African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

Investigation into the Cavally River ichthyofauna in Guinea

Auteur 1 : Soromou Lanan Wassy
Auteur 2 : Yacouba KONATE
Auteur 3 : Kpoulomou Lah,
Auteur 4 : GOUMOU Pé 2,
Auteur 5 : TEA Mama Agnès,

SOROMOU Lanan Wassy
Departement of Applied Biology, University of Labé, 210 Labé, Republic of Guinea

KONATE Yacouba, Departement of Vetrinary Medicine, Institute of Science and Veterinary Medicine, 09 Dalaba, Republic of Guinea

KPOULOMOU Lah, Departement of Vetrinary Medicine, Institute of Science and Veterinary Medicine, 09 Dalaba, Republic of Guinea

GOUMOU Pé 2, Departement of Vetrinary Medicine, Institute of Science and Veterinary Medicine, 09 Dalaba, Republic of Guinea

TEA Mama Agnès, Departement of Vetrinary Medicine, Institute of Science and Veterinary Medicine, 09 Dalaba, Republic of Guinea

Déclaration de divulgation : L'auteur n'a pas connaissance de quelconque financement qui pourrait affecter l'objectivité de cette étude.

Conflit d'intérêts : L'auteur ne signale aucun conflit d'intérêts.

Pour citer cet article : SOROMOU LW, KONATE Y, KPOULOMOU L, GOUMOU P, TEA M.A (2023) «Investigation into the Cavally River ichthyofauna in Guinea », African Scientific Journal « Volume 03, Numéro 19 » pp: 624 – 639.

Date de soumission : Juillet 2023

Date de publication : Août 2023

DOI : 10.5281/zenodo.8335321

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

Abstract

In recent years, naturalists and scientists have been concerned about the ichthyological fauna of rivers and bodies of water. The aim of this study was to identify the fish species inhabiting the Cavally river. Based on consultation with the managers and analysis of the archives, it was established that fishing is practised in the area, but on a limited scale. Surveys of stakeholders revealed 8 families (including 14 genera) of fish, divided between the most abundant (Mormyrudae, Cyprinidae), the rarest (Polypteridae), the most threatened with extinction (Malapteridae) and those that have recently appeared (Claria gariepinus, Oreochromis niloticus and Heterotis niloticus). The fishing equipment used in the area includes fish hooks, nets and creels.

Keywords : Ichthyological fauna; Cavally River ; fish species, Guinea.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

Introduction

Currently, of the nearly 11,000 species of freshwater and brackish fish described worldwide (Nelson, 1994 ; Froese et al., 2016), 3,360 species have been described from Africa, belonging to 95 families (Lévêque et al., 2008). In recent years, naturalists and scientists have taken an interest in the fish fauna of rivers and lakes. This rich and diverse fish fauna is an important source of protein and income for local populations. In addition, knowledge of patterns of species richness and rarity is fundamental for basic needs and applied to all taxonomic groups worldwide (Gaston & Blackburn, 2000 ; Paugy et al., 1994). Increasingly, anthropogenic activities (intensive fishing, construction of hydroelectric and hydro-agricultural dams, industrial discharges, household waste dumps and deforestation) are becoming real environmental threats to fish (Kamelan et al., 2013). The destruction of forests generally reduces fish habitats. This loss of habitat, reducing spawning areas and food resources, severely limits the distribution of fish. Thus, in most tropical countries, the main lines of research are geared towards conserving the biodiversity of living species. In this policy of preserving natural resources for sustainable and rational use, the systematic inventory and enumeration of living species is at the forefront (N'Zi et al, 2003 ; 2008).

