APRW -04

Assessment of Temperate Breeds for Milk Yield, Net Energy Efficiency and Dairy Merit in the Tropical Climate of Nigeria

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Abstract

This study was conducted to assess the milk yield, net energy efficiency and dairy merit of multi-genotypes cattle in low humid condition of Adamawa State. Lactation and milk component records of one thousand and two (1002) multi genotype cattle (Holstein, 200; Jersey, 202; Brown Swiss, 300 and Simmental, 300) was extracted from the database of Sebore farm, Adamawa State. The data were processed to estimate the milk indices. All descriptive statistical analyses (Mean, coefficient of variation and standard error of mean) were done using R commander (2016) Software. Significant differences in means were separated using in Duncan Multiple Range Test. Data measured were milk yield, net energy efficiency and dairy merit. There were significant differences among the genotypes for milk yield, dairy merit and net energy efficiency. Holstein cows was significantly ($p<0.05$) higher in average milk yield, net energy efficiency and dairy merit as compared to Jersey, Brown Swiss and Simmental. Simmental had significantly ($p<0.05$) the least average milk yield, net energy efficiency and dairy merit. It is concluded that Holstein cows have an optimal performance (1788.2 kg, fat corrected milk yield, 50.5% net energy efficiency and 61.2% dairy merit) for milk production as compared to other multi genotype cattle. The outstanding performance of Holstein cows for dairy merit make them suitable candidate for genetic improvement of our local cattle genetic resources.

Keywords: Diary cattle, milk yield, net energy efficiency, breeds

Introduction

The commercial dairy processing industry in Nigeria is virtually absent. Cattle in Nigeria are largely managed by the Fulani herdsmen. The Fulani herdsmen are found mainly in the Northern Nigeria. They reside in the North but the dry season which stretches from October to May allows them to migrate towards the southern part of the country with cattle in search of feed for their cattle which made our indigenous cattle non sedentary and can only produce 1-2kgs of milk per day as compared to their temperate counterpart with high milk production. The sedentary attitude of temperate breeds and high milk production has made them a prefer choice for commercial dairy farming in Nigeria. The indigenous breeds that is presently used in Nigeria for crossbreeding is Bunaji while Holstein, Brown Swiss, Jersey and Simmental are the temperate breeds that are often imported to Nigeria by the few commercial dairy farmers in Nigeria. The wide climatic variations in different agroecological zones made it imperative to evaluate the adaptation for milk production of the temperate breeds and combination of indigenous genotypes in different climatic scales. The spread of different genotype of cows in different agro-ecological zones in Nigeria implies that animal rank may change across the environments which mean that the best animals in one environment may not be the best in another environment. The importance of breed efficiency has received attention in the dairy industry. Several researchers (Akpa *et al*., 2001) reported no comparative advantage for different breeds, in spite of higher ratios of milk to body weight and feed intake. Recently, milking efficiency, feed and production efficiency in dairy cows has become an important function in the dairy industry globally (Prendiville *et al*., 2011).

Therefore, this study investigated the milk yield, net energy efficiency and dairy merit of multi-genotypes cattle in low humid condition in Adamawa State.

Materials and Methods

Lactation and milk component records of one thousand and two (1002) multi genotype cattle (Holstein, 200; Jersey, 202; Brown Swiss, 300 and Simmental, 300) was extracted from the database of Sebore farm, Adamawa State. The data were processed to estimate the milk indices.

Milk yield measurement: Cows were milked using an automatic DELAVAL suction milking machine with teat cups which was used to collect raw milk produced from the cows' udders. Daily milk yield measurement was taken twice a day (06:00 hrs and 13.00 hrs) and was recorded in litres.

Estimation of milk indices: Fat corrected milk (FCM) = [(0.4*milk yield (kg) + [(15*fat yield (kg)] (Gains, 1928)

$$Net\ energy\ efficiency\ (NEE)(\%) = \frac{750 * FCM\ /\ day * 100}{(750 * FCM\ /\ day) + 70W^{0.75}},$$

