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Prevalence of parasitic infections in cichlids from Eleiyele River, Ibadan, Nigeria

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ABSTRACT: The level of parasitic infestation of cichlids from Eleiyele river between January and April, 1998, was examined. The only parasite encountered was the metacercariae of *Clinostomum marginatum*. The parasites were found on the skin, around the eyes, pharyngeal region, along the vertebral axis, the jaw areas, gills and mouth. The pattern of distribution of parasites in these areas was not regular as the metacercariae were most abundant on the skin, followed by the pharyngeal region. The prevalence of infection was 61.3% with male cichlids recording higher prevalence of infection than the female cichlids. The parasites were observed irrespective of the fish species. The sizes of the cysts fell between 2.5 mm and 3.0 mm. The body of the metacercariae worm was dorsoventrally flattened with no segmentation.

Introduction

The importance of parasitological studies in the development of fisheries potential of freshwater habitats cannot be overemphasized. Due to rapid development of aquaculture, especially with advances in raising fishes in freshwater, brackish and marine waters, there has been increasing demand for knowledge about the nature and control of fish diseases. Sarig (1971) reported that parasitic diseases pose a major problem in aquaculture. They do not only result in economic losses due to heavy mortalities but they also affect growth, resistance to fatigue, fecundity, blood changes, vulnerability to predation and susceptibility to sub-optimal environmental factors.

Krull (1934) as well as Hunter and Hunter (1934, 1935) observed that the cercariae of *Clinostomum marginatum* is forked tailed and penetrates the fish which is the intermediate host where it develops into large metacercariae, popularly known as 'yellow grub'.

When infected fish are eaten by certain species of water bird, the yellow grubs are freed and they migrate to the oral cavity of the host where they attain sexual maturity in a few days.

Paperna (1980) showed that cestodes and trematodes are common among cichlids and wild fishes. Hazen and Esch (1978) pointed out that *C. marginatum* is a common digenetic trematode having a cosmopolitan distribution with definitive hosts being several species of herons as well as other fish-eating birds. The metacercariae of *C. marginatum* embeds itself in the flesh, visceral cavity and gills of fish forming large cream coloured cysts and seldom becomes a problem when in large number in the musculature of young fish (Aderibigbe, 1990).

Adekunle (1989), in studies on the identification and description of the metacercariae cysts, found encystment more pronounced on the skin and pharyngeal region than in the eyes, fins and other parts of the body. This paper provides additional information on the level of parasitic infestation on cichlids.

Materials and Methods

Description of Study Area

The Eleiyele river is situated on latitude 7°26'N and longitude 3°52'E in Eleiyele area of Ibadan, Oyo State, Nigeria. Seasonal fluctuations in temperature occurs in this river with the mean minimum temperature (24.5°C) occurring in August when there is dense cloud cover. Wet and dry seasons which are typical of the tropical climate dominate the river location with the wet season occurring between March and October and the dry season between November and February. The mean annual rainfall is 1262.3 mm. Eleiyele water catchment area derived its source from River Ona linking up with Awba dam on the University of Ibadan Campus to form the Eleiyele catchment which then flows to the southwest of Eleiyele area.

Survey Procedure

Tilapia species consisting of *Sarotherodon melanotheron*, *Sarotherodon galilaeus*, *Oreochromis niloticus*, *Tilapia zilli* and *Hemichromis fasciatus* were collected from Eleyele Dam in Ibadan using the dragnets. The fish specimens were transported to the laboratory in a bucket of water from the dam. A total of 240 specimens were collected between January and April, 1998.

Laboratory Procedures

All the fish samples were examined for ectoparasites and endoparasites. The total lengths and the standard lengths were measured to the nearest millimeter using a measuring board. The weight of the fishes were measured to the nearest grammes using the top loading Denward balance. The fish specimens were autopsied and all vital organs, tissue and body musculature were scrutinised for the presence of metacercariae parasites. The metacercariae parasites (all encysted) were removed out using forceps and transferred into normal saline. The search for endoparasites started by opening through the body cavity along the entire length of the fish slitting along the midventral line exposing visceral cavity, pericardial cavity and the removal of musculature from the skeleton. The external surfaces of the body including scales, fins, skin were examined for ectoparasites or any pathological conditions. The photograph of the parasites and the fish were taken in situ (Plate 1). The number of the metacercariae cysts found on different organs were recorded to determine the prevalence of infection.

Results

The only parasites found was the encysted metacercariae of *Clinostomum marginatum* (Plate 2). It was observed that the level of parasitic infection of cichlids of Eleyele river was high, forming 61.3% of the total number of fish examined. The parasites were found on the skin, around the eyes, pharyngeal region, along the vertebral axis, the jaw areas, gills and mouth. It was observed that the encysted metacercariae were more pronounced on the skin and the pharyngeal region. These observations were in line with previous findings by Krull (1934) and Hunter and Hunter (1934 and 1935a). The results of the study showed that all the five species of cichlids were susceptible to infection with *Clinostomum marginatum* metacercariae. The cysts of the parasites measured between 2.5mm and 3.0mm.

