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# HELMINTHS PARASITIC INFECTION OF *CLARIAS GARIEPINUS* FROM GREAT KWA RIVER, CROSS RIVER STATE, NIGERIA.

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## ABSTRACT

A total of 230 *Clarias gariepinus* (African catfish) were purchased between February and June 2016 from artisanal fishermen at Obufa Esuk Beach along Great Kwa River, Calabar. The fish were subjected to parasitological study in Biological Science Laboratory of Cross River University of Technology, Calabar. Out of this 230 fish samples, 122 (53.04%) were infected and a total of 247 helminths parasites recovered. Six species of helminth parasites were isolated namely, Tapeworm species (9.84%), *Anisakis simplex* (24.59%), *Nippostrongylus brasilienses* (34.43%), *Ascaris lumbricoides* (7.38%), *Caenorhabditis elegans* (17.21%) and *Ancyrocephalids monogeneans* (6.56%). There was no significant difference ($p > 0.05$) in the infection rate of male and female fish. The highest fish organ infected was intestine (51.01%), followed by the stomach (18.62%), next was the skin (12.15%), then Liver (10.12%) and finally gills (8.10%). The infection rates in relation to body length and weight was highest 75.00% and 80.00% at 41-50 cm and 201-300 grams respectively.

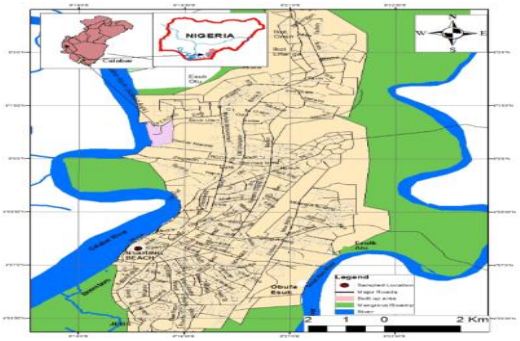
**KEYWORDS**: Helminth Parasites, *Clarias gariepinus*, Great Kwa.

## INTRODUCTION

Fish has been considered as the cheapest source of protein in most parts of Nigeria and Africa as a whole. The most common fish available in Nigeria are the catfish species of *C. gariepinus* and *Clarias angularis*.[1] The cheap and affordability of catfish proteins by the average Nigerian rises as population increases. Some investigators observed that the fish is highly priced and requested by fish farmers and consumer in Nigeria either as smoked, dried or fresh.[2, 3] The African catfish is widely distributed throughout Africa, mainly in swamps, lakes, rivers and quiet waters.[4, 5, 6, 7] According to Skelton et al,[8] in.[7] *C. gariepinus* - the African catfish, is generally considered to be one of the most important tropical catfish species for aquaculture in West Africa. As the world's population increases, fish resources are being depleted at an alarming rate due to environmental degradation, over harvesting, and water pollution, thereby resulting in fish production not meeting the demand of stakeholders in Aquaculture.[1] However, *C. gariepinus* has been plagued by various parasites in the wild and cultured environment where they cause morbidity, mortality and economic losses in aquaculture practice in various parts of the world.[9] Various helminth parasites have been incriminated in *C. gariepinus* infection such as adult Digenea infecting different tissues of the body; trematode cercaria of the family Clinostomidae encysting in tissues; and adult monogeneans of the families Pousopothocetylide, Dactylogyridae and Gyrodactylidae infecting the gills and skin.[10, 11,12] Adams et al,[12] reported that a moderate number of nematodes, trematodes, cestodes and acanthocephalans infest humans, but held that only a few cause serious diseases. According to him, the most important of the helminths acquired by humans from fish are the anisakis nematodes (particularly *A. simplex* and *Pseudoterranova decipiens*), cestodes of the families Heterophylidae, Opisthorchilidae and Nanophyetidae. This study therefore seeks information on helminth parasites of *C. gariepinus* from Great Kwa River, Calabar, Nigeria.

## MATERIALS AND METHODS

The study site is Great Kwa River, one of the major tributaries of Cross River. It takes its course from the oban hills in Aningeje, Gross River state. The Great Kwa River flows southwards and discharges into the Cross River Estuary around latitude $4^{o}$ 45'N and longitude $8^{o}$ 20' E of the Greenwich Meridian (Akpan, 2000). The lower reaches of the river drains the eastern coast of Calabar Municipality in Cross River State, Nigeria (Fig. 1).




**Map showing Great Kwa River (right) the study area**

**Collection of samples**

A total of 230 *C. gariepinus* were purchased alive from artisanal fishermen at Obufa Esuk beach along Great kwa River in Calabar, between February and June 2016. Samples were transported to Biological Science Laboratory of Cross River University of Technology, Calabar, for parasitological investigation.

**Sex identification and measurement of fish**

The sex of the fish was determined by examination of the papillae which is long in males but rounded and reddish in the matured females.[3] In addition, the presence of gonads in males and ovaries in females confirm their identity. The standard length was obtained by measuring the fish with a meter rule and weight taken in grams (g) using a weighing balance.

