Indigenous cattle of Zanzibar: the need for conservation

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Summary

The indigenous cattle of Zanzibar commonly referred to as Zanzibar Zebu belong to the Small East African Zebu but with some influences of Boran and Somali cattle. The breed is under pressure from cross-breeding and from economic reforms that may lead to genetic erosion. This paper is an attempt to describe the characteristics and environment of these cattle as well as highlighting the implications of the prevailing conditions for conservation.

Resumen

El bovino indígena del Zanzibar normalmente se refiere al zebú de Zanzibar, descendiente del pequeño zebú del Este africano pero con algunas influencias del bovino del Boran y Somalia. La raza se encuentra bajo presión por los cruzamientos efectuados y por las distintas reformas económicas que han llevado a una erosión genética. Este artículo presenta una descripción de las características y del ambiente de estos bovinos, e intenta subrayar las implicaciones de las principales condiciones de conservación.

Key words: Characteristics, In situ/ex situ conservation, Origin, Unguja, Pemba, Zebu.

Introduction

Zanzibar comprises two main islands, Unguja (also called Zanzibar) and Pemba, with several islets adjacent thereto, off the coast of East Africa. Although administratively Zanzibar runs an autonomous government, it is part of the United Republic of Tanzania (URT). We can also speak of Tanzania as consisting of the mainland and the isles (Unguja and Pemba). Unguja island, covering a total land area of 1,464 km², is separated from the mainland of Tanzania by a channel which is at its narrowest 36 km across. It lies between latitudes 5°40' and 6°30' south; and longitude 39° east. Its sister island of Pemba has a total land area of about 864 km², and lies about 40 km NNE of Unguja, between latitudes 4°50' and 6°30' south and between longitudes 39° and 39°50' east.

Zanzibar is endowed with strains of cattle that have sustained the lives of thousands of people for centuries. The majority of these cattle are found in Pemba as the presence of tsetse is a limiting factor in Unguja (see table 1). The loss of genetic diversity in Zanzibar is imminent due to the artificial manoeuvres by man in an attempt to secure livelihood and extract more from its livestock. The existence of artificial insemination in cattle and extensive introduction of exotic breeds make this species most vulnerable to genetic erosion. The objective of this paper is therefore to describe the general characteristics of cattle in Zanzibar and highlight the need for their conservation.

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Origin

The cattle of Zanzibar have been described by Tidbury (1954), Griffin (1986), Mason (1988), and Felius (1995) as belonging to the Small East African Zebu, which is an indigenous type common in East Africa. Their origin has been a subject of many speculations. Payne (1970) and Epstein and Mason (1984) provided a general account of movements of thoracic-humped zebu cattle into the eastern horn of Africa by about A.D. 669. In addition, Payne (1970) suggested the direct sea route from India as the probable way by which these cattle entered Zanzibar in the earlier times. From these sources, zoological records (Moreau and Pakenham, 1941; Swynnerton and Hayman, 1951) plus records of the earlier explorers (Rigby, 1861; Burton, 1872), updated information on trade and people’s movements (Sheriff, 1987), and recent records (Khan, 1921; Muir, 1941). It was found necessary to divide the influxes of cattle into the islands of Unguja and Pemba in three major historical epochs (Ali, 1997). Far back in history, cattle were introduced by migrating people from southern Arabia and India, either through the mainland of East Africa or directly via the sea route. In the middle centuries (1500-1700), slave and maritime trade were responsible for bringing in cattle from the mainland of East Africa. Lastly, in the colonial era of the 19th century and the period that followed, cattle were imported for either experimental purposes, commercial production, or slaughter, and more so to Unguja than to Pemba. Although the origin of zebu cattle in Zanzibar can be traced to sources in India and southern Arabia, analysis based on past history, physical characteristics, and population data would tend to suggest greater similarities to small East African Zebus from the mainland of East Africa, with some noticeable features of Boran and Somali cattle.

Physical and Production Characteristics

The outcome of the different means by which cattle entered Zanzibar and the subsequent exposures to climatic and management features existing in the islands of Unguja and Pemba is the occurrence of a cattle population with some unique features. The Zanzibar Zebu, as cattle of these islands are called, show variability in colour patterns (Figure 1 and 3). The commonest colours are of the reddish type (light red, dun, roan, and brindle), black, and grey. Local Zebu cattle were described by Tidbury (1954) as being small, neat animals, whose height at hook bones is usually between 104 and 125 cm, with usually small and flat horns and with a pronounced hump. Adult bulls were reported to weigh on average about 320 kg and cows about 250 kg. Work carried out recently by the present author in Pemba from which also the cattle studied by Tidbury originated found lower values for both height at withers and estimated body weights (see table 2). Body weights in this study were estimated using the following regression equation:

\[ \text{Body weight (kg)} = -293 + 3.68 \times \text{Heart girth (cm)} \]

developed after measurements were initially made on a sample of 37 zebu cattle at the Mtakata Dairy Farm where the weighing bridge could be obtained. An interesting observation of the recent work is the lower values of body measurements for bulls compared to cows. This could be explained by earlier off-take of bulls under field conditions.

