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A SURVEY OF ENDO-PARASITE AND BLOOD PARASITE OF SYNODONTIS SCHALL (BLOCH & SCHNEIDER, 1801) FROM OTUOGORI RIVER IN OGBIA, BAYELSA STATE, NIGERIA

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ABSTRACT

Fishes are a source of protein to human and also provide a means of occupation for the people. Fish parasites are of public health importance, reducing fish population and thereby, resulting in loss of protein source and jobs. This study aimed to reveal the presence of various endo-parasites and blood parasites in fish samples collected from Otuogori River using standard techniques. A total of 40 live fish, purchased weekly from a fisherwoman during early morning hours, from December 2022 to January 2023, contingent on availability, were transported immediately to the laboratory for parasitological examination with the sex noted and the standard length measured. Aliquot from teased internal organs and blood sample collected from caudal circulation of each fish were respectively smeared on clean slides and viewed under the microscope. The parasites detected were identified using an identification key. The study revealed that out of 40 *Synodontis schall* examined, 4 were infected with an overall prevalence of 10%. Females 3(14.29%) were more infected than males 1(5.26%) ($p>0.05$). Parasites recorded include *Trypanosoma spp, Camallanus spp* and *Anisakid spp;* with *Trypanosoma spp*. (50%) being the most prevalent. The study result also showed that those with body length range of 9.2cm-14.2cm were infected the most (25%) ($p>0.05$). Fish samples weighing 55g-105g and those with body length range of 9.2cm-14.2cm had the highest mean intensity. Weight did not significantly affect the prevalence of infestation of the fishes ($p>0.05$). Fish samples collected from Otuogori River should be properly cooked before eaten to avoid zoonotic infections.

Keywords: Bayelsa, Fish parasites, River, Survey, *Synodontis*

INTRODUCTION

Fish is important to human population in trade and economy. Fish is an important protein source (Grzegorz and Jerzy, 2018) and is consumed by a lot of people in the world and Nigeria particularly (Onyishi and Aguzie, 2018). The fisheries sector contributes immensely to the nutritional security and food to about 200 million Africans and it also generates income for over 10 million others engaged in fish production, processing and trade (Béné *et al.*, 2016; Chan *et al.*, 2019).

High productivity in fish is hindered by parasitic infections and diseases. Most fishes in the wild are likely to be infested with parasites such as *monogeneans, digeneans, cestodes, nematodes, acanthocephalans, trypanosome* and *aspidogastrean* (Ziarati *et al.*, 2022). However, fish parasites have numerous impacts on fish given their negative impact on profitability and may also cause zoonotic diseases in many areas of the world (Ali and Reza, 2018). Fish parasites result in loss of economic returns and loss of fish as protein sources (Belhabib *et al.*, 2015). Parasites on fish can lead to nutrient devaluation (Khanum *et al.*, 2022), mechanical damage depending on the parasite species and load (Afolabi and Abass, 2022). Parasites cause secondary infection of other pathogens like viruses, fungi and bacteria which are the most dangerous group that probably cause more diseases in fish than other type of animal parasites (Amos *et al*., 2018; Uruku and Adikwu, 2017).

In addition, parasites of fish have a detrimental effect on fish mortality rates, health, and productivity; parasites can infect people and other animals that consume infected fish. Numerous works had been done on helminth parasites of bony fishes in tropical waters (Effang and Eyo, 2018), but no work has been done on the endo-parasites of this species of fish used, *Synodontis schall,* in the study area. This work provides useful information on the parasites found in the blood and tissues of this species of fish that are naturally abundant in Bayelsa Rivers and are commonly consumed by the people.

MATERIALS AND METHODS

Study Area

The area of study is the Otuogori River in Ogbia Local Government Area of Bayelsa State, Nigeria. Its coordinate is between 4º47′N 6º20′E and 4º783′N 6º33′E in Bayelsa state, Nigeria. The river has a surface area of about 247km2 with a maximum depth of 6.4m. A greater part of the river is shallow and less than 3.0m deep. Other activities like bathing, washing of both dishes and clothes, defecating are carried out in the site of study. The dwellers of Otuogori community are mostly fishermen and fisherwomen who supply the fish to inhabitants of the community, traders and farmers (Smith, 2010).

