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MILK YIELD IN A HERD OF EGYPTIAN BUFFALOES AS AFFECTED BY SERVICE PERIOD, CALVING INTERVAL AND DRY PERIOD

By

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SUMMARY

An investigation covering a peeiod of 20 years, using 223 Lactations and 297 successful pregnancies of 84 buffaloes were analysed for the effect of service period, calving interval and dry period on milk yield.

The length of service period averaged 204 days. It is noticed that length of service period declines till the 5th lactation and shows a tendency to rise afterwards. The length of service period is not affected significantly by sequence of calving. There is a positive significant correlation cofficient between the current service period and total milk yield. The regression coefficient of total milk yield on length of service period is non-significant.

The length of interval between calvings averages 524.4 days It is observed that the average length of calving interval tends to decrease with advance in age. Sequence of calving does not influence it significantly.

There is a positive significant correlation between current calving interval and total milk yield. Regression coefficient was not significant.

The dry period averages 236.3 days. The mean dry period decreases as age advances. Dry period is not influenced significantly by sequence of calving. The optimum length of dry period for high milk production is found to be 4 months. Differences in total milk yield due to length of preceding dry period are not statistically significant.

The average correlation and regression coefficients between preceding dry period and total milk yield are negative and non-significant.

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Introduction

As the buffalo occupies a prominent place among the Egyptian livestock, this calls for a special emphasis in paying more attention to improving its dairy characteristics.

The work was carried out to study the effect of service period, calving interval, and dry period on milk production in a herd of Egyptian buffaloes.

Pakistan showed the average service period to be 168 days. Kaliff (1939) reported a correlation coefficient between service period and milk yield of—0.10, while Ibrahim (1950) found it to be—0.471. The milk yield of all lactations was highly correlated with lenght of service period (Hilmy 1954 & Ragab et al 1956). They also noted that buffaloes showed a highly significant regression of milk yield on service period. In Murrah buffaloes, Venkayya & Anantakrishnan (1957) found that the coefficient of correlation and regression with yield were statistically significant.

1.— *Calving Interval* :

The average length of calving interval was estimated in India to be 417 days by Kartha (1934), 504 days by Rao & Murari (1956), 419 and 407 days by Kartha (1957) for bred and purchased Murrah buffaloes, 420 days by the same author in another study (1957), 444 days by Singh et al (1958) and 444 days by Rife (1959).

Maymone (1942) in Italy gave a figure of 460 days as the mean calving interval. Vendargon (1955) reported an average calving interval of 559.9 days. In Pakistan, Ashfaq & Mason (1954) and Ishaq (1959) found that the average length of calving interval in buffaloes was 467 and 475 days respectively.

Research people in this country arrived at different estimates, *i.e.*, Asker & Ragab 1951 (501 days), Khishin 1951 (585), Alim & Ahmed 1954 (650), Hilmy and Asker et al 1954

(480 days), Ragab et al 1954 (541.7 days), Sidky 1955 (79 weeks (553 days) for the lst. calving interval, and Alim 1957 (552 days).

Hilmy (1954), and Ragab et al (1954-A) noticed that the length of calving interval tended to decrease with advance in age. Ashfaq & Mason (1954) stated that age of buffaloes has an effect on calving interval and Alim (1957) reported that sequence of calving influences it significantly.

Hilmy (1954), noted that the correlation coefficient between milk yield and current calving interval was 0.318 and the regression coefficient of milk yield on current calving interval was 0.875. Both correlation and regression cœfficients were statistically highly significant.

Ragab et al (1954-A) obtained a correlation coefficient of 0.384 between milk yield and length of calving interval which is highly significant.

2.— *Dry Period :*

The dry period of buffaloes in India was found by Kartha (1934) to be 122 and 139 days for buffaloes bred in the farm and purchased ones respectively. Also to be 138 days by the same author (1957) for Murrah buffaloes. Kaliff (1942) gave a figure of 162 days as the mean dry period. Maymone working on buffaloes of Italy (1942) found that the average length of dry period to be 192 days. In Egypt, it was estimated to be 3.95 month (118.5 days) by Ibrahim (1950), 231 days by Khishin (1951), 210.6 days by Ragab et al (1954), 296 days by Alim & Ahmed (1954), and 191.4 days by Hilmy (1954). Ishaq (1959) found that the average length of dry period for Pakistani buffaloes was 190 days.

Ragab et al (1954—A) and Hilmy (1954) observed that in general the average length of preceding dry period declines as age advances.

