

Full Length Research Paper

Helminth parasites of *Synodontis nigrita* at lower Niger (IDAH), Nigeria

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Accepted 31 March, 2010

The isolation and identification of helminth parasites of *Synodontis nigrita* and length-weight relationship of the fish in the lower Niger (Idah), Kogi State, Nigeria were carried out in order to describe the pattern of occurrence of the helminth and to establish the well-being of the host fish. A total of 102 randomly sampled fish were studied and three genera of helminths were recovered; 39.1, 48.7 and 12.2% respectively, and were harboured in the fish' intestine. The three genera of helminths isolates identified include two nematodes (*Capillaria* and *Contraecaecum* species), *Acanthocephala* (*Acanthocephalus* species) and Trematode (*Posthodiplostomum* spp.). Of the 102 fish studied, 16 were infected with 80 helminth parasite giving a prevalence rate of 15.7%. The overall mean intensity and mean abundance of helminth parasite occurrence for the sampled fish were 13.6 and 1.5, respectively. The mean standard length of the fish was 7.45 ± 2.59 cm. The need for fish seeds from the wild to be examined for the helminth parasites during culture practice and the socio-economic and human health implications of eating infected fish is also recommended.

Key words: Acanthocephala, nematode, isolation, trematode, intestine.

INTRODUCTION

Catfish is a common name for about 2,200 species of fishes that make up the order Siluriformes and class Actinopterygii (ray-finned fishes). These two families of the order Ariidae and Plotosidae are primarily marine, while all other families are freshwater dwellers. Catfishes are a collection of scaleless, tenacious fish mostly nocturnal scavengers that have adapted to life in a variety of environments with some living near the bottom in shallow waters (Gunder and Fink, 2004).

Fish, like all living organisms, are susceptible to infections with various parasites (Hilderbrand et al., 2003). Chiefly among the parasites afflicting fish are the helminths. Helminths comprising nematodes, trematodes, cestodes and Acanthocephala commonly parasitize both wild and cultured fish with the former constituting heavier parasitic burden (Merck, 2006). Direct association of wild species with cultured fish farms has been established as a way of contaminating cultured fish by parasites (Okaeme and Olufemi, 1997).

The wellbeing, robustness and degree of fatness of fish is a measure of its condition factor with respect to the same specie taken from other water bodies or to other species of fish taken from the same water body (Pauly, 1983). It is expressed by relating length of fish to its weight. A plump or fat fish will give a higher condition factor than a lean and thin fish. Lower value means that the fish are in poor condition which may be a reflection of either over population or outbreak of diseases (Gupta and Gupta, 2006).

MATERIALS AND METHODS

Study area

The study area is the lower Niger (Idah), Kogi State, Nigeria. It is located on latitude $7^{\circ} 06'N$ and longitude $6^{\circ} 43'E$ of the Greenwich Meridian in the Guinea Savannah vegetation zones of Nigeria (Areola et al., 1992). A total of 102 fish samples of *Synodontis*

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Table 1. Pattern of helminth parasites occurrence in *S. nigrita* in relation to standard length of fish in the lower Niger (Idah), Nigeria.

Standard Length group (cm)	Total number examined	Total number infected	Total parasites recovered	Prevalence rate (%)	95% C I	Mean intensity (No)	Mean abundance (No)
0.0 - 5.4	1	1	18	100.0	-	18.0	18.0
5.4 - 19.0	20	3	12	19.0	18.96 - 19.04	2.6	5.0
5.8 - 19.0	36	2	26	33.0	32.99 - 33.00	3.1	1.0
5.4 - 26.1	22	2	14	28.9	28.78 - 29.02	4.1	1.2
5.8 - 25.1	13	4	8	6.7	6.42 - 6.98	2.0	1.3
19.0 - 26.1	10	4	2	3.7	3.31 - 4.09	53.0	26.5
Total	102	16	80	15.7	26.37 - 26.43	5.0	0.8

CI = Confidence interval.

Table 2. Identity and pattern of helminth parasites recovered from *S. nigrita* in the lower Niger (Idah), Nigeria in relation to predilection sites.

Helminth parasites		Predilection sites					Sub total	
Taxonomic group	Species	Skin	Gill	Fin	Anus	Small intestine	Number	%
Nematoda	<i>Capillaria</i> sp.	-	-	-	-	4	4	16.5
	<i>Contraceacum</i> sp.	-	-	-	-	11	11	22.6
Acanthocephala	<i>Acanthocephalus</i> sp.	-	-	-	-	62	62	48.7
Trematoda	<i>Posthodiplostomum</i> sp.	-	-	-	-	3	3	12.2
Grand total		-	-	-	-	80	80	100.0
Percentage (%)		-	-	-	-	100	100.0	

nigrita of different sizes caught by fishermen using gillnets, cast net and hook and line at Idah area of the lower Niger were identified, bought and transported alive to the Biological Science laboratory, Kogi State University, Anyigba between January and August 2008 for the study.

The skin, fins, eyes, anus, intestinal organs, buccal and opercula cavities of fish were cut open and placed in 0.9% physiological saline and examined under a dissecting microscope. Helminths recovered were counted and placed in saline solution (0.9%) which was kept overnight in refrigerator to enable them stretch and relax. They were later fixed and preserved in 70% alcohol. The helminths were stained over night with weak Erlich's haematoxylin; and dehydrated in graduated alcohol (30, 50, 70, 90% and absolute) for 45 min, cleared in methyl-salicylate and mounted on a slide in Canada balsam. The occurrence (prevalence, mean intensity and abundance) of the helminths on the *Synodontis* fish hosts was determined by standard procedures described by Khalil and Polling (1997).

