(RESEARCH ARTICLE)

Check for updates

Threat of extinction of the taurine breed of sedentary cattle farms in the Bafing Region, in the north-west of Côte d'Ivoire

Bosson Nicolas ABOLY [1, *], Soronikpoho SORO [1], Fatoumata COULIBALY [1], N'dri SOUANGA [2] and et Konan Gboko Gatien BROU [1]

[1] Institute of Agropastoral Management (IGA), Péléforo Gon Coulibaly University of Korhogo, Laboratory of Animal Production and Health, BP 1328 Korhogo, Republic of Côte d'Ivoire.
[2] Ministry of Animal and Fisheries Resources, Regional Director of the Bafing Region, Republic of Côte d'Ivoire.

Abstract

The study was carried out in the Bafing region, in the north-west of Côte d'Ivoire, and focused on the threat of extinction facing taurine breeds as a result of cross-breeding practices on sedentary cattle farms. A three-year survey was carried out to determine the prevalence rate of taurine breeds under pressure from cross-breeding (N'damaze and Méré) on sedentary cattle farms. The results showed that the cattle herd of 90,823 head for 2,060 breeding sites in 2021 had declined over the years to 72,051 head in 2023 for 1,039 breeding sites. In addition, the practice of anarchic cross-breeding between local breeds (N'dama and Baoulé) and Sudanese Peulh zebus by farmers was permanent. Comparison of the results revealed a highly significant difference between the three breeds of cattle (p = 0.000). Thus, the majority of sedentary cattle herds were made up of mixed breeds (60.00 ± 0.1%), followed by the Zebu breed (32.05 ± 0.42) and the Taurine breed with the lowest prevalence (8.43 ± 0.046%).

Keyword: Sedentary breeding; Taurine breed; Zebu; Threat; Bafing region

1. Introduction

Côte d'Ivoire, while giving priority to export plant production (coffee and cocoa), has promoted the implementation of coherent incentive programs for animal production [1]. To meet the population's protein needs, it has made significant foreign exchange outflows linked to imports of livestock products [2]. The Ivorian government felt the need to establish and promote a livestock policy in different regions of the country, including the North and Center of Côte d'Ivoire for the breeding of large and small ruminants. Thus, the North-West regions of Côte d'Ivoire, including the Bafing Region, have worked for the productivity and competitiveness of sedentary cattle breeding with breeding practices that comply with zootechnical standards [3]. Unfortunately, these sedentary cattle farms are extensive with daily movements in search of natural pasture. In addition, the parks are most often located at the edges, or even at the exit of villages, the management responsibility of which is generally entrusted to a herdsman. The maintenance of trypanotolerant breeds is essential to ensure, as a reservoir, a reasoned crossbreeding, given their particular genetic characteristics which allow them to adapt to changes in the environment and resist various diseases [4].

It has to be said that farmers are indulging in anarchic cross-breeding practices between zebus and bulls to obtain cross-breeding products such as N'damaze (Zebu x N'dama) and Méré (Zebu x Baoulé) cattle, on the pretext that they will improve the animals' size and milk yield. This has helped to reduce the number of taurine breeds adapted to the environmental conditions of sedentary livestock farms. This raises the question of whether taurine breeds could disappear from sedentary livestock farms in the north of Côte d'Ivoire.

---

* Corresponding author: Bosson Nicolas ABOLY

To answer this research question, the general objective of the study is to determine the prevalence rate of taurine breeds under pressure from cross-breeding products (N'damaze and Méré) on sedentary cattle farms.