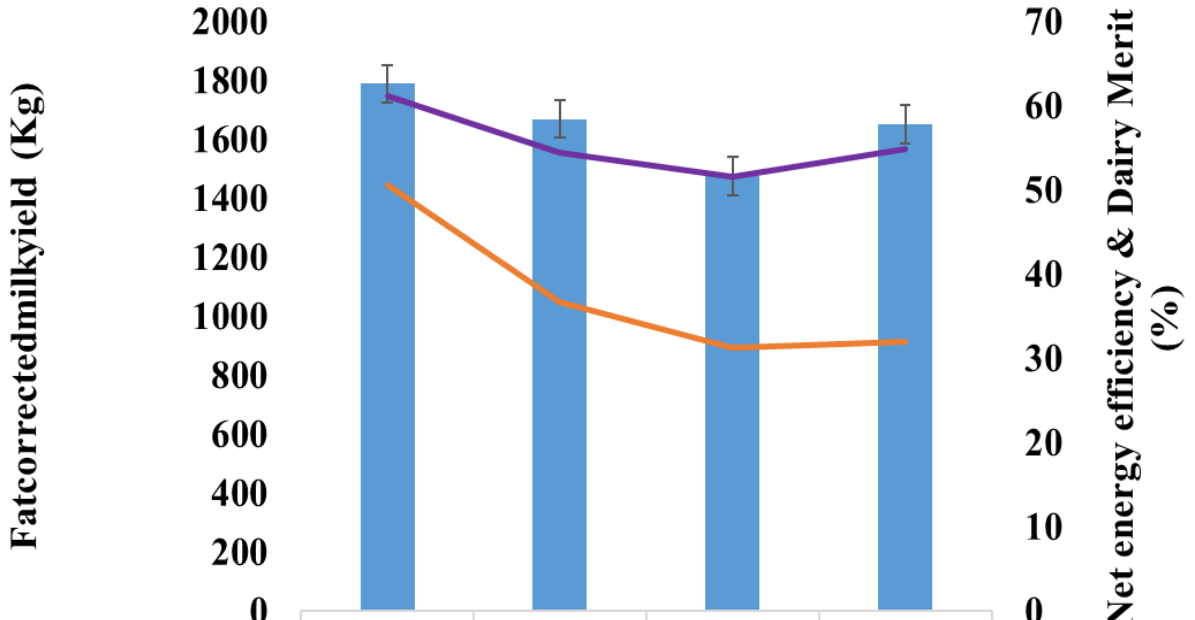
where 750=kilocalories of /energy per kg of FCM and 70= Basal metabolic rate

$$Dairy\ Merit\ (DM)(\%) = \frac{NEE * FCM\ /\ day}{FCM\ /\ day + 0.173W^{0.75}} \quad \text{(Brody, 1945)}$$

Data analysis: All descriptive statistical analyses (Mean, coefficient of variation and standard error of mean) were done using R commander (2016) Software. Significant differences in means were separated using in Duncan Multiple Range Test.

Results and Discussion

There were significant differences among the genotypes for milk yield, dairy merit and net energy efficiency (Figure 1). Holstein cows was significantly ($p<0.05$) higher in average milk yield, net energy efficiency and dairy merit as compared to Jersey, Brown Swiss and Simmental. Simmental had significantly ($p<0.05$) the least average milk yield, net energy efficiency and dairy merit. The mean fat corrected milk yield observed in the present study is lower than the mean of 5519 kg for Holstein Friesian reported by Kollalpitiya *et al*. (2012) in Sri Lanka, 2772.76 kg reported by Sattar *et al*. (2005) for Holstein Friesian cows in India, 5152 kg reported by Jairath *et al*. (1995) for Holstein cows in Canada and 5905 kg/cows in Tunisian HF cows by Ajili *et al*. (2007). The net energy efficiency and dairy merit for genetic groups of cows in the present study might be indicative of poor adaptation of this exotic breed to hot climatic conditions, reduced dry matter intake and poor management. Superior performance obtained for Holstein cows for milk production and efficiency traits was linked to the fact that the shade and fan system adopted by Sebore herd to minimize the adverse effect of heat stress favoured Holstein Friesian cows for optimal milk production by partitioning more energy into milk yield rather than maintenance.



	Holstein Friesian	Jersey	Simmental	Brown Swiss
Milk yield	1788.2	1668.4	1475.7	1650.8
NEE	50.5	36.7	31.3	31.9
DM	61.2	54.4	51.5	54.9

Figure 1: Milk production of multi-genotype cows in Adamawa-State

Conclusion

Holstein cows have an optimal performance (1788.2 kg, fat corrected milk yield, 50.5% net energy efficiency and 61.2% dairy merit) for milk production in low humid environment of Adamawa State.

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