

THE REPRODUCTIVE PERFORMANCE OF THE EGYPTIAN BUFFALO

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SUMMARY

Data in the present study were collected from eight herds of Egyptian buffaloes distributed throughout the Delta region of the U.A.R. It included 1200 buffaloes heifers and covering the period from 1929 through 1961.

The average age at first calving for 445 heifers was 39.9 months. Differences in age at first calving among herds studied were statistically significant, however, no significant differences were obtained due to month of birth.

The overall average of postpartum service interval, interval between recorded services, service period, calving interval and gestation period was 136.35, 69.24, 165.31, 484.74 and 316.31 days, respectively. Differences between the eight herds studied in regards to postpartum service interval, interval between services, calving interval and gestation period were statistically significant. However, there was no significant difference between the eight herds in respect to service period length.

Month of calving appeared to influence postpartum service interval, service period, calving interval and gestation period.

Buffaloes which calved during autumn and early winter had shorter postpartum service and service periods than those calved during the rest of the year. The gestation period for those buffaloes calved from May to November was shorter than that for buffaloes calving during the other months of the year.

Sequence of calving had a significant effect on postpartum service interval, service period and calving interval. The average postpartum service intervals, for the first, second and third calving were 192.95, 152.67 and 121.84 days, respectively. The corresponding service period lengths were 226.26, 182.70 and 148.70 days. The first calving interval was 50 days longer than the second one, while the latter was 21 days longer than the third. Results also showed that the gestation periods for the first, second, third and fourth calvings were 317.9, 317.0, 318.2 and 318.3 days, respectively.

Evidence had been presented to show that the number of services required per conception and the length of postpartum service interval influenced the service period length significantly. A highly significant correlation was found between the number of services per conception and service period length ($r = +0.29$) while the regression coefficient was 39.01 days. The correlation coefficient between postpartum service and service period was highly significant ($r = +0.85$) and the regression coefficient was 0.636 days.

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The percentage of buffaloes that conceived from one, two, three and four or more services were 75.77, 17.41, 4.25 and 2.57, respectively. One third of the buffaloes conceived during a postpartum service interval of 31-90 days.

Age at first calving had no significant effect on the length of the first calving interval. Repeatability estimate of the calving interval for buffaloes with two or three successive intervals was almost equal to zero. Male calves were carried in the uterus on the average 0.51 days longer than females, but, this difference lacked statistical significance.

INTRODUCTION

In many countries of the Middle East, the buffalo is still considered the main dairy animal. Although about 70% of the total milk production in the U.A.R. is from buffaloes, yet little is known about their reproductive performance.

It is generally believed that the reproductive performance of buffaloes in Egypt is low and any attempts for improving their performance should be preceded by a thorough investigation of their reproductive characters in a number of herds distributed throughout the country.

In the present work six parameters were taken as indicatives of the reproductive efficiency of buffaloes (1) Age at first calving, (2) Service period, (3) Postpartum service, (4) Interval between services (5) Calving and interval (6) Gestation period.

Previous investigations showed that buffaloes calve for the first time at an older age compared to dairy cattle. However the available data on weight and age of Egyptian buffaloes at their first calving are scarce and the research into this area is much needed.

The importance of the postpartum service interval lies in the fact that during this period the reproductive organs undergo several anatomical and histological changes related to those in the endocrine system for the resumption of the normal estrous cycle.

Calving interval with its components, is another factor of considerable importance since it influences the economy of buffalo production. Information regarding gestation period for buffaloes and the factors affecting it are rather incomplete. The variations in duration of pregnancy that exist within breeds may be due to both genetic and environmental factors. However, it is rather difficult to determine which of these play the predominant role.

MATERIAL AND METHODS

Data used in the present study were collected from the following eight commercial and experimental herds of buffaloes and distributed throughout the Delta region of the U.A.R. : Allam at Sendebese, The Egyptian Agricultural

Organization at Bahteem, The Ministry of Agriculture at Mehallit Mousa, Moshtohor Secondary School of Agricultural, El-Ahram Farm, The Higher Agricultural Institute at Sehebein El-Kom, Faculty of Agriculture of Ein Shams University and Mostorod Agricultural School. The information collected covered the period from 1929 through 1961 and included 1200 buffaloes and heifers.

