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PREVALENCE OF THE HELMINTH PARASITES OF Oreochromis niloticus and Clarias gariepinus IN LAKE GERIYO JIMETA YOLA, ADAMAWA STATE

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ABSTRACT: An investigation was carried out to compare the helminthic infections of some common species of fish namely; *Oreochromis niloticus* and *Clarias gariepinus*, from the Lake Geriyo,Yola. Out of (120) samples, 48 were infected (40%). The findings indicated that both fish species were infected at (74.6%) in males of *Oreochromis niloticus* and *Clarias gariepinus* and (52.4%) in females of both *Oreochromis niloticus* and *Clarias gariepinus*. There was significant different in the rate of infection between males and females of the two group of fish at (P< 0.05). The common helminthes isolated in the two groups of fish were *Clinostomium* species (53.8%), *Procammalanus* species (35.7%), *Serracdacnitis serrata* (44.4%), and *Wenyonia* species (25.0%) in *Oreochromis niloticus*. In *Clarias gariepinus*, *Clinostomium* species (46.1%), *Procammalanus* species (64.3%), *Serracdacnitis* species (55.6%), and *Wenyonia* species (75%) in *Clarias gariepinus*. There is no significant difference at (P> 0.05). Since some of these parasites are zoonotic to fish eating birds and mammals, the fish consumers should avoid eating half cooked fish and also the public health unit of the local government should create awareness to educate the populace on the need to keep hygiene when cooking fish and also infected person should be well treated.

***Keywords*:** Prevalence, Helminth, Oreochromis niloticus, Clarias gariepinus.

INTRODUCTION

Fishes are the earliest known vertebrates and flourished during the Devonian period, about 400 million years ago. They form a highly successful group of animals comprising more than 40,000 species inhabiting all the seas, rivers, lakes, dams, muddy waters, blackish waters, estuaries and all places where there is water. The fish differs from each other in size, shape and habits. A very wide distribution of fishes into a variety of habitat has resulted in numerous adaptations in their morphology, physiology and behavior (Barber, 2000).

etEconomically fish constitutes a very important group of animals and provides a rich source of food, liver oil and a number of other by-products like fish meal, fish manure etc. Fish serves as a good source of animal protein for man and his livestock. Fish therefore, forms an interesting branch of zoology and has receives considerable attention by biologists. Fishes exhibit the following common characteristics most of which are related to their permanent aquatic mode of life. Fish also provides protein for body building food containing minerals and vitamins which are nutrients essential for regulating the body process and protecting the body (Lynch, 2006). Despite its important among vertebrates, fish supply has been on decline due to threats from parasites and diseases. All animals are susceptible to disease and fish is not an exception. In artificial fish production however, parasites often cause serious outbreak of disease. Parasites of fish constitute one of the major problems confronting modern fish farming (Berber, 1998). High rate of infection reduces the level of productivity and consequently low income to fish farmers. Disease is an important factor militating against fish production. Many diseases are closely linked to environmental

deterioration and stress; once the environment is disturbed, the organisms under such culture systems are stressed (Krause and Godin 1996). In Nigerian the level of awareness of the impact of disease to aquaculture is lacking as revealed by Berber and Wright (2006). The importance of parasitic infections on fish production has largely remained an issue of concern to fish farming industry. Some parasites have been discovered to have zoonotic potential in mammalian hosts including man thereby making them of public health importance. However, in instance where hosts are overcrowded such as in aquaria and fish farms, parasitic disease can spread very rapidly causing gross mortalities (Paperna, 1996). In fish farming or aquaculture, some parasites may be highly pathogenic and contribute to a high fish mortalities and economic loss, while in natural systems they may threaten the abundance and diversity of indigenous fish species. *Clarias gariepinus* is one of the most resistant and widely accepted and highly valued fish that could be cultivated in Nigeria. Therefore, there is need for the assessment and documentation of the different parasites of various water bodies in the country which might constitute serious problems to this important species of fish (Mashego, 2001).

The helminthes known to African fishes include the *Procamallanus mazabukae* infecting the homer fish from Zambia and *Procamallanus spiralis* infecting *Heterobranchus anguilaris* (Clariidae) from northern Africa are known also to infect amphibians. *Procamallanus* infecting fresh water fishes have been recorded in Europe and in the Neo-tropical regions. In South Africa it is a cosmopolitan parasite of fish eating birds and mammals and can reach alarming intensities without affecting the condition of the host (Paperna, 1996). It may be an adaptation that probably ensures that the larvae survive to reach the final host without killing the intermediate host. *Procamallanus laeviconchus* is always found deeply attached to the mucosa of the pyloric region of the host's stomach wall and has been shown to cause severe pathological effects (Paperna, 1996). Fish parasites may include cestodes, trematodes, nematodes and protozoans.

Nematodes are round worms of relatively simple structure; they are known to be second to insects as successful animals. Majority are parasitic, however, some are found in fresh water, mud and are widely distributed all over the world. They have the following characteristic that they are cylindrical, unsegmented, tapered at both end, they possess a body cavity and alimentary canal, usually the females are larger than the males, some have bucal capsule with teeth (Manu 2000).

