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Lactation Length and Lactation Milk Yield in Cattle in Sudan

[1]E.O. Amasaib, [2]H.E. Mohamed and [1]A.N.M.A. Fadel Elseed
[1,2]Department of Animal Nutrition,Faculty of Animal Production,
University of Khartoum, Khartoum, Sudan
[2]Department of Animal Science, Faculty of Health, Agriculture and Natural Sciences,
Tshwane University of Technology, Pretoria

Abstract: This study was conducted to compare some productive traits of imported versus locally bred and crossbred dairy cows (50, 56.5 and 62.5%) in 2 different farms in Khartoum, Sudan. The correlations between milk yield and lactation length for the 1st 3 lactations for Butana farm and the university farm were found to be 0.669 and 0.746, respectively. However, the correlation between total and 100 days mil yield for the 1st three lactations were found to be 0.762 and 0.746 for Butana and the university far, respectively. As for the breed effects, the 100 days milk yield were found to be 2156.6±599, 1566.67±383, 894.7±352.01, 732.76±1711.1 and 888.03±331.96 kg for imported Holstein-Friesian, locally born Holstein-Friesian, 50, 56 and 62.5% Friesian blood, respectively.

Key words: Cattle, lactation length, lactation yield, milk yield, holstein-friensian

INTRODUCTION

With the increase in population worldwide, there is a need to increase milk productivity for the tropic. The introduction of breeds of high milk production plays an important role in this aspect. European dairy cattle breeds are of great economic importance under tropical environments where there is a large variability in terms of feed quality and quantity and disease challenges. In developing countries, the performance of high-yielding breeds imported from countries with highly advanced production systems is often negatively affected due to genotype-environment interactions (Bondoc *et al*., 1989; Rege, 1991; Smith, 1988; Ojango *et al*., 2005).

The Holstein-Friesian is the most widely used exotic dairy breed in all farming in the tropics. The breed is popular for its potentially high milk producing ability and has attractive capabilities for a country where milk supply is not yet able to meet the demands of the growing population. Milk yield is the most important trait in dairy cattle production and total yield in 305 days is often used in genetic evaluation of animals. Various factors affecting milk production such as breed fixed environmental factors and managemental practices calving season, farm operation and parity (Hansen *et al*., 2006).

It is of paramount importance to assess the breed effect on lactation length and lactation yield under tropical conditions of Sudan in different farming systems. The objectives of this study were to evaluate the correlation between the lactation length and the milk yield of pure Holstein-Friesian cattle compared with their counterpart raised in Sudan.

MATERIALS AND METHODS

Farms and feeding: Butana farm is located in Tieba Elhasanab, 30 km south of Khartoum. This farm was established in 1989 by the importation of 500 Holstein-Friesian at different stage of pregnancy from the Netherlands.

Khartoum University farm is located in Khartoum North, Shambat. This farm was established in 1940 by purchasing of local breeds and adopted in 1972 a breeding program with the introduction of Holstein-Friesian. It maintains the level of foreign blood ranging from 25-62.5%. The cows are kept in partial shaded constructed from iron bars, the floor is of concrete.

Cows were fed on forage (home-raised *Sorghum bicolor*), Abu 70 (*Medicago sativa*), Berseem and concentrates. They were allowed to graze two hours daily from 7-9 a.m and the major green fodder is given in the yard. The concentrate is provided during milking and it is composed of cotton seed cake, wheat bran, molasses and salt.

Corresponding Author: H.E. Mohamed, Department of Animal Science, Faculty of Health, Agriculture and Natural Sciences, Tshwane University of Technology, Pretoria

Data collection and analysis: Out of 105 cows at different physiological status, 40 cows were randomly selected and their records were obtained from the University farm. As for Butana farm, 80 cows were also randomly selected out of a herd of 500 cows. Half of this figure was imported and the other half were locally born. MINITAB program was employed to analysis the data statistically.