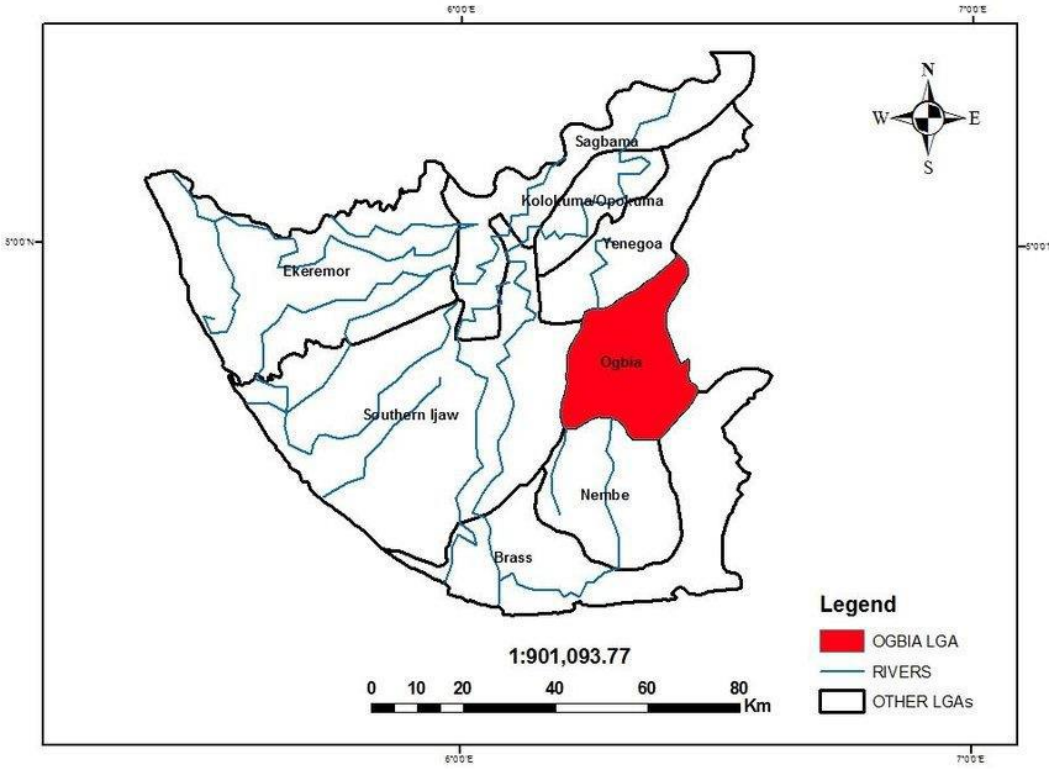

Figure 1: Map of Bayelsa State, showing Ogbia Local Government Area

Sample Collection

Forty live fish from Otuogori River were procured from one of the fisherwomen who supplies fish to the inhabitants of the Otuogori community early in the morning at the waterside. From December 2022 to January 2023, different numbers of fish samples were obtained every week, contingent on availability, until a total of 40 fish were completed. The fish were transported immediately to the laboratory in a transparent bucket with oxygenated water for parasitological examination that same day. *S. schall* was identified using identification key by Fischer *et al.* (1981).

Sexing and Measurement of Experimental Fish

Records of the total and standard lengths (cm) were taken using thread and tape measure for each fish and the weight was measured using an electronic weighing balance. Fish were examined externally noting the urogenital papillae. Detecting the testes in male and ovaries in the female confirmed the sex of the fish. All sampling procedures followed the standard techniques described by Marcogliese (2002).

Blood Samples Collection and Examination

Placing the fish on a dissecting board, the needle was fixed in calibration on the syringe and blood was collected from the caudal circulation with 2ml needle as described by Kori-Siapere and Ake (2005). A 0.5ml of blood was collected from the fish and kept in an EDTA bottles. A smear was made with a drop of the blood applied at the center of a grease-free glass slide, allowed to air dry and fixed by adding 2-3 drops of methanol for 10 minutes. This was stained with Giemsa stain and air-dried again and viewed under X10 and X40 objective lenses respectively.

