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Preliminary results of the characterization of *Clarias* species from Lake Magui in Mali from the Vomerian plate

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Abstract
The objective of the study is to characterize the *Clarias* species of Lake Magui in Mali on the basis of Vomerian dental plaque in order to contribute to the ichthyic diversity of the Senegal River basin. To do this, 32 samples of fish belonging to the genus *Clarias* were collected and then identified. They were measured on 17 metric variables of the body, the length and thickness of the vomerian plate. The *Clarias* species identified are *Clarias anguillaris*, *Clarias gariepinus* and *Clarias* sp. The average length of the vomerian plate was 17.76±1.61 in *Clarias anguillaris*, 20.84±0.43 in *Clarias gariepinus* and 19.97±1.28 in *Clarias* sp. The average value of the thickness of the vomerian plaque was 1.92±0.42 mm in *Clarias anguillaris*; 2.83±0.05 in *Clarias* gariepinus and 1.54±0.22 mm in *Clarias sp.* Comparison of means shows a statically significant difference between species. The results show three species of *Clarias* in Lake Magui and *Clarias* sp. deserves to be better described by more in-depth studies.

Keywords: Characterization, *Clarias* species, Vomerian plate, Lake Magui, Mali

1. Introduction
Lake Magui Located in the rural commune of Ségala, in the Kayes region, constitutes a green and economic lung through the various activities carried out by the populations of these communes. The lake plays a vital role in the fight against the harmful effects of climate change and its consequences and in the restoration of the ecosystem, fauna and flora. The natural reservoir of Lake Magui is teeming with immense biodiversity (terrestrial and aquatic fauna, birds, plant and micro-organic species. The traditional authorities of the village of Diabadji have sounded the alarm on the harmful effects of climate change which threaten the existence of the lake (Diallo, 2020) [4]. Hence the objective of the present study which is to characterize the species of *Clarias* in this lake from the Vomerian plate for good conservation. *Clarias* play an important role in fishing and aquaculture in Mali. Morphological characterization studies of *Clarias* species in Lake Magui were carried out by Diop *et al*. (2022) [6]. Information on the structure of animal populations is useful for the development of management strategies for the conservation of biodiversity (Turan *et al*, 2005) [1], on the one hand, and morphometric studies are very important for understanding the effect interaction of environment, selection and heredity on the shapes and sizes of bodies within a species (Cadrin, 2005) [9].

2. Materials and Methods
2.1. Sampling
The work was done in Lake Magui. A total of thirty-two (32) subjects were randomly selected. The samples were collected near the landing stages along the river. They were kept in coolers and transported to the laboratory for measurements. They were identified using the determination key. These fish were measured and weighed. Lake Magui is located in the Sahelian zone between 14°38'39' north and 11°01'38' west (Figure 1).

It is a permanent freshwater lake fed by several streams and rivers including Blewol, Wodia, Kirgu and the Kolimbiné (RAMSAR). It is bordered by herbaceous and woody Steppe plants and very rich in biodiversity including small mammals, reptiles, fish and aquatic birds. Its main hydrological functions include water retention, groundwater recharge, flood control and coastal stabilization, and it is important in maintaining the general hydrological balance of the Senegal River basin (RAMSAR).

