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Helminthes Load in Two Species of Fish of River Benue: Case Study of Ibi Fishing Site

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ABSTRACT

This study was undertaken to compare helminthes parasite load in relation to the sexes of *Clarias gariepinus* and *Oreochromis niloticus* of River Benue at Ibi fishing site and their significant differences. A total of one hundred and fifty two (152) individuals *Clarias gariepinus* and Oreochromis *niloticus* were caught and 76 each in the dry season rainy season. A T-test statistical analysis was used. Total helminthes load observed in *C. gariepinus* for both seasons was 139.00. The females had higher helminthes load (50.36%) while the males had lower (49.64%). Table 2 shows helminthes load of *O. niloticus* in both seasons. Total helminthes load observed in *O. niloticus* for both seasons was 93.00. The females also had higher helminthes load (67.74%) while the males had lower (32.36%). Total helminthes load observed in both species was 232.00. The females also had higher helminthes load (57.33%) while the males had lower (42.67%). There was no significant difference (p>0.05) in the helminthes load in both species. However, the female had higher helminthes load (mean: 2.76±0.36) and the male had lower (Mean: 2.58±0.35). There was no significant difference (p>0.05) in the helminthes load in *Clarias gariepinus*. However, the female had higher helminthes load (mean: 3.17±0.51) and the male had lower (Mean: 2.28±0.49). There was no significant difference (p>0.05) in the helminthes load in *Oreochromis niloticus*. However, the female had higher helminthes load (Mean: 3.05±0.42) and the male had lower (Mean: 2.13±0.44). It may be concluded that helminthes parasites exist in *Clarias gariepinus* and Oreochromis *niloticus* of River Benue at Ibi Fishing Site. Therefore, fish caught in this river should be treated against helminthes parasites.

INTRODUCTION

Fish are the most diverse groups of vertebrates occupying a variety of marine and freshwater habitat (DACA, 2006). Fish represent a very important food source providing comparatively cheap source of animal protein for man and his livestock (Komatsu and Kitanishi, 2015). Moreover, about a third of the world population, for example several million people in Africa, depend on fish for their livelihood from fishing, processing, transporting, and retailing (World Book, 2001).

Throughout the tropics *Claias gariepinus*, *Oreochromi niloticus, Cyprinus carpio* and *Barbus intermedius* are the common catches (Ayanda and Egbamuno, 2012; Kawe *et al*., 2016). They inhabit calm fresh water ranging from lakes, streams, rivers, swamps

to flood plains many of which are subject to seasonal drying. They survive during the dry season due to the possession of accessory air breathing organ (Akinsanya and Otubanjo, 2006; Ayanda and Egbamuno, 2012).). According to Adewumi and Olaleye (2011) *Clarias gariepinus* hold great prospect for fish farming in Nigeria. These authors emphasized that the wide geographical spread, high growth rate and the resistance to handling and stress has made C. gariepinus well valued in a wide number of African countries. In most part of the world, fish production is mainly from the wild. As the world population grows, fish resources are being depleted at an increasing rate as a result of environmental degradation, over harvesting, pollution thus fish production could no longer meet the demand of the growing population (Ayanda and Egbamuno, 2012).

According to Biu *et al*. (2014) and Murray (2005) the low supply of fish has led to increase in the involvement of stakeholders in aquaculture leading to problems of overcrowding, poor environmental conditions and pollution thereby reducing the immunity of fish and higher susceptibility to parasites and diseases. The occurrence of a wide variety of fish diseases remains a major constraint to successful economic development (Yimer and Eneyew, 2003). Diseases of fish are known to cause productivity losses from high mortality, both in aquaculture and extensive inland fisheries aside from being causes of human diseases in many areas of the world (Biu *et al*., 2014). Kawe *et al*. (2016) asserted that fish parasites are among the major pathogens, which cause fish diseases and spoil the appearance of fish thus resulting in consumer rejection. Several groups of parasites belonging to helminthes, arthropods and protozoan are known to infect fish and produce harmful effects on their hosts. Gaherwal *et al*. (2016) and Omeji *et al*. (2013) reported the common helminth parasites of fish are nematodes (*Procamallanus laevionchus* and *Rhabdochona congolensis*), cestodes (*Polyonchobothrium clariae*) and trematodes (*Allocreadium* spp and *Heterophyidae* spp). Unfortunately there has not been a well report of helminthes load of wild fish in the study area; this is why it necessitated to carry out this study in order to determine the helminthes load in two species of fish of River Benue: case study of Ibi Fishing Site.

