Tropentag 2008
University of Hohenheim, October 7-9, 2008

Conference on International Research on Food Security, Natural Resource Management and Rural Development

On-farm Comparison of Milk Production and Body Condition of Purebred Ankole and Crossbred Friesian–Ankole Cattle in South Western Uganda

Esau Galukande[1,3] Henry Mulindwa [2,3], Maria Wurzinger [3,4], Ally Okeyo Mwai [4], Johann Sölkner[3]
1National Animal Genetic Resources Centre & Data Bank, Uganda
2National Agricultural Research Organisation (NARO), National Livestock Resources Research Institute,Uganda
3BOKU - University of Natural Resources and Applied Life Sciences, Austria
4International Livestock Research Institute (ILRI), Kenya

Abstract

Increasing land pressure due to the rapidly growing population, growing demand for livestock products in urban centres and new land policies in Uganda are changing the life styles of the hitherto extensive grazers of the long horned Ankole cattle in south western Uganda. A production system where two separate herds are kept on one farm, a pure bred Ankole herd and a herd of Friesian - Ankole crosses is emerging. The Friesian-Ankole crosses are kept as a source of milk, most of which is sold to generate income. The Ankole are kept for cultural reasons, a buffer against shock in case of prolonged drought and disease outbreak and for income through sale of live animals.
This study investigates the life cycle efficiency of the different genotypes on farm. Eighteen farmers have been selected and in each farm up to 30 animals have been selected per herd covering the complete age /sex range of the herd. During the selection the crossbred status was evaluated based on information from the farmer and phenotype. All selected animals were tagged. The animals are currently followed up on monthly intervals and this will last for a period of two years. During the visits body condition, tick count, health status, milk production of cows, growth parameters in young animals (weight approximated by the measurement of chest circumference) are recorded. Other information collected includes disease and parasite control measures (methods and costs involved), labour costs, calving dates, any supplementation, rainfall and temperature patterns. This paper discusses preliminary results on performance traits of the different genotypes for the first year of the study.

Keywords: Ankole cattle, crossbreeding, on-farm experiment, Uganda

Introduction

For many years the pastoralist people of south western Uganda have reared the Ankole cattle in an extensive production system with no supplements, minimal drug inputs and with irregular supply of the water to the animals. It is estimated that this breed of cattle comprises up to 50% of the cattle population in Uganda and is important as a source of beef, milk and milk products (Mbuza *et al*., 1990). This breed is known to be hardy and well adapted to stressful climatic and nutritive environment (Okello *et al*., 2005).

In recent years there have been major changes in the Ankole production system. Increasing land pressure due to the rapidly growing human population in Uganda, growing demand for livestock products in the urban centers and new land policies in Uganda are changing the life style of the extensive grazers. Large tracts of land have now been fenced off and the Ankole are now being crossbred with Holstein Friesian to obtain higher milk yields from the crosses. The crossbreeding is taking place at a very fast rate and is being done haphazardly. There are still farmers who are interested in keeping the Ankole in its pure form, this group of farmers have resorted to keeping two separate herds i.e. a pure Ankole herd and a herd of Holstein Friesian - Ankole crosses.

This emerging production system raises a number of questions which include; What proportion of Holstein Friesian genes should be incorporated into the Ankole for maximum productivity? Is the new production system economically viable? If not how can it be improved? Although there are some reports on performance of Holstein Friesian - Ankole crosses (Wang *et al*., 1992, Hatunmukama et *al*., 2006) no comprehensive on-farm studies have been conducted that incorporate changes in production systems and indigenous technology. This study is a comparison of the different genotypes in terms of their life cycle efficiency. This paper discusses preliminary results on performance traits of the different genotypes for the first year of the study.

Materials and methods

The study area

The study was conducted in Kiruhura district of South Western Uganda. The area has four climatic seasons, which affect livestock productivity. A total of 18 farms keeping 2 separate herds one of Ankole and the other Holstein Friesian-Ankole crosses were selected randomly from three sub counties namely; Kikatsi, Rubaya and Kenshunga.

On each of the selected farms up to 30 animals were selected from each herd covering the complete age and sex range of the herd and were grouped into 3 genotypes namely, Ankole, F1 Ankole x Holstein Friesian (HF50%) and Holstein Friesian > 50% (HF >50%) for animals with more than 50% proportions of Holstein Friesian. The animals were ear-tagged and followed up at a four weeks interval for 1 year.

Feeding, milking and reproductive management

The animals are grazed extensively on natural pastures and kraaled at night. All Ankole are milked once, while the crossbreds are either milked once or twice depending on their milk yield and the farm set-up.

Data collection

On each visit, production information was recorded; Growth (weight approximated by heart girth measurement in centimeters (HG), Body Condition Score (BCS), A score of 1 – 5 was developed). For cows in milk, single milk record for morning milk was recorded based of the the farmers statement. The number of times animal is milked was noted.