RESULTS AND DISCUSSION

Table 1 shows the overall and 100 days milk yield of pure Holstein and locally born in the 2 farms. It appear that the imported breeds of cattle secured the highest overall and 100 days milk yield as compared to their counterparts (locally born) and cross bred of different percentages of foreign blood. The least yield is obtained by the 56.5%. It appears from the current data that some of the SD is quite high and this may be attributed to the fact that the sampled animal number is low, with large variation in the data obtained. As for the breed effect, Ibrahim (1983) found that the milk yield for 62.5% Friesian blood is 2598.3 kg, which is similar trend with the present findings. Fawi (1994) however obtained lower figures than those reported here. The imported group of cattle showed no statistical differences from locally born cattle in terms of lactation length. The effect of breed on milk yield is investigated here. The overall herd total lactation milk yield in Friesian dairy cattle found was 1,188.4±458.3 kg, corresponding to a mean daily milk yield of 3.784±1.105 kg (Diack *et al*., 2005).

The data for the lactation length in relation to the percentage of foreign blood is presented in Table 2. Crossbreeding has become increasingly accepted and recommended protocol for the increase in milk production in the tropics. In Sudan, milk yield was negatively correlated with variation in ambient temperature and significant adverse effects of high environmental temperature were only observed in the exotic breed in Sudan. Similarly, Matias (1998) showed a significant difference between the performance of purebred Holstein and crossbred Holstein-Sahiwal animals in terms of adaptability to local conditions, specifically on grazing management.

The data for the correlations between overall and 100 days milk yield in the 1st three lactations is presented in Table 3. High correlation is clear in the 2 farms used (University and Butana farms). The average lactation length reported here were found to be 402.1±121.29, 375±143.75 and 376.93±122.96 days, respectively for crossbred cows with 50, 56.5 and 62.5%, respectively. It appear that the values of the lactation length for crossbred cattle were higher than the standard level by approximately 3 months, this value could be attributed to the mismanagemental practices since the farm do not adopt any program in drying off lactating cows. Also the low fertility level of the herd with the absence of proper heat detection aids and insemination might be another reason for the length of lactation periods reported in this study. The non significant difference in terms of lactation length between the different breeds reported here is similar to results obtained in Libya (Ahmed *et al*., 1996).

The correlation between milk yield (overall and 100 days) is presented in Table 3. The trend of difference is not clear between the 2 farms. The correlation between overall milk yield and lactation length in but Butana and University farms is presented in Table 4. Studies confirmed a correlation of 0.676 between milk yield and lactation length (Elbarbary *et al*., 1983), this is an indication of highly significant effect of lactation length on milk yield.

Table 1: Overall and 100 days milk yield of the 1st threes lactations in pure and crossbred cattle

Milk yield (kg)	Overall	100 days
Imported Friesian	5468.94±1503.94	2155.6±5.99
Locally born Friesian	4222.04±1570.18	1566.67±383
50% Friesian blood	2645.22±1008.1	894.7±352.1
56.5% Friesian blood	2052.98±834.9	732.75±171.1
62.5 Friesian blood	2564.78±1289.1	331.96±122.96

Table 2: Lactation length of pure and crossbred cattle

Milk yield (kg)	Mean
Imported	332.71±68.44
Locally born Friesian	321.42±81.75
50% Friesian blood	402.15±121.29
56.5% Friesian blood	375.14±143.75
62.5 Friesian blood	376.93±122.96

Table 3: The correlation between overall and 100 days milk yield in University and Butana farms in Sudan

Farm	1st lactation	2nd lactation	3rd Lactation	Pooled lactation
Butana	0.669	0.762	0.821	0.752
University	0.755	0.774	0.759	0.746

Table 4: The correlation between overall yield and lactation length in University and Butana farms in Sudan

Farm	1st lactation	2nd lactation	3rd Lactation	Pooled lactation
Butana	0.548	0.420	0.408	0.669
University	0.689	0.370	0.481	0.746