Examination of the Fish Samples for Endo-Parasites

Each sample was dissected and the internal organs, such as the stomach and intestines, removed and placed in separate petri dishes. These were chopped into smaller pieces, adding a10ml of formal saline. The samples were filtered with gauze into another petri dish. The Pasteur pipette was used to pick a drop of the aliquot from the teased body parts and dropped on a grease-free slide and smeared. Two drops of iodine was placed on the smear made on the glass slide, covered with cover slips and viewed using ×10 and ×40 objective lenses. The parasites observed were identified using the identification key by Pouder *et al.* (2005) and Kawe *et al.* (2016).

Statistical Analysis

The results obtained from the study were analyzed statistically using Statistical Package for Social Sciences (SPSS) software. The mean weight and length of the fish were calculated and the significance of the result as related to sex, length and weight of the fish were determined using the Chi square at 0.05 level.

RESULTS

This study was to assess the prevalence of endo-parasites and blood parasites in *Synodontis schall* samples collected from Otuogori River. A total of 40 *Synodontis schall* fish samples, comprising 19 males and 21 females, were examined and it was discovered that 4 fishes were infected with an overall prevalence of 10%. Although the female fishes (14.29%) had a higher prevalence of infection than the males (5.26%), the difference was not statistically significant (df=1, $\chi 2 = 0.90$, p=0.342) as shown in Table 1. Intensity-wise, males (0.13) had a lower intensity than the females (0.36), and the mean intensity of the infected samples was 0.25 (Table 1). Parasites recovered include *Tyrpanosoma spp*., *Camallanus spp*., and *Anisakid spp*. (Table 2).

Table 1: Overall prevalence of infection based on sex

Sex	No. Examined	No. Infected (%)	Mean Intensity	χ^2	p-value
Males	19	1(5.26)	0.13		
Females	21	3(14.29)	0.36		
Total	40	4(10)	0.25	0.902	0.342

Table 2: Occurrence of endo-parasites and blood parasites of *Synodontis schall* examined

Parasite type	No. of occurrence	Location
Trypanosoma spp.	2	Blood
Camallanus spp.	1	intestine
Anisakid spp.	1	Intestine

Prevalence of infection based on the body length of the fishes showed that biggest fishes with the length range of 19.2cm - 24.3cm had zero infection, followed by 14.3cm-19.2cm (11.11%) while the fish with the highest number of infection (25%) were the ones with body length range of 9.2cm-14.2cm. Although there was difference in prevalence, again, it was not statistically significant (df=2, $\chi^2 = 2.04$, p=0.361) (Table 3). Mean intensity revealed that those whose body length ranged from 9.2cm-14.2cm had the highest intensity (0.63) (Table 3).

Table 3: Prevalence of parasites based on the standard length of *Synodontis schall* examined

Standard length (cm)	No. Examined	No. Infected (%)	Mean Intensity	χ^2	p-value
9.2-14.2	4	1(25%)	0.63		
14.3-19.2	27	3(11.11)	0.28		
19.2-24.3	9	0(0)	0.0		
Total	40	4(10)	0.25	2.037	0.361

Weight did not significantly affect the prevalence of infection among the fishes (p>0.05), although those that weighed 55-105g (17.65%) had the highest prevalence, followed by 106-155g (7.14%) while 156g-205g recorded zero prevalence (Table 4). The table also showed that fishes that weighed 55g-105g had the highest mean intensity of infection while 106g-155g had the least intensity (0.18).

Table 4: Prevalence of parasites based on the weight of *Synodontis schall* examined.

Weight (g)	No. Examined	No. Infected (%)	Mean Intensity	χ^2	p-value
55-105	17	3(17.65)	0.44		
106-155	14	1(7.14)	0.18		
156-205	9	0(0)	0.0	2.232	0.328

DISCUSSION

The prevalence of endo-parasite and blood parasite of *S. schall* in the studied area revealed an overall prevalence of 10%. This prevalence is not far from 11.33% and 11.25% overall prevalence recorded by Effanga and Eyo (2018) and Okita *et al.* (2020) respectively, but much lower than 42%, 46 %, 78% and 85.59% prevalence reported by Bamidele (2015), Omeji *et al*. (2015), Awatef (2019) and Florence and Clement (2016) respectively. Prevalence of parasitic infection in a fish varies broadly from one fish to another and from one habitat to another. Varied prevalence of parasites infestation in the fish examined could be as a result of the peculiarities of water body where they were obtained. Ezenwaka and Nweke (2021) opined that wide spatial range the fish covers may limit effective infection of the host by the infective stages of the parasites.