Cestodes are also called tapeworms, they have posterior and exterior end, and they are hermaphrodites (monoecious) and have well developed respiratory and nervous systems more than those of the trematodes. Their bodies are segmented and have alimentary canal (Ezigb, 1990; Robert, 1996; Cheesebrough, 1998 and Manu 2004).

Trematodes are sometimes called flukes. They cause fluke disease in livestock and also in humans (*Fasiola gigantica* and *Faciola hepatica*). They are mostly unsegemented and flat, leaf like worms. *Schistosoma* are exception without a body cavity, they vary in size from 1mm to 70mm in length, and they have attachment organs, a digestive system, and the characteristic feature is that they cause damage to the parenchyma of the liver (Cheesebrough, 1999).

The main aim of this study was to carry out is a preliminary reconnaissance survey of the intestinal parasites that are found in *Clarias* and *Orechromis* from Lake Geriyo, Jimeta Yola, Adamawa State, Nigeria which could be used in fish preliminary health assessment index, with the specific objectives:

1. To access the association between sex and parasitic infections.
2. To compare infection rate by class of helminthic parasites between the two fish species
3. To determine the common helminthes in the two types of fish species in that water body.

STATEMENT OF THE PROBLEM

The parasites of fish constituted one of the major problems confronting modern fish aquaculture and traditional fishing systems. There is a high rate of infection and that reduces the level of productivity and consequently low income to the fish aquaculture and farmers generally, because heavily infected fish or even lightly infected fish particularly with cutaneous infections, when marked are likely to be rejected by consumers.

MATERIALS AND METHODS

Study area

Lake Geriyo is located at longitude 12^{o} 23E and latitude 9^{o} 81N, it is about three (3) kilometers away from River Benue, near Yola the headquarters of Adamawa state Nigeria. The lake is a natural lake which stated as a small gully that later filled with water from the rains and from some parts of the River Benue, the lake came into existence for a very long period of time.

Analysis by the Upper Benue Basin Development Authority (UBRBDA) in 1995 showed that the water temperature ranges is between 18 to 31^{o}C with a pH of 6.9 to 7.8. The lake was initially not used for fishing, but

nowadays, constant fishing activities take place almost around the year. The level of the lake is reasonably constant with regard to the movement of water in the region. This has given rise to a stable growth of water plants that gives the Basin the appearance of a typical lake. In addition, irrigation activities are going on around the lake and this attracts a large number of people to the area. And also there is a small settlement of fishermen around the area (UBRDA, 1995).

Fish collection

The collection of the sample was purchased from fishermen at the lake Geriyo in Jimeta Yola in which fish was bought irrespective of their size and sex. All the fish collection was transported to the laboratory Adamawa State University Mubi (ADSU) in separate plastic containers containing blocks of ice. In the laboratory, they were sorted out according to the type of fish; the sex was determined by observing the external genitalia and observation the gonads after dissection.

Laboratory Procedure

Sedimentation technique

The intestine for each fish was washed very well into a container containing normal saline, the gills, the surface or scales, were also washed in separate containers and mixed normal saline then it was strive through a gauze tissue, the filtrated is then centrifuged at 2000rpm for 2 minutes, the supernatant was then discarded and 10ml of normal saline was added to the sediment it was still centrifuged and the supernatant was discarded. To the residue, 7ml of formal saline was added and allowed to stand for 10minutes or longer for fixation. After that 3ml of petroleum ether was added and was centrifuged at 2000rpm for 2minutes. The tube is allowed to rest for some times, then a four (4) visible layers were seen, the top layer which is a plug of debris is discarded then the 10% of formalin saline is added, using a pastures pipette a drop of the spacemen is smeared on the slide and was viewed under microscope (Cheesebrough, 1989).

Microscopy

The specimens were viewed under microscope with lower power (X10) and then with higher power objective lens (X100). Parasites were identified based on the characteristic forms, that is the eggs (Ova), cysts and larvae as described by Jeffery and Leech (1995) then the result are recorded accordingly.

Statistical method

The analysis of variance (ANOVA) statistical method was used to analyze the data.

RESULTS AND DISCUSSION

RESULTS

A total of 120 fish were dissected for investigation, 60 of each species; Oreochromis niloticus and Clarias gariepinus and recorded in the tables below:.