Ghazy (1953), and Ragab et al (1954—A) pointed out that preceding dry period is an important cause of variation in milk yield as it accounts for about 6.4% of the total variance.

Ibrahim (1950) found that there was a neagtive correlation between current dry period and milk yield.

Ghazy (1953) and Ragab et al (1954–A) found that the average regression of milk yield on preceding dry period and the average correla- tion coefficient between the two variables were non-significant.

Hilmy (1954) found that there was a non-significant correlation between preceding dry period and milk yield in all lactations. The average regression of milk yield on preceding dry period on the other hand was highly significant.

Material and Methods

Milk and reproduction records of buffaloes kept by the Animal Breeding Department of the Egyptian Agriculture Society at Bahteem near Cairo were used in this study. Data used in this work comprised 223 lactations and 297 successful pregnancies of 84 buffaloes. Records of doubtful information were excluded. The investigation covered a period of 20 years beginning from 1937.

Buffaloes were tethered in open sheds all day and are allowed to graze clover during Winter. Animals were milked twice a day by hand at 5 A.M. and 4 P.M., and mik recording was made at each milking. During the period from November to May buffaloes are fed on Egyptian clover (Trifolium Alexandrinum) only, and animals giving more than 20 pounds of milk daily are given concentrates equivalent to the excess in production. Animals are fed during Summer on concentrates according to their weight and production, and they are given green maize fodder in limited quantities.

Total milk yield record were used in the analysis. Data were dealt with on 10 gallons basis.

Statistical techniques used were according to Snedicor (1946).

Results and Discussion

1.— *Effect of Service Period* :

Figure (1) indicates the frequency distribution of length of service period in all lactations. The mode was estimated to be 5 months, while 53% of the buffaloes showed a service period above the mode.

TABLE 1.—**Mean Lengths of Service Period at Different Lactations for Buffaloes**

Sequence of lactation	No. of animals	Average service period in days
2	64	221.6 ± 84.4
3	46	199.6 ± 122.4
4	31	188.9 ± 126.0
5	22	179.1 ± 98.9
6 and over	50	205.7 ± 187.1
Total and Average . . .	213	204.0 ± 146.7

The mean service period at different lactations and their standard deviations were represented in table (1). The service period averaged 204.0 ± 146.7 days. This estimate is close to that found by Venkayya & Anantakrishnan 1957 (202 days) for Murrah buffaloes. However, it is shorter than that obtained by Vendargon 1955 (238.25 days) for buffaloes in Malaya, while it is longer than that found by Zaher 1944 (58.9 days),

