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RESEARCH ARTICLE

BIODIVERSITY AND FISH REPRODUCTIVE ASPECTS OF THE SÔ RIVER IN SOUTHERN BENIN.

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Abstract

Sô River, located in southern Benin, like other rivers in the country, is subject to human pressure. The aim of this study was to characterize the ichthyofaunal diversity and to evaluate the reproductive aspects of the main species. In total, 11 stations have been sampled on the Sô River. Physico-chemical parameters were taken monthly in the morning between 6 am and 11 am and the fish samples were collected twice a month at each station from June to October 2015. The length-weight relationships, condition factor K, gonado-somatic index (GSI) and the sex ratio were evaluated. The physico-chemical parameters showed a great spatio-temporal variation with stratification in two groups in time and space. In total, the inventory revealed 29 fish species belonging to 16 families and 21 genera. The abundant species in the catches were *Pellonula leonensis*, *Coptodon guineensis*, *Sarotherodon melanotheron*, *Eleotris vittata* and *Brevymirus niger*. The condition factors evaluated for the 4 species were between 0.74 and 1.93. The average Gonado-Somatic Index for *S. melanotheron* was 1.8% in June and 7.5% in July while it was 13% in June and 21% in July for *Coptodon guineensis*. Thus, the results showed that the main species of the river adapt themselves to the pressures on the ecosystem.

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Introduction:-

Benin is a coastal country with a river-rich watershed, especially in its southern part. The Sô River, located north-west of Nokoué Lake in the municipality of Sô-ava, like the other rivers of the country, is subject to the action of local populations whose main activity is fishing (Lederoun et al., 2016).

The fishing sub-sector in Benin represents 15% of the total labor force and 25% of the primary sector. This business sector directly or indirectly provides over 600,000 jobs. Inland fisheries contribute about 75% of national fish production and account for nearly 31% of national consumption of animal protein (Aholoukpe, 2017, Achoh et al., 2018). However, the widespread use of non-regulatory fishing gear, techniques and fishing methods is leading to the degradation of aquatic ecosystems. Fishing is one of the causes of the degradation of river biodiversity (Lederoun et al., 2016, Hazoume et al., 2017). The intensification of the exploitation of freshwater and brackish water populations by permanently growing local populations constitutes a major risk of regression and disappearance of species (Kouakou et al., 2016, Aholoukpe, 2017). In addition, water pollution contributes to lower catches and fish size (Noumon et al., 2015). The analysis of the sustainable management of inland water resources shows that the use of small-scale fishing gear contributes to the progressive depletion of natural resources of water bodies (Aholoukpe, 2017). Thus, the resources taken from these waters decrease when the quality of the continental waters, or even the environment, deteriorates (Agblonon Houelome, et al., 2017). According to Ainan (2014), this situation can generate among the fishermen population many economic, social and health problems such as falling incomes, unemployment, poverty and malnutrition.

In Benin, the municipality of Sô-Ava, which is a lacustrine community, is one of the most vulnerable to this degradation of aquatic ecosystems because aquatic resources are the basic source of income for its population (Koudenoukpo et al., 2017). Indeed, the aquatic resources available there play a role in the local economy, but also at national and international levels (Sossou-Agbo, 2014).

It is therefore necessary to work for the preservation and/or restoration of aquatic ecosystems. But a good conservation policy requires a good knowledge of the different aquatic ecosystems, their components and the factors that influence their functioning and their balance (Houndonougbo et al., 2013, Amoussou et al., 2017, Djidohokpin et al. 2017).

Among the rivers in the commune of Sô-Ava, the Sô River is the only one that has been the subject of very few studies (Kiossa 2012, Guillou 2013 and Hamani 2015). Like the other rivers of the town, it is therefore appropriate to make investigations on this river to better understand its extent of degradation. The purpose of the study was therefore to characterize the ichthyological diversity and reproductive aspects of some dominant species of the Sô River.

Materials and methods:-**Sampling stations**

Data collection was conducted at 11 stations in the Sô River. These were Vekky, Sindomey, Dogodo, Ahomey Glon, Ahomey ounmey, Ahomey lokpo, Zoungomey, Kinto Dokpaka, Kinto Oudjra, Kinto Oudjra Arm 1, and Kinto Oudjra Arm 2 stations as shown in Figure1.

Measurement of physico-chemical parameters

Physico-chemical measurements were taken in the mornings between 6 am and 11 am, once a month at each of the eleven (11) stations during the months of June, July, August, September and October of the year 2015. During these measurements, the weather was every time assessed (state of the sky). The physico-chemical parameters measured were air and water temperature, river depth, water clarity, dissolved oxygen, pH, conductivity, Total dissolved solids (TDS), and salinity of the water.

Fish collection and monitoring of fishing gear

Fish collection was done by station twice a month. Fishermen's catches were sorted by species, counted and weighed. In each case, a sample of the catches was taken for morphometric and reproductive parameters. The number of individuals collected was a function of the relative abundance of the catches.

Measurement of Morphometric and Reproductive Parameters

In the laboratory, the collected species were first identified. The order of the taxa was presented according to the CLOFFA standard (Check-List of the Freshwater Fishes of Africa (Lévêque et al., 1990 and 1992, Paugy et al., 2003).

