصل الشتاء إلى ١٧٤,٠ ، ١١٢,٨ يوما فى ولادات فصل الخريف ، على الترتيب. وكانت تلك الصفتان السابقتان أقصر مايمكن عندما كانت مواسم الولادة أكثر من اربعة (١٤٣,٢ ، ٨٥,٠ يوما) ، وعندما كان مستوى إنتاج اللبن منخفضا (١٧٦,٨ ، ١١٥,٨ يوما) على الترتيب . وسجلت أقصر فترة من الولادة حتى أول تلقيحة حينما تمت الولادة فى فصل الخريف (٦١,٢ يوما) ، حينما كان ترتيب موسم الولادة أكثر من أربعة (٥٨,٣ يوماً)، و حينما كان مستوى إنتاج اللبن منخفضا (٦١,٠ يوما) .

وتخلص الدراسة إلى حدوث إنخفاض فى الفترة بين الولادتين فى الجاموس المصرى حينما تمت الولادة فى فصلى الخريف والصيف ، وكذلك مع زيادة ترتيب موسم الولادة . كما تأثرت الفترة بين الولادتين تأثيرا معنويا بمستوى إنتاج اللبن خلال المائة يوما الأولى بعد الولادة .