MATERIALS AND METHODS

Study Area

Ibi is a town and an administration district in Taraba State, Nigeria. The town is located on the south bank of the Benue River opposite the influx of the much smaller Shemankar River. Both the Taraba River and the Donga River flow into the Benue River within this Local Government Area. The approximate length of the Ibi fishing site is 100km. Ibi falls within the Northern Guinea Savanna (woody) and the vegetation along the course of the River is sparse with trees, shrubs and grasses. The coordinate of Ibi are 80^{o} 19^{o}, 90^{o} 51E/8.317oA N9.850oE having a total land area of 2,672km (1.032sqml) with a population of 84,054 according to 2006 census (Fig 1 and 2).The climate of the area consist of two seasons, the rainy season begins at early April and ends towards the end of October. The dry season starts from early November to late March. Ibi, as one of the metrological centers in Taraba State exhibit a trend of increasing temperature and rainfall with the peak rainfall in July, August and September; accompanied with flood on both sides of the river (Oruonye, 2014).The soil consist of sandy loam soil and clay loam. The extensive flood plain on either side of river encourages farming activities and important crops include yam, cassava, guinea corn, maize, tomatoes and beans. Other important anthropogenic activities include cattle grazing by Fulani, buying and selling of fish (fresh and smoked), transportation of people and lugages across the river by boats

Ibi town is made up of predominantly fishermen, fish sellers, navigators (boat drivers), farmers and business men. Most of the fisher men are indigenes with a few migrants. The Nwongo fishing festival is one of the major fishing events in the area. Economic fish species include *Tilapia* (*Oreochromis niloticus*), Mud fish (*Clarias guillaris*), Nile perch (*Lates niloticus*,), Silver site (Alestes *macroleptilotis*), *Heterotis niloticus, Polypterus senegalus, Malepterurus electricus, Protopterus annectens, Mormyru srume* (Oruonye, 2014).