Morphometric data were taken by species and individuals. These included total length (TL), standard length (SL), total weight (TW), stage of gonad maturation, and gonad weight.

The stages of sexual maturity (1 to 5) were determined after macroscopic observation of the fish ovaries or testis. The maturity scale used is that of Legendre and Ecoutin (1989) modified by Tidiani Koné, 1999 (Table 1).

Traitements de donnees et analyses statistiques

Data processing and statistical analysis

The physico-chemical parameters were calculated by the *Proc means* procedure of SAS (Statistical Analysis System, 2013). The correlation between the physico-chemical parameters was calculated by the SAS *Proc corr* procedure (2013). The General Linear Model (GLM) procedure was used to test the station effect on the physico-chemical parameters and the means were compared using paired student's t-test.

The weight-length relation was established according to the classical formula of Le Cren (1951).

$$TW = aTL^b$$

where TW and TL represent total body weight in grams and total length in centimeters, respectively.

The factors a and b are allometric coefficients. The factor b is the relative growth coefficient of the weight at height. The coefficient b is close to 3 and varies with genetic and physiological factors. For b = 3, the growth is said to be isometric and allometric for b different from 3. A value of b greater than 3 indicates a better growth in weight than in length whereas a value of b less than 3 indicates that the fish grows more in length than in weight. The Student's t-test was performed to compare the values of the coefficient b with the value 3. The factor a is a coefficient related to the ecological factors and varies according to the time of the catch, the health status of the fish and the degree of development of the gonads.

Results:-

Physico-chemical parameters

The means of the physicochemical parameters are presented in Table 1. The variation of the temperatures as a function of the stations was not observed ($P > 0.05$). The average transparency obtained at the Kinto-oudjra station arm 2 was significantly higher than that observed at the Ahomey-glon, Ahomey-lokpo, Ahomey-ounmey, Sindomey, Vekky and Dogodo ($P < 0.05$). The transparency of the water at Ahomey-ounmey was also significantly higher than those obtained at Kinto oudjra ($P < 0.05$). The water depth values at Dogodo were significantly higher than those of all other stations ($P < 0.05$). The Kinto-oudjra depth values were very significantly higher than those obtained at Ahomey-glon, Ahomey lokpo, Ahomey-ounmey, Sindomey, Vekky, Kinto-oudjra arms 1 and 2 ($P < 0.05$). The pH of the Ahomey-glon water was significantly lower than the pH at Sindomey and Vekky ($P < 0.05$). As for the dissolved oxygen and the saturation rate, no significant difference was recorded between the stations ($P > 0.05$). On the other hand, the salinity values obtained at Dogodo were significantly higher than those obtained at Kinto-oudjras arms 1 and 2, at Zoungomey and at Ahomey-lokpo ($P < 0.05$). Similarly, the salinity values obtained at Vekky were significantly higher than those obtained at Ahomey-lokpo ($P < 0.05$). The mean value of TDS at Kinto-oudjra arms 1 and 2 was significantly lower than the values obtained at Dogodo and Vekky ($P < 0.05$).

Inventory of ichthyological diversity

Table 2 presents the list of species found in the Sô River. During this study, 29 species of fish belonging to 16 families and 21 genera were identified. The diversity of species by station varied from 5 in Sindomey to 21 in Zoungo.

Dominant species

The abundant species in the catches were *Pellonula leonensis*, *Coptodon guineensis*, *Sarotherodon melanotheron*, *Eleotris vittata* and *Brevymirus niger* (Figure 2). The first three species represented respectively 64.64%, 14.16% and 10% of the catches.

Growth of dominant species

The analysis of the growth coefficients of the abundant species revealed that there was no significant difference between the "b" values obtained for the four species and the value "3" (Table 3). The dominant species showed then isometric growth in the Sô River.

Condition factor K

Table 4 shows that the condition factor varied from one species to another with higher values in *Eleotris vittata* and lower in *Sarotherodon melanotheron*. There was no difference between the K values of *C. guineensis* and *S. melanotheron* ($p > 0.05$). In contrast, the condition coefficient of *E. vittata* was different from those of *C. guineensis* and *S. melanotheron* ($P < 0.05$).

Sex ratio and stage of sexual maturity

The sex distribution of the dominant species identified in the catches showed an unequal distribution of the numbers by sex of each species (Table 5). The distribution of the *Sarotherodon melanotheron* and *Coptodon guineensis* specimens obtained and processed by size class showed that the size of sexual maturity of these species was between 3 cm and 10 cm (Table 6 and 7).