Data analysis

Model

For analysis of (BCS) and (HG) the General linear model SAS (2002) was used. The model included the independent variables (fixed effects of) genotype, season, farm, interaction of breed and farm, interaction of breed and season. Covariate (age) was used to adjust for differences in ages of the cows. For analysis of the milk yields the General linear model SAS (2002) was used. The model after appropriate changes included the independent variables genotype, lactation number, and farm, breeds nested in farms, interaction of breed and lactation number, season and breed, farm and season. Covariate (days in milk) was used to adjust stages of lactation. A correction factor of (M x 1.65) where M is the single morning milk record, was used to adjust milk yields for animals milked twice a day as observed by Erdman *et al*., (1995)

Results and Discussion

Body condition

Least square means of the BCS for the three breeds were 3.36, 3.29 and 3.26 for the Ankole, HF 50% and the HF>50% respectively and were not significantly different. Figure 1 shows trends in BCS over seasons, while Figure 2 shows changes in heart girth measurements. The four seasons had similar effects on BCS of the three genotypes. The long dry season had the largest negative effect. Similar results have been obtained by Okello *et al*., 2005, who observed crests responding with dry season and troughs with wet seasons. The gain in body condition at onset of rains is due to new vegetative growth. Changes in body weight (figure 2) were affected by similar factors to those affecting body condition scores. All three genotypes showed a drop in the dry periods.

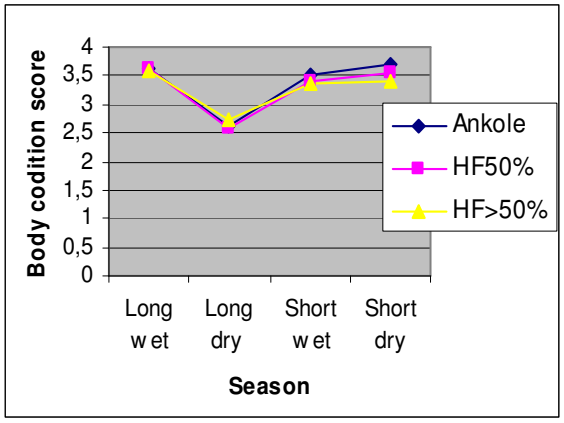

Figure 1 : Body condition changes over the seasons

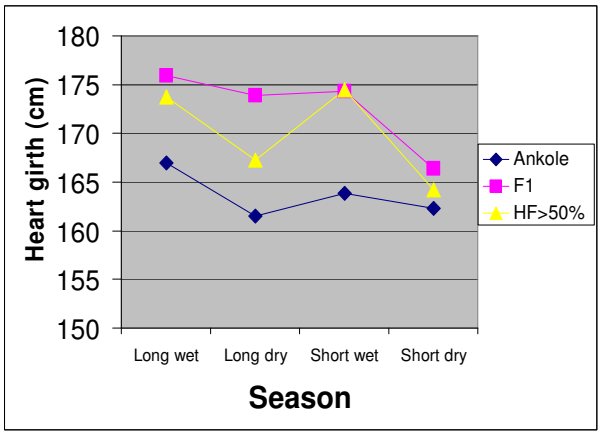

Figure 2: Changes in heart girth (cm) over the seasons

The Ankole and the HF> 50% showed the steepest decline in weight during the long dry season. For the Ankole, this could be attributed to the fact that farmers normally give preferential access of the crosses to the best pastures on the farms.

Milk production

Least square means for the daily milk yields were 2.4 litres, 11.2 litres and 10.4 litres for the Ankole, HF50% and HF>50% respectively. The production observed in Ankole is in line with that observed by Hatungumukama et *al.*(2007). The higher yields in the HF50% could be an indication that HF50% is more suited to the production environment than the HF>50%.

Conclusions

The crossbred animals are likely to remain attractive to farmers because of the higher milk yields obtained. It can therefore be expected that crossbreeding of the Ankole mainly with the Holstein Friesian will continue at a very fast rate. The higher milk yields obtained in the crossbreeds does not necessarily mean that they are most profitable. Studies on reproductive performance and health are still required on-farm to evaluate the genotypes further.

References

Erdman, R.A. and Verna, M. 1995. Fixed yield responses to increasing milking frequency. Journal of Dairy Science. 78:1198 -1203

Hatungumukama, G., Sidikou, D. I., Leroy, P., and Detilleux, J. 2007. Effects of non –genetic and crossbreeding factors on daily milk yield of Aryshire x (Sahiwal x Ankole) cows in Mahwa station (Burundi). Livestock Science 110: 111 – 117

Mbuza, F.M.B., Hoona, J., Tizikara, C., and Hashakimana, K.G. 1998. Current status of Uganda's Domestic Animal Diversity (DAD); A background paper to the National Biodiversity strategy and Action Plan of the National Environmental Management Authority (NEMA). Government of Uganda.

Okello, S., Sabitti, E.N., and Schwartz, H.J. 2005. Analysis of factors affecting yield of Ankole cows grazed on natural range pastures in Uganda. African Journal of Range & Forage Science 22(3):149 – 156

SAS,2002. User Installation Guide for SAS system version 9, (SAS Institute Inc., Cary,NC)

Wang, N., Vandepitte, W., Nowwen, J., and Carbonez, R. 1992. Crossbreeding of Holstein Friesian, Brwon Swiss and Sanga breeds in Zaire. *Revue* d'elevage et de medecine veterinaire des *pays* tropicaux., 45 (3 - 4): 353 - 356