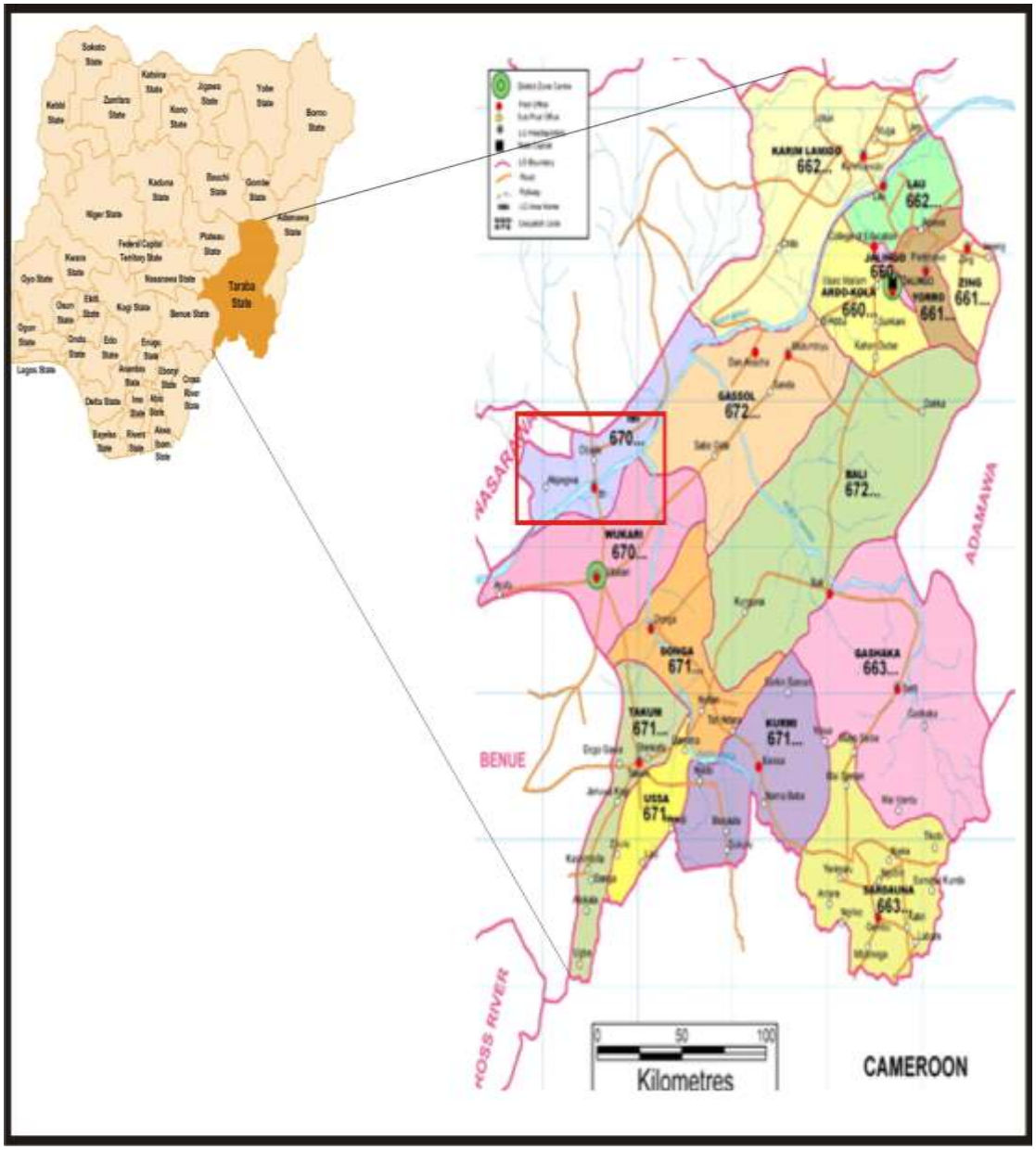

Figure 1: Map of Nigeria showing Taraba state with the study area marked in the red rectangular box
Source: Oruonye (2014)