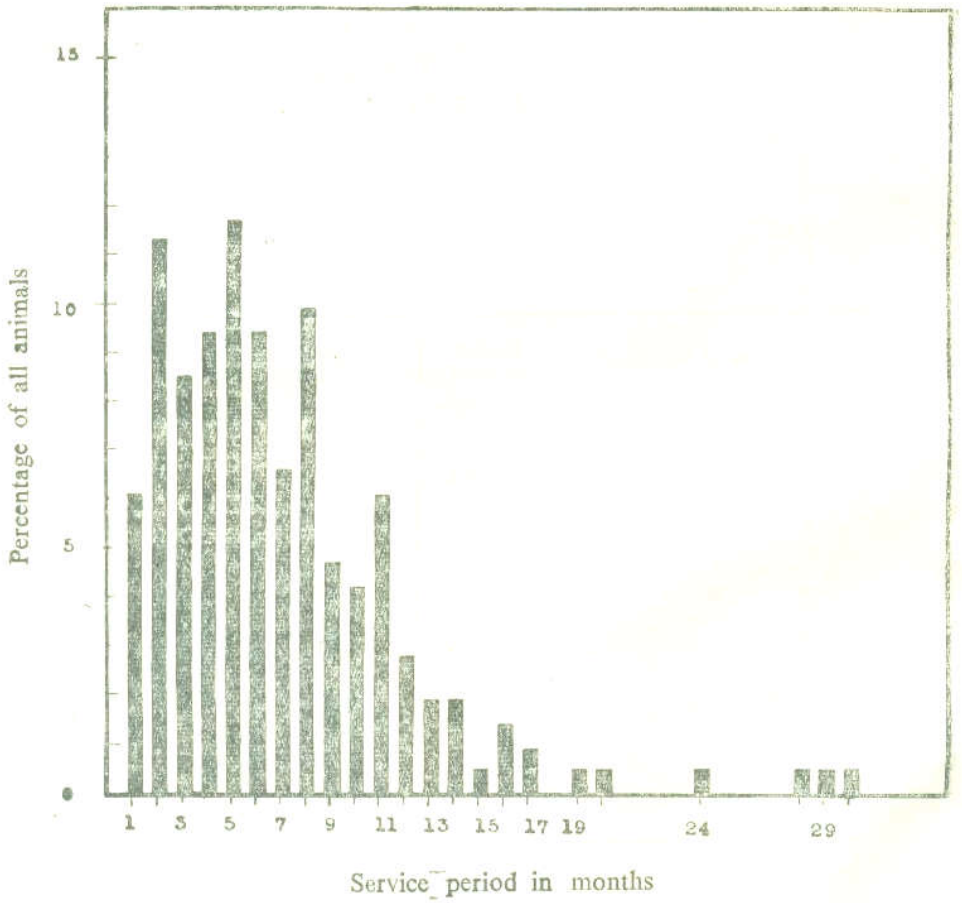

FIG. 1.—Frequency distribution of service period in buffaloes

Ragab 1945 (157 days for the lst. lactation), Ibrahim 1950 (5.3 months), Hilmy 1954 (164 days), and Ragab et al 1956 (177 days) for different herds of buffaloes. The average service period obtained in this study is also long when compared to that reported for the European, Indian, and Egyptian cattle.

The long service period obtained may be attributed to the fact that oestruos cycles in buffaloes are frequently intervened by silent heats (Hafez 1954) and also may be due to the seasonal sex rhythmicity as reported by Venkayya & Anantakrishnan (1957) for Murrah buffaloes. Besides, it was noticed that buffaloes were left for long service interval before conception.

It was observed from table (1) that the lenght of service period declined till the 5th lactation and showed a tendency to rise afterwards.

The longest length of the first service period may be due to the more services needed by virgin heifers (Oloufa 1955, Ragab et al 1956, and Ahmed & Tantawy 1959). The rise after the 5th lactation may be caused by senility as reported by Sanders (1927).

Variation in service period attributed to sequence of calving was non-significant as shown in table (2).

TABLE 2.—**Analysis of Variance of Service Period for the Sequence of Lactation for Buffaloes.**

Source of variation	Degrees of Freedom	Sum of squares	Mean squares	F. Value
Between lactations . .	4	41571.19	10392.7975	0.478
Error	208	4520338.80	21732.3981	—
Total . . .	212	4561909.99	—	—

The effect of current service period on total milk yield using the correlation and regression method was illustrated in table (3).

TABLE 3.—**Effect of Current Service Period on Total Milk Yield at Different Lactations.**

Sequence of lactation	No. of animals	Average current S.P. in days	Average milk yield in 10 gallons	Coefficient of Correlation	Regression
1	58	227.4	33.43	0.282*	0.020
2	40	197.8	37.77	0.162	0.017
3	27	194.0	40.44	0.230	0.025
4	21	183.8	46.57	0.347	0.049
5 and more	42	200.2	42.04	0.264	0.017

* = Significant at the level of 5%.

S.P. = service period.

Correlation coefficient between current service period and milk yield for separate lactation was noticed to be non-significant except that of the 1st. lactation Regression of milk yield on length of current service period for separate lactations was non-significant. Both coefficients are positive.

TABLE 4.—**Effect of Current Service Period on Total Milk Yield in All Lactations.**

No. of lactations	=	188
Average milk yield in 10 gallons	=	38.75
Average current service period	=	205.3
Coefficient of correlation	=	0.197*
Coefficient of regression	=	0.017

* = Significant at the level 5%.

Table (4) shows that there was a positive significant correlation coefficient between total milk yield and current service period for all lactations. This agrees with the findings of Venkayya & Anantakrishnan who concluded that correlation coefficient between service period and milk yield was statistically significant in Murrah buffaloes (1957) and in Red Sindhi cows (1958), and also to those of Hilmy (1954) and Ragab et al (1956) who stated that the average correlation coefficient of all lactations between the two variables for Egyptian buffaloes was highly significant.

Our results disagree with that obtained for the native cattle by Hilmy (1954) and Ragab et al (1956), who reported non-significatint correlation between total milk yield and service period for all lactations. The average regression of total milk yield on current service period was 0.017 being non-significant. This is in disagreement with Hilmy (1954) and Ragab et al (1956) who obtained a highly significant regression of total milk yield on service period in both native cattle and buffaloes, and Venkaya & Anantakrishnan who showed that the same coefficient was significant in Murrah buffaloes (1957) and highly significant in Red Sindhi cows (1958).

