Helminth Parasites of some Freshwater Fish from River Niger at Illushi, Edo State, Nigeria

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Abstract: Although there are some reports on parasites of fish at different locations on River Niger, there had been no report for Illushi. Parasitological investigation of 71 fish samples belonging to 14 genera from river Niger at Illushi showed a 60.6% prevalence infection and an infection rate of 59.15%. The gills, stomach and sometimes muscles were infected; no parasites were found infecting the liver and eye lens. Nematodes, acanthocephalans, trematodes and cestodes were recovered in decreasing order of abundance. *Proteocephalus* sp. was found in *Ctenopoma kingsleye* and was the only parasite infecting *Tilapia galilaeus. Diphyllobothrium* sp. was only found in the stomach and gills of *Chrysichthys nigrodigitatus. Paramphistomum* sp. was the only trematode found in the gills of examined fishes. *Bucephalus* sp was only found in *Synodontis eupterus* and *Distichodus engycephalus.* Acanthocephalans were represented by *Pomporhynchus, Quadrigidae* and *Neoechinorhynchus. Neoechinorhynchus* was found only on the intestine of *Lates niloticus*. Parasites were more prevalent in fish of10 – 30cm standard length. There was no specific trend in parasite prevalence in *S. eupterus, S. clarias, C. nigrodigitatus* and *C. kingsleye* as regards the weight classes. The study showed the intestine as the preferred organ for infection, no infection was noticed in the oesophagus. [Journal of American Science 2010;6(3):16-21]. (ISSN: 1545-1003).

Key words: helminth parasites, prevalence, freshwater fish, River Niger.

1. Introduction.

Parasites in fish have been a great concern since they often produce disease condition in fish thereby increasing their susceptibility to other diseases, causing nutritive devaluation of fish and fish loss.

Various studies have been done on parasites of fish from different Nigerian water bodies (Onwuliri and Mgbemena, 1987; Anosike *et al.*, 1992*;* Ezenwaji and Ilozumba, 1992; Aken'ova, 1999; Auta *et al.*, 1999; Okaka, 1999; Emere, 2000; Ibiwoye *et al.*, 2000, 2004; Olurin and Somorin, 2006, Olofintoye, 2006 and Akinsanya *et al.*, 2007) but none on the parasite burden of fish in Niger river at Illushi. Investigations on the helminth fish parasites of fish from River Niger at Shagunu and Kainji reservoir include those of Awachie (1965) and Ukoli (1965) respectively.

This study is designed to ascertain the diversity and extent of parasitic infection in fish from River Niger at Illushi, Edo State, Nigeria.

2. Materials and Methods

Fishes used for the study were bought from same fisherman operating with gill nets and cast nets along the river Nigeria at Illushi, Edo State located within longitude 6^o 30' to 6^o 40'E and latitude 6^o 34 to 6^o 47' N. The fish samples were kept in plastic coolers containing river water and ice blocks before being transported to the laboratory. In the laboratory the fishes were identified to species level using keys provided by Holden and Reed (1972) and Lowe-Mc Connel (1972). Fish standard length (SL – from the snout to the base of the caudal peduncle) were determined with a meter rule while body weight (BW) was determined using a weighing balance.

The gills, muscles, intestine, stomach and oesophagus of the fish were examined for parasites. Parasites recovered from each site were properly washed, fixed in alcohol-formol- acetic acid according to Olurin and Somorin (2006) and site of infection noted. Identification of parasites was carried out according to Yamaguti (1958, 1959, 1961 and 1963).

3. Results

Seventy-one fish samples belonging to 14 genera were subjected to parasitologic investigation. Forty-three fish were infected with hundred and fourteen parasites. The prevalence of parasitic infection was 60.6%.

Parasites recovered were Nematodes, Acanthcephalans, Cestodes and Trematodes in decreasing order of abundance. The incidence of infestation by nematodes and cestodes were 57.96% and 2.54% respectively. The gills, stomach and sometimes muscles were infected; no parasites were found infecting the liver and eye lens.

The only parasites recovered from *Tilapia galilaeus* was a cestode – *Proteocephalus* sp. which was also found in *Ctenopoma kingsleye*. *Diphyllobothrium* sp.

was only found in the stomach and gills of *Chrysichthys nigrodigitatus*.

Nematodes occurred mostly in the stomach and intestines of fish examined but were also found in the gills of *Synodontis eupterus* and *Alestes nurse* (Table 1 & 2).