**Parasitological investigation**

Scrapings of the skin, gills and fins of the fish were made and placed on a clean glass slide and covered with cover slip, then mounted and viewed under the microscope in search of ectoparasites. The fish were dissected to expose the digestive tract. The digestive tract was removed and divided into sections such as oesophagus, stomach, intestine, liver, large intestine and rectum. Each of these parts was placed on a Petri dish containing 0.9 % of normal saline and further cut open to free trapped parasites. The emergence of parasites was noticed by the wriggling movement in the saline solution under the microscope. Parasites found were counted, placed in physiological saline and later fixed in 70% alcohol before staining and identification using the texts of.[14, 15, 16]

**RESULTS**

A total of 230 samples of *C. gariepinus* from Great Kwa River were investigated for helminth infection between February and June 2016. Of this number, 122 (53.04%) were infected and a total of 247 parasites were recovered from the fish (Table 1). Although more males 72 (68.60%) were infected than female 50 (40.00%), there was no statistical significant difference ($p > 0.05$) in the infection rate between male and female fish.

Table 2 revealed the prevalence of helminth infection of *C. gariepinus* from Great Kwa River, Calabar. Three taxonomic groups of helminth were isolated namely, Cestoda, Nematoda and Monogenoidea. The Cestoda were Tapeworm species (9.84%), Nematoda include *A. simplex* (24.59%), *N. brasiliensis* (34.43%), *A. lumbricoides* (7.38%) and *C. elegans* (17.21%), while the Monogenoidea were *A. monogeneans* (6.56%). Cestodes were recovered from the intestine, nematodes from the intestine, stomach, skin, and liver, while the Monogenoides from the gills. However, the highest parasites (56.01%) were recovered from the intestine, followed by the stomach (18.62%), next the skin (12.15%), then the liver (10.12%) and finally the gills (8.10%).

Table3 showed helminth infection of *C. gariepinus* in relation to the body length of fish. The infection rates of 68.57%,, 58.70%, 75.00% and 37.84% were recorded by body length 21-30, 31-40, 41-50 and 51-60 cm respectively.

Table 4 showed helminth infection of *C. gariepinus* in relation to the body weight of fish. The infection rates of 70.00%, 80.00%, 47.27% and 44.44% were harboured by body weight 101-200, 201-300, 301-400, 401-500 grams respectively. The body length and weight classes of 0-20cm and0-100 grams respectively had no infection.

**Table 1. Prevalence of helminth parasites in *C. gariepinus* in relation to sex**

| Sex | Number examined | Number of fish infected | Percentage infected (%) | Parasites recovered |
|---|---|---|---|---|
| Male | 125 | 50 | 40.0 | 99 |
| Female | 105 | 72 | 68.6 | 148 |
| Total | 230 | 122 | 53.04 | 247 |

**Table 2. Prevlence of helminths parasites in *C. gariepinus* in relation to site of infection**

| Parasite species | Taxonomic group | No of fish infected (%) | Prevalence (%) | Site of parasitic infection | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Intestine | Stomach | Skin | Gill | Liver |
| Tapeworm | Cestoda | 12 (9.84) | 5.22 | 24 | - | - | - | - |
| *Anisakis simplex* | Nematoda | 30 (24. 59) | 13.04 | 37 | - | - | - | 25 |
| *Nippostrongylus brasiliensis* | Nematoda | 42 (34.43) | 18.26 | 46 | 46 | - | - | - |
| *Ascaris lumbricoides* | Nematoda | 9 (7.38) | 3.91 | 19 | - | - | - | - |
| *Caenorhabditis elegans* | Nematoda | 21 (17.21) | 9.13 | - | - | 30 | - | - |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Ancyrocephalids monogeneans* | Monogenoidea | 8 (6.56) | 3.48 | - | - | - | 20 | - |

**Table 3. Helminths infection of *C. gariepinus* obtained from Great Kwa River in relation to body length.**

| Body length (cm) | Number of fish exmined | Number of fish infected | Percentage of fish infected | Total parasites isolated |
|---|---|---|---|---|
| 0-20 | 26 | 0 | 0 | 0 |
| 21-30 | 35 | 24 | 68.57 | 49 |
| 31-40 | 92 | 54 | 58.70 | 110 |
| 41-50 | 40 | 30 | 75.00 | 65 |
| 51-60 | 37 | 14 | 37.84 | 23 |

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**Table 4. Helminths infection of *Clarias gariepinus* in relation to body weight**