Table (5) represents the relation between the total milk yield and current service period when grouping the milk yield records into groups due to the length of current service period with a month class interval.

From this table it can be seen that the total milk yield increased with increasing of current service period till it reached 9 months.

The variation in total milk yield due to groups studied as the effect of current service period on total milk yield was non-significant (table 6).

TABLE 5.—**Effect of Current Service Period on Total Milk Yield in Buffaloes.**

Average current service period in months	Number of animals	Average milk yield in 10 gallons	Relative yield %
1	10	34.72	91
2	23	33.48	88
3	14	37.17	97
4	17	33.86	89
5	23	37.15	97
6	19	40.31	105
7	13	41.89	110
8	17	43.60	114
9	8	45.19	118
10	9	39.81	104
11	12	40.55	106
12—more	23	41.70	109
Average milk yield.		38.22	100

TABLE 6.—**Variation in Total Milk Yield Due to Length of Current Service Period.**

Source of variation	Degrees of Freedom	Sum of Squares	Mean Square	F. Value
Between groups	11	2456.57045	223.32459	1.332
Error	176	29509.69685	167.66873	—
TOTAL	187	31966.26730	—	—

2.—*Effect of calving interval* :

Figure (2) shows the frequency distribution of calving interval in the buffaloes studied. The mode was noticed to be 13 months which is the same as that obtained by Hilmy (1954) for buffaloes. It was observed that 77.6% of the buffaloes had longer intervals between births than the mode.

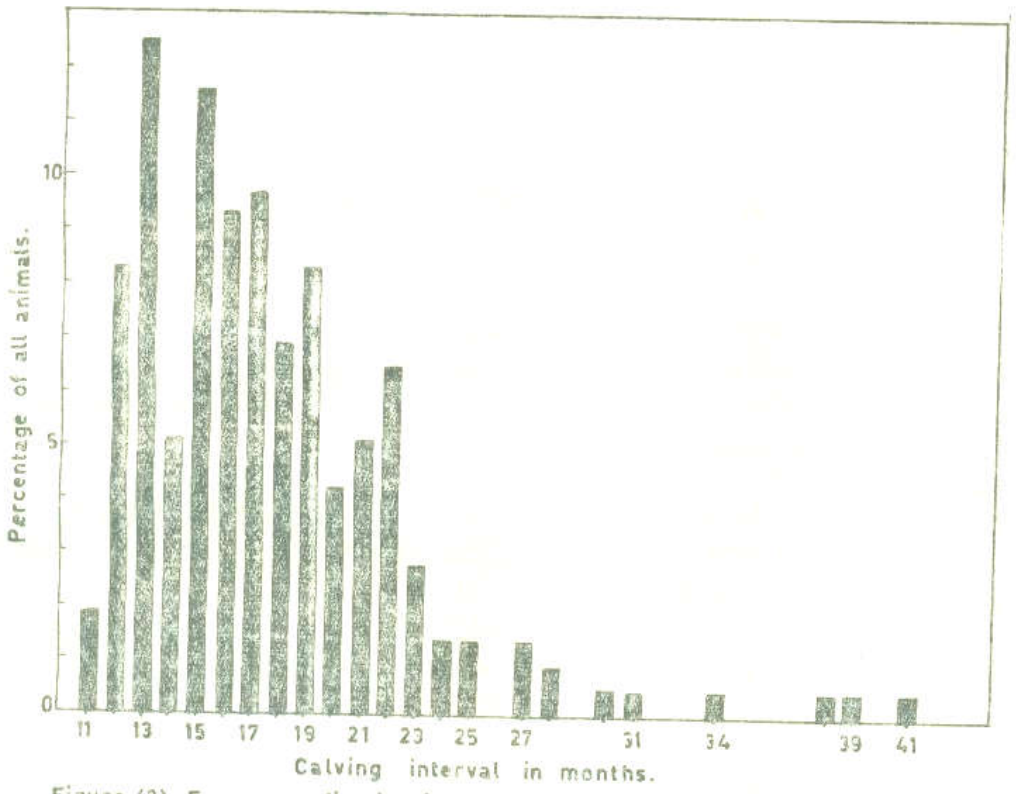

Figure (2): Frequency distribution of calving interval in buffaloes.