In Guinea, particularly in N'Zoo (Lola prefecture), the exploitation of the fishery resources of the Cavally river by local populations is constantly increasing. The alarming acceleration of all these processes of degradation of the natural environment constitutes a major risk of regression and extinction of species. These threats include the intensification of human activities along the river shores, which have had a major impact on the river's fishery resources, resulting in the destruction of the Cavally river ecosystem, in particular the habitat of fishery resources, spawning grounds and food stocks for the local population. Despite all this, no study has yet been carried out to take stock of the Cavally River's fish resources. In view of all these observations, we have undertaken this project with a view to contributing effectively to the conservation of the Cavally River's ichthyological resources. These risks include the intensification of human activities on the shores of the river, which have had a major impact on the river's fishery resources, leading to the destruction of the Cavally river ecosystem, in particular the habitat of fishery resources, spawning grounds and food stocks for the local population. Despite all this, no study has yet been carried out to evaluate the fishery resources of the Cavally river. In the light of these facts, we undertook the project entitled "Investigation into the Cavally River ichthyofauna in Guinea" with the aim of contributing to the conservation of the fishery resources of the Cavally River. Therefore, based on consultation with the managers and surveys of stakeholders, the fishery resources of the Cavally river were evaluated.

Materials and methods Material

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

1- Overview of the study area

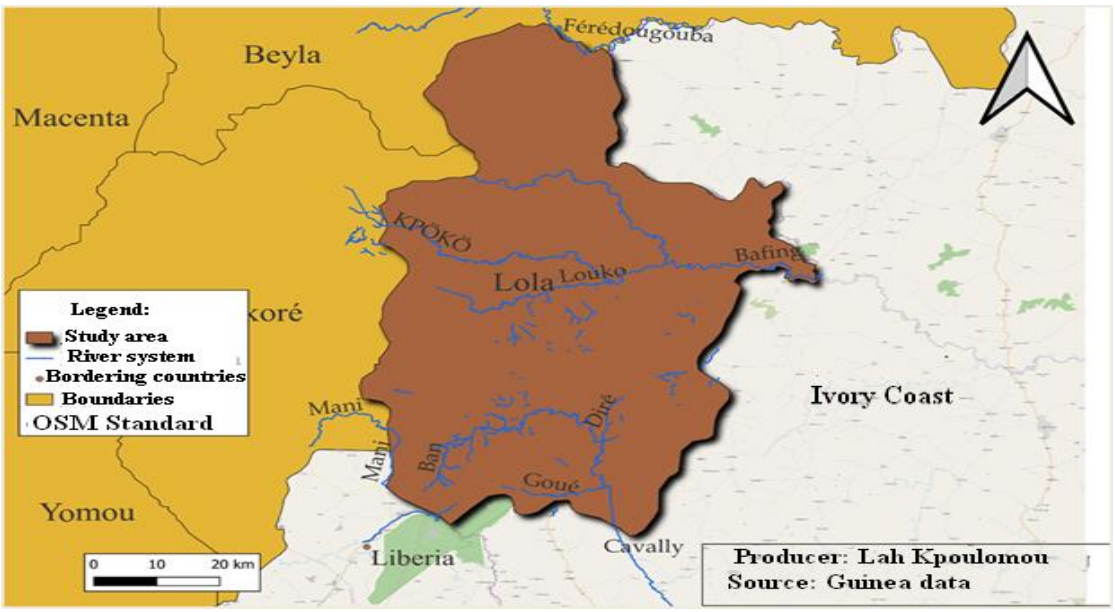
1.1 Geographical location

Lola is one of the 6 prefectures of the administrative region of N'Zérékoré, belonging to the natural region of Forest Guinea. It has great economic potential in terms of its agricultural and fishing resources. It is a zone of exchange and transition, and represents an open door for Guinea to the Ivorian and Liberian markets. It is located in the extreme south-east of Guinea, around 1050km from the capital Conakry.The prefecture of Lola is located between latitudes 7°32 and 8°13 north and between longitudes 6°03 and 8°35 west. It covers an area of 3940 Km² with a population of 171561 inhabitants, an average density of 44 inhabitants / km² (Guinea RGPH, 1994).

It is limited :

- to the east by the Republic of Ivory Coast;
- to the west by the prefecture of N'Zérékoré ;
- to the north by the prefecture of Beyla ;
- south by the Republic of Liberia.