With the aid of a measuring board and sensitive Mettler weighing balance, the total length (cm), standard length (cm) and weight (g) of each fish sample was measured fresh to the nearest 0.1 cm and 0.1 g, respectively. The length weight relationships were estimated from the allometric formula, $W = aL^b$, where W is total body weight (g), L the total length (cm), a and b are the coefficients of the functional regression between W and L (Ricker, 1973).

RESULTS

From Table 1, grouping of the fish into 6 categories according to standard length (SL) showed that every

group had helminth infection but the group with highest parasitism is the 0.0-5.4 cm group ($n = 1$) as it had prevalence rate of 100%; this group had mean intensity and mean abundance of 18.0. Mean intensity (number of parasite per fish) was highest for the SL group 5.8- 26.1 cm.

A total of 80 helminth parasites comprising nematode, Acanthocephalan and trematode were isolated from one predilection site of the fish sampled, the small intestine. The types and pattern of helminth parasites isolated from *S. nigrita* species were nematodes, 15 (30.3%); Acanthocephala, 62 (55.4%) and trematode, 3 (14.3%) (Table 2).

The pattern of helminth parasites occurrence in relation to season of the year is as shown in Table 4. Sixty one (61) fish were sampled for wet season, out of which 5 (21.1%) were infected, mean intensity 11.6 and mean abundance 1.0 of helminth parasites occurrence were recorded. In dry season, forty one (41) fishes were sampled, 11 (78.9%) had infection with mean intensity of 2.0 and mean abundance of 0.5, respectively (Table 3).

The standard lengths (SL) of the sampled fish ranged from 5.4 to 26.1 cm, 5.8 to 19.0 cm and 5.4 to 26.1 cm. The mean SL for the fish were 7.29 ± 2.82 , 7.66 ± 2.25 and 7.45 ± 2.59 . The weights of the fish ranged from 2.6 - 379.9, 3.4-206.6 and 2.6-379.9 g with the overall mean

Table 3. Pattern of helminth parasites occurrence recovered in *S. nigrita* in relation to season in the lower Niger (Idah) Nigeria.

Season	Fish species	Total fish examined	Total fish infected	Total parasites recovered	Prevalence rate (%)	95% CI	Mean intensity (No)	Mean abundance (No)
Wet season	<i>S. nigrita</i>	61	5	58	7.5	7.11 - 7.14	11.6	1.0
Dry season	<i>S. nigrita</i>	41	11	22	8.2	8.52 - 8.63	2.0	0.5
Total		102	16	80	15.7	15.63 -15.77	13.6	1.5

CI = Confidence interval

Table 4. Length - weight relationship of *S. nigrita* in the lower Niger (Idah) Nigeria.

Fish species	Sex	Standard length (cm)			Weight (g)			n	a	b	r
		Min.	Max.	Mean ± SD	Min.	Max.	Mean ± SD				
<i>S. nigrita</i>	Males	5.4	26.1	7.29 ± 2.82	2.6	379.9	13.90 ± 49.41	58	0.0197	2.9948	0.9697
	Females	5.8	19.0	7.66 ± 2.25	3.4	206.6	13.31 ± 30.53	44	0.0164	3.0887	0.9694
	Combined sex	5.4	26.1	7.45 ± 2.59	2.6	379.9	13.65 ± 42.13	102	0.0182	3.0364	0.9701

n = Number of fish examined; a = intercept; b = slope; r = correlation coefficient of determination.

weight of 13.65 ± 42.13 g (Table 4).

DISCUSSION

The result of this study reveals the occurrence of four helminth parasites in *S. nigrita* in the lower Niger (Idah), Kogi State, Nigeria. The four parasites belonged to nematode, Acanthocephala and trematoda. The large number of helminths infection recorded indicated that helminths were considerable parasites of the *Synodontis* species studied. This agrees with the study of Boomker (1994), Akinsanya et al. (2008) and Owolabi (2008). The parasites recovered from the studied fish were *Capillaria* spp., *Contraceacum* spp., *Acanthocephalus* spp. and *Posthodiplostomum* species. This conforms with the studies of Boomker (1994), Khalil (1969) and Boomker (1994).

According to the host parasite checklist on African freshwater fishes of Khalil and Polling (1997) and other relevant studies, the present work is the first scientific record of *Contraceacum* spp. and *Posthodiplostomum* spp. in the *Synodontis* species examined in lower Niger (Idah) Nigeria. The high proportion of Acanthocephala (48.7%) than nematode (39.1%) and trematodes (12.2%) showed that *Acanthocephalus* spp were the commonest infection of this genus in lower Niger (Idah).

The standard lengths (SL) of the sampled fish ranged from 5.4 to 26.1 cm, 5.8 to 19.0 cm and 5.4 to 26.1cm. The mean SL for the fish were (7.29 ± 2.82), (7.66 ± 2.25) and (7.45 ± 2.59). The weights of the fish ranged from 2.6 - 379.9 g, 3.4 - 206.6 g and 2.6 - 379.9 g, while the mean was 13.65 ± 42.13 g. The result of the length-weight relationship of the fish showed that the fish exhibits isometric growth in the water body.

It is therefore recommended that fish seeds from the wild should be examined for the presence of helminth parasites prior to use and periodically during culture practice. Awareness should also be created on the socio-economic and human health implications of eating infected fish among the fisher folks and the general

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