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Intestinal Helminth Parasites of Fishes of Orashi River, Ebocha Axis, Rivers State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study was carried out to investigate the parasites of some freshwater fishes in Orashi River at Ebocha Axis, Ogba/Egbema/Ndoni Local Government Area (ONELGA), Rivers State, Nigeria. One hundred and seventy-nine (179) fish specimens were examined, comprised of 14 different species. Fish species were caught by fishers using cast nets from the water body. The fish species were the catfish (*Auris heudelotti*, n = 25) and *Clarias anguillaris* (n=20), *Caranx hippos* (n=20), *Sardinella maderensis* (n=20), *Oreochromis niloticus* (n=5), *Sarotherodon galileus* (n=5), *Tilapia dagetti* (n=5), *Mormyrus* sp. (n=4), *Labeo* sp. (n=43), *Phago loricatus* (n= 5), *Lutjanus goreensis* (n = 6), *Ethmalosa fimbriata* (n = 5) and unspecified species (n=16). The parasites encountered were three nematodes (*Cithariniella citharini, Amplicaecum* sp. and *Eustrongylides* sp. larva), a cestode (*Diphyllobothrium* sp.) and a trematode (*Diplodiscus* sp.). Prevalence of infection ranged from 5-10% while the mean intensity of infection was between 1.0-1.5 parasites per infected host. Parasites were encountered only in the catfish, *Clarias anguillaris.* In conclusion, low parasite diversity and prevalence were observed in the study population.

Keywords: Helminths; freshwater fish; Clarias anguillaris; Orashi River; Ebocha axis; Nigeria.

1. INTRODUCTION

Freshwater systems provide ambient habitats for a number of fish species and their parasites [1]. Studies on freshwater fish of River Niger, Nigeria, revealed the presence of about sixteen fish species at the Illushi axis, Edo State - Nigeria, including *Synodontis eupterus, S.*

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clarias, Chrysichthys nigrodigitatus, Bagrus bayad, Labeo spp., *Mormyrus* sp., *Tilapia galilaeus* and *T. zilli*, etc. Helminth parasites ranging from acanthocephalans (e.g., *Pomporhynchus* and *Neoechinorhynchus* spp.), nematodes (such as, *Procamellanus* and *Camellanus* spp.), trematodes (*Paramphistomum* and *Clinostomum*) and cestodes (*Diphyllobtothrium* and *Proteocephalus* spp.) were isolated from infected specimens [2].

From another freshwater system, River Orogodo in Delta State, Nigeria, Nmor et al. [3] reported on the helminth parasites of five predominant cichlid species (*Hemichromis fasciatus, Chromidotilapia guentheri, Tilapia mariae, Tilapia zilli* and *Tilapia aurea*) stating that acanthocephalans (*Acanthogyrus* sp., *Octospiniferoides* sp.), nematodes (*Camallanus* sp., *Cucullanus* sp.) and cestodes (*Wenyonia* sp.) were isolated from infected specimens. Few related research has been conducted on the Orashi River in Rivers State, Southern Nigeria. For instance, an earlier research [4] had reported the occurrence of cestodes, *Nesolecithus africanus*, from the freshwater prawn *Desmocaris trispinosa*. In In 2013, Jamabo et al. [5] reported on the food and feeding habit of the African snakehead (*Parachanna obscura*) in same river. However, research on the helminth-endo parasites of fish from the river is scarse.

This research was therefore conducted to provide information on the gastro-intestinal helminth parasites of freshwater fish species inhabiting the the Ebocha axis of the Orashi River, Nigeria. This would bridge the information gap and serve as reference material for future related research.

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted in the Ebocha axis of Orashi River in Ogba/Egbema/Ndoni Local Government Area of Rivers State, Nigeria. It is located between Longitude 05^{o}27.7632' N and Latitude 006^{o}42.1769' E (Fig. 1). The climatic condition of the area is characterized by two distinct seasons, the wet and dry seasons. The dry season extends from November to April, whereas the wet season lasts from May to October, with the highest rainfall peak during July [6]. The main occupations of the inhabitants are artisanal fishing, subsistence farming and petty trading.