Figure 1: Hydrographic map of Lola



Source: IGN topographic base, 2021

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

The climate is sub-equatorial, characterized by generally high temperatures, with a maximum of 35°C in May and a minimum of 15°C in January. Two seasons are recorded, a three-month dry season (december-january-february) and a nine-month rainy season (March-November), with the greatest abundance in august and september. Rainfall is limited to the 1800mm isohyet in the north, and varies from 1395.2mm to 2368mm in the Mount Nimba massifs. The average annual humidity is around 15-80%. It increases with the intensity of the rains (80% in august) and decreases in the dry season (15 to 22% in january). The prevailing winds are the harmatan (a dry north-easterly wind that marks the dry season) and monsoon (a humid south-westerly wind prevailing during the rainy season). The relief and humid climate are conducive to the existence of a very extensive hydrographic network. It comprises the rivers of Gba, Diré, Goua, Gouét, Zié, which all flow into the Cavally. The Bafing, divided into Gouan and kpogho upstream of the Guéasso station and the Bagbé. Bagbé is in turn divided into Djilimbé and Béya upstream of the border with Ivory Coast.

Located in the far north of the prefecture, the Kpogho river irrigates several villages in the rural communes of Lainé and Guéasso. It is made up of two main rivers including Lougo and Doulou.

2- Presentation of the sub-prefecture of N'Zoo

2.1-Geographical location and population

The rural commune of N'ZOO is one of the 8 rural communes located 31 km from Lola. It covers an area of 375 km2 and includes 9 Districts and 24 Sectors.

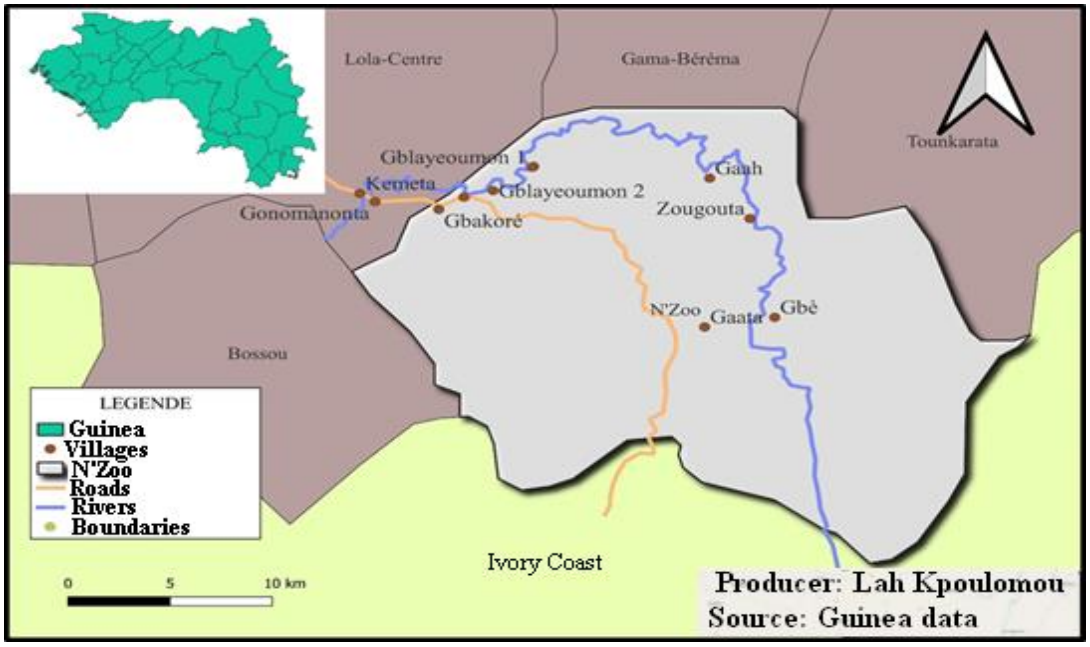
It is limited :