TABLE 7.—**The Average Lengths of Calving Interval in Successive Lactations for Buffaloes.**

Sequence of lactation	No of animals	Average calving interval (days)
2	65	540.1 ± 151.0
3	48	521.4 ± 123.2
4	31	506.4 ± 125.9
5	21	502.3 ± 98.8
6—more	51	527.4 ± 187.1
Total **and** Average . .	216	524.4 ± 146.8

Table (7) represents the average lengths of calving interval at different lactations. The total average lenght of calving interval was 524.4 ± 146.8 days. It was more than that calculated for buffaloes in India by Kartha 1934 (417 days), Rao & Murrari 1956 (504 days), and Rife 1959 (444 days) ; for buffaloes in Italy by Maymone 1942 (460 days); for Pakistani buffaloes by Ashfaq & Mason 1954 (467 days) and Ishaq 1959 (475 days) ; for the Egyptian buffaloes by Ragab & Asker 1951 (501.3 days) and Hilmy 1954 (480 days) ; and for Murrah buffaloes by Kartha 1957 (419 days) and Singh et al (1958) (444.1 days).

Khishin (1951), Alim & Ahmed (1954), Ragab et al (1954-A), Sidky (1955), and Alim (1957), all working on buffaloes of Egypt as well as Vendargon (1955) studying buffaloes of Malaya gave averages for the lenght of calving interval longer than our estimate being 585, 650, 541.7, 553, 552, and 559.9 days respectively.

The average calving interval obtained in our study is very long when compared to that calculated by different investigators for Native, Indian, and European breeds of cattle which ranged from 355 to 430 days. This is partially due to the fact that the service period is longer in buffaloes than in cattle and to the fact that the gestation period is nearly a month longer in the

former than in the later as stated by Hilmy (1954). The long calving interval estimated in this study may be also due to management as indicated by Knapp (1956).

It is clear from table (7) that the length of calving interval tends to decrease with advance in age. However, this agrees with that found in buffaloes by Ragab et al (1954-A) : and for both native cattle and buffaloes by Hilmy (1954). Schmidt (1932) in cattle obtained an opposed observation.

Decreasing the calving interval with advance in age may be attributed to the tendency of service period to behave in the same manner.

It is observed that the 1st. calving interval was longer than the subsequent ones. It was 18.7 days longer than the second, 33.7 days longer than the 3rd and 37.8 days longer than the 4th.

TABLE 8.—**Analysis of Variance of Length of Calving Interval for the Sequence of Calving for Buffaloes.**

Source of variance	Degrees of freedom	Sum of squares	Mean square	F. Value
Between calvings. . .	4	37304.96	9326.24	0.428
Error	211	4594530.24	21775.0248	
TOTAL	215	4631835.20	—	—

It can be seen from table (8) that the sequence of calving did not influence the lenght of calving interval significantly. This result disagrees with Alim (1957) who reported a relative importance of sequence in determining the lenght of calving interval in buffaloes.

The correlation coefficient between milk yield and current calving interval as well as the regression coefficient were estimated for every lactation independantly and illustrated in table (9).

TABLE 9.—**Effect of Length of Current Calving Interval on Milk Yield.**

Sequence of calving	No. of animals	Average calving interval (days)	Average milk yield in 10 gallons	Coefficient of correlation	Regression
1	58	545.3	33.43	0.282*	0.020
2	42	522.1	38.81	0.189	0.021
3	27	512.4	40.44	0.211	0.023
4	20	507.8	47.13	0.306	0.044
5—more	43	522.6	42.09	0.264	0.017
Total and Average	190	526.4	39.02	0.198*	0.018

* = Significant at the level of 5%

It is apparent that total milk yield increased with the increase in the length of calving interval because there was a positive correlation coefficient between the two variables for all lactations, being 0.198 which is statistically significant.

Correlation between total milk yield and current calving interval obtained on buffaloes in Egypt by Hilmy (1954), Ragab et al (1954-A) and on native cattle by Hilmy (1954) and Asker et al (1958) were highly significant.

Table (9) shows that the average regression of total milk yield on length of calving interval was non-significant. Regression of total milk yield on current calving interval reported for buffaloes by Hilmy (1954), and for the native cattle by Hilmy (1954) and Asker et al (1958) were highly significant.

3.—*Effect of preceding dry period.*

The frequency distribution of dry period of all lactations for buffaloes studied is shown in figure (3). The mode was 5 months, however 69.1% of the animals had dry periods longer than the mode.