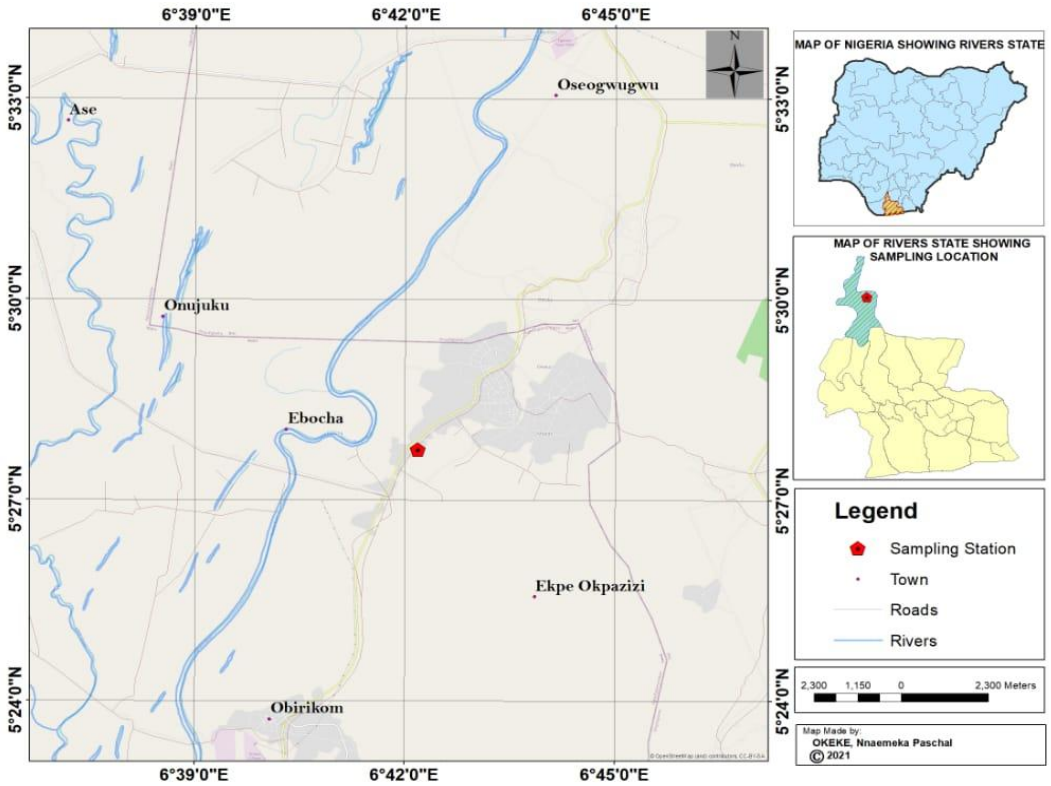

Fig. 1. Map of Study Area

2.2 Collection of Fish Specimens

The fish specimens were bought from the Ebocha waterfront very early in the morning when they were freshly caught by fishers. The fish were transported in an ice chest to the Parasitology Laboratory, Department of Animal and Environmental Biology, Rivers State University, for identification, processing, and examination for parasitic infection. Specimen collection was conducted between November, 2020 and January, 2021.

2.3 Identification and Parasitic Examination of Fish Samples

Fish samples were identified using taxonomic keys [7]. The gills were carefully removed and kept in universal bottles containing 0.9% normal saline solution. This was shaken vigorously and poured into a Petri dish. The solution was viewed under a compound microscope at x4 and x10 objective lenses.

For examination of the intestinal parasites, an incision was made through the anal opening to expose the intestinal organs which were excised and examined in Petri dishes half-filled with 0.9% normal saline solution. Parasites were removed using pipettes and fixed appropriately.

Nematode parasites were first stretched in hot water and fixed in 70% ethanol. They were afterward cleared in lactophenol before being viewed under the microscope. Trematodes and cestodes were flattened in between two microscope glass slides in 5% formol saline, examined under the microscope and afterwards, fixed in same solution.

Parasite species were identified according to Paperna [8] and Moravec [9]. Prevalence and mean intensity of infection were calculated for the parasites according to the formula of Bush et al. [10].

3. RESULTS

3.1 Fish Species Examined

One hundred and seventy-nine (179) fish specimens were examined in the course of this research including, *Auris heudelotti* (25), *Clarias anguillaris* (20), *Caranx hippos* (20), *Sardinella maderensis* (20), *Oreochromis niloticus* (5), *Sarotherodon galileus* (5), *Tilapia dagetti* (5), *Mormyrus* sp. (4), *Labeo* sp. (43), *Phago loricatus* (5), *Lutjanus goreensis* (6), *Ethmalosa fimbriata* (5) and unspecified species (16). By families, nine fish families were examined. They were Carangidae, Cichlidae, Mormyridae, Clariidae, Carangidae, Cyprinidae, Lutjanidae, Distichodontidae and Clupeidae.

