

LONGEVITY IN EGYPTIAN BUFFALOES

By

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Records on two herds of buffaloes were utilized to study factors affecting longevity. Number of animals used at Sakha and Sids stations were 176 and 444 having 718 and 814 lactations in the two stations respectively.

The results obtained are summarized in the following:

1. The average longevity of buffaloes in terms of lactation was 3.45 calvings (4.08 and 3.04 lactations at Sids and Sakha respectively) while at Sakha it came to 74.6 months.
2. Longevity of buffaloes born during April, May and August were the lowest compared to those born in other months. However, month of calving has no significant effect on longevity.
3. Age at first calving have an effect on longevity, as observed by the correlation coefficients of 0.172, 0.235 and 0.211 for buffaloes at Sids, Sakha and the two stations together.
4. Highly significant correlations were found between 305 day milk yield during the first lactation and longevity and higher producing first lactations had a longer productive life. The regression coefficient also indicated that an increase of 100 lbs. of milk yield above the average yield is associated by an increase of one month above the average age of longevity.
5. Heritability estimate of longevity based on paternal half-sibs correlation was 38.4%.

Longevity is the average length of the productive life of the cow or buffalo in the herd. The ability of the animal to produce and reproduce well for a long time is a desirable characteristic in dairy animals, both from an economic and breeding standpoints. A long productive life reduces the number and the cost of herd replacements and increases the proportion of highly producing mature animals in the herd.

Longevity in the present study was determined in two herds of buffaloes at Sakha and Sids. The effect of age at first calving and month of calving on longevity was also studied. Heritability of longevity, the relationship between milk yield during the first lactation and productive life, were estimated. Such information is of vital importance for breeding plans aimed at improving the economic characteristics of buffaloes

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Material and Methods

The data used in estimating longevity in buffaloes covered the period from 1945 to 1964, and included 1532 lactations. Of these 718 lactations were from 176 buffaloes at Sids and 814 lactations were from 444 buffaloes at Shakha.

Two methods were used in estimating longevity in buffaloes. The first was suggested by Dickerson and Chapman (1940), in which longevity is determined by the average number of calvings given by each animal after a normal gestation whether the calf was born alive or dead. The second method was according to Parker *et al.* (1960) in which longevity is calculated as the average age of animals from birth to the last calving prior to their disposal.

Snedecor (1956) was consulted for the methods of analysis of variance and covariance. For each individual three parameters were obtained i.e. age at calvings, number of calvings and 305 day milk production for the first lactation

Results and Discussion

Applying the method reported by Dickerson and Chapman (1940) the average number of lactations for the buffaloes which remained in the two herds was 3.45 calvings (4.08 and 3.04 at Sids and Sakha respectively). This result is in close agreement with those reported by Khishin (1951) who found the average productive life to be 3.78 lactations for three commercial herds of buffaloes. A recent study on buffaloes by Maymone and Martini (1962) in Italy showed that longevity of one of the two herds of buffaloes analysed was 3.86 lactations which is in line with our findings, while in the other herd the average came to 5.7 lactations

Our finding is lower than the 4.65 lactations obtained by Alim (1953). Asker *et al.* (1954) analysing another herd of buffaloes in Egypt reported a shorter productive life of 2.45 lactations. Youssef and Asker (1959) gave a higher estimate being 5.1 calvings. It may be interesting to note that results on buffaloes in this study are similar to those found abroad for dairy cattle, Mahadevan (1953) and Singh and Sinha (1960).

Applying the method developed by Parker *et al.* (1960) showed that longevity of buffaloes at Sids was 79.7 months while at Sakha it was 74.6 months. Such findings are close to the figure of 83.29 months obtained by Mahesh *et al.* (1965) as longevity of buffaloes. Longevity of buffaloes studied are higher than the 61.1 months obtained by Gaalaas and Plowman (1963) as longevity for Friesians.

It is interesting to note that buffaloes have higher figures for longevity than that reported by workers abroad. Dickerson and Chapman (1940) in U.S.A. found longevity of two herds of Friesian to be 42 and 34 months respectively. The difference may be accounted to late sexual maturity and age at first calving in buffaloes as compared to cattle. The amount of selection practised and the management conditions of the herds may also be responsible for differences in results mentioned above.

Effect of Month of Calving on Longevity

The method applied by Parker *et al.* (1960) was used when studying factors affecting this character. The effect of month of calving on longevity was carried out to examine to what extent this trait is influenced by this factor. Table 1 shows the means of longevity of buffaloes born during the different months of the year.

