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# Prevalence of Protozoan Parasites in African Catfish (*Clarias Gariepinus*) from Great Kwa River

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**Abstract**

The prevalence of protozoan parasites in *Clarias gariepinus* from the Great Kwa River, was surveyed. A total of 128 fishes was examined of which 15 fishes were infested with an overall prevalence of 11.72% out of 128 fishes examined. Qualitatively, 130 parasites were recovered from *Clarias gariepinus*. All recovered parasites were protozoan, although they were not identified to species level. These includes *Trichodina species, Ichthyophthirius multifilis* and *Protozoan cysts.* The parasite load in *Clarias gariepinus* increased with age and the gills was the organ mostly infested. Protozoan parasite load of fishes in the different length class had a probability level of 0.381 and did not differ significantly (P>0.05). The present study showed that the infestation rate of Protozoan parasites in *Clarias gariepinus* from the Great Kwa River was low.

**Keywords:**
*Protozoan parasites, Clarias gariepinus, and Great Kwa River*

## Introduction

Parasitic infection gives an indication of the water quality, since, they occur abundantly and diversely in polluted waters, and are capable of causing harm to fish through injury on the tissues or organs. In general, protozoans are one of the major sectors of fish parasites that have been long neglected because of its inherent difficulty in studying compared to other larger parasites. Among protozoan, ecto-and endo parasitic protozoa, attack the fish, causing massive destruction of skin and gill epithelium. A moderate infection of these organisms on fish may prove a fatal disease, since the fish may stop feeding prior to the infection (Klinger and Francis-Floyd, 2000).

*Clarias gariepinus* is one of the most popular food fish in Nigeria, it is delicious and is relished very much in food (Skelton, 2001). It is a good source of high quality animal proteins, as well as minerals, vitamin A and D from fatty fish speciess, as well as thiamine (B1), riboflavin (B2) and niacin, which are essential for human health and growth (FAO, 1995). *Clarias gariepinus* is one of the most resistant, widely accepted and highly valued fish that could be cultivated in Nigeria. There is need for documented research on protozoan parasites; which may constitute serious problems to this fish (Dankishiya and Zakari, 2007). However, there are only few reports of parasites causing mortality or serious damage to the fish population, but this may be largely because such effects go unnoticed, thus the basis of this research. This study provided information on the prevalence, abundance, intensity and incidence of protozoan parasites of *Clarias gariepinus* by size and to identified protozoan parasites affecting *Clarias gariepinus* from the Great Kwa River, Calabar.

## Materials and Methods

### *Study Area*

This study was carried out in the Great Kwa River, which is one of the major tributaries of the Cross River Estuary. It takes its course from the Oban Hills in Aningeje, Cross River State, which flows southwards and discharges into the Cross River Estuary around latitude 4°45'N and longitude 8°20'E (Akpan, 2000). The lower reaches of the river drain the eastern coast of the Calabar Municipality, the capital of Cross River State, Nigeria (Figure 1).