Table 1. Total number of cattle in Zanzibar.

<table>
<thead>
<tr>
<th>Year</th>
<th>Unguja</th>
<th>Pemba</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1913</td>
<td>4,614</td>
<td>6,534</td>
<td>11,148</td>
</tr>
<tr>
<td>1938</td>
<td>6,908</td>
<td>30,061</td>
<td>36,969</td>
</tr>
<tr>
<td>1947</td>
<td>6,640</td>
<td>27,668</td>
<td>34,308</td>
</tr>
<tr>
<td>1951</td>
<td>9,662</td>
<td>32,969</td>
<td>42,631</td>
</tr>
<tr>
<td>1960</td>
<td>16,233</td>
<td>31,525</td>
<td>47,758</td>
</tr>
<tr>
<td>1966</td>
<td>19,599</td>
<td>30,179</td>
<td>49,778</td>
</tr>
<tr>
<td>1978</td>
<td>28,225</td>
<td>31,915</td>
<td>60,140</td>
</tr>
<tr>
<td>1985</td>
<td>28,365</td>
<td>48,000</td>
<td>76,365</td>
</tr>
<tr>
<td>1993</td>
<td>45,750</td>
<td>65,943</td>
<td>111,693</td>
</tr>
</tbody>
</table>

*=1992/93 Zanzibar livestock census (preliminary report)

Source: Department of livestock.
and hence in such cases measurements would be made with younger animals (see age range in table 1).

It is generally believed that cattle in Unguja and Pemba are used for milk, beef and traction. But the work done recently by the author indicated cattle in Pemba serving more as living savings accounts to insure against unforeseen events. Pemba cattle are smaller than those found in Unguja, but are said to be relatively better milkers (Payne, 1970). Mean lactation yield for cows in Pemba (excluding milk taken by the calves) was estimated by Griffin (1986) to be 205 litres for a mean lactation length of 205 days. Mean weaning age for calves was estimated to be 13 months and calving percentage for cows of only 35% due to long periods of anoestrus. There is also some seasonality in occurrence of oestrus with peak observations in the months of October, November, December and January due to the relatively better condition of cattle than in other months. On average Zanzibar Zebu calve for the first time at 3.5 years of age and the average calving interval is about 20 months. Figure 2 shows a Zanzibar Zebu heifer. Figure 4 represents a grazing Zanzibar zebu cow.

Climate and Soils

In general the climate to which the cattle in Zanzibar are exposed is shaped very much by the trade winds of the tropical Monsoon system. The rainfall pattern is bimodal in nature, with a long rainy season (*Masika*) from mid March to the end of May, and short rains (*Vuli*) in the months of October to December. Comparing the two islands, Pemba, on average, receives more rainfall (1 900 mm) than Unguja (1 600 mm). The distribution of rainfall is such that there is more rainfall in the western sides than in the east. Temperatures in Zanzibar are high during the short dry season of January to February, with
maximum mean of 32°C, and low during the cool season lasting from May to September. The mean annual maximum and minimum temperatures are 29.3°C and 21.1°C, respectively. The relative humidity is high, with a monthly average ranging from 87% in April (Masika) to 76% in November (Vuli), and a minimum at 60% during the dry season.

According to earlier local classification based on physical characteristics, soils of Pemba can be categorized into upland soil types differentiated by geomorphology, and lowland soils whose parent material forms the basis for classification (CATAD, 1988). In general, soils of the western side of both Unguja and Pemba are deeper than those of the eastern side. This feature, together with the rainfall pattern described before, is associated with many differences of agricultural significance and actually forms the basis for the agroecological zonification of the two islands into the deep soil zone on the western side and coral rag zone to the eastern side.

Management

The management of cattle for most farmers in Zanzibar is rather traditional, involving limited use of shelters and veterinary inputs (Griffin, 1986; CATAD, 1988; Ali, 1997). Most farmers have no formal education and have acquired knowledge of livestock keeping through field experiences. Tethering is the dominant grazing system of feeding animals. This may be a response to limitations associated with raising livestock in crop producing areas where conflicts with crop farmers is a sensitive issue. Grazing is done on permanent crops, in fallow lands, and in the interseasonal crop lands in sophisticated systems of cattle movements. Fodder shortage is perceived by farmers as the most common problem of livestock keeping (Griffin, 1986; Ali, 1997). Field experiences point out the cyclical loss and recovery of condition among animals with seasons in Zanzibar. Diseases and insect disturbances are only secondary problems making the use of veterinary inputs a rare thought in the minds of most livestock keepers. East Coast Fever is the primary health concern, particularly for young animals. Worms and other malaise become a health threat during the dry season when fodder is scarce and animal conditions are weak. Griffin (1986) observed morbidity and mortality rates of 53% and 7%, respectively, for cattle in Pemba. This implies that even though animals do suffer from various health problems, the majority recover and only few die.