Discussion:-

The average values obtained for the air and water temperatures ($27.3 \pm 1.89^\circ \text{C}$, $27.6 \pm 1.87^\circ \text{C}$) are close to the average values obtained by Koudénoupo et al. (2017). Also, the water temperature recorded during the study period fits perfectly into the temperature range that provides ideal living conditions for fish species (Zinsou et al., 2016). Indeed, in tropical environments, particularly in southern Benin, the temperature of water that can be tolerated by most species is between 23°C and 31°C (Nounmon et al., 2015). The significant variation in ambient temperatures and water depending on the months could be explained by the effect of the seasons on temperature. The highest temperatures were obtained in June and October for air temperature and only in June for the temperature of the water. Thus, the high sunshine during the dry season (July, August) would favor the warming of the water and thus the rise of the temperatures whereas the abundance of rains in the rainy season (June, September, October) causes the fall of the temperatures. Temperature variations play a large role in egg development, sex determinism in fry and in adult reproduction (Zinsou et al., 2016). The superiority of the water temperature values of the Sô River to those of the ambient temperature was observed during the months of June, July and August, where the values obtained for conductivity and suspended solids were also very high. This situation could be related to the high levels of suspended solids which can be considered as a form of pollution responsible for a warming of the water (Makhoukh et al., 2011). This high water turbidity reduces habitat quality for fish and causes mineralization of water (Agblonon Houolome et al., 2017). The high temperature of the water during this period could therefore be related to the high content of water in suspended solids. In addition, suspended elements can also clog fish branch systems or cause irritation, and silt deposits significantly alter the quality of substrates in breeding areas (Zinsou et al., 2016). The high average value of the obtained conductivity ($2055.5 \pm 3047.32 \mu\text{S} / \text{cm}$) explains the high content of suspended solids and reveals the anthropogenic pollution. In fact, the drainage of runoff water during the rains in the river and the leaching of plant protection products and chemical fertilizers used for crops in the upstream zones of the ecosystem contribute to an important part to the enrichment of the water body. Agblonon Houelome et al. (2016) emphasized in particular that the position of fields in relation to rivers causes, by the leaching phenomenon, the loading of water by agricultural discharges that sediment in rivers.

The high mean value of TDS ($1678 \pm 2448.24 \text{ mg} / \text{l}$) obtained in this study further supports sediment input from runoff. The TDS values are higher than the values obtained by Dimon et al. (2014) on Lake Nokoué. The high average salinity value ($1 \pm 1.41 \text{ mg} / \text{l}$) obtained on the Sô River expresses the intrusion of Nokoué Lake water loaded with salt into the Sô River during a period of low water (Houndonougbo et al., 2013 Odountan and Abu, 2015). The mean dissolved oxygen content ($4.56 \pm 2.51 \text{ mg} / \text{l}$) is close to the values ($5.5 \pm 2.2 \text{ mg} / \text{l}$) obtained by Koudénoupo et al. (2017). The oxygen saturation observed in the Sô River ($54.5 \pm 22.99\%$) in this study differs from the $13.9 \pm 5.4\%$ recorded by Kiossa (2012) on the same river during the same season period. The average value of transparency obtained in this study was overall low. This situation could be explained by the absence of flooding, which favors dilution during the study period. The high transparency measured at the Kinto-oudjra station arm 2 is related to its position in a non-urbanized area protected from any human activity likely to influence the physicochemical parameters of the water and the embankments are well covered by abundant vegetation. In addition, it is located on the arm of the river leading to Adjohoun and in direct connection with the Ouémé River. The average depth of water obtained ($3.7 \pm 1.24 \text{ m}$) is close to $3.6 \pm 0.9 \text{ m}$ obtained by Kiossa (2012). This is certainly due to the

exploitation of sand at the bottom of the Sô River by local residents for construction and for commercialization because a variation in the depth according to the stations was observed (Guillou, 2013).

The results of the inventory (29 species belonging to 16 families and 21 genera) are similar to those of Kiossa (2012) which identified 38 species grouped in 19 families and that of Guillou (2013) which identified 38 species of fish belonging to 23 families. The difference between the number of species identified during our work and those of Kiossa (2012) and Guillou (2013) can be explained by the absence of flood during the sampling period. The abundance of *Sarotherodon melanotheron* and *Coptodon guineensis* and their distribution at all stations can be explained by the ability of these Cichlids to live in environments of variable salinity, their mode of reproduction and feeding (Aholoukpe, 2017). A study conducted by Bob-Manuel et al. (2013) on food and dietary habits of *T. guineensis* showed that juveniles of *T. guineensis* feed primarily on zooplankton while adults consume more aquatic plants and invertebrates.

The values of "b" (allometric coefficient) for the species caught in the different stations were within the limits (2 to 4) reported by Kapute et al. (2016). The values obtained in this study are similar to those obtained by Hazounme et al. (2017) in the Sô River and by Koffi et al. (2014) in the Aby lagoon in Côte d'Ivoire for *S. melanotheron*, *Coptodon guineensis* and *Eleotris vittata*. The parameters of weight-length relationships are affected by several factors such as the number of individuals in the sample, habitat, availability of food resources, gonad maturity and fishing pressures (Konan et al., 2015; Lederoun et al., 2016).

The condition factor makes it possible to assess the biological state, the buildup of fish and to compare mono-specific populations living under apparently similar or different conditions. A high value of K means that the fish are overweight and live in an environment where conditions are favorable (Houndonougbo et al. 2013). The condition factors (1.93, 1.85, and 0.99) obtained in this study for *S. melanotheron* are superior to those obtained by Niyonkuru et al. (2007) in Nokoué Lake, Niyonkuru et al. (2010) in Lake Ahémé and by Djidohokpin et al. (2017) in the river Tovè. The difference between the results obtained in this study and those results can be explained by the fact that *S. melanotheron* has during the month of June or July (rainy season), the environmental conditions favorable to its development. In addition, the relatively high values of K for the other species could be in the same trend. The *S. melanotheron*, *C. guineensis*, *E. vittata* and *B. niger* species were able to find suitable conditions in the Sô River during June, July and August.

