

HERITABILITY AND REPEATABILITY ESTIMATES OF LACTATION LENGTH IN WHITE FULANI CATTLE

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SUMMARY

There were 1,111 records of 155 White Fulani cows covering the years 1978 through 1986. Records, irrespective of length up to 400 days for one or more calvings, were used to estimate the heritability of lactation length and for the determination of correlation between lactation length and milk yield.

Adjustment for short records (abnormal records) due to death of calf, cow died, cow sick and transfers were made to avoid the customary procedure of deleting short records when attempting to evaluate differences among cows of breeds indigenous to tropical areas.

Results indicate a moderately high heritability of 0.30 ± 0.14 and low repeatability of 0.15 ± 0.07 for lactation length. Also, correlation level as high as 0.8 was observed between length of lactation and milk yield.

INTRODUCTION

McDowell et al. (1972) in his studies on the improvement of livestock production in warm climates stated that low milk production and short lactation length in the tropics is due to the interaction of climate, disease, breeding, feeding and managerial factors, and these vary in their relative importance from country to country and from region to region within countries.

Lush (1945) stated that repeatability estimates are valuable in the analysis of milk records. They may be utilized to assess the real producing ability of individual cows in a population.

From his study of the variation of length in the White Fulani, Lecky (1951) argued that whereas in European dairy cattle, the length of lactation is chiefly determined by pregnancy and management, in most tropical cattle lactations are short and their length is determined by other factors, heredity being the main one. Singh and Desai (1962) arrived at an identical heritability of 0.32 ± 0.03 based on 190 daughter-dam pairs for lactation length in Hariana cattle in India.

The objective of this study is to determine the heritability and repeatability of lactation length in the White Fulani cattle and, in addition, to determine the correlation between milk yield and lactation length.

METHODS

The materials for this study were obtained from the University of Ibadan Teaching and Research Farm. The animals whose data were used for this study were all of the White Fulani breed taken from the 1978 to 1985 breeding records.

There were 1,111 records representing one or more calvings of 155 cows covering the years 1978 through 1986. Particulars of records include sires, dams, disposals, services, calvings, lactations, abortions, date freshed and date dried. Lactation records over 400 days were included, irrespective of length. Milking was done routinely with the calf present, although milking was continued until 2 months before expected parturition or until yield per

day declined to 0.1 kg per day. Recorded milk yield in lactation excluded that suckled by the calf. Until 3 or 4 months of age, the calf was allowed to suckle one-quarter at each milking. Thereafter, the calves were used to stimulate milk-let-down, but were usually not allowed to suckle.

The analysis of variance for estimating repeatability values based on the model suggested by Becker (1975) was used in determining the variance components. The repeatability, R, was calculated with the following equation:

$$R = \frac{r_b^2}{r_b^2 + r_w^2}$$

where R = repeatability, r_b^2 = between cow variance and r_w^2 = within cow variance.

The analysis of variance for estimating heritability values based on the model suggested by Becker (1975) was used in determining the variance components.

The standard error of this estimate was calculated according to approximate method suggested by Swiger et al., 1964.

RESULTS AND DISCUSSION

In this study, milk yield was found to be highly correlated with lactation length. A correlation level as high as 0.8 was observed between these two traits. This agrees with the earlier findings of Galukande et al. (1962) and Robertson (1950), among others, who obtained correlations ranging from 0.4 to 0.9 between these two traits in different populations of indigenous cattle in Nigeria, Ceylon, Egypt, Sudan, Uganda, Kenya, India and Ghana. The high correlations between these two production traits shows that one way of improving milk yield in the White Fulani is by selecting for breeding only those cows with higher lactation length.

The heritability estimate obtained based on 97 daughter-sire pairs for lactation length in this study was 0.30 ± 0.14 . This value agrees with most of the earlier findings by some workers. Robertson (1950) using data from White Fulani cattle in Nigeria reported that the heritability of a single record of milk yield was 0.32, while that of the average of two records was 0.47. Singh and Desai (1962) arrived at an identical heritability of 0.32 ± 0.03 based on 190 daughter-dam pairs for lactation length in Hariana cattle in India. These moderately high heritabilities of lactation length in the White Fulani suggest that one of the methods by which length of lactation could be increased is by selecting for breeding those cows with longer lactations.

In the analysis of data, repeatability value of 0.15 ± 0.07 was observed. The repeatability estimates for length ranging from 0.1 (Mahadevan, 1953) to 0.5 (Robertson, 1950) permit no general conclusion to be drawn. They suggest, nevertheless, that in herds where variation in lactation length is high, a considerable improvement of milk yield could be achieved by culling cows with short lactations.

Therefore, the low repeatability observed shows that White Fulani cows do not have a reliable milk producing capacity. Thus, the relative efficiency of selection based on one or more observations is low, an indication that selection would not be very effective in improving this trait in tropical White Fulani cattle.

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