- to the east by the rural commune of Tounkarata;
- to the west, by the rural commune of Bossou and the urban commune ;
- to the north by the rural commune of Gama Bérema ;

to the south by the Republic of Ivory Coast.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

Figure 2: Map of N'Zoo (sub-prefecture)



Source: IGN topographic base, 2021

3. Materials used

During our investigations, the following equipment was used:

Table I: Materials used during the survey

N°	. Equipment	Quantities
1	Survey sheets	67
2	Identification key	01
3	Life jackets	01
4	Canoe	01
5	Fishing net	01

Methods

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

1. Frame consultation and archive analysis

Research work in the field began by consulting the management and analyzing the archives of the Lola prefecture to gather information on the fishing zones, the species encountered, the gear used, and the relationship between the management and the fishermen.

2. Angler survey

Fishermen were asked about the species of fish they encounter, the gear they use, the most favourable fishing periods, the most abundant and least abundant species, and whether they have observed the appearance or disappearance of certain species and the cause of this dynamic in the area.

3 Inventory of fish biodiversity

During this phase of the work, the identification of certain fish species was carried out on site after landing and other structural examinations. Fish species were differentiated on the basis of structural characteristics (body shape, skin color, fin position, number of rays in fins, mouth position and presence of barbels). Species not recognized directly were identified using the identification key (Stiassny et al., 2007).

Results

1-Consultations with managers and analysis of archives

Analysis of the archives has yielded the following results:

Table II: Distribution of fishermen by locality

N°	Villages	Number of anglers
1	Kémèta	2
2	Gbakoré	4
3	Goamo	3
4	Gonomanota	5

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

5	Blayeoumon I	2
6	Blayeoumon II	5
7	Gaah	10
8	Zougouta	10
9	Gbé	11
10	Gatta	13

1.2 Previous fish species in the Cavally River

Table III: Lists of existing fish species in the Cavally River

N°	**Families**	**Scientific names**
1	Cichlidae	*Tilapia zillii*
		Anomalochromuse thomas
2	Mormurudae	*Paramormyrops*
		Mormurus mormurus
		Mormyrops tapirus
3	Cyprinidae	*Abramis brama*
		Scardinuis erythrophthalmus
		Rhodeus amarus
4	Mepsetidae	*Hydrocynus odoe*
5	Polypteridae	*Polypterus bichir*
6	Hepsetidae	*Brycinus macrolepidotus*

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

7	Centropomidae	*Lates niloticus*
8	Mastacembeludae	*Mastacembelus liberiensis*
9	Schilbeidae	*Schilbe mysrus*
10	Bagridae	*Chychyctus nigrodigitatus*
11	Malapteruridae	*Malapterurus electricus*
12	Claridae	*Herobranchus isopterus*

2. Survey of fishermen

2.1. Type of boat used by fishermen

In the N'Zoo region, fishermen use only one type of boat for transport: the monoxyle on the Cavally river, which has a certain depth. This boat is made of boards, into which the fishermen put their fishing nets and the fish they catch. It can only carry one or two people and is not equipped with a motor, so it moves around using canoe paddles.

3. Inventory of fish biodiversity

a. Endangered fish species

Table IV: List of threatened fish species

N°	**Names**			Individuals obtained by Month
	Scientists	**French**	**Local**	
1	*Polypterus bichir*	African Polypterus	Kpangnè	0 à 2
2	*Abramis brama*	Common bream	Mèagla	2 à 5
3	*Mormyrops tapirus*	Mormurus flat	Ben	0 à 2
4	*Paramormyrops*	Mormurus (long)	Glakpa	0 à 3

b. Extinct fish species

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

Table V: Missing fish species

Nº	Names		
	Scientists	**French**	**Local**
1	*Malapterurus electricus*	Electric catfish	Gbligblignè
2	*Schilbe mysrus*	Schilbe	Flè
3	*Mastacembelus liberience*	Snakefish	Kaagnè
4	*Late niloticus*	Freshwater Captain	Kontougo
5	*Brycinus macrolepidotus*	Freshwater sardine	Bannira