2. Materials and methods

2.1. Study area

The study area is the Bafing region, which has a population of 262,850, the majority of whom live in rural and agricultural areas. It comprises three departments (Touba, Koro and Ouaninou), of which Touba is the capital (Figure 1). The region is criss-crossed by rivers and abounds in mountains, plateaux, valleys and plains. The climate is a transition zone between the equatorial climates of the south and the Sudanian climates of the north, characterised by two seasons (a long dry season from November to March and a long rainy season from April to October) [5].
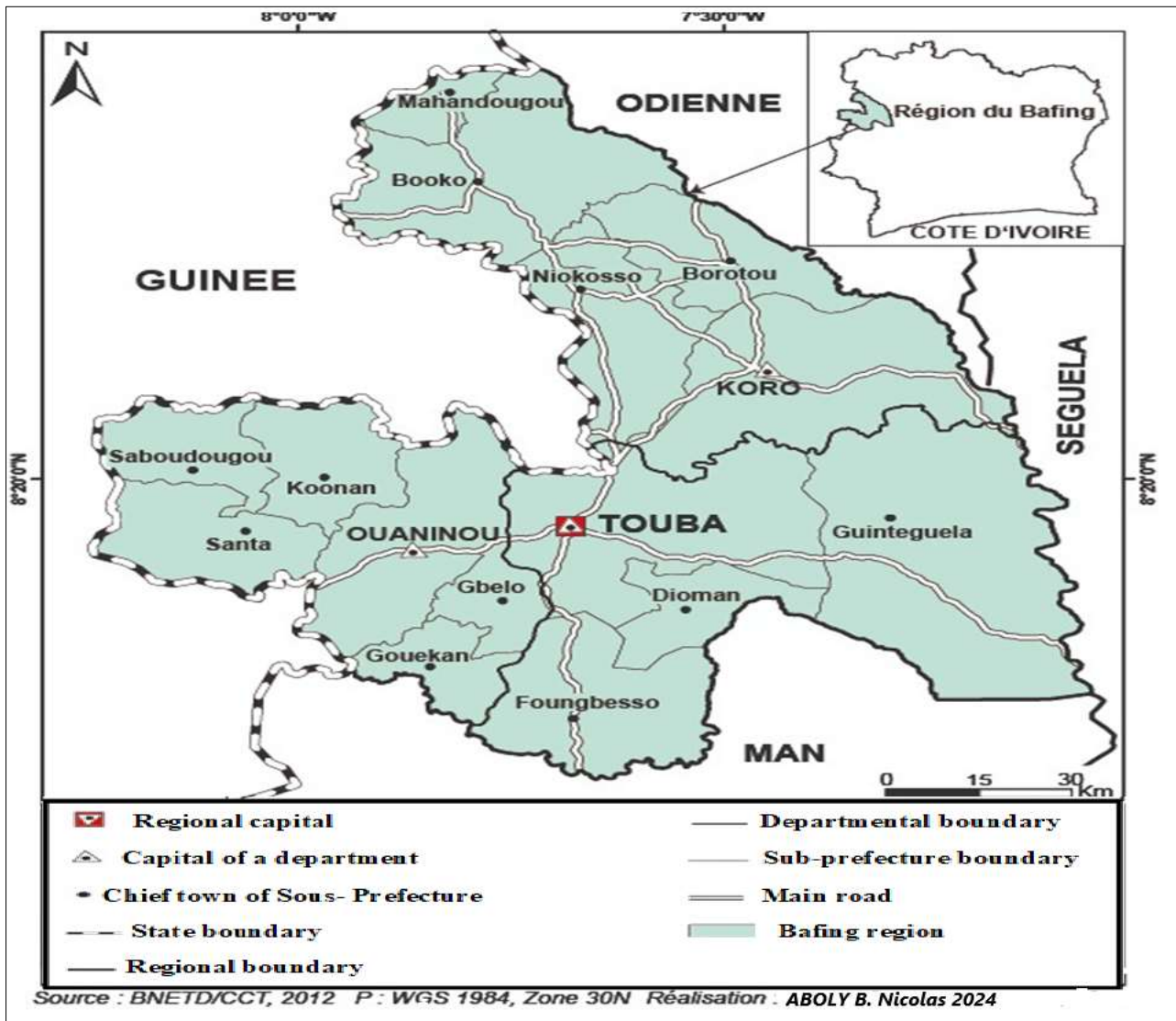

Figure 1 Map of study area [6]

2.2. Sampling

All sedentary cattle farms in the three departments of the Bafing Region were selected for sampling. It should be emphasised that the farming system is extensive, with cattle fed on natural pasture and watered in streams. All the cattle farms were surveyed over a period of three (3) years to assess the cross-breeding rate of the cattle, identify the different breeds and determine their numbers by department. On the basis of the numbers, the percentages of the different cattle breeds were determined. The number of breeding sites was 2060 in 2021 for a cattle population of 90,823 head.

2.3. Farm characteristics

The study took into account all the breeding sites registered by the Regional Directorate of the Ministry of Animal Resources and Fisheries (MIRAH) covering the period from January 2021 to December 2023. The criteria for selecting the farms were their effective registration in the Ministry's technical documents relating to the census of breeders. The biological material consisted of 90,823 head of cattle of all breeds in 2021.