Table 1. Host Specificity of parasite types

		Fish species															
Taxonomic Group	Parasites	*Synodontis eupterus*	*Synodontis clarias*	*Chrysichthys nigrodigitatus*	*Clarias gariepinus*	*Bagrus bayad*	*Ctenopoma kingsleye*	*Tilapia galilaeus*	*Tilapia zilli*	*Alestes nurse*	*Citharinus citharius*	*Hydrocynus vitatus*	*Mormyrus rume*	*Labeo senegalensis*	*Labeo cubie*	*Distichodus engycephalus*	*Lates niloticus*
Nematoda	*Procamellanus*	+	+	+	+	-	-	+	+	+	+	+	+	-	-	+	-
	Camellanus	+	+	+	+	-	-	+	+	+	-	-	-	-	+	-	-
	Gnathostoma	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Trematoda	*Paramphistomum*	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-
	Clinostomum	+	-	-	-	-	+	-	+	-	+	-	-	-	-	-	-
	Bucephalus	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Acanthocephala	*Pomporhynchus*	+	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-
	Quadrigyidae	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
	Neoechinorhynchus	+	+	-	-	-	+	-	-	-	-	-	-	-	-	-	+
Cestoda	*Diphyllobothrium*	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
	Proteocephalus	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-

Table 2. The occurrence of parasites in fish examined (S=stomach, I=intestine, G=gill)

	Nematoda			**Trematoda**			**Acanthocephala**			**Cestoda**			
Fish species	**S**	**I**	**G**	**S**	**I**	**G**	**S**	**I**	**G**	**S**	**I**	**G**	**Total**
Synodontis eupterus	18	35	3	2	0	0	12	8	0	0	0	0	**78**
Synodontis clarias	17	2	0	0	0	1	0	25	0	0	0	0	**45**
Chrysichthys nigrodigitatus	10	14	0	0	0	0	5	27	0	1	0	1	**58**
Clarias gariepinus	11	0	0	0	0	0	0	0	0	0	0	0	**11**
Ctenopoma kingsleye	13	0	0	2	0	0	0	13	0	0	6	0	**34**
Tilapia galilaeus	2	0	0	0	0	0	0	0	0	0	0	0	**1**
Tilapia zilli	1	3	0	0	0	0	0	0	0	0	0	0	**4**
Alestes nurse	0	5	5	0	0	0	0	0	0	0	0	0	**10**
Citharinus citarius	3	0	0	0	2	0	0	0	0	0	0	0	**5**
Hydrocynus vitatus	5	0	0	0	0	0	0	0	0	0	0	0	**5**
Mormyrus rume	0	3	0	0	0	0	0	0	0	0	0	0	**3**
Labeo cubie	4	6	0	0	0	0	0	8	0	0	0	0	**18**
Distichodus aegycephalus	30	0	0	0	0	0	0	13	0	0	0	0	**43**
Lates niloticus	0	0	0	0	0	0	0	3	0	0	0	0	**3**
Total	**114**	**68**	**8**	**4**	**2**	**1**	**17**	**97**	**0**	**1**	**6**	**1**	**318**

Few trematodes were recovered from fish examined. The trematode *Paramphistomum* sp was found in the gills of *Synodontis clarias*. *Bucephalus* sp was only found in *S. eupterus* and *Distichodus engycephalus*.

Pomporhychus, Quadrigidae and *Neoechinorhynchus* were the Acanthocephala recovered from the fish examined.

Table 1and 2 shows the host and organ specificity of parasites respectively.

Table 3: Prevalence (%) of Helminth infection in fish species collected in relation to their standard length.

Standard Length (cm)	*S. eupterus*			*S.clarias*			*C. nigrodigitatus*			*C. gariepinus*		
	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered
10 – 13.9	4 (33.3)	3 (25)	44 (56.4)	(0.0)	(0.0)	(0.0)	3 (16.7)	1 (5.6)	1 (1.7)	(0.0)	(0.0)	(0.0)
14 – 17.9	6 (50)	4(33.3)	16 (20.5	1 (33.3)	1 (33.3)	3 (6.7)	4 (22.2)	2 (11.1)	2 (3.5)	(0.0)	(0.0)	(0.0)
18 – 21.9	2 (16.7)	2 (16.7)	18 (23.1)	(0.0)	(0.0)	(0.0)	6 (33.3)	4 (22.2)	19 (32.8)	(0.0)	(0.0)	(0.0)
22 – 25.9	(0.0)	(0.0)	(0.0)	1 (33.30	1 (33.3)	25 (53.3)	4 (22.2)	2 (11.1)	23 (39.7)	(0.0)	(0.0)	(0.0)
26 – 29.9	(0.0)	(0.0)	(0.0)	1 (33.3)	1 (33.3)	17 (37.8)	1 (5.6)	1 (5.6)	13 (22.4)	1(100)	1 (100)	11(100)
Total	**12(100)**	**9(75.0)**	**78 (100)**	**3 (100)**	**3 (100)**	**45 (100)**	**18 (100)**	**10(55.6)**	**58 (100)**	**1 (100)**	**1 (100)**	**11 (100)**