Buffaloes in all herds studied were kept in semi-open sheds throughout the year. Feeding regime included Egyptian clover during winter and spring mainly, and concentrate mixtures (cotton seed cake, rice and wheat bran and corn) during summer and fall. Green corn and Alfalfa were sometimes available during the latter period. Buffaloes were hand milked twice daily and breeding heifers were allowed to suckle their dams for 3 months approximately.

On the first apparent heat following parturition, buffaloes were mated naturally. Mating was repeated when heat symptoms reappeared. Buffaloes that did not show heat signs following recorded mating were considered pregnant. Pregnancy was diagnosed per rectum but only in limited cases.

RESULTS AND DISCUSSION

I. Age At First Calving

The average age at first calving for buffaloes was 39.9 ± 0.69 months (Table 1). Other investigators in the U.A.R. Ragab *et al*, 1953 (Alim and Ahmed, 1954; and Asker and Youssef, 1959) reported similar age at first calving for buffalo (39.4 - 40.2 months). However, lower estimates were also reported by some U.A.R. investigators (Khishin, 1951; Hilmy, 1954 and Afifi, 1961). Indian and Pakistani workers (Ashfaq and Mason, 1954; Venkayya and Ahantakrishnan, 1957; Rife, 1959; and Agarwala, 1962) obtained high estimates for age at first calving in Indian and Pakistani buffaloes. Differences between the present estimates for age at first calving and those of Indian and Pakistani buffaloes may be genetical or due to climate and managerial practices. Significant differences in age at first calving ($P < 0.01$) were observed among the six herds studied. Variations in systems of calf rearing may be responsible for such differences. Since only natural suckling was practiced, some calves could have more milk than others due to the fact that marked differences exist in milk yield of buffaloes.

Investigations on the optimal age and weight for first mating and the effect of calving at an early age on both body development and milk production in buffaloes are much needed. The small value of heritability of age at first calving obtained by Asker and Youssef (1959), and Singh (1957), precludes selective breeding as an effective system for lowering the age at first calving. Improving the system of heat detection and proper service along with the improvement in managerial practice could be useful in this respect.

TABLE 1.—The average and standard error for age at first calving, postpartum service interval, period between recorded services, service period, calving interval and gestation period for eight herds of buffaloes.

Herd	Age at first calving		Postpartum Service		Int. between services		Service period		Calving interval		Gestation period	
	No.	Average and stand. error (months)	No.	Average and stand. error (days)	No.	Average and stand. error (days)	No.	Average and stand. error (days)	No.	Average and stand. error (days)	No.	Average and stand. error (days)
Allam	54	37.94±0.55	137	143.93±7.77	130	46.10±4.27	260	180.16±6.20	273	500.21±6.07	397	316.74±0.34
Fac. of Agric.	59	41.19±0.77	75	147.59±11.68	65	56.95±6.51	67	169.23±8.32	130	477.39±9.25	96	318.07±1.00
Shebien Fi-Kom	28	41.23±1.96	140	132.41±8.97	54	82.50±10.72	116	176.40±8.83	137	487.02±12.40	134	317.72±0.59
Moshohor	54	42.68±0.75	161	140.01±6.94	79	88.05±9.32	146	162.60±8.48	149	483.20±9.92	194	319.73±0.57
Mchallit Mousa	222	39.47±0.44	331	132.65±5.36	184	82.48±5.47	107	151.02±10.75	607	485.05±5.34	274	317.01±0.51
Ei-Ahram	28	37.40±0.81	150	164.84±9.95	60	72.07±9.46	108	182.83±11.32	124	498.43±11.34	183	316.72±0.70
Mostorod	—	—	58	109.43±9.20	11	162.36±38.75	50	131.16±15.15	56	456.01±14.85	82	318.24±0.67
Bahteem	—	—	404	127.90 3.93	288	62.20±3.40	221	147.87±5.80	220	468.24±4.28	386	314.06±0.42
Total	445	39.90±0.67	1456	136.35±2.49	871	69.24±2.21	1085	165.31±3.20	1696	484.74±2.86	1746	316.70±0.19

Season of birth may affect the age at first calving. Heifers born in October, November and December calved for the first time at a younger age than those born in any other month of the year (Table 2). These differences, however, were not statistically significant. Alim (1957) and Asker and Youssef (1959), found significant differences between months with respect to age at first calving. On the other hand Sidky (1955), did not arrive at a similar conclusion.