The Gonado-Somatic indices (GSIs) obtained in this study are consistent with the values of tropical fish GSIs. The low values obtained for *S. melanotheron* versus *C. guineensis* can be explained by the nature of the oral incubator of *S. melanotheron*. This situation is confirmed by the study of Kidé et al. (2015). They reported in their work on the reproduction of *Sarotherodon melanotheronheudelotii* that the male is responsible for the incubation of the eggs and larvae that lasts 22 to 25 days and that during these periods, the males stop feeding and become inactive. The studies of Keremah and Ndah (2013), on aspects of the reproductive biology of *Coptodon guineensis* in the laboratory confirmed that this species is a substrate spawner, that incubation of eggs lasted only 2 days and that parental care was performed by both parents.

The size class of sexual maturity obtained in this work (3 to 10 cm) for *Sarotherodon melanotheron* and *Coptodon guineensis* is lower than the size of first maturity obtained by Hazounme et al. (2017) for *Sarotherodon melanotheron*. Sanogo et al. (2012) reported that in male subjects the smallest emission size of soft roe is 7.4 cm against 13.2 cm in females for oocytes. In addition, these authors reported that the comparison between experimental and artisanal catches revealed a notable difference. Male and female individuals have the respective sizes of first sexual maturity of 13.6 cm and 14.6 cm for catches obtained in artisanal fisheries. In experimental fishing, the 90 mm male individuals were already at first sexual maturity. It can be deduced that *Sarotherodon melanotheron* and *Coptodon guineensis* are confronted with a phenomenon of dwarfism, certainly due to the fishing pressure to which they are subjected on the Sô River.

Conclusion:-

The species inventory identified 29 species grouped into 16 families and 21 genera. The dominant species in the ichthyofauna stand were *Coptodon guineensis* and *Sarotherodon melanotheron* and incidentally *Brevimyrus niger* and *Eleotris vittata*. The study of the condition factors of these species and the length-weight relationships showed that these species have been able to adapt to the ecological conditions of the watercourse and the anthropogenic

pressures on the ecosystem. Evaluation of the gonado-somatic indices of *Coptodon guineensis* and *Sarotherodon melanotheron* revealed that the reproductive physiology of these species has allowed them to grow in the river.

Declarations: -

Conflict of interest: The authors declare no conflict of interest

Ethical approval:

This Manuscript does not report studies involving human participants, human data or human tissue. The use of fish and sample collection procedures were in accordance with the ethical standards in Benin.

Tableau 1:-Variations in physico-chemical parameters of the Sô River according to the stations

Values in the same column followed by different letters are significantly different at the 5% threshold ($P < 0.05$). NS: Not significant.

Stations	Ambient T°	Transp m	Prof m	T°	pH	CE (µS/cm)	Ox mg/l	Ox Sat (%)	Sal (mg/l)	TDS (mg/l)
Ve	26,9 ^{NS}	0,5 ^a	2,3 ^d	25,7 ^{NS}	7,3 ^a	4052,7 ^a	4,6 ^{NS}	59,0 ^{NS}	2,1 ^a	3335,7 ^a
Si	27,0 ^{NS}	0,5 ^a	3,4 ^b	28,1 ^{NS}	7,4 ^a	4764,5 ^a	5,2 ^{NS}	63,7 ^{NS}	1,7 ^{NS}	2821,8 ^a
Do	27,3 ^{NS}	0,5 ^a	6,5 ^a	28,1 ^{NS}	7,0 ^a	4100,4 ^a	5,9 ^{NS}	58,8 ^{NS}	2,2 ^a	3599,2 ^a
Ag	26,6 ^{NS}	0,5 ^a	3,3 ^b	27,5 ^{NS}	6,8 ^b	2674,9 ^{NS}	2,6 ^{NS}	39,3 ^{NS}	1,2 ^{NS}	2378,4 ^{NS}
Ao	26,7 ^{NS}	0,4 ^a	3,6 ^b	27,5 ^{NS}	7,0 ^{NS}	1770,3 ^{NS}	4,6 ^{NS}	55,7 ^{NS}	0,9 ^{NS}	1439,4 ^{NS}
Al	26,5 ^{NS}	0,6 ^a	2,8 ^d	27,5 ^{NS}	7,0 ^{NS}	1171,0 ^{NS}	4,3 ^{NS}	54,0 ^{NS}	0,2 ^b	1453,2 ^{NS}
Zo	27,1 ^{NS}	0,7 ^{NS}	3,7 ^b	27,4 ^{NS}	7,1 ^{NS}	991,6 ^b	4,1 ^{NS}	47,0 ^{NS}	0,5 ^b	825,8 ^{NS}
Kd	27,3 ^{NS}	0,7 ^{NS}	4,0 ^b	28,0 ^{NS}	7,1 ^{NS}	998,6 ^b	5,7 ^{NS}	66,5 ^{NS}	0,7 ^{NS}	1077,1 ^{NS}
Ko	27,5 ^{NS}	0,9 ^b	5,2 ^c	27,9 ^{NS}	7,0 ^{NS}	1705,5 ^b	5,1 ^{NS}	58,9 ^{NS}	0,9 ^{NS}	1360,1 ^{NS}
K1	28,5 ^{NS}	0,8 ^b	2,9 ^d	28,2 ^{NS}	7,1 ^{NS}	265,7 ^b	4,1 ^{NS}	48,2 ^{NS}	0,1 ^b	91,6 ^b
K2	28,4 ^{NS}	1,0 ^b	3,0 ^d	27,9 ^{NS}	7,2 ^{NS}	115,8 ^b	3,9 ^{NS}	48,5 ^{NS}	0,1 ^b	75,6 ^b