c. Appearance of new species

Table VI: **Appearance of new species**

Nº	Names		
	Scientists	**French**	**Local**
1	*Clarias gariepinus*	African catfish	Kwiharan
2	*Oreochromus niloticus*	Nile tilapia	Kwikébéin
3	*Heterotis niloticus*	Hetero	Mbadègnè

d. Fish species currently found in the river

Table VII: List of existing fish species in the Cavally River

N°	Families	Scientific names	Names		Image
			French	**Local**	
1	Cichlidae	*Oreochromis niloticus*	Nile tilapia	Kwikébéin	

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

		Tilapia zillii	Tilapi Zillii	Parakébéin	
2	Mormuridae	*Paramormyrops*	Mormurus (long)	Glakpa	
		Mormmyrops tapirus	Mormurus (less)	Ben	
		Mormurus mormurus	Mormurus (short)	Piri	
3	Clariidae	*Clarias gariepinus*	Fish African cat	Kwiharan	
		Heterobranchus isopterus	Catfish	Gnèkpoko	
4	Cyprinid	*Scardinuis erythrophthalmus*	Red roach	Wakébéin	
		Abramis brama	Common bream	Meakala	

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

		Rhodeus amarus	Bouvière	Liira	
5	Bagridae	*Chychyctus nigrodigitatus*	Chewers	Yellow	
6	Hepsetidae	*Hepsetus odoe*	Dogfish	Langan	
7	Polypteridae	*Polyptère*		Gbangnè	
8	Osteoglossidae	*Heterotis niloticus*	Kanga	Mbadègnè	

e. Abundance of species inventoried in the study area

Table VIII: Abundance of species inventoried in the study area

Families	**Scientific names**	**Number of individuals**	**Percentage**
Cyprinid	*Scardinuis erythrophthalmus*	100	16,58%
	Abramis brama	20	3, 32%

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

	Rhodeus amarus	110	18,24%
Clariidae	*Clarias gariepinus*	15	2,49%
	Heterobranchus isopterus	60	9 ,96%
Mormuridae	*Paramormyrops*	10	1,66%
	Mormyrops tapirus	8	1,33%
	Mormurus mormurus	80	13,27%
Cichlidae	*Oreochromis niloticus*	10	1,66%
	Tilapia zillii	100	16,58%
Bagridae	*Chychyctus nigrodigitatus*	50	8,29%
Hepsetidae	*Hepsetus odoe*	27	4,48%
Polyptera	*Polypterus bichir*	8	1,33%
Osteoglosidae	*Heterotis niloticus*	5	0,83%
Total		**603**	**100%**

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

Discussion

In this study, we determined the fishing gear and ichthyological richness of the Cavally River in the N'zoo sub-prefecture. The ichthyofauna inventory showed that Cyprinidae, Mormyrudea, Clariidae and Cichlidae are the most abundant species. Bagridae, Mepstidae, Polypteridae, Ostoglosidae and Centropomidae are the least abundant. In addition, the fish diversity of the Cavally River is increasingly threatened by the intensification of human activities along the river shores and the over-exploitation of fish resources. This damage, which is essentially due to human activity, threatens to endanger the survival of the species living in the area. The number of fishermen varies from one village to another. The villages of Gaah, Zougouta, Gbé and Gatta have a higher number of fishermen. The higher number of fishermen in these villages is due to the fact that they are located downstream from the river, where the watercourse is wide and rich in biodiversity.