TABLE 2.—The influence of month of birth on age at first calving for buffaloes.

Month of birth	No. of heifers	%	Average age at first calving (months)
January	42	9.43	41.48
February	49	11.01	40.13
March	30	6.74	40.94
April	21	4.72	40.59
May	23	5.17	39.54
June	23	5.17	39.75
July	30	6.74	41.26
August	29	6.52	39.57
September	53	11.91	39.46
October.	44	9.89	38.96
November	57	12.81	38.32
December	44	9.89	39.20
Total	445	100.00	39.90

II. Postpartum Service Interval, Interval Between Recorded Services and Service Period Length.

Table 1 shows the average length of postpartum service interval, the period between consecutive services and the service period length for the eight herds studied. The overall averages were 136.35 ± 2.49 , 69.24 ± 2.21 and 165.31 ± 3.20

days, respectively. The differences among the eight herds studied in the length of postpartum service interval and period between recorded services were statistically significant ($P < 0.01$). However, differences among herds with respect to service period length were not significant.

The average postpartum service interval in the present study was longer than those obtained by Hafez (1954), and Oloufa (1960), who used data from selected experimental herds of buffalo and was also longer than those of El-Sheikh and El-Fouly (1963) and Menge *et al* (1962) using dairy cattle.

Length of interval between recorded services in the present study was close to that obtained by Hafez (1953), on buffaloes. However, it is longer than the estimates for cattle given by Mares *et al* (1961), El-Sheikh and El-Fouly (1964) or for buffaloes by Hafez (1954). The prolonged intervals shown in the present study may be attributed to several factors including faint non-observed estrous, failure of fertilization and proper implantation and early embryonic mortality. Various ovarian disturbances may prolong or decrease the length of intervals between services. Such disturbances may be due to persistence of the corpus luteum. El Attar (1955), reported that fetal mortality is associated with luteal deficiency. El-Sheikh and El-Fouly (1966), reported on their study of the causes of fertilization failure from the first service of buffalo heifers that 40.0%, 23.3%, 8.9%, 20.0%, 4.4% and 3.3% of the cases studied were due to apparent quiet ovulation, nonovulatory heats, ovarian inactivity, infertile services; embryonic mortality and persistancy of corpora lutea, respectively. Ovarian cysts or cystic follicles are common in cows, and may also produce nymphomania or constant oestrus and result in shorter heat periods.

Some Factors Affecting Postpartum Service and Service Period Length :

1. Month of calving :

Table 3 shows that buffalo calvings occurred all the year round, however, most of these calvings occurred from August through January. This may be attributed to the general practice in Egypt which allows buffaloes to mate during the winter in order to have calves during the late autumn and early winter, when the weather is mild and plenty of green fodder is available. In some parts of the Delta region, where green fodder is available during summer and early autumn, calving during this period is also practiced. Month of calving had significant influence ($P < 0.01$) on both the length of subsequent postpartum service and service period. Moreover, the autumn and early winter calvings were followed by the shortest postpartum service intervals and service period lengths compared to the other seasons of the year. Seasonal changes in the fertility level of buffaloes have been reported by Kartha (1957), and Ishaq (1957), in India and Pakistan, respectively. In addition Muller and Kurtz (1958), reported that the high percentage of returns to service in both adult cows and heifers was due to high humidity. Bond *et al* (1960), had also produced anestrus experimentally in milking Shorthorn heifers by placing them in a constant ambient temperature of 90°F.

TABLE 3.—The influence of month of calving on the length of service period, postpartum service, calving interval and gestation period for buffaloes.

