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REPEATABILITY OF SOME DAIRY CHARACTERS IN THE EGYPTIAN BUFFALOES

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Summary

This work was carried out on two herds of Egyptian buffaloes: one belonging to the Egyptian Agriculture Society at Bahteem and the other to the Faculty of Agriculture of Ain-Shams University at Shebin Elkom.

The repeatability estimates obtained for milk yield, lactation period, dry period, service period and claving interval were 0.47, 0.32, 0.39, 0.24 and 0.17 respectively.

Milk yield was found to be affected by heredity and permanent environment more than the other four characters studied.

Service period and calving interval were mostly or entirely affected by changes in the non-genetic factors.

Introduction

The repeatability of the economic characters in dairy animals are of vital importance for the breeder since it measures the variation caused by heredity and permanent environment. This work was carried out to study the repeatability of milk yield, lactation period, dry period, service period, and calving interval.

Materials and Methods

The records of two Egyptian herds of buffaloes were used for this study. The herd of the Egyptian Agriculture Society at Bahteem near Cairo, and that of the Faculty of Agriculture of Ain Shams University at Shebin Elkom. The study covered the periods 1937-57 and 1949-57 for the two herds respectively. The Bahteem records included 223 lactations of 84 buffaloes. The Shebin Elkom records included 97 lactations of 40 buffaloes.

Buffaloes of the two herds were tethered in open sheds all day and allowed to graze clover during winter. Animals were milked twice a day

by hand. During the period from November to May buffaloes were fed on Egyptian clover, and animals giving more than 20 pounds daily were given concentrates according to their milk production. Animals were fed during summer on concentrates according to their weight and production, and they were given green maize fodder in limited quantities.

The repeatability was studied by including all animals with two or more lactation records. Correlation coefficients between successive and non-successive records for all possible combinations of the 1*st*, 2*nd*, 3*rd*, and 4*th* lactation were obtained. The method given by Snedicor (1946) for estimating and averaging correlation coefficients was used.

Results and Discussion

The average repeatability of total milk yield was 0.47. However, this value is within the range 0.36 - 0.66 obtained by other workers on the Egyptian buffaloes (Alim, 1953; Asker *et al.*, 1953; Alim and Ahmed, 1954; Itriby and Asker, 1956). Our estimate is similar to that reported for cattle by Johansson and Hanson (1941), Ragab (1950) and Mahadevan (1950 & 1953).

TABLE 1

Repeatability of Milk yield for Buffaloes.

Pairs of lactations	Number of pairs	Correlation coefficient
1,2	59	0.49**
2,3	42	0.63**
3,4	26	0.62**
1,3	38	0.37*
1,4	23	0.10
2,4	24	0.31
Total and Average	212	0.47**

* P ≤ .05 ** P ≤ .01

Table (1) shows that correlations between total milk yield of successive lactations did not show any noticeable changes with age up to the 4*th* lactation. Similar results were obtained by workers of Egyptian buffaloes, (Askar *et al.* 1953 and Hilmy, 1954); and on Ayrshire cattle (Sikka, 1940).

It is clear that correlations between non-successive lactations had a tendency to be lower than those between successive ones. This agrees with the result reported by Hilmy (1954), and differs somewhat from that found by Asker *et al.* (1953).

TABLE 2.

Repeatability estimates for milk yield, lactation period, dry period, service period, and calving interval for buffaloes.

Character	Number	Repeatability estimate
Milk Yield	212	0.47**
Lactation period	212	0.32**
Dry period	161	0.39**
Service period	196	0.24**
Calving interval	281	0.17**

** $P \leq .01$

The repeatability estimate for lactation period was 0.32 which is higher than that calculated for Egyptian buffaloes by other workers whose estimate ranged from 0.16 to 0.26. Itriby and Asker (1956) gave lower estimates of 0.19 to 0.26 for this character in the Native, European, and Native × European cattle. Hilmy (1954) gave a higher estimate (0.58) for lactation period in the Native cattle.

Our results for repeatability of dry period (0.39) is much higher than the estimate obtained in the Egyptian buffaloes by other workers which ranged from 0.11 to 0.18.

On the other hand, Johansson and Hansson (1941), Johansson (1949), Hilmy (1954), and Itriby and Asker (1956) reported lower values for this trait in cattle compared with our results.

Table (2) shows that the average repeatability of service period is 0.24 which is not significantly different from the figure of 0.32 reported by Hilmy (1954) for buffaloes but higher than that reported by the same worker for the native cattle.

This work shows that the repeatability of calving interval is 0.17 which is within the range of 0.05 - 0.28 reported by other workers of Egyptian buffaloes.

Itriby and Asker (1954) working on Native, European and Native × European cattle gave lower estimates.

Conclusions

Repeatability can be defined as the fraction of the phenotypic variance which is caused by permanent differences between individuals. It measures the variation caused by hereditary factors and permanent environment. So, estimating it for any character gives the breeder an idea about how much this character can be improved in his herd by culling the poorer individuals.

Our findings on repeatability of the 5 dairy characters studied showed that milk yield, lactation length, and dry period had a higher repeatability than service period and calving interval. So, it could be stated that the milk production characters are more affected by heredity and permanent environment than the other two characters.

The estimates of repeatability of lactation period and dry period for the buffaloes are relatively high compared with those obtained by other workers elsewhere. The reason may be found in the s all size of our data.

The lower average repeatability of service period and calving interval indicates that these characters are more affected by changes in the non-genetic factors. Therefore, it should be possible to shorten service period and calving interval in buffaloes by improving feeding and management.

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المعامل التكرارى لبعض صفات انتاج اللبن فى الجاموس المصرى

الملخص

اجريت دراسة لقياس المعامل التكرارى لكل من : محصول اللبن ـ فترة الحليب ـ فترة الجفاف ـ فترة التلقيح وكذلك للفترة بين الولادتين وذلك فى قطيعين من الجاموس المصرى أحدهما فى بهتيم ويتبع الجمعية الزراعية المصرية والاخر فى شبين الكوم ويتبع كلية الزراعة جامعة عين شمس ٠٠٠٠ وقد جمعت البيانات التى استخدمت فى هذه الدراسة من سجلات الخصب وانتاج اللبن لقطيع الجمعية الزراعية عن الفترة من عام ١٩٣٧ الى عـــام ١٩٥٧ ولقطيع كلية الزراعة عن الفترة من عام ١٩٤٩ الى عام ١٩٥٧ وتتلخص نتائج هذه الدراسة فيما يلى :

كان المعامل التكرارى لمحصول اللبن (٠ر٤٦٧) ولفترة الحليب(٠ر٣١٧) ولفترة الجفاف (٠ر٣٨٨) ولفترة التلقيح (٠ر٢٤٤) وللفترة بين الولادتين (٠ر١٦٨)

يعتبر محصول اللبن اكثر الصفات الخمس المدروسة تأثرا بالوراثة والبيئة الدائمة بينما تتأثر كل من فترة التلقيح والفترة بين الولادتين كثيرا أو كليا بالعوامل غير الوراثية ٠