3.2 Parasites Isolated

The parasites isolated comprised of three nematodes (*Chitharinie*l*la citharini, Amplicaecum* sp*.* and *Eustrongylides* sp. larva), a cestode (*Diphyllobothrium* sp.) and a trematode (*Diplodiscus* sp.) (Plate 1).

All the parasites were isolated from the catfish, *Clarias anguillaris*; other hosts were uninfected. Prevalence of infection was very low as only very few fish belonging to one species were infected (Table 1).

4. DISCUSSION

Results from this research showed that only *Clarias anguillaris* was infected with helminth endo-parasites, and that in low prevalence, though over twelve fish species were examined. This is in contrast to the reports of some other researchers on helminth parasites of freshwater fish from locations in Nigeria. For instance, Okaka and Akhigbe [11] reported more helminth parasites from a larger number of infected fish species in their study on the Osse River, a freshwater system in Benin, Nigeria. Similarly, Onyedineke *et al*. [2] examined sixteen species from River Niger at Illushi, Edo State, Nigeria and reported that fourteen were variously infected with helminth parasites, including acanthocephalans, cestodes, trematodes and nematodes. The two uninfected species reported in their research were *Bagrus bayad* and *Labeo senegalensis*. Although Yakubu et al. [12] examined only two fish species, *Tilapia zilli* and *Clarias gariepinus*, from Uke River in Plateau State, Nigeria, they reported higher prevalence of infection (61.8% for *T. zilli* and 55% for *C. gariepinus*) and eight parasite species. In a recent research, Onoja-Abutu et al. [13] reported 77.0% prevalence of infection in fishes from Lokoja, Nigeria. These differences could be due to differences in the physico-chemical properties of the water systems and diversity and abundance of zooplankton some of which function as intermediate hosts of some fish parasites [14,15,1].

Table 1. Prevalence and mean intensity of parasite infection in Fishes of Orashi River, Ebocha, Rivers State, Nigeria

Parasite	Host	Total number of hosts	Number of hosts infected	Number of parasites recovered	Prevalence (%)	MI
Trematode						
Diplodiscus sp.	*Clarias anguillaris*	20	1	1	5	1
Cestode						
Diphyllobothrium sp.	*Clarias anguillaris*	20	1	1	5	1
Nematodes						
Cithariniella citharini	*Clarias anguillaris*	20	2	3	10	1.5
Amplicaecum sp.	*Clarias anguillaris*	20	1	1	5	1
Eustrongylides sp. (larva)	*Clarias anguillaris*	20	1	1	5	1

Plate 1. Anterior (A) and posterior (B) sections of *Cithariniella citharini*, isolated from *Clarias anguillaris*, Orashi River, Ebocha, Rivers State, Nigeria (scale:0.5mm)

The trematode (*Diplodiscus* sp.) was isolated at a prevalence of 5.0%. There is paucity of literature reporting the occurrence of this trematode in freshwater fish of Nigeria. However, Ztrk et al. [16] reported *D. subclavatus* in the intestines of the pike (*Esox Lucius*) from Lake Uluabat, Turkey.

Nematodes (*Cithariniella citharini)* were also isolated from infected fish specimens at a prevalence of 10.0%. Although, there has been no report of this parasite from earlier reports on freshwater fish of Nigeria, it has been reported from other African countries such as Senegal [17], South Benin [18] and Egypt [19]. Other species of nematodes encountered in the present research were *Amplicaecum sp*. and *Eustrongylides sp.* at a prevalence of 5.0%, each. More nematode species were encountered than either trematodes or cestodes. This is frequently encountered in similar studies possibly because nematodes usually exhibit direct transmission cycles [2,11,20].

5. CONCLUSION

This research examined 179 specimens of fish which comprised of the following species; *Auris heudelotti*, *Clarias anguillaris, Caranx hippos*, *Sardinella maderensis*, *Oreochromis niloticus*, *Sarotherodon galileus*, *Tilapia dagetti*, *Mormyrus* sp., *Labeo* sp., and some unspecified species. The parasites discovered were trematodes (*Diplodiscus* sp.), tapeworms (*Diphyllobothrium* sp.), and nematodes (*Cithariniella citharini, Amplicaecum* sp., and *Eustrongylides* sp. (larva). Only *Clarias anguillaris* specimens were infected. This research has reported on the helminth endo-parasites of freshwater fish from the Ebocha axis of the Orashi River, Rivers State, Nigeria.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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