Standard Length (cm)	*D. engycephalus*			*C. citharius*			*T. galilaeus*			*T. zilli*		
	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered
10 – 13.9	1 (100)	1 (100)	43 (100)	(0.0)	(0.0)	(0.0)	2 (50.0)	(0.0)	(0.0)	1(100)	(0.0)	(0.0)
14 – 17.9	(0.0)	(0.00	(0.0)	(0.0)	(0.0)	(0.0)	2 (50.0)	1 (25,0)	1 (100)	3 (75.0)	2 (50.0)	4(100)
18 – 21.9	(0.0)	(0.0)	(0.0)	3(100)	2 (66.7)	5(100)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
22 – 25.9	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Total	**1 (100)**	**1 (100)**	**43 (100)**	**3(100)**	**2 (66.7)**	**5(100)**	**4(100)**	**1 (25.0)**	**1 (100)**	**4 (100)**	**2 (50.0)**	**4 (100)**

Standard Length (cm)	*C. kingsleye*			***A. nurse***			*L. coubie*		
	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered
10 – 13.9	(0.0)	(0.0)	(0.0)	3 (75.0)	2 (50.0)	5 (50.0)	1(10.0)	(0.0)	(0.0)
14 – 17.9	1 (33.3)	1 (33.3)	13 (38.2)	(0.0)	(0.0)	(0.0)	8 (80.0)	3 (30.0)	6 (33.3)
18 – 21.9	(0.0)	(0.0)	(0.0)	1 (25.0)	1 (25.0)	5 (50.0)	1 (10.0)	1 (10.0)	12 (66.7)
22 – 25.9	1 (33.3)	1 (33.3)	7 (20.6)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
26 – 29.9	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
30 – 33.9	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
34 – 37.9	1 (33.3)	1 (33.3)	14 (41.2)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Total	**3(100)**	**3(100)**	**34 (100)**	**4 (100)**	**3 (75.0)**	**10 (100)**	**10 (100)**	**4(40.0)**	**18 (100)**

Table 4. Prevalence (%) of Helminth infection in fish species collected in relation to their body weight

Body weight (g)	*S. eupterus*			*S. clarias*			*C. nigrodigitatus*			*C. gariepinus*		
	No (%) of fish Examined	No(%) of fish infected	Total No (%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No (%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No (%) of parasites recovered
0 – 10.9	1 (8.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	2 (11.1)	1 (5.6)	1 (1.7)	(0.0)	(0.0)	(0.0)
11 – 20.9	2 (16.7)	2 (16.7)	38 (48.7)	(0.0)	(0.0)	(0.0)	4 (22.2)	2 (11.1)	2 (3.4)	(0.0)	(0.0)	(0.0)
21 – 30.9	5 (41.7)	3 (25.0)	18 (23.1)	1(50.0)	1(50.0)	3(6.7)	1 (5.6)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
31 – 40.9	1 (8.3)	1 (8.3)	6 (7.7)	(0.0)	(0.0)	(0.0)	8 (44.4)	6 (33.3)	53 (91.4)	1 (100)	1 (100)	11(100)
41 – 50.9	3 (25.0)		16 (20.5)	1 (50.0)	1 (50.0)	42 (93.3)	3 (16.7)	1 (5.6)	2 (3.4)	(0.0)	(0.0)	(0.0)
51 – 60.9	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Total	12(100)	9(75.0)	78 (100)	2 (100)	2 (100)	45 (100)	18 (100)	10(55.6)	58 (100)	1 (100)	1 (100)	11 (100)

Body weight (g)	*D. engycephalus*			*C. citharius*			*T. galilaeus*			*T. zilli*		
	No (%) of fish Examined	No(%) of fish infected	Total No (%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No (%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No (%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No (%) of parasites recovered
0 – 10.9	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
11 – 20.9	1 (100)	1 (100)	43 (100)	(0.0)	(0.0)	(0.0)	1(25.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
21 – 30.9	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	2 (50.0)	1 (25,0)	1 (100)	1(25.0)	(0.0)	(0.0)
31 – 40.9	(0.0)	(0.0)	(0.0)	1(33.3)	1(33.3)	4(80.0)	1(25.0)	(0.0)	(0.0)	3 (75.0)	2 (50.0)	4(100)
41 – 50.9	(0.0)	(0.0)	(0.0)	1(33.3)	1(33.3)	1(20.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
51 – 60.9	(0.0)	(0.0)	(0.0)	1(33.3)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Total	**1 (100)**	**1 (100)**	**43 (100)**	**3(100)**	**2 (66.7)**	**5(100)**	**4(100)**	**1 (25.0)**	**1 (100)**	**4 (100)**	**2 (50.0)**	**4 (100)**