TABLE 1 — AVERAGE LONGEVITY FOR BUFFALOES BORN DURING DIFFERENT MONTHS

Month	Sids		Sakha		Total	
	No.	Mean of Longev. (months)	No.	Mean of Longev. (months)	No.	Mean of Longiv. (months)
January	32	76.3	25	82.3	57	78.9
February	20	84.0	33	66.1	53	72.9
March	13	86.9	16	62.1	29	73.2
April	8	64.9	14	67.3	22	66.4
May	10	65.2	23	60.8	33	62.2
June	7	95.0	9	69.8	16	80.8
July	8	99.0	15	84.3	23	89.4
August	9	67.9	8	83.4	17	65.8
September	10	85.9	40	78.6	50	80.0
October	13	81.2	29	72.7	52	75.3
November	19	79.2	28	87.2	47	84.0
December	27	78.4	28	82.9	55	80.7
Total & Average . .	176	79.7	268	74.6	444	76.8

Longevity of buffaloes born during April, May and August were the lowest compared with other months. It was found also that month of calving had no significant effect on longevity. An examination of Table 1 indicates that the average longevity of animals born during spring months (March, April and May) was low being 67.10 months compared with the 79.93 months for the autumn months (September, October November).

Alim (1953) and Youssef and Asker (1959) have shown that month of calving did not influence age at first calving in Egyptian buffaloes. It is concluded by various workers in Egypt, Knapp (1956), that month of calving has a negligible effect on milk production and the composition of milk. The present results as well as those reported by other workers indicate that buffaloes in Egypt can calve at any month during the year with no detrimental effect on their economic characters, provided they are kept under good conditions.

Effect of age at first calving on longevity

The age at first calving is the first manifestation of the cow's reproductive capacity. When a cow calves for the first time in good condition and at an early age, this permits a more efficient reproductive and productive life.

In order to study to what extent the age at first calving may influence longevity of buffaloes, animals were classified into classes according to their age at first calving using a class interval of four months as shown in Table 2. The first class included animals which calved for the first time below 32 months of age while the last class included animals which calved over 48 months.

TABLE 2.—EFFECT OF AGE AT FIRST CALVING ON LONGEVITY OF BUFFALOES

Class Interval	Sids		Sakha		Total	
	No.	Mean of Longevity (months)	No.	Mean of Longevity (months)	No.	Mean of Longevity (months)
Below 32 months	21	62.1	18	51.1	39	57.0
32 months	44	74.5	50	66.4	94	70.2
36 months	52	89.4	76	74.3	128	80.4
40 months	29	78.7	52	75.6	81	76.7
44 months	22	72.9	35	82.9	57	79.0
Over 48 months	8	114.3	37	89.4	45	92.9

It is evident from this table that longevity increased with the increase of age at first calving at both Sids and Sakha farms up to 36 to 40 months after which it has no specific trend. It can be seen that the majority of animals had their first calving from 36 to 40 months and these had the higher longevity. It can be expected therefore that calving at that age would increase the useful life of the animal to some extent.

Results obtained are in agreement with those reported by Singh and Sinha (1960) who concluded that late calvers had a longer productive life than early calvers. Our results are not similar to that reported by Alim (1953) who found that early calvers have higher longevity as compared to late calvers. The observation of Asker *et al.* (1954) also showed that longevity gradually decreased with the increase of age at first calving in both cattle and buffaloes in Egypt.

The correlation coefficients between age at first calving and longevity was found to be 0.172 for buffaloes at Sids, 0.235 at Sakha and 0.211 for the pooled data and all estimates were highly significant. Mahesh *et al.* (1965) studying Indian Buffaloes found the correlation between these two variables to be 0.061. Maymone and Martini (1962) in Italy showed that age at first calving had not

a marked effect on longevity in terms of lactations. This is probably because of the greater length of the productive life of the buffaloes studied by the previous workers. Our finding is not in agreement with that reported by Asker *et al.* (1954), Youssef and Asker (1959) who found a negative correlation between age at first calving and longevity.

The Relationship between the 305 day Milk Production during the First Lactation and Longevity

It has been observed by many workers that productive life is highly influenced by the first lactation yield. Table 3 presents the intra-sire correlation and regression for the 305 day milk yield during the first lactation and longevity (*i.e.*, the final age of calving).

TABLE 3.— THE CORRELATIONS AND REGRESSIONS OF LONGEVITY AND FIRST LACTATION YIELD

Herds	No. of offspring	No. of Sires	r ± S. E.	b	
Sids	176	52	0.222** ± 0.074	0.99/100	lbs of milk
Sakha	268	32	0.277** ± 0.059	0.98/100	„
Total	444	57	0.255** ± 0.046	0.98/100	„

The correlation coefficients between milk yield during the first lactation and longevity were 0.222, 0.277 and 0.255 for Sids, Sakha and the pooled data respectively. All these coefficients were significant at the 1% level of probability. It seems from these results that buffaloes producing more than the herd average during the first lactation have an apparent longer productive life. These findings are in accordance to results obtained by Parker *et al.* (1960) on Friesians and Mehesh *et al.* (1965) on Indian Buffaloes.

The regression coefficients as shown in Table 3, indicate that for an increase of 100 lbs. of milk yield in the first lactation, there is an increase of one month in terms of longevity above the average of the herd.