Ve: Vekky ; Si :Sindomey ; Do :Dogodo ; Ag :Ahomey Glon ; Ao : Ahomey ounmey ; Al ;Ahomey lokpo ; Zo :Zoungomey ; Kd :Kinto Dokpakpa ; Ko :Kinto Oudjra ; K1 : Kinto Oudjra arm 1 ; K2 : Kinto Oudjra arm 2

Tableau 2:-List of inventoried species and species richness per station

Family	Genus	Species	Ve	Si	Do	Ag	Ao	Al	Zo	Ko	To
Clupeidae	Pellonula	<i>Pellonula leonensis</i> (Boulenger, 1916)						×	×		×
		<i>Pellonula vorax</i> (Günther, 1868)						×	×	×	
Osteoglossidae	Heterotis	<i>Heterotis niloticus</i> (Cuvier, 1829)	×					×	×		
Mormyridae	Brevimyrus	<i>Brevimyrus niger</i> (Günther, 1866)	×						×	×	
	Hyperopisus	<i>Hyperopisus bebe</i> (Lacepède 1803)							×		×
Hepsetidae	Hepsetus	<i>Hepsetus odoe</i> (Bloch, 1794)	×					×	×	×	×
Alestidae	Brycinus	<i>Brycinus longipinnis</i> (Günther, 1864)								×	
Claroteidae	Chrysichthys	<i>Chrysichthys auratus</i> (Geoffroy St Hilaire, 1808)						×	×	×	
		<i>Chrysichthys nigrodigitatus</i> (Lacepède, 1803)	×		×			×	×		
Schilbeidae	Schilbe	<i>Schilbe intermedius</i> (Rüppel, 1832)	×		×			×	×	×	
Clariidae	Clarias	<i>Clarias gariepinus</i> (Burchell, 1822)	×	×	×	×	×	×	×	×	
		<i>Clarias ebriensis</i> (Pellegrin, 1920)	×			×	×	×	×	×	×

Mochokidae	Synodontis	<i>Synodontis nigrita</i> (Valenciennes, 1840)								×	×
Belonidae	Strongylura	<i>Strongylura senegalensis</i> (Valenciennes, 1846)								×	
Channidae	Parachanna	<i>Parachanna obscura</i> (Günther, 1861)					×		×		
		<i>Parachanna africana</i> (Steindachner, 1879)							×	×	
Cichlidae	Sarotherodon	<i>Sarotherodon melanothron</i> (Rüppel, 1852)					×	×	×	×	
	Oreochromis	<i>Oreochromis niloticus</i> (Linnaeus, 1758)	×				×	×		×	
	Tilapia	<i>Tilapia mariae</i> (Boulenger, 1899)	×		×			×	×	×	×
		<i>Tilapia zillii</i> (Gervais, 1848)			×	×	×	×	×	×	
	Coptodon	<i>Coptodon guineensis</i> (Bleeker, in Günther, 1862)						×	1		
	Hemichromis	<i>Hemichromis bimaculatus</i> (Gill, 1862)		×	×			×	×	×	
		<i>Hemichromis fasciatus</i> (Peters, 1852)	×	×	×	×	×	×			
Mugilidae	Liza	<i>Liza falcipinnis</i> (Valenciennes, 1836)								×	
Gobiidae	Porogobius	<i>Porogobius schlegelii</i> (Günther, 1861)		×							
Eleotridae	Dormitator	<i>Dormitator lebretonis</i>				×	×	×	×	×	
	Eleotris	<i>Eleotris vittata</i> (Dumeril, 1858)	×	×	×	×	×	×	×	×	×
Anabantidae	Ctenopoma	<i>Ctenopoma kingsleyae</i> (Günther, 1896)	×								×
		<i>Ctenopoma petherici</i> (Boulenger, 1907)	×				×	×	×		×

Tableau 3:-Growth coefficient b of the abundant species of the Sô River

Coefficient	<i>C. guineensis</i>	<i>S. melanothron</i>	<i>E. vittata</i>	<i>B. niger</i>
b	3,04	2,91	2,82	2,48
a	0,016	0,023	0,017	0,034
R²	0,95	0,96	0,92	0,98

Tableau 4:-Condition factor K of some species

Coef K	<i>C. guineensis</i>	<i>S. melanothron</i>	<i>E. vittata</i>
Moy.	1,74	1,93	1,22
Min.	0,68	0,42	0,90
Max	3,23	2,80	4,17
Écart type	0,35	0,27	0,38

Tableau 5:-Distribution of dominant species by sex in catches

Species	F	M	Total
<i>E. vittata</i>	10	54	64
<i>C. guineensis</i>	35	64	99
<i>S. melanothron</i>	43	28	71
<i>B. niger</i>	13	6	19

Tableau 6:-Distribution by size class according to the sexual maturity stages of some individuals of *Sarotherodon melanothron*