Body weight (g)	*C. kingsleye*			***A. nurse***			*L. coubie*		
	No (%) of fish Examined	No(%) of fish infected	Total No (%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered	No (%) of fish Examined	No(%) of fish infected	Total No(%) of parasites recovered
0 – 10.9	(0.0)	(0.0)	(0.0)	3 (75.0)	2 (50.0)	5 (50.0)	1(10.0)	(0.0)	(0.0)
11 – 20.9	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	2 (20.0)	(0.0)	(0.0)
21 – 30.9	1(33.3)	1(33.3)	7(20.6)	(0.0)	(0.0)	(0.0)	7 (70.0)	4(40.0)	18 (100)
31 – 40.9	1 (33.3)	1 (33.3)	13 (38.2)	1(25.0)	1(25.0)	5(50.0)	(0.0)	(0.0)	(0.0)
41 – 50.9	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
51 – 60.9	1(33.3)	1(33.3)	14(41.2)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Total	3(100)	3(100)	34 (100)	4 (100)	3 (75.0)	10 (100)	**10 (100)**	**4(40.0)**	**18 (100)**

The cestodes were found parasitizing the stomach, intestine and gills only in *Chrysichthys nigrodigitatus, Ctenopoma kingsleye* and *Tilapia galilaeus*.

Procamellanus was mostly found infecting the stomach and intestine of *Hydrocynus vitatus* and *Mormyrus rume* while *Neoechinorhynchus* as the only parasites found in the intestine of *Lates niloticus*. *Procamalanus* species was the most prevalent.

The percentage infection of the fish genera is presented in Table 3.

Parasites were most prevalent in fish of 10 to 30cm standard length. In *C. kingsleye* parasites were most prevalent in fish of 14- 17cm and 34 to 37.9cm standard length.

There was no specific trend in parasite prevalence in *S. eupterus, S. clarias, C. nigrodigitatus and C. kingsleye* as regards the weight classes.

The largest numbers of parasites isolated were nematodes.

Organ specificity of parasite infection showed the intestine as the preferred organ while none was found in the oesophagus (Table 4).

3. Discussion

The study showed a high infection rate (59.15%) in all fish genera examined. This is unlike the low infection rate reported elsewhere (13.6% in Imo River, Ugwuozor, 1987). The high infection rate in these fishes could be attributed to the sanitary condition of the place, the location of the river from living place, number and class of people visiting the river and their purpose. Number of nematodes isolated was higher than cestodes, trematodes and acanthocephalans. Nematodes are known to occur in body cavities or found penetrating subcutaneous tissues. Host specificity of nematodes was variable which agrees with the findings of Akinsanya *et al.*, (2007).

Ukoli (1965) and Olurin and Somorin (2006) recovered *Clinostomum sp.* from the intestines of tilapia fishes, in this study, *Clinostomum* was found parasitizing non-cichlids such as *Synodontis eupterus, Ctenopoma kingsleye, Clarias* sp. and *Citharinus* sp. Kabata (1985), reported that *Clinostomum* when ingested with poorly cooked fish is capable of producing laryngopharyngitis which is an unpleasant inflammatory condition in man.

Most Acanthocephalans were found in the intestine of fish which agrees with the findings of Awachie (1965) and Olurin & Somorin (2006) in fishes from Kainji Lake and Owa stream respectively.

High number of parasites was found in the intestines could be associated with the fact that most digestion activity takes place in the intestine resulting in the release of parasite ova/cysts in food particles. Few parasites were found on the gills could be as a result of the continuous movement of water current over the gills which may not encourage establishment and survival of parasites there.

The length classes within the range of 10 -29.9cm recorded the highest prevalence of infection. This might be attributed to low level of immunity in smaller sized fish.

Only *C. nigrodigitatus* fish of 31 – 39.9g body weight recorded the highest prevalence of parasitic infection. This might be attributed to random selection. This agrees with the finding of Olorin & Somorin (2006) regarding *T. mariae* in Owa stream which had increased parasite load with increased weight. Increase in weight also increases fish susceptibility to parasitization.

Past studies on parasitic infection of fishes from River Niger by Ukoli (1965) and Onyia (1970) reported *Diplodiscus* species *Macrodus, Dactylogyrus, Gyrodactylus, Nephrocephalus and Rhabdinorynchus* species as the major causes of parasitic infection. None of these parasites was recovered in the present study; it could be that they could not survive in this part of the river Niger

River Niger at Illushi has high parasitic load as exhibited by the high rate of infection on the fishes examined as such adequate measures should be put in place to prevent these parasites from spreading.

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