Month	Service period		Postpartum service		Calving interval		Gestation period	
	% (No.)	Average (months)	% (No.)	Average (days)	% (No.)	Average (days)	% (No.)	Average (days)
December	7.83 (85)	175.56	9.48 (138)	124.16	10.55 (179)	489.74	10.60 (185)	318.67
January	8.57 (93)	195.39	9.20 (134)	177.13	8.20 (139)	476.50	8.42 (147)	317.40
February	6.54 (71)	204.76	6.11 (89)	149.81	7.02 (119)	479.21	6.76 (118)	318.23
March	6.64 (72)	213.57	5.70 (83)	182.87	5.31 (90)	490.61	5.96 (104)	319.25
April	6.64 (72)	164.36	5.43 (79)	138.80	4.30 (73)	499.68	5.78 (101)	317.24
May	7.65 (83)	173.41	6.32 (92)	134.78	6.02 (102)	515.32	6.59 (115)	316.08
June	7.37 (80)	161.26	7.83 (114)	126.47	6.54 (111)	482.98	6.93 (121)	314.85
July	7.65 (83)	148.05	7.28 (106)	132.18	6.84 (116)	486.02	7.16 (125)	315.55
August	9.59 (104)	157.44	8.93 (130)	143.84	8.25 (140)	502.03	8.53 (149)	315.82
September	11.52 (125)	143.70	10.92 (159)	124.33	13.62 (230)	559.66	11.45 (200)	315.86
October	10.32 (112)	129.71	11.33 (165)	121.07	11.56 (196)	488.64	11.28 (197)	316.04
November	9.68 (105)	159.43	1.47 (167)	117.41	11.79 (200)	474.08	10.54 (184)	315.74

2. Sequence of calving :

From Table 4 it can be seen that the first postpartum service and the service period are longer than the subsequent ones. Differences among the three calvings studied in both parameters mentioned were statistically significant ($P < 0.01$). Kohli and Suri (1960), working on Indian cows showed that the second postpartum service was shorter than the first but they found non-significant differences between the first and second service period. Contrary to this regard is the observation of Buch *et al* (1955), who found that the involution of the uterus of primiparous cows occurred earlier than that of pluriparous ones. The effect of sequence of calving on service period length may be related to the prevailing system of management under which buffaloes of lowered fertility are usually eliminated after the first calving and consequently the shortening in postpartum service interval and service period length.

TABLE 4.—The effect of sequence of calving on length of postpartum service, service period, calving interval and gestation period for buffaloes.

Sequence of calving	Postpartum service		Service period		Calving interval		Gestation period	
	No.	Average (days)	No.	Average (days)	No.	Average (days)	No.	Average (days)
First calving . .	142	192.95	141	226.26	305	539.06	169	317.9
Second calving .	106	152.67	102	182.70	221	489.05	139	317.0
Third calving . .	63	121.84	63	148.00	158	467.65	101	318.2
Fourth calving .							62	318.3

3. Effect of number of services required per conception on service period :

The average service period for buffaloes requiring one, two, three and four or more services per conception were 146.00, 196.29, 261.72 and 272.81 days, respectively (Table 5). These differences were statistically significant ($P < 0.01$). The correlation coefficient between service period length and the number of services required per conception was highly significant ($r = +0.29$). The regression coefficient was 39.01 days. There was an increase of 39.01 days in service period for each additional service required per conception following the first one. Hafez (1954), working on buffalo and El-Sheikh and El-Fouly (1966), on buffalo heifers estimated the estrous cycle length by 20.40 and 27.65 days, respectively. This discrepancy between the length of estrual cycle on one hand and the 39.01 day delay in conception due to each infertile service on the other may be attributed to failure in detecting heats, especially when they are faint or of short duration and/or to early embryonic mortality.

4. *Effect of postpartum service on service period :*

The period from parturition to first service had a highly significant effect on service period length ($P < 0.01$). It is evident that with an increased postpartum service, there was a corresponding elongation in service period. A high percentage of buffaloes conceived when postpartum service interval ranged between 31 and 90 days (Table 6).

TABLE 5.—The influence of number of services required for conception on service period for buffaloes.

No. of services required per conception	No. of cases	%	Average of service period (days)
1	766	75.77	146.00
2	176	17.41	196.29
3	43	4.25	261.72
4 or more	26	2.57	272.81

TABLE 6.—The effect of postpartum service interval on service period for buffaloes.

Class interval of postpartum service	No.	%	Average of service period (days)
30 or less	53	5.54	62.98
31- 50	154	16.09	70.89
61- 09	164	17.24	101.98
91-120	123	12.85	123.58
121-150	112	11.71	143.59
151-180	86	8.98	190.29
181-210	67	7.00	218.70
211-240	55	5.75	238.82
241-270	36	3.76	262.94
271 or more	106	11.08	362.28

The correlation between service period length and postpartum service interval was highly significant ($r = +0.855$). The regression coefficient of service period on postpartum service was $+0.636$ days.