Classe /Stages	ND	1	2	3	4	5	Total
] 3 ; 5]	0	6	6	12	6	6	36
] 5 ; 10]	0	0	0	12	6	6	24
] 10 ; 15]	0	0	0	0	0	6	6
] 15 ; 20]	6	0	0	0	0	0	6
] 20 ; 25]	6	24	0	0	0	0	30
Total	12	30	6	24	12	18	102

Tableau 7:-Distribution by size class according to the sexual maturity stages of some individuals of *Tilapia guineensis*

Classes/Stades	ND	1	2	3	4	5	Total général
] 3 ; 5]	0	4	16	9	18	5	52
] 5 ; 10]	0	1	0	1	8	3	13
] 10 ; 15]	5	0	0	0	0	0	5
] 15 ; 20]	0	0	28	0	0	0	28
Total général	5	5	44	10	26	8	98

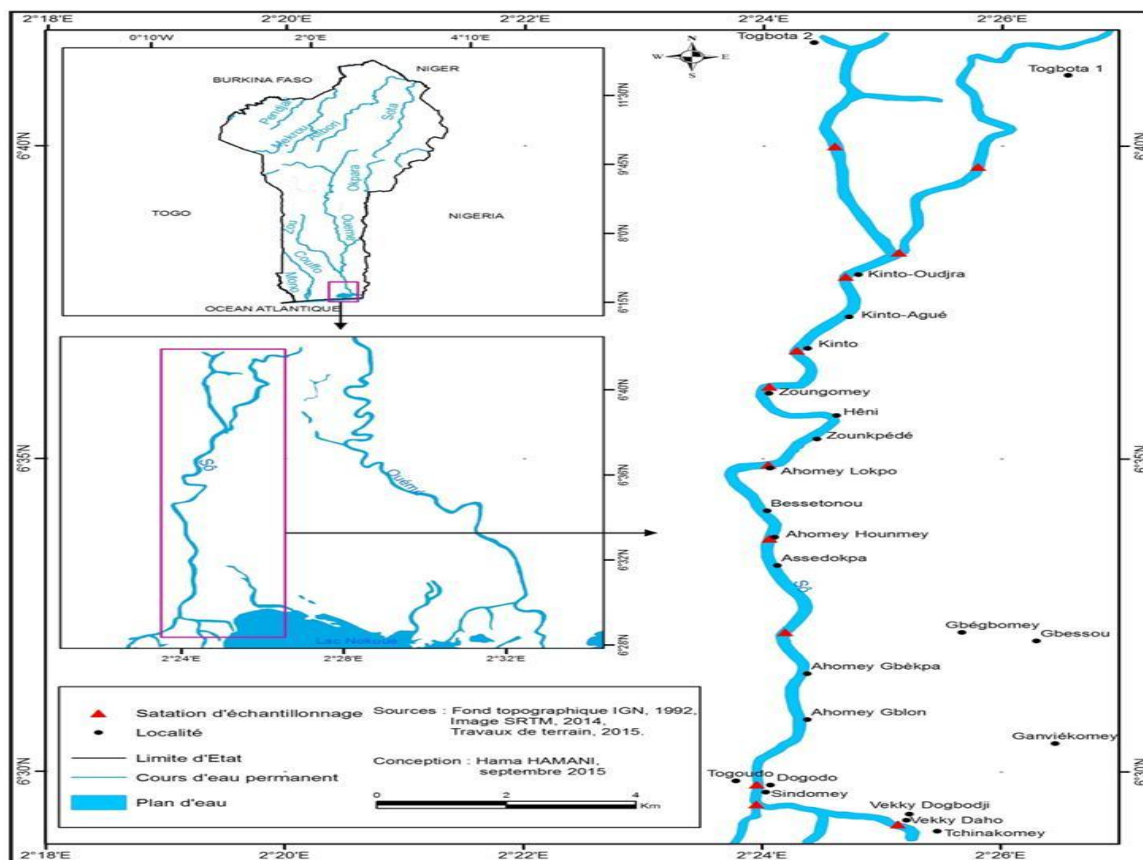


Figure 1:-Localization of sampling stations (Hamani, 2015)