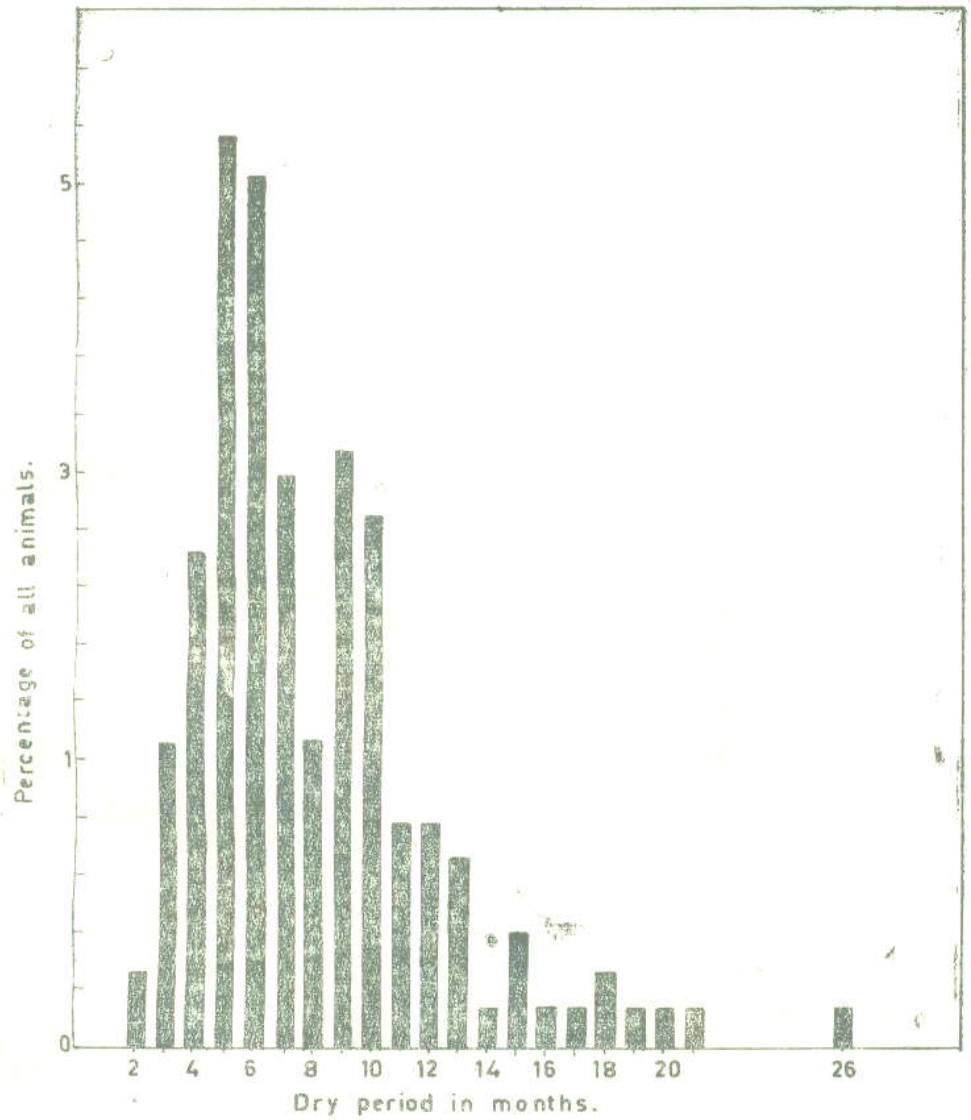

Figure (3): Frequency distribution of dry period in buffaloes.

Table (10) represents the average length of dry periods of different lactations.

TABLE 10—**Lengths of Dry Period at Different Lactations.**

Sequence of lactations	No. of animals	Average dry period in days
2	46	265.7 ± 124.5
3	34	241.7 ± 131.2
4	22	210.5 ± 104.4
5	17	202.7 ± 103.3
6—over	33	224.1 ± 115.7
Total and Average . .	152	236.3 ± 120.0

The average length of dry period was 236.3 ± 120 days which was close to that found by Khishin(1951) for the Egyptian buffaloes (231 days). Our estimate was shorter than that reported by Alim and Ahmed 1954 (296 days) in an Egyptian herd of buffaloes. On the other hand it was longer than that calculated by Kartha (1934) and (1957) in India, Ishaq (1959) in Pakistan, Kaliff (1942), Maymone (1942) in Italy ; Ibrahim (1950), Ghazy (1953), Ragab et al (1954-A), and Hilmy 1954 in Egypt. It was also higher than that obtained by Mahadevan (1953), Khishin and Issawi (1954), Ragab et al (1954-B),Asker et al (1958), and Itriby and Asker (1958) ; for Sinhala, European and Egyptian cattle.