III. Calving Interval

In the eight herds studied (Table 1) it was found that the overall average of calving interval length was 484.74 days. This estimate agrees well with the findings of Hilmy (1954), Venkayya and Anantakrishnan (1957)a, Ishaq (1959) and Ashfaq and Mason (1954), but shorter than that reported by Khishin (1951) Ragab *et al* (1954), Sidky (1955), Alim (1957)^b and Afifi (1961) and longer than that reported by Kartha (1957) Singh *et al* (1958), and Agarwala (1962). Significant differences among herds studied in calving interval length were obtained ($P < 0.05$). These differences may be attributed to the variations among herds in service period length. Buch *et al* (1959) considered that infertile service, loss of pregnancy, interruption of the estrual cycle, out-of-breeding condition and postpartum anestrus are the causes for prolonged calving interval.

Some of the factors that may affect the length of calving interval :

1. Age at first calving :

Age at first calving had no effect on the corresponding first calving interval (Table 7) and the differences shown in calving interval were not significantly affected by age at first calving. Alim (1953), and Venkayya and Anantakrishnan (1957)a arrived at the same conclusion.

TABLE 7.—The effect of age at first calving on calving interval length.

Class interval for age at first calving (days)	No. of animals	%	Average calving interval (days)
1000 or less	23	7.72	534.43
1001-1050	29	9.73	535.38
1051-1100	33	11.07	551.84
1101-1150	29	9.73	538.34
1151-1200	51	17.12	509.59
1201-1250	36	12.08	566.19
1251-1300	19	6.38	549.52
1301-1350	18	6.04	477.33
1351-1400	20	6.71	428.50
1401 or more	40	13.42	564.57
Total	298	100.00	537.58

2. Sequence of calving :

Data presented in Table 4 indicate that the first calving interval was 50 days longer than the second, and the latter was 21 days longer than the third. Differences in length of calving intervals were statistically significant ($P < 0.01$). Similar results were obtained by Ragab *et al* (1954), Alim (1957)^b, Singh *et al* (1958), and Afifi (1961).

3. Month of calving :

No particular order was observed for a shortening or lengthening in calving intervals through the months of the year (Table 3), however, it was generally observed that November calvings were followed by the shortest calving intervals (474.08 days) and September calvings were followed by the longest calving intervals (569.66 days). These differences in calving interval length as affected by month of calving were statistically significant ($P < 0.01$).

The frequency distribution of calvings during the seasons of the year showed that 36.97%, 25.77%, 15.63% and 21.63% of the calvings occurred in autumn, winter, spring and summer months, respectively. The higher percentage of calvings during the autumn and early winter months are attributed primarily to the system of management which allows buffaloes to calve at the onset of the clover season in Egypt.

4. Repeatability:

The repeatability value for calving interval length for those buffaloes that had two or three successive intervals was almost zero. Ragab *et al* (1953), Alim (1957)^a and Afifi (1961) obtained some lower values for repeatability of calving interval length. The low repeatability values indicate that variation among buffaloes in calving intervals are mostly due to nongenetic causes. Ashfaq and Mason (1954), were able to reduce calving interval length from 614 to 385 days by improving herd management.

IV. Gestation Period

Table 1 shows the average length of gestation period for the eight herds of Egyptian buffalo. The overall average for gestation period was 316.70 ± 0.19 days, which is close to that obtained for Egyptian buffalo by Ragab and Asker (1951), and Ghanem *et al* (1955), of 316.7 and 316.4 days respectively. However, it is longer than that estimated for Indian buffaloes by Arunchalam *et al* (1952), Kartha (1957), and for the Pakistani buffaloes of Ishaq (1953), who reported averages of 303.8 and 307 days, respectively.

The available information on gestation length show that the Egyptian buffalo has considerably longer gestation period than both Indian and Pakistani buffalo. Significant differences ($P < 0.01$) were observed among the eight herds studied in their gestation length. The relatively small average standard deviation and coefficient of variability (8.12 and 2.56 respectively) supports the view that little variation actually existed among individuals with regards to gestation period length.