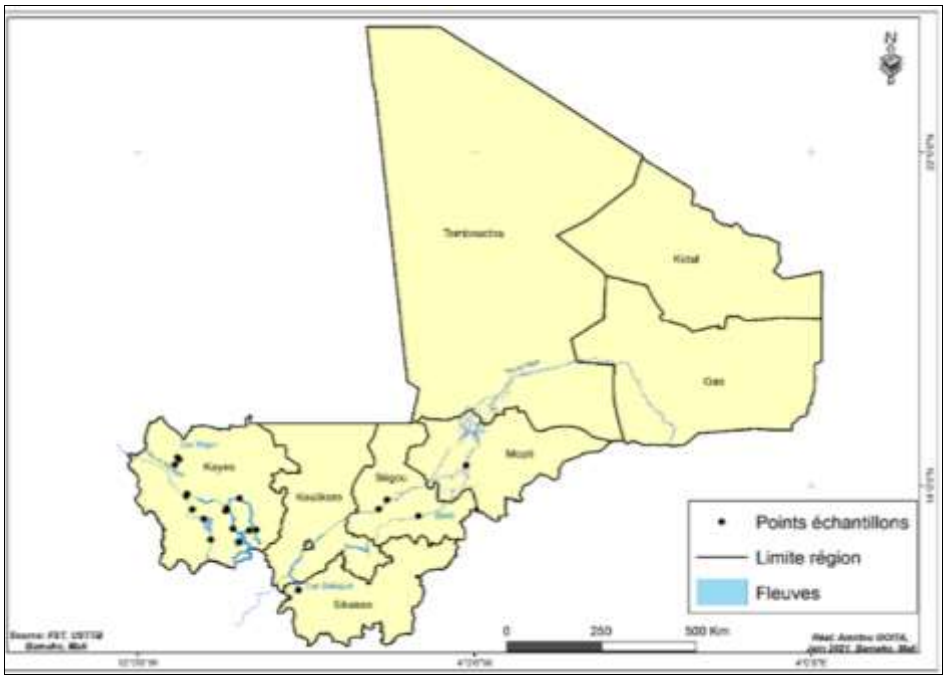

Fig 1: Location of Lake Magui in the Senegal River basin (Diop 2022) [5].

3.Results

3.1. Identification of *Clarias* species

A total of three species have been identified: *Clarias gariepinus*, *Clarias* sp and *Clarias anguillaris*. The observation of the vomerian plaques shows in *Clarias gariepinus* a continuous and thicker vomerian plaque, in *Clarias* sp. the vomerian plate is convex, less thick and indented in the middle; on the other hand, in Clarias anguillaris, the vomerian plate is convex, continuous and small.

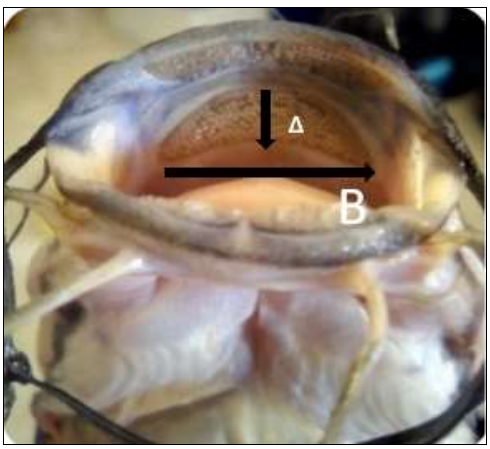

Fig 2: *Clarias Gariepinus*: A: thickness vomer; B: length vomer

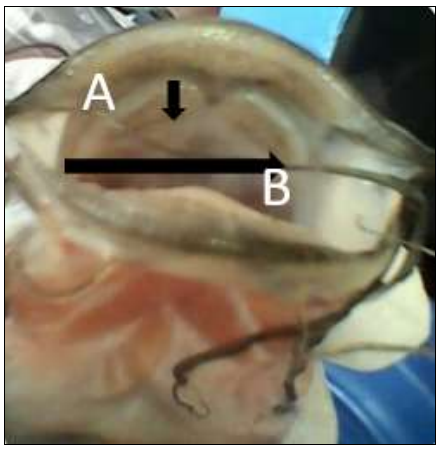

Fig 3: *Clarias* sp: A : thickness vomer; B: length vomer

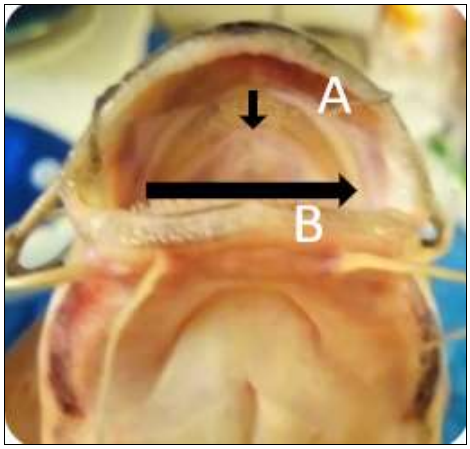

Fig 4: *Clarias anguillaris*: A: thickness vomer; B: length vomer

3.2. Morphometric characteristics

The principal component analysis made it possible to extract six (6) factors which best explain (76.29%) of the variance between the three species.

The variation is in the length of the head, snout, eye diameter, standard length, fin pre-ventral fin on the standard length respectively on the six factors (Table 1). The maximum mean value of the vomerian plate thickness was observed in *Clarias gariepinus* and the minimum mean value in *Clarias* sp (Table 2).

As for the length of the vomerian plate, *Clarias gariepinus* presented a maximum average value and the minimum in *Clarias anguillaris* (Table 2). Comparison of the means of the thickness and length of the vomerian plate showed a significant difference between the species (tables 3 and 4). The principal component analysis showed a variance of 67.69% for vomerian thickness and 80.77% for vomerian length and this allowed the distribution of species into three groups (figure 5 and 6).

Tables 1: Principal component analysis.