In general, the average length of dry period was shown to decrease as age advanced, with the first dry period being the longest of all. Ghazy (1953), Ragab et al (1954-A), studying buffaloes in Egypt as well as Hilmy (1954) in both native buffaloes and cattle came to the same conclusion.

Our findings disagree with that stated by Sanders (1927) and Lonka (1946) who reported that the first dry period was shortest than any later ones.

Table (11) indicates the analysis of variance of length of dry period as affected by sequence of lactation.

TABLE 11.—**Analysis of Variance of Dry Period for Sequence of Lactation in Buffaloes.**

Source of variance	Degrees of freedom	Sum of squares	Mean Square	F. Value
Between lactations . . .	4	79536.346	19884.0865	0.300
Error	147	9731120.494	66198.0986	
TOTAL	151	9810656.840	—	—

It is noticed that sequence of lactation did not influence the dry period significantly.

When the lactations were grouped into groups with a month class interval, the total milk production decreased with the increase of preceding dry period (Table 12). The optimum dry period for this herd seems to be 4 months, since animals belonging to this group had the highest milk yield in all lactations. This is more than that obtained by Ragab et al (1954-A) for buffaloes which ranged from 60 to 90 days. It was also more than that calculated for cattle by Caroll (1913), Arnold and Backer (1936), Kelin and Woodward (1943), Berdrick (1951), which ranged from 1 to 3 months.

Preceding dry period did not affect the total milk yield significantly, because variation in total milk yield due to this factor was non-significant as indicated in table (13).

Asker et al (1958) reported that preceding dry period was found to have a negligible effect on milk yield of the native cow.

TABLE 12.—The Relation between Length of Preceding Dry period and Total Milk Yield.

Dry period in Months	No of animals	Average milk yield in 10 gallons	Relative yield %
2	2	46.58	122
3	8	41.48	109
4	13	48.49	127
5	24	39.93	104
6	23	40.74	107
7	15	39.18	103
8	8	46.58	122
9	16	42.99	112
10	14	31.85	83
11	6	34.61	91
12—over	23	41.38	108
Total and average milk yield		38.22	100

TABLE 13.—Variation in Total Milk Yield Deu to Preceding Dry Period for Buffaloes.

Source of variation	Degrees of freedom	Sum of squares	Mean square	F. Value
Between groups	10	2601.2089	260.12089	1.512
Error	141	24251.3159	171.99515	
TOTAL	151	26852.5248	177.83129	—

Variance in total milk yield due to preceding dry period =

$$\frac{177.83129 - 171.99515}{177.83129} \times 100 = 3.2\ \%$$

The results obtained for the effect of preceding dry period on total milk yield at different lactations were illustrated table (14).

TABLE 14.—**Effect of Length of Preceding Dry Period on Total Milk Yield.**

Sequence of lactation	No. of animals	Average dry period (days)	Average milk yield (10 gallons)	Coefficient of correlation	Regression
2 . . .	46	265.7	39.18	— 0.053	— 0.006
3 . . .	34	241.7	40.14	0.009	0.001
4 . . .	22	210.5	46.02	— 0.048	— 0.006
5 . . .	17	202.7	44.38	— 0.155	— 0.021
6—more . .	33	224.1	38.50	0.029	0.003

Regression of milk yield on preceding dry period and the correlation between the two variables were worked out in each lactation separately. All values of both coefficients were shown to be statistically non-significant. This agrees with that found by Hilmy (1954).

TABLE 15.—**The Effect of Preceding Dry Period on Total Milk Yield in all Lactations.**

Number of lactations . . . . . =	152
Average milk yield in 10 gallons =	40.82
Average preceding dry period . . =	236.3
Coefficient of correlation . . . . =	— 0.057
Coefficient of regression . . . . =	— 0.006

Table (15) shows that the average regression of total milk yield on preceding dry period and the average correlation between the two variables to be —0.006 and —0.057 respectively.

Both figures are non-significant. Ghazy (1953), Ragab et al (1954-A) working on buffaloes arrived at the same conclusion. Asker et al (1958) working on the native cattle agrees with our findings in this respect. Hilmy (1954) stated that the average regression of total milk yield on preceding dry period was highly significant for buffaloes and cattle, and the average correlation between the two variables was non-significant for both native cattle and buffaloes.