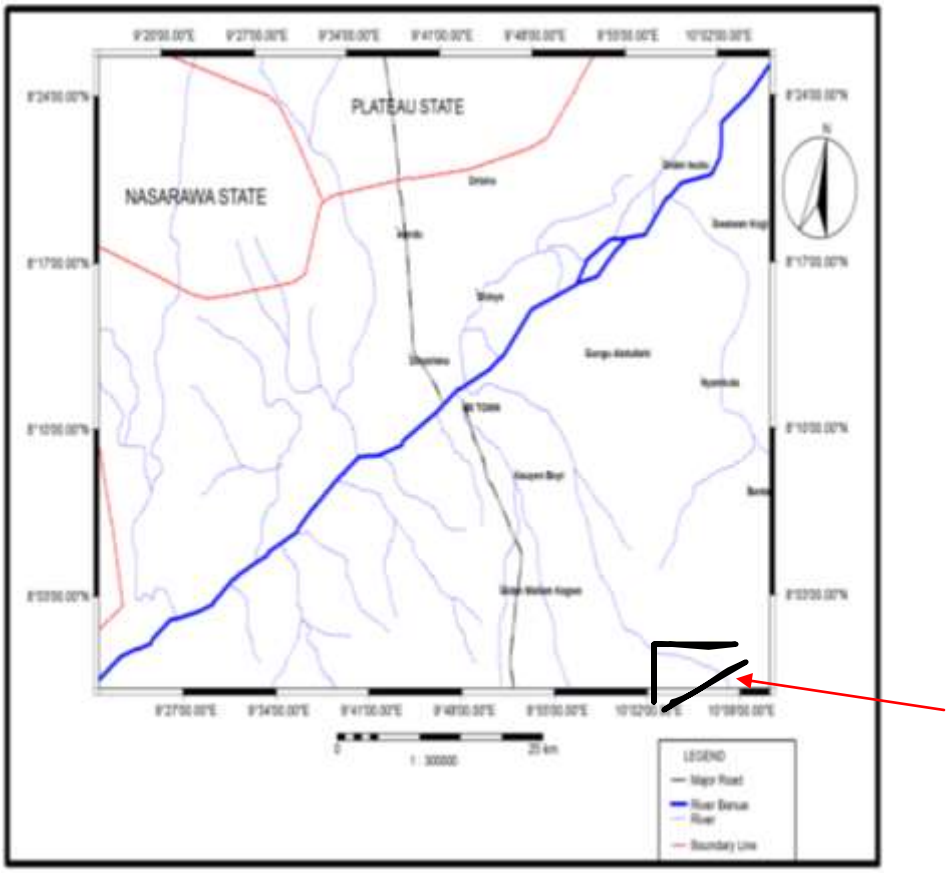

Figure 2: Survey Map of River Benue at the Ibi fishing Site (100km length of the r
Source: Oruonye (2014)

Collection of Specimens

A total of one hundred and fifty two (152) fishes were used. Fish were collected early in the morning and kept in polythene bags filled with oxygenated water carefully labeled. All sampling procedures followed that of Marcogliese (2001). The fish were transported to the Hydrobiology and Fisheries Laboratory in Zoology Department of the University of Jos.

Dissection of Fish and Identification of Parasites

Dissection of specimen was done using dissection board and kit. The body cavity was open following the procedure of Ogbeibu *et al*. (2014). Identification of parasites was made following standard keys in literature Nematodes were cleared with lactophenol while the cestode and trematodes were stained overnight with a weak Ehrlich's haematoxylin solution and passed through graduated alcohol (30, 50, 70, 90% and absolute) for 45 min to dehydrate, cleared in methylsalicylate (Amlacher, 2005; Pouder *et al*., 2011). All parasites collected were fixed and preserved in 70% ethanol (Amlacher, 2005, Marcogliese, 2001).

Analysis of Data

The data generated was analyzed using descriptive statistics and t-test was used to to find out the differences between the sexes of the fish species.

RESULTS

Generally, the helminthes parasites observed in the fishes were nematodes, cestode and trematodes.

Table 1 shows helminthes load of *C. gariepinus* in both seasons. Total helminthes load observed was 139.00. The females had higher helminthes load (50.36%) while the males had lower (49.64%).

Table 1: Helminthes parasite load of *C. gariepinus* in both seasons

Sex	Number of fish examine	Parasite Load	%
Male	38.00	60.00	49.64
Female	38.00	70.00	50.36
Total	**76.00**	**139.00**	**100.00**

Helminthes load constitute Nematodes, Cestodes and Trematodes

Table 2 shows helminthes load of *O. niloticus* in both seasons. Total helminthes load observed was 93.00. The females also had higher helminthes load (67.74%) while the males had lower (32.36%).

Table 2: Helminthes parasite load of *O. niloticus* for both season

Sex	Number of fish examine	Parasite Load	%
Male	38.00	30.00	32.26
Female	38.00	63.00	67.74
Total	**76.00**	**93.00**	**100.00**

Helminthes load constitute Nematodes, Cestodes and Trematodes

Table 3 shows helminthes load in both species for both seasons. Total helminthes load observed was 232.00. The females also had higher helminthes load (57.33%) while the males had lower (42.67%).