Component matrix	Component					
	1	2	3	4	5	6
doltte	-0,143	0,834	0,416	0,133	0,020	0,016
LMLTTE	-0,591	-0,400	0,308	0,571	0,140	-0,080
LSTL	-0,604	0,196	-0,084	-0,038	0,346	-0,297
HCLS	0,302	0,256	-0,672	0,258	0,340	0,176
LTTELS	0,848	-0,082	-0,045	-0,020	0,345	0,004
LMLS	-0,285	-0,483	0,326	0,633	0,301	-0,091
DOLS	0,030	0,820	0,428	0,129	0,095	0,018
PDLS	0,608	-0,294	0,030	0,053	0,464	-0,278
PALS	0,329	-0,556	0,395	-0,101	0,061	0,181
PPLS	0,200	0,463	0,123	0,400	0,076	-0,316
PVLS	0,536	0,022	0,497	0,272	0,189	0,188
LDLS	-0,721	-0,059	-0,191	0,359	-0,068	0,197
LALS	-0,357	-0,059	-0,670	0,092	0,304	0,229
LPLS	0,281	0,049	0,124	0,380	-0,191	0,737
LV	0,566	-0,009	-0,309	0,316	-0,245	-0,229
HPLS	0,252	0,282	-0,543	0,446	-0,017	-0,022
LCLS	0,267	-0,203	-0,105	0,442	-0,675	-0,314

LT: Total length; LS: Standard length; HC: Body height; LM: Jaw length; DO: eye diameter; LPD: Pre-dorsal length; LND: Length of the base of the dorsal fin; LNV: Length of base of pelvic fin; LNA: Length of base of anal fin; LNP: Length of base of pectoral fin; LPV: Pre-ventral length; LPA: Pre-anal length; LPP: Length pre-pelvic; HPC: the height of the caudal peduncle; LPC: Length of the caudal peduncle, Lte: length of the head.

Tables 2: The average value of vomerian dental plaque parameters

	Clarias anguillaris			***Clarias* sp**			***Clarias gariepinus***		
Effective	**16**			**9**			**7**		
Plaque vomérienne	**Min**	**Moy**	**Max**	**Min**	**Moy**	**Max**	**Min**	**Moy**	**Max**
Thickness	1,19	1,92±0,42	2,58	1,04	1,54±0,22	1,80	2,78	2,83±0,05	2,92
Lenth	11,53	17,76±1,61	23,34	16,37	19,97±1,28	25,12	20,07	20,84±0,43	21,37

Table 3: Analysis of variance of vomerian plate thickness at species level

	Sum of squares	**dl**	**Average of squares**
Intergroup	21,36	1	21,36***
Intergroup	70,71	60	1,17
Total	92,07	61	

Table 4: Analysis of variance of thickness of vomerian plate length at species levels

	Sum of squares	**dl**	**Average of squares**
Intergroup	7050,63	1	21,36***
Intergroup	121,52	60	2,09
Total	92,07	61	

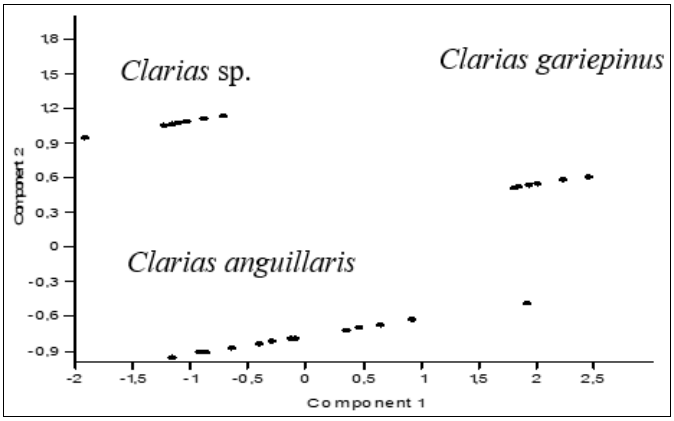

Fig 5: Principal Component Analysis Diagram on the variable of vomerian plaque thickness

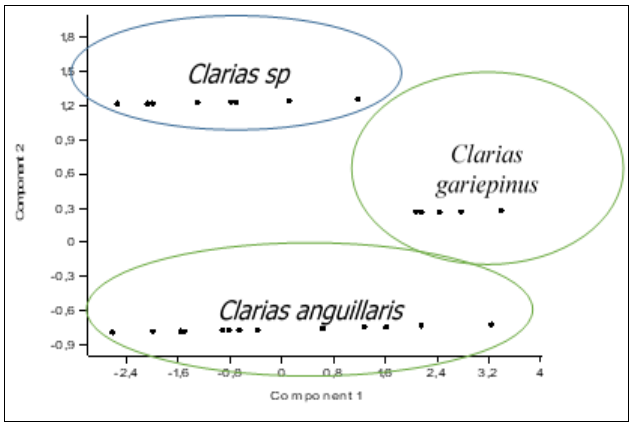

Fig 6: Principal Component Analysis diagram on the vomerian plaque length variable.