CONCLUSION

Milk and reproduction records of a herd of Egyptian buffaloes located at Bahteem is used to study the effect of service period, calving interval, and preceding dry period on total milk yield.

The long service period obtained in this study (204 days) may be attributed to the fact that oestrous cycles in buffaloes are frequently intervened by silent heats (Hafez 1954) and also it may be due to the seasonal sex rhythmicity (Venkaya and Anantakrishnan 1957). Moreover, it was noticed that the buffaloes were left for a long service interval before conception. Shortening the long service period will decrease the milk yield since the two variables were significantly correlated and the coefficient was positive (0.197). On the other hand, this will increase the average productive life which will probably make up for the loss in milk through the undesirable effects of a short service period (Hilmy 1954). Hafez (1953) stated that buffaloes must be bred at post-partum oestrous. He suggested to mate the buffaloes at 30 to 40 days after calving instead of the usual Practice of 60 days, bearing in mind, probable decrease in milk yield due to subsequent pregnancy would be less expensive than cutting down the productive potentiality of the animal.

Shortening the service period will shorten the calving interval and then the maximum production will be attained at a later lactation. As a result of that, the rate of replacement will decrease and buffaloes will show a longer productive life (Ragab et al 1956).

The length of calving interval averaged 524.4 days. This unduly long calving interval is due to the irregularity of calving in buffaloes which may be caused by low fertility, long service period, long gestation period, and also due to management. Alim (1957) reported that calving at interval longer than optimum, limits the increase of the population in number and causes a serious economic loss to dairy farmers as it reduces the average productive life of the animals. So, although there is a positive significant correlation between milk yield and current calving interval, yet efforts should be done to shorten the calving interval to a reasonable period.

Results obtained on dry period in this work yielded an average estimate of 236.3 days which is unduly long. The irregularity of calving in buffaloes, the long service period estimated for this herd, in addition to the short lactation period which averaged 276.1 days, and the long average calving interval of 524.4 days seem to be responsible for the long dry period. It was found that the increase of preceding dry period reduces milk yield. It is known also that increasing the length of preceding dry period causes the excess in length of calving interval and consequently reduces the productive life of the buffaloes. Therefore, for increasing milk production and productive life of buffaloes attempts should be made to shorten dry period.

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الملخص

تأثير فترة الحمل والفترة بين الولادتين وفترة الجفاف على انتاج اللبن من قطيع الجاموس المصرى

استخدم فى هذا البحث ٢٢٣ موسم حليب و٢٩٧ حالة حمل ناجحة لـ ٨٤جاموسة فى مدة ٢٠ عام لمعرفة تأثير فترة التلقيح والفترة وقد تبين أن متوسط فترة التلقيح ٢٠٤ يوم كما لوحظ أن طول فترة التلقيح يقل حتى الموسم الخامس ثم يتجه إلى الارتفاع بعد ذلك . كما لم تتأثر طول فترة التلقيح معنويا بتتابع الولادات وقد وجد ان هناك معامل تلازم معنوى موجب بين فترة التلقيح الحالية وإنتاج اللبن الكلى . أما معامل انحدار إنتاج اللبن الكلى على طول فترة التلقيح فلم يكن معنوياً .

وقد كان متوسط طول الفترة بين الولادتين ٥٢٤.٤ يوما ولوحظ أن متوسط الفترة بين ولادتين يتجه إلى الانخفاض بتقدم العمر . وقد جد أن تتابع الولادات لايؤثر تأثيراً معنويا على متوسط الفترة بين ولادتين.

كما تبين وجود تلازم معنوى موجب بين الفترة بين الولادتين الحالية وإنتاج اللبن الكلى ولكن معامل الانحدار كان غير معنوى.

متوسط فترة الجفاف ٢٣٦.٣ يوم وقد قل هذا المتوسط بتقديم العمر.

ولم تتأثر فترة الجفاف معنويا بتتابع الولاداتوالحد الأدنى لطول فترةالجفاف لإنتاج اللبن العالى كان ٤ شهور.

والفروق فى إنتاج اللبن الكلى وتعزى إلى طول فترة الجفاف السابقة لم تكن معنوية .

ومتوسط معاملى التلازم والانحدار بين فترة الجفاف السابقة وإنتاج اللبن الكلى كانا سالبين وغير معنويين.