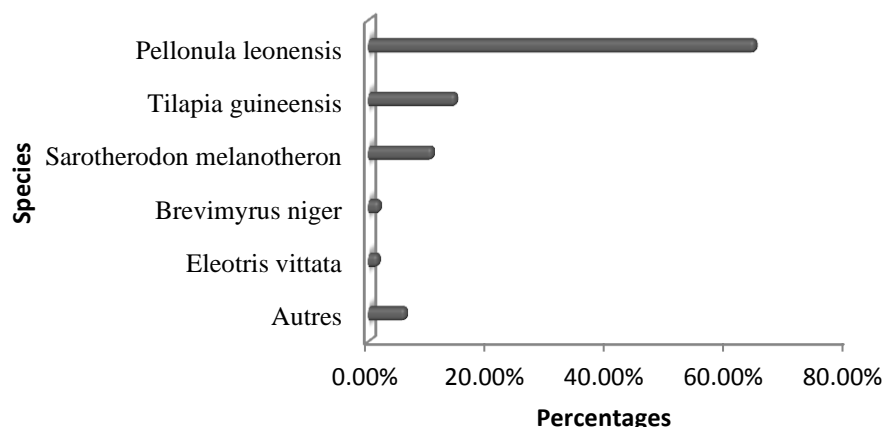


Figure 2:-Numerical abundance of species found in catches

References:-

1. Achoh M.E., Agadjihouede H., Gangbe L., Dougnon V. T., Hounmanou Y.M.G, Baba-Moussa L. 2018. Diversité et abondance des poissons tilapias exploités au Bénin et le virus TiLV (Tilapia Lake virus) : revue de synthèse et prospection des risques d'explosion de l'épidémie. *Afrique SCIENCE* 14(2) (90 – 99
2. Agblonon Houelome M.T., Adandedjan D., Chikou A., Imorou Toko I., Youssao I., Laleye P. 2017. Caractérisation de la qualité physico-chimique des eaux de la rivière Alibori dans le bassin cotonnier du Bénin. *Afrique SCIENCE* 13(4) : 35 – 49
3. Agblonon Houelome T.M., Adandedjan D, Chikou A., Imorou Toko I., Bonou C., Youssao I., Laleye P. 2016. Evaluation de la qualité des eaux des ruisseaux du cours moyen de la rivière Alibori par l'étude des macroinvertébrés benthiques dans le bassin cotonnier du Bénin (Afrique de l'Ouest). *International Journal of Biological and Chemical Sciences*. 10(6): 2461-2476.
4. Aholoukpe C. 2017. Paramètres biologiques des principales espèces de poisson dans les complexes lagunaires du sud-Bénin et constitution d'une banque de géniteurs de *Mugil cephalus* (Mugilidae). Mémoire de Master en Aquaculture et Aménagement des Pêches. Faculté des Sciences Agronomiques, Université d'Abomey-Calavi. 111p
5. Aïnan B. H. 2014 : Analyse économique de la gestion durable des ressources halieutiques des eaux continentales du Bénin. *Revue d'Economie Théorique et Appliquée* ISSN : 1840-7277
6. Amoussou T.O., Toguyeni A., Imorou Toko I., Chikou A., Bravo M., and Youssao Abdou Karim Y. 2017. Evaluation of zootechnical and reproductive parameters of wild populations of *Sarotherodon melanotheron* Rüppell, 1852 of Southern Benin raised in captivity. *International Journal of Fisheries and Aquaculture*, 9(1), 1-13.
7. Bob-Manuel G., F. 2013. Food and Feeding Habits of *Tilapia guineensis* (1862) in Rumuolumeni Creek, Niger Delta: Implications for Pisciculture. *Journal Life Science*, 5(1): 41-45
8. Dimon F., Dovonou F., Adjahossou N., Chouti W., Mama D., Alassane A., Boukari M. 2014. Caractérisation physico-chimique du lac Ahémé (Sud Bénin) et mise en relief de la pollution des sédiments par le plomb, le zinc et l'arsenic. *Journal de la Société Ouest-Africaine de Chimie* (2014) 037 ; 36 - 42
9. Djidohokpin G., Sossoukpe E., Adite A., Houndotossi E.S., Honfo M., Fiogbe E.D. 2017. Guildes trophiques relatives de l'ichtyofaune de la rivière Tovè au Sud-Bénin. *Afrique Science*. (13)1-75-90.
10. Guillou O. 2013 : Etude de l'écologie des pêches de la Réserve Naturelle Communautaire de la Vallée du Sitatunga. 99p
11. Hazoume U.R., Chikou A., Koudenoukpo C., Houndonougbo P., Adite A., Bonou C.A., Mensah A. 2017. Length-weight relationships of 30 species of fish of the river Sô in Benin (West Africa) *International Journal of Fisheries and Aquatic Studies* 5(3): 514-519
12. Houndonougbo P., Chikou A., Fagnon S., Fiogbé D. 2013. Etude de reproduction des populations de *Sarotherodon melanotheron* (Rüppell 1852) dans les eaux douces et saumâtres au sud Benin". *Les cahiers du CBRST*, 22 p.
13. Kapute F., Valeta J., Likongwe J., Kangombe J., Nagoli J., Mbamba D. 2016. Grow the performance of three tilapia fish species raised at varied pond sizes and water depths. *Int. J. Fish. Aquac.* 8(8):81-86.
14. Keremah R. I., Ndah A. P., 2013. Aspects of the Reproductive Biology of *Tilapia Guineensis* (Bleeker, 1862) Under Laboratory Conditions. *Greener Journal of Biological Sciences*. Vol. 3 (3), pp. 123-126.