Factors Affecting Gestation Period:

1. Sex of calf :

Table 8 shows the effect of sex of calf on gestation length for the eight buffalo herds. In six herds the male calf had a longer gestation period than the female calf. The reverse was true in the herds of Moshtohor and A'lbm. The overall average gestation length for male and female calves were 317.0 and 316.5 days, respectively. This difference lacked statistical significance.

TABLE 8.—The effect of sex of calf on gestation period.

Herd	Male		Female	
	No. of calving	Average gestation period (days)	No. of calving	Average gestation period (days)
Allam	206	316.73	190	316.82
Faculty of Agric.	48	320.00	48	316.42
Shebein El-Kom	74	318.51	53	316.60
Bahteem	103	319.80	87	319.75
Moshtohor	48	318.17	33	320.91
Mosterod	193	314.55	185	314.15
Mehallet Mousa	135	316.81	129	316.72
El Ahram	101	316.66	80	316.42
Total	908	317.00	805	316.50

The findings of many other investigators (Ragab and Asker, 1951; Shalash and El Mikkawi, 1966; Ahmed and Tantawy, 1956; Khishin *et al* 1963; on buffaloes Burris and Blunn, 1952; Wheat and Riggs, 1952; and Davis *et al* 1954; on cattle) agree well with the present findings. However, Ghanem *et al* (1955), and Arunachalam *et al* (1952) using buffaloes and Burris and Blunn (1952), working on Shorthorn cattle reported that female calves had longer gestation period than males.

2. Sequence of calving :

The average gestation period for buffaloes, in the first second, third and fourth calving were 317.9, 317.0, 318.2 and 318.3 days, respectively (Table 4). These differences in gestation period were statistically non-significant. This result is in agreement with that reported by Ragab and Asker (1951), Arunachalam *et al* (1952), Khishin *et al* (1963), on buffaloes and Makela and Oittila (1956), on Shorthorns. However, it disagrees with the findings of Davis *et al* (1954), Rollins *et al* (1956), using cows and Ahmed and Tantawy (1956), working on cattle and buffaloes.

3. Month of calving :

Table 3 shows the effect of month of calving on gestation period. It is clear that buffaloes calve all the year around and most of the calvings occur during August and January (60.79%). Gestation period length was shorter during the period from May to November as compared to that during the rest of the year. The gestation period appeared to be influenced significantly ($P < 0.01$) by the month of calving. This result is similar to those obtained by Ragab and Asker (1951), using cattle and buffaloes, Shalash and Mikkawi (1956), using buffaloes and Stallcup *et al* (1960) working on cattle. However, Arunachalam *et al* (1952), Khishin *et al* (1963), using buffaloes, Ahmed and Tantawy (1956), on cattle and buffaloes and Singh and Ray (1961), working on cattle showed no significant effect for month of calving on gestation length.

4. Age of Dam :

Results presented in Table 9 indicated that there is no effect of age of dam on gestation length. Differences among ten age groups of buffaloes lacked statistical significance. Similar results were reported by Ragab and Asker (1951), on both cattle and buffaloes, Burris and Blunn (1952) using cattle. However, our finding disagrees with those of Brakel *et al* (1952), Stallcup *et al* (1960) on cattle, Ghanem *et al* (1955), using buffaloes and Ahmed and Tantawy (1956), on cattle and buffaloes who reported that age of dam effects the gestation length.

TABLE 9.—The effect of age of dam
on gestation period length.

Class interval of dam's age (years)	No. of calving	Average gestation length (days)
3 or less	42	315.57
3.0—3.5	71	318.17
3.5—4.0	44	318.41
4.0—4.5	49	316.47
4.5—5.0	59	317.63
5.0—5.5	38	317.71
5.5—6.0	50	318.22
6.0—6.5	38	318.61
6.5—7.0	29	318.31
More than 7.0	50	318.30
Total	470	317.70

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مظاهر الخصب في الجاموس المصري

الملخص

شملت هذه الدراسة سجلات ١٢٠٠ عجلة وجاموسة في المدة بين عام ١٩٢٩ ، ١٩٦١ جمعت من مزارع مختلفة خاصة وحكومية في منطقة الدلتا .