4. Discussions

The *Clarias* species identified in Lake Magui are *Clarias anguillaris*, *Clarias gariepinus* and *Clarias* sp. The observation data of the vomerian plaques show in *Clarias anguillaris*, a convex, continuous and small vomerian plaque, in *Clarias gariepinus* a continuous and thicker vomerian plaque on the other hand in *Clarias* sp. the vomerian plate is convex, less thick and indented in the middle. Specimens of

Clarias presenting forms of small and indented continuous vomerian dental plaque were encountered in the natural and farmed environment in Cameroon by (Nkongho *et al*. 2019) [3], (Diop *et al*. 2018) [5] on farmed *Clarias* in Mali. These differences in dental plaque could be explained by food selection or genetics.

A variation in the length of the head, snout, eye diameter, standard length, pre-ventral fin on the standard length was observed in the three species encountered. Our results are different from those observed in the Osun, Ogbese and Aago rivers on *Clarias gariepinus* whose variation was observed in pre-anal distance by (Michael *et al*. 2021) [8] in Nigeria. Diop *et al*. (2018) [5] observed a significant difference in the variables head length, eye diameter, pre-anal length, pre-pelvic length and height of the caudal peduncle in Clarias anguillaris and Clarias sp in fish farms in Mali. EYO (2003) [2] observed a difference between *C. ebriensis* and *C. albopunctatus*, *C. gariepinus* and *C. anguillaris* in the Anambra River in Nigeria. Of which the differences between species appeared in the data of the length of the base of the pectoral fin, the length of the base of the pelvic fin. These can be explained by environmental differences.

The mean value of the vomerian plate length varied from 17.76±1.61 in Clarias anguillaris to 20.84±0.43 in *Clarias gariepinus*. As for the thickness, this varied from 1.54±0.22 mm in Clarias sp to 2.83±0.05 in *Clarias gariepinus*. This is explained by the difference in species.

5. Conclusion

The study made it possible to identify three species of *Clarias* in Lake Magui: *C. anguillaris*, *C. gariepinus* et *C.* sp. Principal component analysis showed variation in head length, snout, eye diameter, standard length, pre-ventral fin over standard length within species. The most observable difference appeared in the thickness and length of the vomerian dental plaque.

The results could serve as a reference in decision-making for future conservation programs for species of the *Clarias* genus of Lake Magui.

6. Reference

1. Turan C, Yalçin S, Turan F, Tkur E, Akyurt I. Morphometric comparisons of African catfish, *Clarias gariepinus*, populations in Turkey. Folia Zoologica. 2005;54(1–2):165–172.
2. Eyo JE. Congeneric discrimination of morphometric characters among members of the *Pisces genus* Clarias (Clariidae) in Anambra river, Nigeria. The Zoologist. 2003;2(1):1-17.
3. Nkongho GO, Oben BO, Sanni MT, Agbebi T, Obie AE, Makombu JG, *et al*. Morphological and Molecular Characterization of Some Wild and Cultured Clarias (Clariidae, Siluriformes) Fish Species from Cameroon. International Journal of Research Studies in Biosciences (IJRSB). 2019;7(3):16-26.
4. Diallo MS. Le lac Magui: Un poumon vert et économique. Républicain; c2020.
5. Diop R, Konaté A, Traoré D, Sanogo Y, Camara M. Variabilité Morphométrique et génétique des espèces de Clarias utilisées en pisciculture dans la zone périurbaine de Bamako. Société Malienne des Sciences Appliquées, Bamako; c2018.
6. Diop R. Caractérisation morphométrique et diversité génétique de Clarias anguillaris (Linnaeus, 1758) pêché dans les bassins du fleuve Niger et Sénégal au Mali. Mémoire de thèse. Université des Sciences, des Techniques et des Technologies de Bamako, Bamako; c2022. p. 110.
7. RAMSAR. Lac Magui. Service d'information sur les Sites Ramsar. Available from: https://rsis.ramsar.org/fr/ris/2126.
8. Michael PO, Olubunmi OO. Morphological differentiation in African catfish (*Clarias gariepinus*) from three different populations in Nigeria. Journal of Technological Research, 2021, 16(1).
9. Cadrin S. Morphometric variation of yellowtail flounder in ICES Journal of Marine Science. 2005;62(4):683-694.