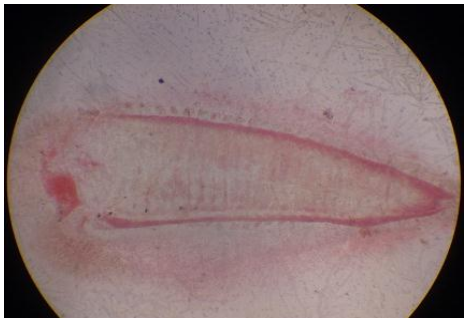
| Body weight (g) | Number of fish examined | Number of fish infected | Percentage of fish infected | Total parasites isolated |
|---|---|---|---|---|
| 0-100 | 30 | 0 | 0 | 0 |
| 101-200 | 40 | 28 | 70.00 | 57 |
| 201-300 | 60 | 48 | 80.00 | 88 |
| 301-400 | 55 | 26 | 47.27 | 56 |
| 401-500 | 45 | 20 | 44.44 | 46 |

***Ascaris lumbricoides* X40**

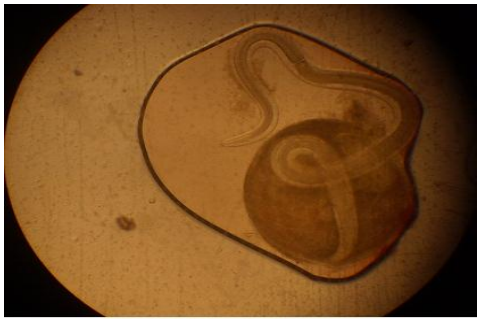
**Caenorhabditis *elegans* X40**

**Tapeworm spp x40**

**Anisakis simplex x40**



***Ancyrocephalids monogenean* X40**



**Nippostrongylus *brasiliensis* X40**

**FIG: 2 Pictorial representation of *Clarias gariepinus* parasites from Great Kwa River.**

## DISCUSSION

This study investigated 230 *C. gariepinus* species for helminth parasitic infection and 122 (53.04%) were found to be infected and 247 helminth parasites recovered. It was observed that though this finding was in contrast with those reported by.[17] 60% from Earthen and concrete pond and[18] 75% from Ogun River, it confirms the presence of helminth parasites in catfish from Great Kwa River. *C. gariepinus* from Great Kwa River, Calabar, were infected by six species of helminth parasites comprising of a cestode, four nematodes and one monogenean. The cestode was Tapeworm species, the nematodes were *A. simplex, N. brasiliensis, A. lumbricoides* and *C. elegans*, while the monogenean was *A. monogenean*.

Out of the helminth parasites recovered in C. gariepinus from Great Kwa River in this investigation, nematodes had the highest occurrence in the intestine, followed by cestodes and then monogeneans. This finding is in consonance with earlier reported work of.[7] who held that nematodes had the highest occurrence, while cestodes parasites showed maximum prevalence in the intestine. In addition, Abdel-Gaber et al[7] observed that the high infection of C. gariepinus by cestode parasites could be due to the injection of eggs, copepods and molluscs which serve as intermediate hosts of the larval stages of the cestodes.

The recovery of cestodes, nematodes and monogeneans in this study could have serious physiological consequences as they could interfere with the absorption of food nutrients in the fish intestine. This observation agrees with the report of.[1] who stated that such interference could reduce food intake.

This study reported higher infection rates in large fish greater than 20 cm and 101 grams, as compared to the absence of infection in small fish. This finding confirms the works of[2, 19,20, 21, 22] who observed that the condition of infection was age factor. These investigators argued that the higher infection rates in adults than young may be due to the longer duration of time the older fish were exposed to the agents of infection in the environment. To substantiate this, Roberts[20] reported that larger fish show greater surface area for infection than younger ones; Oniye et al.[2] revealed that no parasitic infection of juveniles but higher in adult fish due to change in diet during adulthood, while Bichi and Dawaki.[21] stated that increase in the abundance of parasites is associated with host size.

It is worthy of note that each of these parasites recovered has health consequences in the fish host and of Public Health implications. *A. monogeneans* attached on the skin, gills and eyes of the fish causes scale loss, respiratory diseases, swollen eyes respectively, and extreme irritation to the host.[23] The most important nematode diseases of humans acquired from fish is Anisakiasis or Anisakidosis. In humans, A. simplex larva causes abscess in the intestinal mucosa if eaten raw or undercooked.[12]

## CONCLUSION

The investigation of helminth parasitic infections of *C. gariepinus* from Great Kwa River, Cross River State, Nigeria, revealed the presence of six helminth parasites from the fish. These included *A. simplex*, Tapeworm species, *N. brasilienses, A. lumbricoides, C. elegans* and *A. monogeneans*. There was more infection in female than male fish. These infections are associated with socio-cultural behaviour especially the habit of eating raw fish. Individuals in Calabar city and beyond should be aware of the Public Health implications of these parasites from fish. Although consumption of raw fish is not our culture in Nigeia, intrusion of man into the wild habitat of the host fish through contamination of water with human faeces should be avoided. Post-harvest controls such as proper fish processing and preparation of food are the most effective measures to prevent infection from fish.

## CONFLICT OF INTEREST

There was no conflict of interest in this research work.

## AKNOWLEGEMENT

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