2.4. Data collection and analysis

The departments were considered as three zones per year. In each zone of the Bafing Region, the prevalences of the different cattle breeds were compared. In this experiment, the departments were considered as replicates for the statistical processing of the data. SPSS software (Statistical Package for Social Sciences, version 28.0) was used for the analysis of variance at the threshold $\alpha = 0.05$ and the Newman-Keuls test for the comparison of means in the case of significant differences.

3. Results and discussion

3.1. Presentation of the cattle population of the Bafing Region by year

Table I shows the cattle population of the Bafing Region and the number of sedentary herds by department for the periods 2021 to 2023. The cattle population was estimated at 90,823 head in 2021 for 2060 herding sites. It should be noted that the number of mixed breeds was high compared with other cattle breeds. The analysis showed that the number of farms and the number of cattle declined from one year to the next, leaving just 72,051 head in 2023 for 1,039 farms. However, the numbers of bull cattle were the worst affected, falling from 8,588 to 6,071 head in 2021 and 2023 respectively.

Table 1 Cattle population in the Bafing Region from 2021 to 2023

Cattle breeds by department					
Year 2021					
Département	Taurine	Zébu	Mixed breeds	Total	Number of breeders
Touba	1409	4210	8437	14056	335
Koro	2679	8027	16061	26767	915
Ouaninou	4500	15500	30000	50000	810
Total	8588	27737	54498	90823	2060
Year 2022					
Département	Taurine	Zébu	Mixed breeds	Total	Number of breeders
Touba	2048	8190	12289	22527	410
Koro	2756	8045	22292	33093	517
Ouaninou	3210	6812	11230	21252	543
Total	8014	23047	45811	76872	1470
Year 2023					
Département	Taurine	Zébu	Mixed breeds	Total	Number of breeders
Touba	2875	10344	17267	30486	417
Koro	1481	5985	11234	18700	457

Ouaninou	1715	6760	14390	22865	165
Total	6071	23089	42891	72051	1039

3.2. Characteristics of cattle herds in 2021

The prevalence of cattle breeds in the Bafing region in 2021 is presented in Table II. Analysis of variance (ANOVA 1) showed highly significant differences in the prevalence of the three cattle breeds (p-value = 0.000). Comparison of the mean prevalences showed a higher value for the mixed breeds (N'damaze and Méré) of 60.00 ± 0.01%. This mixed breed was followed by the Zebu breed (30.54 ± 0.59%). The lowest prevalence was obtained by the Taurine breed (9.46 ± 0.58%).

3.3. Characteristics of cattle herds in 2022

The prevalence of cattle breeds in the Bafing region for the year 2022 is presented in Table II. Analysis of variance (ANOVA 1) showed significant differences in the prevalence of the three cattle breeds (P-value = 0.045). Comparison of the mean prevalences showed higher values for the mixed breeds (N'damaze and Méré), followed by zebu with statistically comparable values of 59.59 ± 0.51 and 29.98 ± 0.51% respectively. The lowest prevalence was obtained by the taurine breed (10.43 ± 23.69%).

3.4. Characteristics of cattle herds in 2023

The prevalence of cattle breeds in the Bafing region in 2023 is presented in Table II. Analysis of variance (ANOVA 1) showed highly significant differences in the prevalence of the three cattle breeds (P-value = 0.000). Comparison of the mean prevalences showed a higher value for the mixed breeds (N'damaze and Méré) of 59.53 ± 0.42%. This mixed breed was followed by the Zebu breed (32.05 ± 0.42%). The lowest prevalence was obtained by the Taurine breed (8.43 ± 0.046%).

Table 2 Prevalence rate of cattle breeds from 2021 to 2023

Cattle breeds	Prevalence of cattle breeds (%)		
	Year 2021	Year 2022	Year 2023
Taurine	9,46 ± 0,58 c	10,43 ± 23,69 b	8,43 ± 0,046 c
Zébu	30,54 ± 0,59 b	29,98 ± 0,51 ab	32, 05 ± 0,42 b
Mixed breeds	60,00 ± 0,01 a	59,59 ± 0,51 a	59,53 ± 0,42 a
Average	33,33 ± 21,91	33,33 ± 19,88	33,33 ± 21,87
p-value	0,000	0,045	0,000
Signification	HS	S	HS

* Means followed by the same letters are not significantly different at the threshold; α = 0.05; HS = Highly Significant; S = Significant.