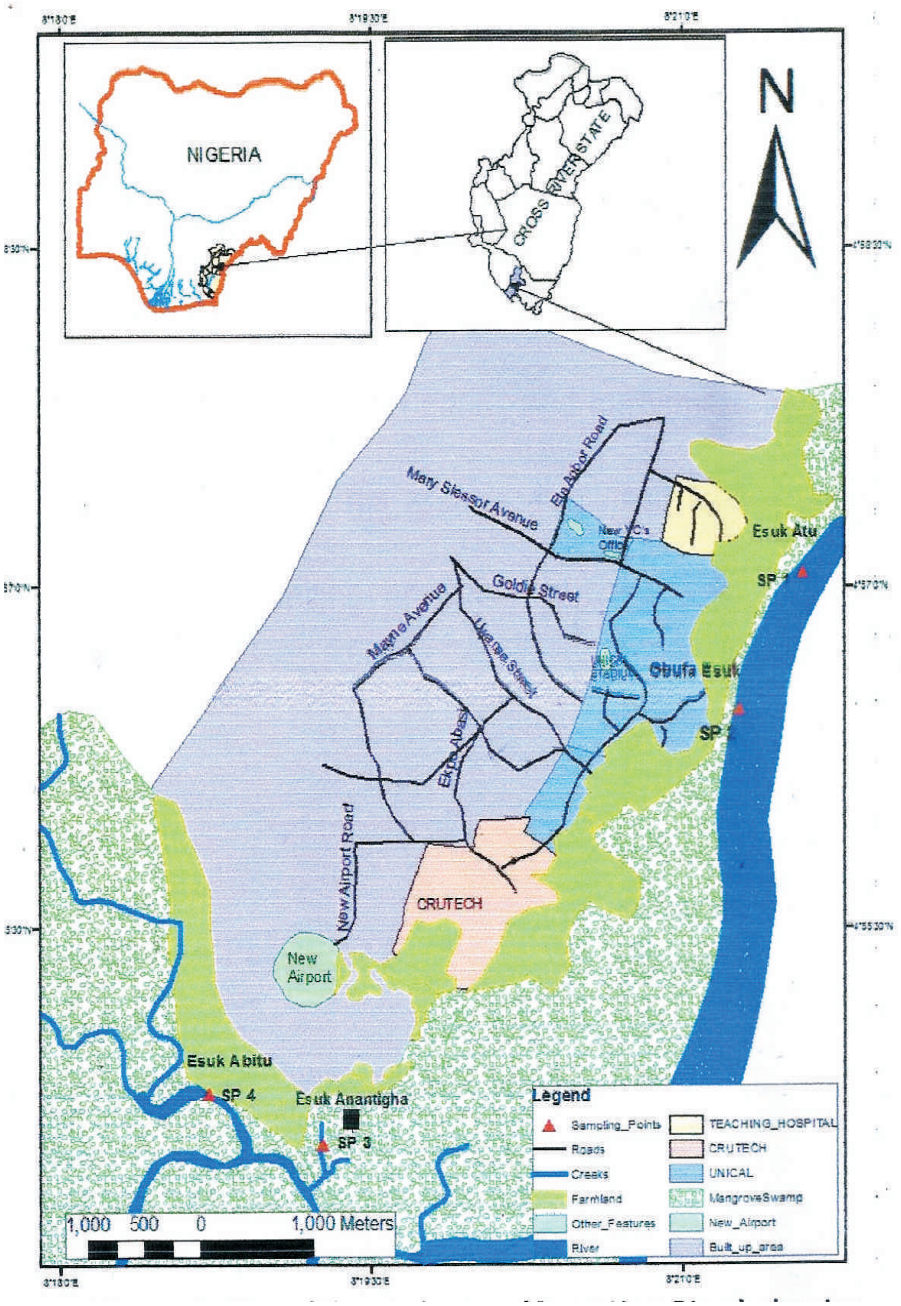


**Figure 1:** Map of Kwa River

***Collection of Samples***

One hundred and twenty-eight specimens of *Clarias gariepinus* were collected by means of hooks, scoop nets, hand fishnets and cast nets by hired fishermen, into transparent plastic buckets, containing water sample from the respective habitat of the fish species. The samples were transported to the Fisheries and Aquaculture Laboratory, Institute of Oceanography (IOC) University of Calabar, where they were examined.

***Microscopy and Identification of Samples for Ectoparasites***

Scrapings from the fins, skin and gills of the fish specimen were smeared on clean glass slides, covered with cover slides and examined under light microscopes for protozoan parasites. Skin scrapings and wet mounts from fins, skin and gills were examined for abundance and distribution of protozoan parasites. Each sample was examined independently for parasites according to the protocol outlined in Obiekezie and Ekanem (1995). Identification of parasites was carried out according to parasites identification keys given by Paperna (1996), and Roberts and Janvoy (2000).

**Percentage Incidence of Protozoan Parasites**

The percentage incidence of protozoan parasites was calculated according to Tombi and Bilong (2004). Percentage incidence (%) = (n/N) x 100. Where, n = number of individual parasite species isolated and N = total number of parasites isolated from individual fish.

*Numerical Abundance of Protozoan Parasites*

The numerical abundance of protozoan parasite from the Great Kwa River was determined by direct count, and was calculated as given below:
Abundance = Number of parasite/ Number of fish examined.