Table 1. Rate of infection of Clarias gariepinus and Oreochromis niloticus in relatio to sex

	MALE			FEMALE		
Host species	No. Examined	No. infected	%	No. Examined	No. infected	%
Orechromis niloticus	21	13	42.9	39	10	25.6
Clarias gariepinus	19	14	31.7	41	11	26.8
Total	40	27	74.6	80	21	52.4

P>0.05

Table 2. Parasites isolated from Oreochromis niloticus and Clarias gariepinus

Fish species Parasites spp	Orechromis niloticus	Clarias gariepinus	Total	%
Clinostomium spp	7	6	13	21.7
Procamalanus spp	5	9	14	23.3
Serradacnitis serrata	4	5	9	15
Wenyonia spp	3	9	12	20
Total	19	29	48	

Table 3. Monthly Sampling and Prevalence of Oreochromis niloticus and Clarias gariepinus

	Orechromis niloticus			Clarias gariepinus		
Months	No.E	No.I	%	No.E	No.I	%
June	60	18	30	60	11	18.3
July	60	11	18.3	60	08	13.3
Total	120	29	48.3	120	19	31.6

Sixty (60) samples were collected in June of whom 30 for each of the fish species for each month the investigation lasted. In Oreochromis niloticus 18 (30%) were infected in June, 11 (18.3%) were infected in July. In Clarias gariepinus 11 (18.3%) were infected in June and 8 (13.3%) were infected in July.

DISCUSSION

Table 2; shows the distribution of infection by types parasites isolated from Oreochromis niloticus were Clinostomium species, 3 (15.8%), Wenyonia species, 5 (26.3%), Procammalanus species and 4 (21.0%), Serradacnitis serrata. In Clarias gariepinus, parasites were isolated Clinostomium species, 9 (31%), Procammalanus species, 5 (17.2%), Serradacnitis serrata and 9 (31%), Wenyonia species

Four (4) different helminthe parasites species were encountered in the 120 samples investigated. These include Clinostomium heterostum (Trematode), Procammalanus laeuichonclus and Serradacnitis serrata (Nematode) and Wenyonia species (Cestode). The result showed a significant association between the parasitic infection and sex of host (P>0.05) as shown in table 1. In Oreochromis niloticus 13 out of 21 males were infected with various species of worms giving a rate of (42.9%) and 10 out of 39 females infected with various species of worms giving a rate of (25.6%). In Clarias gariepinus on the other hand 19 males were examined 14 were infected with (31.7%) and 41 female out of which 11 were infected with a rate of (26.8%). The infection rates was recorded in male Oreochromis niloticus was (42.9%) and in Clarias gariepinus was (31.7%), while in female Oreochromis niloticus, it was (25.6%) and (26.8%) in Clarias gariepinus as showed in table 1. Procammalanus and Wenyonia seem to be the commonest worms in Claria gariepinus with 9 cases each giving an infection rate of (31%) followed by Clinostomium species with 6 cases, giving (20.7%) and Serradacnitis serrata with 5 (17.2%). In Oreochromis niloticus on the other hand, the infection rate was higher with Clinostomium species commonly known as 'grup's with 7 cases, giving (36.8%), followed by Procammalanus species with 5cases, (17.2%), serradacnitis serrata with 4 (21%) and in Wenyonia species with 3 (15.8%). This result contrasts with other studies carried out in some other parts of Africa where Hoffman and Prinsloo (1996) in a similar work, recorded 23 different worms in Clarias from South African dam of Cape Town region.

The different in parasites numbers might be due to the relatively small number of fish sampled and also to the ecological differences in the two localities. The Wenyonia species and Procammalanus species were intestinal worms and Clinostomium species was recovered from the gills of both Orechromis and Clarias. Ugwuzor, (1997) found also Procammalanus species, Serradacnitis serrata and Wenyonia species in the intestine of Polypterus loichir. It was observed that trematodes were frequently recorded from the gills. This shows that each class of parasite has a particular site of preference in the host. Akogun and Gaddard (1991) identified feeding preferences as a vital source of fish infection.

Infection was higher in the month of June for both Claries gariepinus with a rate of (18.3%) and in Oreochromis niloticus with rate of (30%). In July infection was high in Oreochromis niloticus with (18.3%) and in Clarias gariepinus with a rate of (13.3%). Disparity in infection rates in the two fish species in different months may be due mixing of different waters of the lake and the waters from the river Benue the level of water increases due to rain. This mixing of water brings about the mixing of various types of fishes from river and affluent which increases the chances of contamination. Another reason could be the increases of activities around the lake with the increase of water around the months of July and August. Akogun and Gaddard (1991) recorded that a great deal of animal activities such as watering of cattle, sheep, defecation and disposition of sewage coupled with abundance of birds and aquatic animals such as mollusk which enhance parasites life-cycle can increase the of infection. This might have been the reason for the high infection in both Clarias species and Oreochromis species.

CONCLUSION

The result of the investigation reveals Oreochromis niloticus are mostly infected by trematodes and site of infection is the gills, while Clarias gariepinus mostly infected by cestodes which prefer the intestines. Result also showed variation in month of highest infection in the two fish species. Clarias gariepinus have it highest infection in June with mostly cestodes and Oreochromis niloticus has its highest infection in June with gills trematodes.

RECOMMENDATIONS

From this study, it could be recommended that:

- Since some of these parasites are zoonotic to fish eating birds and mammals, the fish consumer should avoid eating half cooked fish. That is fish should be very well cooked before eating.

The public health unit of the local government should create awareness to educate the populace on the need to keep hygiene when cooking or dealing with fish.

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