Parasites recorded in this study include *Tyrpanosoma spp*., *Camallanus spp*. and *Anisakid spp*., with *Trypanosoma spp*. recording highest occurrence. These parasites had occurred at varied percentages, alongside other parasites, in various studies (Iboh and Ajang, 2016; Okoye *et al*., 2016; Uneke and Jonah, 2017; Absalom *et al.*, 2018; Enyidi and Uwanna, 2019; Idowu *et al.*, 2023). The protozoans and helminths are main group of parasites of fish in Nigeria. The occurrence rate and intensity of infestation on fresh water fish species by helminth parasites are often influenced by factors like parasite specie, their biology, host physiology and feeding habit. Other factors like presence of intermediate hosts, physical factors and hygiene condition of the water body are also necessary (Kawe *et al*., 2016).

In relation to the size (weight and length), it was observed in this study that the percentage infection decreased with increased standard length and weight, but was not dependent on size which reflects the age of the fish. Uneke and Jonah (2017) also noted decrease in infection rate in fish with increase in length and weight. Omeji *et al.* (2015) made similar observation of a decrease in length and weight in parasitized fishes. This present study agrees with findings of various authors who reported higher parasite load in smaller fish than the bigger ones (Kawe *et al.*, 2016; Okita *et al*., 2020 and Sadauki *et al.*, 2022). This appears to be a common trend, especially in *Synodontis* fish, as fishes only in the lower weight and length classes were parasitized in a study by Iyaji and Yaro (2016). This study result also conforms to Amaechi (2015) and Okoye *et al*. (2016) who recorded no relationship between parasite burden and fish size (length and weight), but disagrees with Uneke *et al*. (2015) who reported that parasite burden is dependent on age of fish. The range of length of fish with highest prevalence in this study agrees with 10cm - 14.9 cm size class recorded by Effanga and Eyo (2018). Ezenwaka and Nweke (2021) opined that fish species builds immunity as age increases and so, are not suitable host to an array of parasites. It could be that small fishes feed on smaller quantity of foods, hence, gained less immunity compared to the large fishes (Sadauki *et al.*, 2022).

It was also observed that the parasitic load was more in the females 3(14.3%) than in the males 1(5.3%). This agrees with

the observations of Uneke *et al*. (2015), Amos *et al.* (2018), Okita *et al.* (2022) and Ezenwaka and Nweke (2021) who noted female fishes to be more infected than male fishes, but differs from Idowu *et al.* (2023) who recorded more male fishes being infected than the females. However, variation in parasites infection between the sexes of fish studied was not significant, implying that infection rates in either the male or female were simply by chance. A similar observation was made by Iboh and Ajang (2016) and Hailu and Mitiku (2021) who reported that there was no significant difference ($p > 0.05$) in the infection rate of male and female fish. On the contrary, Uneke *et al.* (2015) in their study of *Chrysichthys nigrodigitatus* recorded high parasite burden which was dependent on sex of fish. Significant occurrence of infections between the sexes of fish was also reported by Agatha *et al.* (2021). This, possibly, may be due to differences in feed quantity or quality or varying levels of resistance to infection. Iyaji and Yaro (2016) opined that parasitic infection in female fish is due to the physiological state of the female, as most females could have reduced resistance to infection by parasites.

CONCLUSION

The study found a 10% overall prevalence of parasitic infestation in fish from Otuogori River in Bayelsa State, with higher prevalence in females and smaller fish. Weight did not significantly affect infections' prevalence in fishes. The presence of parasitic infestation, despite its low prevalence in the study area, can impact fish growth, productivity, economic importance, and even market value. There is need for an extensive work to cover other fish species in the area.

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