*Prevalence of Protozoan Parasites*

Prevalence of protozoan parasites of *Clarias gariepinus* from the Great Kwa River was calculated as: Prevalence (%) = Number of infected fish/ Total number of fish examined X 100.

*Intensity of Protozoan Parasites*

Intensity of protozoan parasites of *Clarias gariepinus* from the Great Kwa River was calculated as: Intensity = Number of collected parasites/ Number of infected fish.

*Statistical Analysis*

The analytical technique applied to the raw data generated from laboratory examination was done using the computational software *(MINITAB 14)*. Number of parasites obtained for the length classes was subjected to One-way analysis of variance (ANOVA) for significant difference at the 0.05 probability level.

**Results**

The prevalence of protozoan parasites in relation to length class (Table 1) showed that parasites were most prevalent in fishes of length class 41 - 50.9cm, with a prevalence of 15.4%, followed by length class 11- 20.9cm, with a prevalence of 13.04%, followed by length class 21-30.9cm, with a prevalence of 10.84%, and followed by lengthy class 31 - 40.9cm, with a prevalence of 9.4%.

The abundance of protozoan parasites in relation to length class (Table 1) showed that parasites were most abundant in fishes of length class 11 - 20.9cm, with an abundance of 2.33, followed by length class 41 - 50.9cm, with an abundance of 0.38, followed by length class 21 - 30.9cm, with an abundance of

0.32, and followed by length class 31- 40.9cm, with an abundance of 0.19.

The intensity of parasites in relation to length class (Table 1) showed that parasite intensity was high in fishes of length class 11 - 20.9cm, with an intensity of 17.83, followed by length class 21 - 30.9cm, with an intensity of 3, followed by length class 41 - 50.9cm, with an intensity of 2.5 and followed by length class 31 - 40.9cm, with an intensity of 2. Table 1 shows the prevalence, abundance and intensity of fish examined and infested in relation to length class (cm) accordingly.

**Table 1:** Number and percentage prevalence, abundance, and intensity of C*larias gariepinus* infected

| Length Class (cm) | No. and % of fish examined | No. of fish infected | Total no. of parasites extracted | Prevalence (%) | Abundance (%) | Intensity (Unit) | % of fish infected |
|---|---|---|---|---|---|---|---|
| **11 – 20.9** | 46 | 6 | 107 | 13.04 | 2.33 | 17.83 | 40.0% |
| **21 – 30.9** | 37 | 4 | 12 | 10.81 | 0.32 | 3 | 26.7% |
| **31 – 40.9** | 32 | 3 | 6 | 9.4 | 0.19 | 2 | 20.0% |
| **41 – 50.9** | 13 | 2 | 5 | 15.4 | 0.38 | 2.5 | 13.3% |
| **Total** | 128 | 15 | 130 | 11.72 | 1.02 | 8.67 | 100 |

**Incidence of Protozoan Parasites in relation to Length Class and Organ Specificity**

The incidence of protozoan parasites in relation to length class (Table 2) revealed that parasites were more prevalent in length class 11-20.9cm, with a total of 107 parasites, followed by length class 21-30.9cm, with 12 parasites, followed by length class 31-40.9cm, with 6 parasites and lastly by length class 41-50.9cm, with 5 parasites respectively.

*Break down of recovered parasites*

In length class 11-20.9cm; 107 parasites were recorded. 19 *Trichodina* species with percentage incidence of 17.75% recovered from the skin, 23 *Protozoan cysts* (21.50%) recovered from the gills and 65 *Ichthyophthirus multifilis* (60.75%) recovered from the gills.

**Table 2:** Incidence of Protozoan parasites in relation to length class and organ specificity

| Length Class (cm) | Total no. of Parasites recorded | Parasite species Found | No. of Parasite Species | % incidence of parasites | Organs |
|---|---|---|---|---|---|
| **11 – 20.9** | 107 | *Trichodina species* | 19 | 17.75 | Skin |
| | | *Protozoan cysts* | 23 | 21.50 | Gills |
| | | *Ichthyopthirius multifilis* | 65 | 60.74 | Gills |
| **21 – 30.9** | 12 | *Trichodina species* | 1 | 8.33 | Skin |
| | | *Protozoan cysts* | 9 | 75 | Gills |
| | | *Ichthyopthirius multifilis* | 2 | 16.7 | Gills |
| **31 – 40.9** | 6 | *Trichodina species* | 2 | 33.3 | Gills |
| | | *Protozoan cysts* | 4 | 66.7 | Gills |
| **41 – 50.9** | 5 | *Trichodina species* | 1 | 20 | Gills |
| | | *Protozoan cysts* | 4 | 80 | Gills |