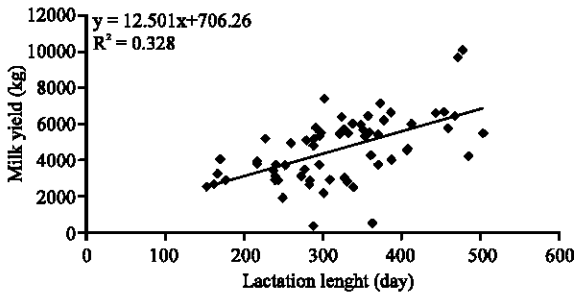

Fig. 1: Regression analysis between first lactation length and first lactation milk yield in Butana farm

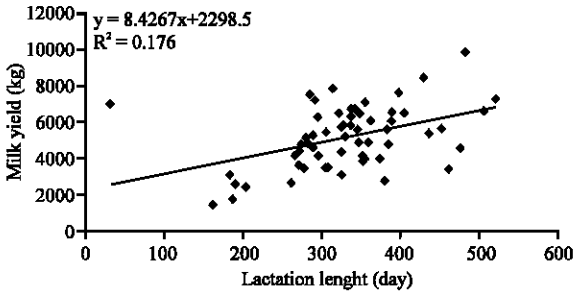

Fig. 2: Regression analysis between second lactation length and second lactation milk yield in Butana farm

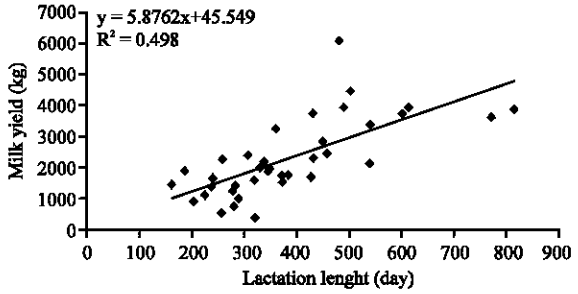

Fig. 3: Regression analysis between first lactation length and first lactation milk yield in University farm

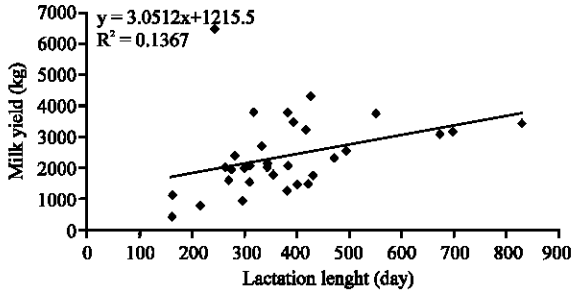

Fig. 4: Regression analysis between second lactation length and second lactation milk yield in University farm

Figure 1 shows the regression analysis between first lactation length and first lactation milk yield in Butana farm. However, Fig. 2 shows the data for the second lactation length in the same farm.

The regression analysis as for the university farm for the first lactation length and lactation milk yield is presented in Fig. 3. The data for second lactation length and second lactation milk yield is shown in Fig. 4.

The correlation between total milk yield and 100 days milk yield were found to be 0.762 and 0.746, respectively. This high correlation might indicate the economic importance of this trait since the 100 days yield constitutes a significant portion of the total yield. The mean lactation lengths for the Friesian cattle in Sudan were found to be 241±0.5 and 236±0.4 days for unequal and equal data, respectively (Mahmoud, 1998). In another study, Fadel Elmoula (1989) revealed that lactation length was affected by the percentage foreign blood and cows with 37.5, 50 and 62.5%. In Gambia, the overall total lactation and daily milk yields in F1 crossbred Friesian were 1.188±458 and 3.78±1.1 kg. Their mean daily milk peak yield, time to peak and persistency were 4.16±2.51 kg, 3.8±4.7 weeks and 84.0±32.3%, respectively (Diack *et al*., 2005).

In many places in the tropics crossbreeding European dairy cattle with local breeds has been advocated to gain time in increasing productivity per animal unit in order to tackle the challenge of an increasing gap between demand and supply in milk. Hence, in many places programmes based on the continuous production of F1s (Madalena, 1993) are being implemented, crossbreeding high-yielding European dairy cattle with local breeds (Tawah *et al*., 1999). The highest milk production post-claving and at peak and lowest persistency was achieved with third parity cows. Further research is needed to investigate the impact of tropical conditions on lactation length and milk yield and other productive traits.

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