4. Discussion

The cattle herd was estimated at 90 823 head in 2021 for 2060 breeding sites in the Bafing Region of Côte d'Ivoire. Unfortunately, it was declining from one year to the next, and the bull breeds were the worst affected. A survey of livestock farmers revealed an overall decline in the areas inhabited by tsetse flies as a result of the deterioration of their habitat, caused by anthropogenic and climatic factors [7]. As a result, more and more Fulani pastoralists and their herds of trypanosensitive Fulani zebu are moving from northern Sahelian areas to wetter regions [8]. Anarchic cross-breeding practices between local breeds and Sudanese Peulh zebus are recurrent [4, 9]. The majority of sedentary cattle herds were of mixed breeds (60.00 ± 0.01%) over a period of three (3) years (from 2021 to 2023). Analysis of variance (ANOVA 1) showed highly significant differences in prevalence between the three cattle breeds (p = 0.000). Comparison of the mean prevalences showed a higher value for the mixed breeds (N'damaze and Méré). These mixed breeds were followed by the Zebu breed (32.05 ± 0.42). The lowest prevalence was obtained by the Taurine breed (8.43 ± 0.046%). This could be explained by the fact that zebu breeds are large and use poor rangelands, unlike local breeds. Our results are similar to those of Soro *et al.* (2015) [7] who suggest that the presence of Fulani herders in Bouna and Doropo explains the interbreeding of Baoulé bulls with zebu in these localities. The introduction of a Zebu breeding male into the herd is a frequent occurrence. This is a situation to be feared, especially as in the north and centre of Côte d'Ivoire.

Sokouri (2008) [10] found that 86% of herds in the northern region were mixed and 40% in the central region. The latter reported that natural mating was the preferred method, with reproduction carried out by a Zebu bull selected from within the herd on a permanent basis, or on loan from one of the neighbouring farms. This observation was made by Atsé (1990) [11], who stated that farms in the northern region showed very high levels of cross-breeding, in the order of 43 to 57%. Several authors have carried out studies that have revealed the same results, including Roukayath (2016) [12] in north-eastern Benin, and Olorunnisomo (2010) [13] and Baldet (2011) [14] in Oyo State in Nigeria and eastern Senegal respectively, according to which mixed breeds are clearly predominant. However, milk production has been a secondary activity, left to the herdsmen [4]. These results corroborate those obtained by FAO (2016) [15], which reported that over 75% of sedentary herds in northern Côte d'Ivoire were milked by herdsmen, and this was linked to the herding contract. The decline in cattle numbers from one year to the next in the production zone is to be deplored, notably from 90,823 head in 2021 for 2,060 breeding sites to 72,051 head in 2023 for 1,039 breeding sites. This could be explained by the relocation of some livestock farmers to other regions of Côte d'Ivoire as a result of the occupation of natural grazing land by farmers who have planted food crops, annual and perennial crops.

As far as development prospects are concerned, a programme to promote the taurine breed, taking into account the preservation of the genetic heritage and the improvement in productivity and profitability of sedentary livestock farms, should be carried out with a view to curbing the threat of the taurine breed becoming extinct in Côte d'Ivoire.

5. Conclusion

The cattle herd was estimated at 90,823 head for 2,060 breeding sites in 2021, and had declined over the years, both in terms of the cattle herd (72,051 head), of which the bull breeds were the most affected, and the breeding sites (1,039 sites). A survey of livestock farmers in the Bafing region of Côte d'Ivoire revealed a massive influx of Fulani pastoralists and their herds of trypanosensitive Fulani zebu from the northern Sahelian zones to the wetter regions. Unfortunately, there has been ongoing uncontrolled cross-breeding between local breeds (N'dama and Baoulé) and Sudanese Peulh zebus. It turned out that the majority of sedentary cattle herds were composed of mixed breeds (60.00 ± 0.1%), followed by the Zebu breed (32.05 ± 0.42%) and the Taurine breed, which had the lowest prevalence (8.43 ± 0.046%) over a three-year period (from 2021 to 2023). Comparison of the mean prevalences revealed a highly significant difference (p = 0.000) between the breeds.