In length class 21-30.9cm; 12 parasites were recorded.1 *Trichodina* species with percentage incidence of 8.33% was recovered from the skin, 9 *Protozoan cysts* with (75%) was recovered from the gills, and 2 *Ichthyophthirus multifilis* (16.7%) were recovered from the gills.

In length class 31 - 40.9cm; 6 parasites was recorded. 4 Protozoan cysts with percentage incidence of 66.67% recovered from the gills and 2 *Trichodina* species (33.33%) recovered from the gills.

In length class 41-50.9cm; 5 parasites were recorded.4 *Protozoan cysts* with percentage incidence of 80% recovered from the gills, and1 *Trichodina* species (20%) recovered from the gills.

**Analysis of Variance (ANOVA) for Number of Parasites of *Clarias gariepinus***

Analysis of Variance (ANOVA) for number of parasites of *Clarias gariepinus* in relation to length Class (Table 3) showed that there were no significant difference (P>0.05) between the number of parasites in the four length classes with a probability level of 0.381.

**Table 3:** Analysis of Variance (ANOVA) for number of parasites of *Clarias gariepinus*

| Length Class (cm) | No. of Fish infested | Mean no. of Parasites | Significant value |
|---|---|---|---|
| **11 – 20.9** | 6 | 17.83 ± 23.34 | |
| **21 – 30.9** | 4 | 3.00 ± 2.16 | 0.381 (>0.05) |
| **31 – 40.9** | 3 | 2.00 ± 1.73 | |
| **41 – 50.9** | 2 | 2.50 ± 2.21 | |
| **Total** | 15 | 8.67 ± 16.01 | |

**Discussion**

Result obtained from this study revealed a low infestation of 11.72% in fishes examined, with all recovered parasites being protozoan. This infection rate is lower than 13.6% reported for *Clarias gariepinus* in natural waters of Kano, Oniye *et al.,* (2004) but higher than 3.33% reported by Ekanem et al, (2011) for parasites of landed fishes from Great Kwa River, Calabar, Nigeria. The low infection rate in these fishes could be attributed to the sanitary condition of the river, the location of the river from residential areas, number and class of people visiting the river and their purposes.

Different kinds of Protozoan parasites were observed to be present in different locations in *Clarias gariepinus* from the Great Kwa River. *Trichodina* species were found on the skin and gills, Protozoan cysts were found in the gills, and *Ichthyopthirius multifilis* occurred on the gills where chronic infections of the fishes were observed. This could be because the gills are the centre of filter feeding and are sites of gaseous exchange. This observation agrees with the reported works of Emere and Egbe (2006), who reported highest load of Protozoan parasites in the gill of *Synodontis clarias* and Nyaku *et al.,* (2007) who also reported highest load of protozoan parasites in the gills of *Synodontis clarias, Oreochromis niloticu*s, and *Bagrus bayard* in River Benue, but this is contrary to the reported work of Ekanem et al, (2011) who reported infection of *Camallanus species* in the intestine and no parasitic infestation on the gills, skin, and fin of *Clarias gariepinus* from the Great Kwa River.

Comparing the prevalence of parasites in relation to length class (cm), bigger fishes in length class 41 - 50.9cm were observed to have higher rate of Protozoan parasites (15.4%), than the smaller ones in length class 11 – 20.9cm with 13.04%. This might be because the bigger ones cover wider areas in search of food. As a result, they take in more food than the smaller ones, and this exposes them more to infection by parasites. Emere and Egbe (2006) had made similar observation in bigger *Synodontis clarias* than the smaller ones in Jeremiah Usein River, Gwagwalada, Nigeria. However, protozoan parasite load of fishes from the Great Kwa River in the different length class had a probability level of 0.381 and did not differ significantly (P>0.05).

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