Heritability of Longevity

The heritability estimate of longevity in buffaloes was calculated as 38.4% using paternal half sibs correlation (D.f. 443). Very little work has been done on heritability of this character in dairy cattle and buffaloes. Youssef and

Asker (1959) arrived at a lower estimate of heritability of longevity in buffaloes being 2.0%. Working with Friesians, Parker et al (1960) found that the heritability of longevity did not differ significantly from zero. However, our results in line with those found by Wilcox et al (1957) who reported 37.0% as the heritability of longevity for a Friesian herd in the United States. Plowman and Gaalaas (1960) estimated the heritability in Holstein Friesian as 15.0% using 3881 daughter dam pairs.

REFERENCES

- ASKER, A.A., RAGAB, M.T. AND HILMY, S.A. (1954).—*Ind. J. Dairy Sci.*, **7**: 135.
- ALIM, K.A. (1953).—*Nature*, **171**: 755.
- DICKERSON, G.E. AND CHAPMAN, A.B. (1950).—*Amer. Soc. Anim. Prod. Proc.*: **76**.
- GAALAAS, R.E. AND PLOWMAN, R.D. (1953).—*J. Dairy Sci.*, **46**: 27.
- KHISHIN, S.S. (1951).—*Emp. J. Exp. Agric.* **19**: 185.
- KNAPP, B. (1956).—*Water buffaloes in Egypt*, N.S.O.M.E.
- MAHADEVAN, P. (1953).—*Emp. J. Exp. Agric.* **21**: 61.
- MAHESH, DUTT, SINGH, SHI PARKASH AND DESAI, R.H. (1965).—*Ind. Vet. J.* **42**: No. 1.
- MAYMONE, B. AND MARTINI, R. (1962).—*Annali Sper. Agr.* **16** ($\frac{1}{2}$) 35-51 cited by A.B.A. **30**, No. 74.
- PARKER, J.B. BAYLEY, N.D., FOHRMAN, M.H. AND PLOWMAN R.D. (1960).—*J. Dairy Sci.*, **43**: 401.
- PLOWMAN, R.D. AND GAALAAS, R.E. (1960).—*J. Dairy Sci.* **43**: 877.
- SINGH, S.P. AND SINHA, (1960).—*Ind. J. Dairy Sci.* **13**: 163.
- SNEDCOOR, G.W. (1956).—*Statistical Methods*. 5th Ed. The State College Press, Ames, Iowa, U.S.A.
- WILCOX, G.J. PFAU, K.O. AND BARTLETT, J.W. (1957).—*J. Dairy Sci.* **40**: 942.
- YOUSSEF, A.A. AND ASKER, A.A. (1959).—*Ind. J. Dairy Sci.* **12**: 1.

طول فترة الحياة الانتاجية للجاموس

الملخص

حللت السجلات الخاصة بقطعان الجاموس الموجودة بمحطات التربية بسخا وسدس لدراسة طول فترة الحياة الانتاجية للجاموس . استخدمت في الدراسة السجلات التي تجمعت في خلال العشرين سنة الاخيرة وكان عددها ١٤٥٧ سجلا ل ٥٧١ جاموسة في محطة سخا و ٨٢٤ سجلا ل ٢٩٢ جاموسة في محطة سدس .

وتتلخص نتائج هذه الدراسة فيما يلي :

١ - قدر طول الحياة الانتاجية للجاموس بطريقتين الاولى بايجاد متوسط عدد المواسم حيث وجد انه ٠.٧ ر. موسما في سدس و ٠.٤ ر. موسما في سخا والثانية بحساب طول الحياة الانتاجية بالأشهر وقد وجد انها ٧٩٧ شهرا في سدس و ٧٤٦ شهرا في سخا .

٢ - وعلى الرغم من أن طول الحياة الانتاجية للجاموس المولود في أشهر أبريل ومايو وأغسطس كان أقصر من مواليد باقى أشهر السنة فقد اتضح أن أشهر الولادة ليس له تأثير مؤكد عليها .

٣ - لوحظ أن لعمر الأم عند أول ولادة تأثير ملموس على طول حياتها الانتاجية وهذا واضح من معاملات الارتباط العالية التأكيد والتي كانت ٢١١ للجاموس في سخا وسدس معا . وقد وجد أيضا أن عمر أغلب الحيوانات عند أول ولادة كان يتراوح فيما بين ٣٦ و ٤٠ شهرا وكانت الحيوانات التي تلد فيما بين هذه الفترة من العمر تصل الى أطول حياة انتاجية .

٤ - معاملات التلازم بين الادرار في ٢.٥ يوم في الموسم الأول وطول الحياة الانتاجية كانت عالية التأكيد وهي ٢٥٥ ر. في المحطتين معا . وتدل هذه النتائج على أن الحيوانات ذات الادرار العالي في الموسم الأول لها حياة انتاجية أطول . كما دلت أيضا معاملات الانحدار على أن كل زيادة قدرها ١.٠ رطل لبن فوق متوسط الادرار يصحبها زيادة شهر واحد فوق متوسط الحياة الانتاجية للحيوان .

٥ - قدرت القيمة الوراثية لطول الحياة الانتاجية وبلغت ٣٨٤٪ باستخدام طريقة الاخوة غير الأشقاء .