As a way forward, a programme to develop the taurine breed, taking into account the preservation of the genetic heritage and the improvement of the productivity and profitability of sedentary livestock farms, should be carried out to curb the threat of the taurine breed becoming extinct in Côte d'Ivoire.

Compliance with ethical standards

Acknowledgments

Disclosure of conflict of interest

The study was carried out without conflict of interest.

Authors' contributions

The study and writing of the manuscript were carried out in a collegial manner. Nevertheless, according to the following steps, ABN, SN and BKGG participated in the design and planning of the study. ABN and FC collected the data and drafted the first version of the manuscript. BKGG, SN and ABN carried out the statistical analyses and interpretation of the data. FC, SN critically revised the manuscript.

References

[1] Djakarya Coulibaly. Livestock development policy in Ivory Coast. Ministry of Animal and Fisheries Resources, Directorate of Planning and Programs (DPP). Abidjan; 2013.

[2] Bi Kouablé et Bi Tré. Evolution of Malian livestock exports following recent crises; Final report of the study, Côte d'Ivoire- APCAM/MSU/USAID; .2014.

[3]   Aimé Franck Etienne Essoh. Importation of poultry meat and the poultry industry in Ivory Coast [Veterinary Medicine Thesis]. Dakar: Inter-State School of Sciences and Veterinary Medicine (E.I.S.M.V.); 2006.

[4]   Bosson Nicolas Aboly, Fatoumata Coulibaly, Nahoulé Silue., and Gboko Konan Gatien Brou. Constraints to the Development of Sedentary Cattle Farming in the District of Denguele, in the North-West of Cote d'Ivoire. Multidisciplinary International Journal of Research and Development. 2022; 2 (1): 23-32

[5]   INS (National Institute of Statistics). General Population and Housing Census. Overall results: BAFING Region. Touba; 2021.

[6]   BNETD/CCT (National Office for Technical Studies and Development). Status of cartographic production and management of reference geographic information. Côte d'Ivoire, Country Report. Abidjan; 2012.

[7]   Brahima Soro, Didier Paul Sokouri, Guiguibaza-Kossignan Dayo, Assanvo Simon-Pierre N'Guetta. & Chia Valentine Yapi-Gnaoré. Characterization of Baoulé cattle in the "Lobi Country" of Côte d'Ivoire: Socioeconomic roles, breeding methods and production constraints. TROPICULTURA. 2015; 33 (2):111-124

[8]   Jean Bouyer. Ecology of Mouhoun tsetse flies in Burkina Faso: Interest in the epidemiology and control of African trypanosomoses [Thesis in Veterinary Medicine]. Montpellier: University of Montpellier II; 2006.

[9]   Apélélé Adanléhoussi, Habré Bassowa, Défly A., Koffi Djabakou., Jean Kossi Liassidji Adoméfa and N'tcha Tidouo Kouagou. The performance of the Somba taurine breed in a rural environment. TROPICULTURA. 2003; 21 (3): 135-141

[10]   Didier Paul Sokouri. Characterization of domestic cattle populations (Bos taurus L and Bos indicus L) in livestock systems in the Central and Northern regions of Côte d'Ivoire [Single PhD Thesis]. Abidjan (Côte d'Ivoire): University of Cocody; 2008.

[11]   Achi Pascal Atsé. Bovine genetic policy in Côte d'Ivoire. Ministry of Animal Production. Korhogo SODEPRA Nord; 1990.

[12]   Chabi Toko Roukayath. Place of livestock breeding in the rural economy of the Fulani of northern Benin. Original dissertation presented for the degree of doctor in agricultural sciences and biological engineering [Single PhD Thesis]. Liège – Gembloux: University of Liège – Gembloux agro-bio Tech.; 2016

[13]   Olusola Adeyanju Olorunnisomo, Olawale Olubowale, Akinwumi Adesina.,. Socio-economic characteristics of cattle farmers and their perception of commercial milk production in three agricultural zones of Oyo state. Journal of Agriculture, Forestry and the Social Sciences. 2010; 8 (2):1-10.

[14]   Thomas Baldet Agrarian diagnosis of the Badi and Wassadou terroirs in the rural community of Dialacoto (Eastern Senegal) [End of studies thesis]. Rhône Alpes: Higher Institute of Agronomy; 2011.

[15]   FAO. Review of the livestock, meat and milk sectors and the policies that influence them in Côte d'Ivoire. Abidjan, FAO and ECOWAS; 2016