Out of the total number of 240 specimens of cichlids examined, 147 were found to be infected. Throughout the study the rate of infection is significantly higher in the male than in the female as shown in Table 1 ($P > 0.05$).

Table 1: Prevalence of Metacercariae infection in relation to sex of cichlids from Eleyele River.

	Male	Female	Combined
Number Examined	132	108	240
Number infected	83	64	147
Percentage of infection	62.8	59.3	61.3

Chi-square value = 1.228 (P > 0.05).

Table 2 illustrates the prevalence of metacercariae infection in relation to species of fish and sex. A high prevalence of 73.5% was observed among *S. melanotheron*. The male were more susceptible to infection (47.0%) than female (26.5%).

Out of the 67 samples of *H. fasciatus* examined, 26 were found to be infected, that is, 38.8% infection. The percentage of the infected male were 23.4% while that of the female were 16.4%. The rate of infection is significantly higher in male than female.

A prevalence of 58.8% were observed among *O. niloticus* examined. The percentage of the infected male were 29.4% and that of the female were also found to be 29.4%. Both the male and the female were equally susceptible to infection with metacercariae cysts.

S. galilaeus and *T. zilli*, had 73.5% and 70.3% infection rates respectively. The percentage of the infected male in *S. galilaeus* were 38.2% and the female were 35.2% while in *T. zilli* male percentage of infection were also found to be 43.2% and that of the female to be 27.0%. Males showed a higher prevalence than the female fishes.

Table 2: Prevalence of metacercariae infection in relation to species of fish and sex.

Fish species	Number Examined	Number Infected		
		Male	Female	Total
<i>S. melanotheron</i>	34	16	9	25
<i>S. galilaeus</i>	68	26	24	50
<i>O. niloticus</i>	34	10	10	20
<i>H. fasciatus</i>	67	25	11	36
<i>T. zilli</i>	37	16	10	26

Table 3 illustrates the size related variations in the level of parasitic infections. The parasites were observed on cichlids irrespective of size. There was significant variation in the level of infection between the size groups.

Table 3: Parasitic infestation of cichlids in relation to size in Eleyele river

	Below 9.5cm	9.6 – 15.0cm	15.1 – 21.3cm	Total
Number examined	11	181	48	240
Number infected	7	105	35	147
Percentage of infection	63.63	58.01	72.91	61.3