15. Kidé N.G., Dia M., Yarba L., Koné Y., Khalil F., Salhi G. 2015. Ecologie trophique de *Sarotherodon melanotheron heudelotii* et de *Tilapia guineensis* (Perciformes : Cichlidae) du parc national du Banc d'Arguin, Mauritanie. *Rev. Ivoir. Sci. Technol.* 25:188-203.
16. Kiossa, C. C. 2012 : Biodiversité et exploitation de quelques espèces de poissons de la rivière Sô au Bénin. Mémoire pour l'obtention du diplôme de master recherche en analyse des populations des espaces fauniques et halieutiques. Université polytechnique de BOBO-DIOULASSO, IDR. 113p.
17. Koffi B. K., Berté S., Koné T. 2014. Length-weight Relationships of 30 Fish Species in Aby Lagoon, Southeastern Côte d'Ivoire. *Current Research Journal of Biological Sciences* 6(4): 173-178.
18. Konan K.F., Bony K.Y., Edia O.E., Aliko N.G., Ouattara A., Gourene G. 2015. Predicting factors that influence fish guild composition in four coastal rivers (southeast Ivory Coast) using artificial neural networks. *Croatian Journal of Fisheries*, 73:48-57.
19. Kouakou I.K., Kone T., Agnissan J.P., Soro Y., N'da K. 2016. Regime et ethologie alimentaires de *Heterotis niloticus* (Cuvier, 1829) dans la riviere Agneby. *International Journal of Innovation and Applied Studies*. 14(3):721-732
20. Koudénoukpo Z.C., Chikou A., Adandédjan D., Hazoume R., Youssao A.K.I., Mensah G.A. Laleye A. Philippe. 2017. Caractérisation physico-chimique d'un système lotique en région tropicale : la rivière Sô au Sud-Bénin, *Afrique de l'Ouest. Journal of Applied Biosciences*. 113:11111-11122.
21. Legendre M., Ecoutin J. M. 1989. Aspects de la stratégie de reproduction de *Sarotherodon melanotheron* : comparaison entre une population naturelle (lagune Ebrié, Côte d'Ivoire) et différentes populations d'élevage. P. 360-374. In R. S. V. Pullin, J. Lazard, M. Legendre, J.B
22. Lederoun D., Vandewalle P., Brahim A.A., Moreau J., Lalèye P.A. 2016. Population parameters and exploitation rate of *Sarotherodon galilaeus galilaeus* (Cichlidae) in Lakes Doukon and Togbadji, Benin. 41(2):151-180
23. Levêque, C., Paugy D. et Teugels, G. G. 1990-1992. Faune des poissons d'eaux douces et saumâtres de l'Afrique de l'Ouest. Edition, ORSTOM, Paris (France). 902.
- Makhouk M., Sbaa M., Berrahou A., Van Clooster M. 2011 : Contribution à l'étude physico-chimique des eaux superficielles de l'oued Moulouya (Maroc oriental). *Larhyss Journal*, ISSN 1112-3680, n° 09, pp. 149-169.
24. Montchowui E., Chikou A., Kogbeto M-J., Lalèye P. 2008. Biodiversité et structure des communautés de poissons du lac Hlan au Bénin. *International Journal of biological and chemical science* 2 (2) :196-206
25. Niyonkuru C., Lalèye A. P., Villanueva M. C. S. and Moreau J., 2007. Population parameters of main fish species of Lake Nokoué, Benin, West Africa. *Journal of Afrotropical Zoology*, Proceedings of the Third International Conference on Africa Fish and Fisheries, Cotonou, Benin, 10–14 November 2003, Special issue, 149–155.
26. Niyonkuru C., Lalèye, P. A., Moreau J. 2010. Impact of acadja fisheries on the population dynamics of *Sarotherodon melanotheron* and *Hemichromis fasciatus* in a Lake Nokoué (Benin, West Africa). *Knowledge and Management of Aquatic Ecosystems*. 397, 01.
27. Noumon C.J., Mama D., Dedjiho C.A., Agbossou E., Ibouraima S. 2015. Évaluation de la qualité physico-chimique et du risque d'eutrophisation de la retenue d'eau de Kogbétouhoué (Sud-Bénin). *Journal of Applied Biosciences*, **85**: 7848– 7861
28. Odountan H., Abou Y. 2015. Can Macroinvertebrate Assemblage Changes Be Used as Biological Indicator of Water Quality of the Nokoué Lake (Benin)? *Journal of Environmental Protection*, 6: 1402-1416
29. Paugy, D., Lévêque, C. et Teugels, G. G. 2003 : Faune des poissons d'eaux douces et saumâtres de l'Afrique de l'Ouest. Ed. IRD, Paris (France).
30. Plisnier P. D. 1990. Ecologie comparée et exploitation rationnelle de deux populations d'*Hpochromis* spp. (Teleostei, Cichlidae) des lacs Ihema et Muhazi (Rwanda). Thèse de doctorat en Science Agronomique. Université Catholique de Louvain. 324 p.
31. Sanogo Y., Traoré D., Samaké F., Koné A. 2012. Les communautés ichthyologiques de la rivière Baoulé dans le bassin du fleuve Niger au Mali. *Tropicultura*. 30 (2), 65-71.
32. Sossou-Agbo L. A. 2014. La mobilité dans le complexe fluvio-lagunaire de la basse vallée de l'Ouémé au Bénin, en Afrique de l'Ouest. Thèse doctorale sciences de l'homme, du politique et du territoire. 357p
33. Tidiani Koné, Reproduction of an estuarine tilapia (*Sarotherodon melanotheron* Rüppell, 1852) landlocked in a man-made Lake. Article in *Aquatic Living Ressources* 12(4): 289-293, August 1999
34. Zinsou H. L., Attingli A. H., Gnohossou P., Adandedjan D., Laleye P. 2016. Caractéristiques physico-chimiques et pollution de l'eau du delta de l'Ouémé au Bénin", *Journal of Applied Biosciences*, 97 :9163 – 9173