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The Performance of Holstein-Friesian, Bunaji and their Cross Breds in a Tropical Environment

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Abstract: Total lactation (Tolac-kg) and lactation days (Lacdays-days) were measured to assess the performance of Holstein Friesians, Bunaji and their Cross breds using records from 70 animals consisting of 18 pure bred Holstein-Friesians dams (HF dam), 18 pure bred Friesian daughters (HF daughters), 17 Bunaji dams (BB dams) and 17 Bunaji daughters (BB daughter-F1 cross bred). The natural logarithm procedure was applied to the original data to homogenize the variance and the mean. This was then analysed using the general linear model procedure in a model that considered the dam's records as the independent and the daughter's records as the dependent variables. Result showed that Tolac for the 3 cattle genotype was significantly ($p<0.05$) different, while Lacdays showed no significant ($p>0.05$) difference, when their means were compared.

Key words: Performance, Holstein-Friesian, Bunaji, crossbred, tropical environment

INTRODUCTION

The productivity of indigenous tropical cattle is generally low with late maturity, wide calving interval and low milk yield. This has been attributed to the problems of nutrition, climate, disease, management and genetic factors. Thus in an attempt to improve the productivity of the local cattle, there has been a need to introduce into the tropics exotic cattle breeds (Chamberlain, 1989). The practice had often been to import the animals either as bulls, semen for artificial insemination or heifers, which are then raised as pure breeds.

Increased milk yield is obviously the main objective of trying to improve dairy cattle production. Therefore the Holstein-Friesian, high milk producing exotic cattle breed, has become more popular because of its high milk producing and the attendant low butterfat in its milk (Maul, 1990). It has been used variously in crossbreeding programmes especially with the Bunaji, a local breed that is capable of increased milk production. The resultant strain has been known to give excellent performance and have proven to be disease resistant, producing an average milk yield higher than that of the pure breed Bunaji (Adeneye, 1994; Buvanendra *et al*., 1981).

Since the true picture of the genetic and other potential of these cattle genotypes cannot be said to have been seen yet, this work was therefore carried out to further assess their lactortional performance.

MATERIALS AND METHODS

Records for a total of 17 animals consisting of 18 pure bred Holstein-Friesian dams, (HF Dam) 18 Holstein-Friesian daughters (HF daughter) 17 Bunaji dam (BB Dams) and Seventeen Bunaji daughters (Fi-Cross bred-BB Daughters) were used for the study.

The parameters considered were total lactation (Tolac) measured in Kg and Lactation days (Lacdays), in days. Lactation days were corrected to 100, since lactation according to Beth *et al*. (1978). Peaks at about 100-200 days and decreases as lactation length increases.

The natural logarithm procedure was applied to the original data to homogenize the variance and the mean. The data was then analysed using the general linear model procedure (SAS, 1987) in a model that considered the dams record as the independent and the daughter's records as the dependent variables.

RESULTS AND DISCUSSION

The result for total lactation yield (kg) of the three genotype as presented in Table 1 were 6565.75±276.8 (HF dam), 7703.80±324.70 (HF daughter), 1060.10±142.48 (BB dam) and 4118.39±232.60 (BB daughter). Statistical analysis showed that they differed ($p<0.55$). Significantly with the pure bred Friesians and the Cross breds performing better than the Bunaji.

Table 1: Total lactation yield of holsfein-friesian, bunaji and che Crossbred

Parameters	----------Total lactation ----------	
Hf dam x Hf daughter	6565.75±276.8[b]	7703.8±324.7[a]
BB dam x Hf dam	1066.10±142.48[b]	6565.75±276.8[a]
BB dam x Hf daughter	1066.10±142.48[b]	7703.77±4247[a]
BB dam x BB daughter±	1066.10±142.48[b]	4118.39±233.6[a]
BB daughter± x Hf daughter	4118.39±233.6[b]	7703.8±324.7[a]
BB daughter± x Hf dam	4118.39±233.6[b]	6565.75±276.8[a]

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Table 2: Lactation days of holsfein-friesian, bunaji and the crossbred