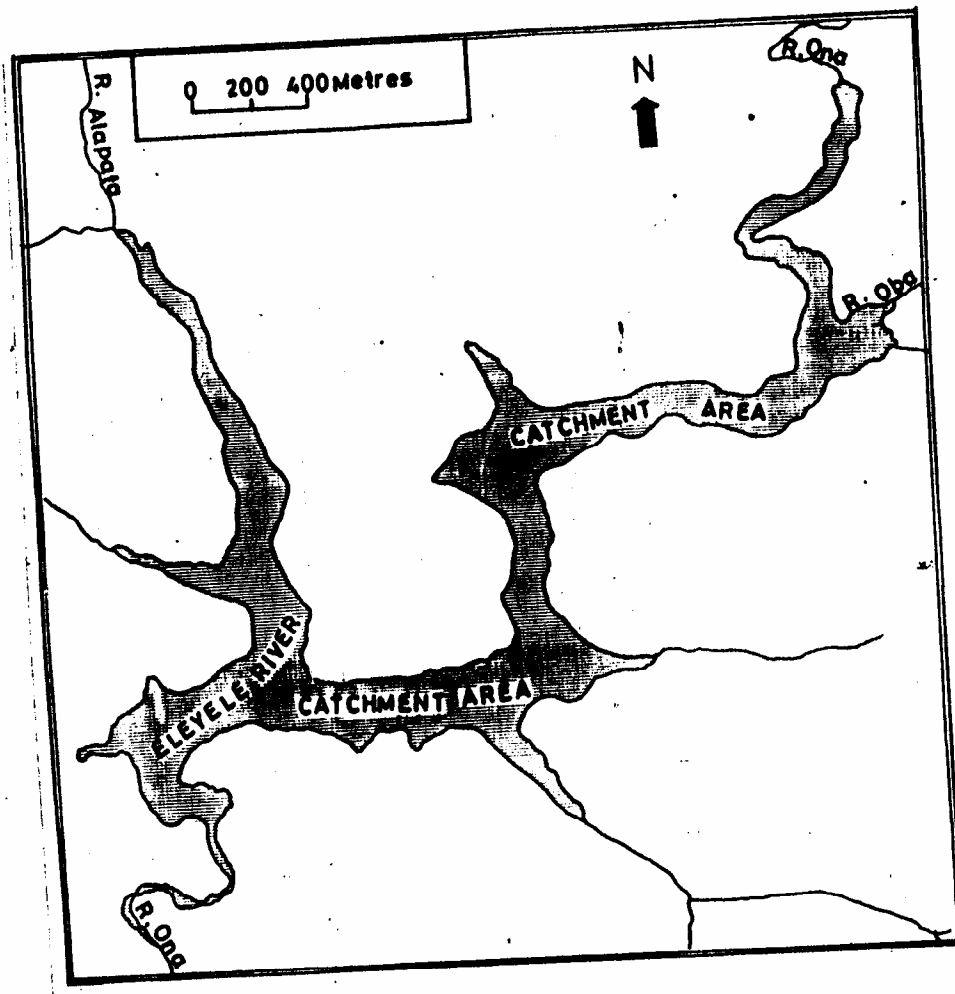


Fig. 1: Map showing Eleyele River.

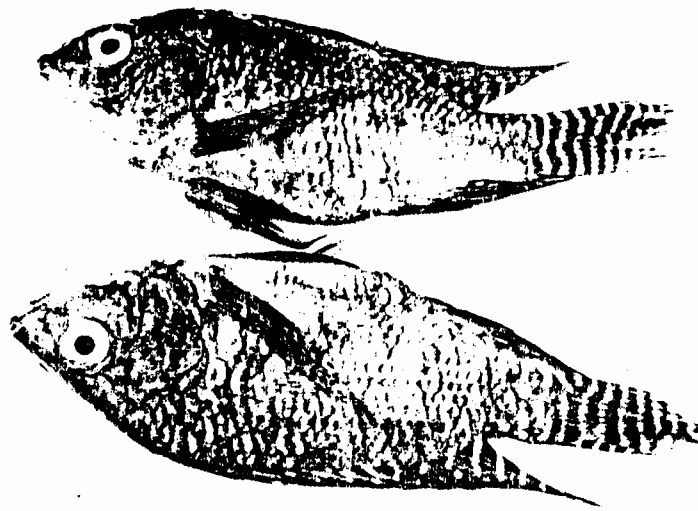


Plate 1: *Oreochromis niloticus* infected with metacercariae cysts.



Plate 2: The metacercariae of *Clinostomum marginatum*.

There was no ectoparasites on the fins. There were parasites on the gills, mouth, skin, around the eyes, pharyngeal region, along the vertebral axis and the jaw areas. There were no endoparasites in the brain, heart, stomach, kidney, liver and the gonads.

Discussion

Clinostomum marginatum is essentially a parasite of herons and other fish eating birds (Krull, 1934; Hunter and Hunter, 1934 and 1935a).

Therefore finding encysted metacercariae on the body of cichlids was not very surprising as this only aids its life cycle. The level of parasitic infestation in cichlids of Eleyele river was high. Excystment of the metacercariae in the definitive host must have to occur before parasites can attain maturity. Komolafe (1995) observed that Neascus species, *Clinostomum tilapiae* and *Acanthocephalan* are the parasites found in *O. niloticus* in Opa reservoir of Ile-Ife. It was also noted that all these parasites were not observed on *S. galilaeus* of Opa reservoir. Aderounmu and Adeniyi (1972) reported succinctly that 62.5% of *Oreochromis niloticus* collected in the agricultural fish pond of Obafemi Awolowo University, Ile-Ife, were infected with a cestode *Anomotaenia* sp.

This present research recorded a higher level of parasitic infestation of cichlids. Previous reports revealed a low level of infection of parasites in cichlids species (Anyanwu, 1984; Akinpelu, 1983). The 61.3% infection observed during this study is significantly high when compared with 41% infection observed by Anyanwu (1984). This could be due to difference in the period of survey or variation in the fish species and number examined.

Parasites can be ingested with food through the mouth or in water through the operculum and this may be the reason why metacercariae cysts are mostly found in the gills and pharyngeal region. The penetration of parasites on the skin is a clear indication of their desperate search for a suitable source of continuous nutrient supply during their encystment period. The species of trematode larvae belongs to the family *Clinostomatidae* and has always been called yellow grubs in many countries. The trematode metacercariae removed from its cysts showed a much resemblance to the adult worm and this observation is in agreement with Kabata (1985).

The occurrence of *Clinostomum marginatum* on cichlids species is in agreement with Akinpelu (1983) and Adekunle (1989).

Oswald and Hulse (1982) noted that fish species in good environmental conditions rarely succumb to the regular range of fish diseases. However, percentage infection in the examined species of cichlids varied. From this research findings, it was noted that *S. galilaeus* and *T. zilli* harboured more cysts.

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