A study of the archives revealed that the Cavally River formerly comprised 17 species of fish belonging to 12 families, the most abundant of which were the Cichlidaes, the Mormurudaes and the Cyprinidaes. This proves that the river was previously abundant in ichthyofauna. This richness depended at the time on the level of socio-economic development of the population, the number of fishermen and the use of traditional gear. During our consultations with stakeholders, we realised that fishing had been much more productive in previous years. The current decrease in fish catches is due in part to human interventions (the use of agricultural herbicides, bush fires, excessive wood cutting along the river, excessive loading of the riverbed with discarded objects) and in part to the over-exploitation of these species. These factors have led to the extinction of several species of fish in the Cavally river in the sub-prefecture of N'Zoo. In addition, the emergence of other fish species considered to be completely new has been observed in the Cavally river. Despite these risks of extinction due to human activities along the river, some species have adapted to climate change and the physico-chemical parameters of the river's aquatic ecosystem, leading to a state of abundance. This abundance is due to the prolificacy of these species and to their favourable living conditions.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

Conclusion :

In this study, we identified the fish species inhabiting the Cavally river. The surveys revealed 8 families (including 14 genera) of fish, divided between the most abundant (Mormyrudae, Cyprinidae), the rarest (Polypteridae), the most threatened with extinction (Malapteridae) and those that have recently appeared (Claria gariepinus, Oreochromis niloticus and Heterotis niloticus).

Declaration of Competing Interest

The authors declare that they have no known conflicting financial interests that could appear to influence the work presented in this paper.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

References

Froese, R., Winker, H., Gascuel, D., Sumaila, R., & Pauly, D. (2016). Minimizing the impact of fishing. *Fish and Fisheries*, 17, 785–802.

Gaston, K.J. & Blackburn, T.M. (2000). Patterns and Process in Macroecology. *Blackwell, Oxford*.

Kamelan, M.T., Bereté, S., N'zi, K.G., Bamba, M., Bi, G.G., & Kouamélan, P.S. (2013). Peuplement ichtyologique du complexe Brimé-Méné-Nounoua, Côte d'Ivoire *Intertionnal Journal of Biological and Chimical Sciences*, 7, 6: 2248-2263. DOI : http://dx.doi.org/10.4314/ijbcs.v7i6.6].

Léveque, C., Oberdorff, T., Paugy, D., Stiassny, M.L.J., & Tedesco, P.A. (2008). Global diversity of fish (Pisces) in freshwater. *Hydrobiologia*, 595, 545–567

Nelson, J.S. (1994). Fishes of the World. 3rd Edition. *John Wiley and Sons, Inc. New York*, 620 pp.

N'Zi, K.G., Gooré, B.G., Kouamélan, E.P., N'Douba, V., Koné, T., & Frans, O. (2003). Diversité biologique des crevettes d'un petit bassin côtier ouest africain de Côte d'Ivoire en relation avec les variables environnementales. *Sciences et Techniques*, 27(1 et 2), 17-27.

N'Zi, K.G., Gooré, B.G., Kouamélan, E.P., N'Douba, V., Koné, T., Frans, O. (2008). Influence des facteurs environnementaux sur la répartition spatiale des crevettes dans un petit bassin ouest africain– rivière Boubo, Côte d'Ivoire. *Tropicultura*, 26(1), 17-23.

Stiassny, M. L., Teugels G. G., & Hopkins C. D. (2007). *Poissons d'eaux douces et saumâtres de basse Guinée, ouest de l'Afrique centrale, vol. 1 et 2.* Muséum national d'Histoire naturelle, Paris, 1456p.

Paugy, D., Traore, K., Diouf, P.S. (1994). Faune ichtyologique des eaux douces d'Afrique de l'Ouest. In : Teugels G.G. (ed.), Guégan Jean-François (ed.), Albaret Jean-Jacques (ed.). Biological diversity in African fresh- and brackish water fishes : geographical overviews : PARADI symposium = Diversité biologique des poissons des eaux douces et saumâtres d'Afrique : synthèses géographiques : symposium PARADI. Annales du Musée Royal d'Afrique Centrale.Sciences Zoologiques, 275, p. 35-66. Symposium PARADI, Saly (SEN), 1993/11/15-20.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 19, Août 2023

Recensement Général de la Population et de l'Habitat https://www.unicef.org/guinea/rapports/recensement-g%C3%A9n%C3%A9ral-de-la-population-et-de-lhabitat