Parameters	---------- Total lactation----------	
HF dam x Hf daughter	295.37±6.3	345.2±12.69
BB dam x Hf dam	211.0±14.7	295.37±6.3
BB dam x Hf daughter	211.0±14.7	345.2±12.69
BB dam x BB daughter±	211.0±14.7	293.54±9.97
BB daughter± x Hf daughter	293.54±9.79	345.2±12.69
BB daughter± x Hf dam	293.54±9.97	295.37±6.3

Hf dam-Holstein-Friesian dam, BB dam-Bunaji dam,±Fi-Cross bred Hf daughters-A Holstein-Friesian daughter, BB daughter-Bunaji daughter

The higher lactation yield of the Holstein-Friesian is obvious due to its high genetic potential for milk production through high selection pressure over time for inspite of the fact that they do not maintain the high level of production which the were a claimed back home, mainly because there is a limit to their adaptability as a result of caused by heat, high humidity levels, poor nutrition and management and disease infestation, they are known to produce more milk than that produced by the Bunaji (Mbapard and Ngere, 1990; Pagot, 1992; Rege *et al*., 1992) as a result of this superior genetic quality thus having better milk production characteristics than the Bunaji (Adeneye, 1994; Mbap and Ngere, 1995; Ojango and Pollet, 2001). The locally born Friesian daughters had a significantly ($p<0.55$) better lactation yield than the imported dams as a result of better adaptation to the local environment. This is in agreement with the works of Udedible *et al.* (1985), Chamberlian (1989), Maul (1990).

The Bunaji dam did not perform well compared to the Holstein-Friesians (dams and daughters) and the cross bred. This large variation in yield can be attributed to the fact that the breed has a low genetic merit as well as there having been no selection within the cows (Pagot, 1992), having been acquired from local farmers.

However, the beneficial effect of cross breeding has undoubtedly been reflected in the lactation yield of the cattle genotypes in this study. That the crossbred (Fi) had a significantly ($p<0.55$) better lactation yield that the pure indigenous tropical breed is an indications of its improved genetic make up due to the mix up of genes when the two breeds were crossed. This according to many authors have resulted in a strain with good survival rate, that have proven to be disease resistant and produced average milk yield higher than the pure breed Bunaji (Knudsan and Sohael, 1970; Sohael, 1984; Udedibie *et al*., 1985; Mbap and Ngere, 1990; Alba and Kennedy, 1994; Rege *et al*., 1994).

The appreciable improvement showed by the cross bred when compared to those already reported could be attributed to the increased heterozygousity or hetorosis effect which when taken with good feeding management, the crossing of two breeds both contribute a necessary but different attributes to the production level of the cross, as the combining of different genes from different parents breeds has a favourable effect on milk production (Mackinon *et al*., 1996; Hollon *et al*., 1996).

The result for lactation days is presented in Table 2. It showed Lactation days to be 211.00±14.70 (BB dam), 295.37±6.30 (HF dam), 293.54±9.79 (Fi)and 345.20±12.69 (HF daughter). The Bunaji which has a lower genetically make up land a lower lactation days compound to the Friesians and the crossbred. They however were not significantly ($p<0.55$) different from each other. This is in agreement with Mcdowell (1992) who found lactation length in indigenous cattle to be 50-100 days less than the European breed who reported a lactation length of 246.271, 304 and 282 days for the Bunaji, Crossbreds and Holstein-Friesians and a range of 190-360 days that was reported by Williamson and Pane (1978) for the indigenous breed.

The general observation however seems to be that longer lactation length probably leads to higher milk yield (Alba and Kennedy, 1994; Mbap and Negere, 1995).

The result in this study are 345.2±12.69, 293.54±9.97, cross-bred and Bunaji respectively. However they were not significantly ($p<0.55$) different from each other, despite the environmental effect and other management practices. The higher genetic potential on the part of the Holstein-Friesian and the Crossbred enhanced it's better performance while the Bunaji which is genetically inferior and a shorter lactation length. The general observation in this study as that longer lactation length probably leads to higher milk yield.

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