وقد اتضح من هذه الدراسة ان متوسط العمر عند أول ولادة في ٤٤٥ عجلة كان ٣٩٩ شهرا كما ثبت وجود فروق معنوية بين القطعان المختلفة فيما يتعلق بهذه الصفة على عكس ما اثبتته البحث من عدم وجود فروق معنوية بين القطعان بالنسبة لشهر الولادة أو الوضع .

وقد تبين أيضا ان متوسطات مدة التلقيح السابقة للولادة والمدة بين التلقيحات المسجلة ومدة التلقيح والمدة بين ولادتين ومدة الحمل وكانت ١٣٦ر٣٥ و ٦٩ر٢٤ ، ١٦٥ر٣١ ، ٤٨٤ر٦٤ ، ٣١٦ر٣١ يوما على التوالي . وقد ثبت من دراسة هذه الصفات السابقة الذكر في القطعان الثمانية التي شملها البحث ان هناك فروق معنوية بين هذه القطعان في هذا الخصوص باستثناء طول مدة التلقيح .

وقد ظهر أن شهر الولادة له تأثير على مدة التلقيح السابقة للولادة ومدة التلقيح والمدة بين ولادتين وكذلك مدة الحمل اذ ان الجاموس الذي وضع في خلال أشهر الخريف والشتاء المبكر كانت مدة التلقيح السابقة ومدة التلقيح أقصر مما هي عليه في مثيله الذي وضع في بقية شهور السنة . كما أن مدة الحمل في الجاموس الذي وضع في المدة بين الذي وضع في المدة من مايو الى نوفمبر كانت أقصر من قبلها في الجاموس الذي وضع في بقية شهور السنة .

هذا وقد وضح أيضا أن ترتيب الولادة له أثره على هذه الظواهر فقد كان متوسط طول مدة التلقيح السابقة للولادة في أول موسم وثناني موسم وثالث موسم هي : ١٢٩ر٩٥ ، ١٥٢ر٦٧ ، ١٢١ر٨٤ ، يوما على الترتيب . كما كانت متوسطات مدة التلقيح هي ٢٢٦ر٢٦ ، ١٨٢ر٧٠ ، ١٤٨ر٧٠ يوما بنفس الترتيب ،

وقد كانت المدة الأولى بين ولادتين أطول بمقدار ٥٠ يوما عن المدة الثانية كما كانت المدة الثالثة أطول بمقدار ٢١ يوما عن المدة الثانية هذا كما تبين أيضا أن مدة الحمل في المدة الأولى متوسطها ٣١٧ر٩ يوما وللمدة الثانية ٣١٧ر٠ يوما والثالثة ٣١٨ر٢ يوما والرابعة ٣١٨ر٣ يوما •

ونظرا لما أثبتته البحث من وجود علاقة وثيقة بين عدد مرات التلقيح اللازمة للحمل وبين مدة التلقيح السابقة للولادة حيث ظهر وجود معامل تلازم بين الصفتين مقدارها + ٠٣٩ ، وكان معامل الانحدار ٣٩ر٠١ يوما هذا بالإضافة الى وجود معامل تلازم قدره + ٨٥ر بين مدة التلقيح السابقة للولادة وبين مدة التلقيح مقابل معامل انحدار قدره ٦٣٦ر٠ •

هذا وقد بلغت النسبة المئوية للجاموس الذى حمل من مرة واحدة ومرتين وثلاث وأربع مرات ٧٥و٧٧٪ ، ١٧و٤١٪ ، ٤و٢٥٪ ، ٢و٥٧٪ على الترتيب هذا علما بأن ثلث الجاموس فقط قد تم حمله في مدة تتراوح بين ٣١ ، ٩٠ يوما مدة تلقيح بعد الولادة •

وقد ثبت أن العمر عند أول وضع ليس له تأثير معنوى على المدة الأولى بين ولادتين ، هذا وقد ظهر أن المعامل التكرارى للمدة بين ولادتين للجاموس الذى وضع أكثر من مرتين وثلاثة كانت صفرا • هذا كما تبين أن الأجنة الذكور تحمل في بطن أمهاتها مدة ٥١ر يوما أطول من الاناث وان كان هذا الفرق لم يثبت من الناحية الاحصائية •