Table 3: Helminthes parasite load in both species for both seasons

Sex	Number of fish examine	Parasite Load	%
Male	76.00	99.00	42.67
Female	76.00	133.00	57.33
Total	**152.00**	**232.00**	**100.00**

Helminthes load constitute Nematodes, Cestodes and Trematodes

Table 4 shows prevalence of helminthes load in both species for both seasons. There was no significant difference ($p>0.05$) in the helminthes load in individual fish. However, the female had higher helminthes load (mean: 2.76±0.36) and the male had lower (Mean: 2.58±0.35).

Table 4: Prevalence of helminthes parasites in both species for both seasons

Sex	Number of fish examine	Helminthes (Mean±SD)
Male	76	$2.58±0.35^{NS}$
Female	76	$2.76±0.36^{NS}$

SD = standard deviation,
^{NS} Helminthes load do not differ significantly ($P>0.05$)
Helminthes load constitute Nematodes, Cestodes and Trematodes

Table 5 shows prevalence of helminthes load in *Clarias gariepinus*. There was no significant difference ($p>0.05$) in the helminthes load in individual fish. However, the female had higher helminthes load (mean: 3.17±0.51) and the male had lower (Mean: 2.28±0.49).

Table 5: Prevalence of helminthes in *Clarias gariepinus*.

Sex	Number of fish examine	Helminthes (Mean±SD)
Male	38	2.28±0.49^{NS}
Female	38	3.17±0.51^{NS}

SD = standard deviation,
^{NS} Helminthes load do not differ significantly (P>0.05)
Helminthes load constitute Nematodes, Cestodes and Trematodes

Table 6 shows prevalence of helminthes load in *Oreochromis niloticus*. There was no significant difference (p>0.05) in the helminthes load in individual fish. However, the female had higher helminthes load (mean: 3.05±0.42) and the male had lower (Mean: 2.13±0.44).

Table 6: Prevalence of Helminthes in *Oreochromis niloticus*

Sex	**Number of fish examine**	**Helminthes (Mean±SD)**
Male	38	2.13±0.44^{NS}
Female	38	3.05±0.42^{NS}

SD = standard deviation
^{NS} Helminthes load do not differ significantly (P>0.05)
Helminthes load constitute Nematodes, Cestodes and Trematodes

DISCUSSION

In this study the percentage prevalence of helminthes parasites in most cases was higher in the females than males of *Clarias gariepinus* and *Oreochromis niloticus* obtained from River Benue at Ibi Fishing Site. However, statistically, there was no significant difference (P>0.05) observed in the helminthes loads between the males and female This result agrees supported the report of Olurin and Somorin (2006) who reported no significant difference in helminthes loads between males and females of *Saratherodongalilaeus*. However, the present finding disagrees with the report of Goselle *et al.* (2008) who reported that female fish have higher helminthes infection than males. Also, this result is not in agreement with the report of Kawe *et al.* (2016) who reported high helminthes infection in females at 75.29% in *C. gariepinus* and 73.90% in *Tillapia. Zilli*. Other scientists like Ohaeri (2012) and Ukpai (2001) also reported higher prevalence of helminthes parasites in fish and also higher significant difference between the males and females with the females having heavy helminthes load. The influence of sex on the susceptibility of animals to infestations could be attributed to genetic predisposition and differential susceptibility owing to hormonal control. The physiological peculiarities of the female animals constituting stress and lowering the immunity make them vulnerable to infestation, emaciation and event death (Kawe *et al*., 2016; Singh *et al.,* 2016).

CONCLUSION

The results obtained showed that *C. gariepinus* and *O. niloticus* of River Benue at Ibi fishing site had a prevalence of helminth parasites. For this reason fish caught from this river should be treated against helminthes parasite.

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