Numbers

Data for total number of cattle in Zanzibar for the period from year 1913 to 1993 is presented in table 2 and table 3. It is evident from table 2, that the cattle population in the two islands has increased ten-fold from 1913 to 1993. Pemba has however comparatively more cattle than Unguja. This can be traced from 1913 onwards where the official records are available. Whereas for Unguja there was a slow growth at the beginning, for Pemba the period between 1950 and late 70’s appears to have been very critical for the growth of the cattle population.

The Zanzibar Zebu is included in the World Watch List of domestic animal diversity as a breed at risk (FAO, 1995). It is unclear why such categorization is made to the Zanzibar Zebu if the name refers to all cattle in these islands, whose population is in the tune of many tens of thousands. The argument presented in this paper for the need to conserve Zanzibar Zebu is not based on its risk status as judged by the number of breeding individuals, but rather to genetic erosion due to widespread use of cross-breeding and to consequences emanating from the current economic reforms.

Implications for Conservation

Although livestock genetic resources in Zanzibar appear to be largely of similar origin to those found elsewhere in East Africa, the geographical and environmental features in the islands of Unguja and Pemba have
Table 2. Characteristics of Zanzibar Zebu.

<table>
<thead>
<tr>
<th>Traits</th>
<th>Bulls (n = 33; age range 2-6 years)</th>
<th>Cows (n = 147; age range 2-18 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average±SE</td>
<td>Average±SE</td>
</tr>
<tr>
<td>Withers height (cm)</td>
<td>99.9±1.1</td>
<td>102.8±0.5</td>
</tr>
<tr>
<td>Heart girth (cm)</td>
<td>123.9±1.9</td>
<td>128.4±0.9</td>
</tr>
<tr>
<td>Body weight (kg)</td>
<td>162.9±7.1</td>
<td>179.4±3.4</td>
</tr>
</tbody>
</table>

Table 3. Total number of cattle in Zanzibar by class.

<table>
<thead>
<tr>
<th>Class</th>
<th>Unguja</th>
<th>Pemba</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulls</td>
<td>5 699</td>
<td>10 513</td>
<td>16 212</td>
</tr>
<tr>
<td>Cows</td>
<td>20 391</td>
<td>26 143</td>
<td>46 534</td>
</tr>
<tr>
<td>Heifers</td>
<td>9 039</td>
<td>12 073</td>
<td>21 112</td>
</tr>
<tr>
<td>Male calves</td>
<td>5 203</td>
<td>8 686</td>
<td>13 889</td>
</tr>
<tr>
<td>Female calves</td>
<td>5 418</td>
<td>8 518</td>
<td>13 936</td>
</tr>
<tr>
<td>Total</td>
<td>45 750</td>
<td>65 943</td>
<td>111 693</td>
</tr>
</tbody>
</table>


Figure 2. A Zanzibar Zebu heifer.
shaped livestock populations, particularly cattle, into unique types. The existence of tsetse flies in Unguja island is a factor that has disturbed cattle populations over many generations. Therefore, Pemba has historically served as refuge sanctuary for cattle in Zanzibar. The cattle of Pemba have, however, been exposed to the challenges of East Coast Fever (ECF) over many generations, and natural selection has probably favoured animals which are to some extent resistant to this disease. ECF is claimed to have wiped out a large number of cattle in the region from time to time. Both Unguja and Pemba are islands and are geographically isolated from the mainland of East Africa. For Pemba, the isolation has been strengthened by the fact that the channel separating it from the mainland is wider (56 km) and deeper than that of Unguja. This isolation has made the cattle population of Pemba one of the most closed in the region. Inbreeding has probably prevailed for generations and loss of genes is probable.

Besides inbreeding, the threat due to extensive introduction of exotic breeds by means of artificial insemination demands close attention. Currently, artificial insemination is commonly carried out in cattle in the deep soil zone where demand for milk is high. Artificial insemination permits very rapid replacement of existing populations (Cunningham, 1992). Therefore, if cross-breeding is allowed to continue unchecked, chances of losing the indigenous cattle are very high. Another threat to the

Figure 3. Zanzibar Zebu. Various colour patterns.
cattle of Zanzibar is the growth of tourism and the hotel industry. It is possible that the demand for beef to supply the chain of hotels in these areas might tempt farmers to sell their cattle at numbers far beyond the reproductive rate of the population. Sales are even called for because the original grazing areas are now the important sites for hotel businesses. The eastern coast that includes most of the coral rag lands in Zanzibar were important cattle refuges for the country. The prices of beef in Zanzibar town on the Unguja island is very high compared to that of other parts in the country. This is currently causing a drain of cattle in large numbers from rural areas of Unguja and from Pemba into Zanzibar town for slaughter purposes.

Therefore, it can be concluded that the conservation of cattle in Zanzibar is of paramount importance. In this endeavour both in situ and ex situ methods should be adopted. However, before any steps for conservation are considered, it is important to document genetic differences between cattle of Zanzibar and those found elsewhere in Tanzania. This work should be preceded by characterization work involving base-line surveys and monitoring of population status in the two islands. Efficient and effective conservation work may mean in the first place the need to review the legal and policy aspects associated with animal genetic resources. In this regard the commitment of the government is of utmost importance.

References

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