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Prevalence of Helminthes Parasites of *Oreochromis niloticus* in the Mid Cross River Flood System, Southeastern, Nigeria

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Abstract
Parasites occurring in fishes require urgent attention, particularly those that infect economically important fishes which in many cases devalue their aesthetic quality and palatability. The prevalence of helminth parasites of Nile Tilapia fish in mid Cross river flood system was studied using standard parasitological procedures. A total number of hundred and twenty (120) samples of *Oreochromis niloticus* were examined for the prevalence of intestinal helminth between September and October, 2013. Total numbers of twenty four (24) samples were infected with prevalence rate of 20.0%. Two intestinal worms were encountered, *Procamallanus laevinochus* and *Spironoura pisicola*. According to size (length based), the length class 16-20 cm TL had the highest prevalence rate 13(10.8%) while the length class 21-25 had the least prevalence rate 4(3.3%). Prevalence rate based on sex showed that 15(12.5%) males were infected while 9(7.5%) were infected. Two species of helminthes were found in the intestine of the samples with 17(14.2%) samples harbouring *P. laevinochus* and 7(5.8%) samples infected by *S. pisicola*. It is concluded that there is occurrence of helminth parasites in *O. niloticus* of the mid Cross river flood system, and thus good culinary practices should be adopted to decimate risks to human health.

1. Introduction

As the world population grows, fish resources are being depleted at an alarming rate as a result of over harvesting, and pollution, thus fish production is struggling to meet the increasing demand of the growing population. Poor environmental conditions and pollution often result in reduced immunity of fish and increased susceptibility to parasitic infestation and disease (Luque, 2004). Over seventy species of tilapine fish have been identified, though global tilapia production has been dominated by three members of the genus *Oreochromis*: Nile tilapia, *Oreochromis niloticus*: blue tilapia, *Oreochromis aureus* and mossambique tilapia, *Oreochromis mossambicus*. The worldwide harvest of fish is more than 93.7 million metric tons/year (107 million U.S. tons) and approximately six million metric tons (6.6 million U.S. tons) comes from aquaculture and farming of fish in artificial ponds and tanks (FAO, 2012). Despite this, consumers demand continues to rise. More importantly tilapia fish are highly valued throughout the world as food source. Fish are also used as feed for poultry and pigs. They can be grown in aquaculture, backyard units or pond as well as intensive agro-industrial hatcheries. Hence the role of tilapines as

part of the broader food production of tropical development countries needs further attention. Despite the large fish population, the economic benefits remain marginal due to the prevailing diseases, poor nutrition, and reproductive inefficiency and management constraints. Parasites have a detrimental effect on fish tissues and on fish growth (Kabata, 1995). This results in economic losses in fishing industry and aquaculture (Ukoli, 2007) and the share of such losses caused by helminth infections is not well known. Investigation on fish parasites and disease in most parts of Nigeria are still lagging behind (Oniye*et al*., 2004). Parasites of fish constitute one of the major problems confronting the modern fish culturists, and pathological conditions arising from parasitic infections assume a high magnitude especially under crowded conditions. All fishes are potential host to many different species of parasites that cause significant mortalities among captive and wild fish stocks. Accurate identification of parasites is therefore important so that a build-up of parasite numbers can be prevented. Information about the mode of transmission and potential intermediate hosts is often crucial to select the most appropriate management action to reduce or eliminate the problem. Present approach to treatment of parasitic diseases is largely limited to those on external surfaces and the intestinal lumen. So blood parasites and encysted worms cannot be treated effectively and economically. The Internal or endoparasites of fish inhabits the digestive tract or other organs in the body while external or ectoparasites attach themselves to the gills, skin and fins of fish (Murray, 2005). The importance of fish pathology has been realized and efforts are being made to intensify work in this field in various part of the world especially in Africa. Parasites occurring in African fresh water fishes require urgent attention; particularly those that infect economically important fishes which in many cases devalue their aesthetic quality and palatability (Olurin and Samorin 2006). Thus this paper seeks to provide valuable information on the prevalence of helminthes parasites of Nile Tilapia fish in mid Cross river flood system. Also to determine the rate of infection with these parasites and the relationship between parasite infection and length of the fish, to evaluate the relationship between helminths parasites infection and the host sex, to determine the prevalence of helminths species infecting Nile Tilapia in the mid Cross river flood system, Southeastern Nigeria.

2. Material and Methods

2.1. Study Area

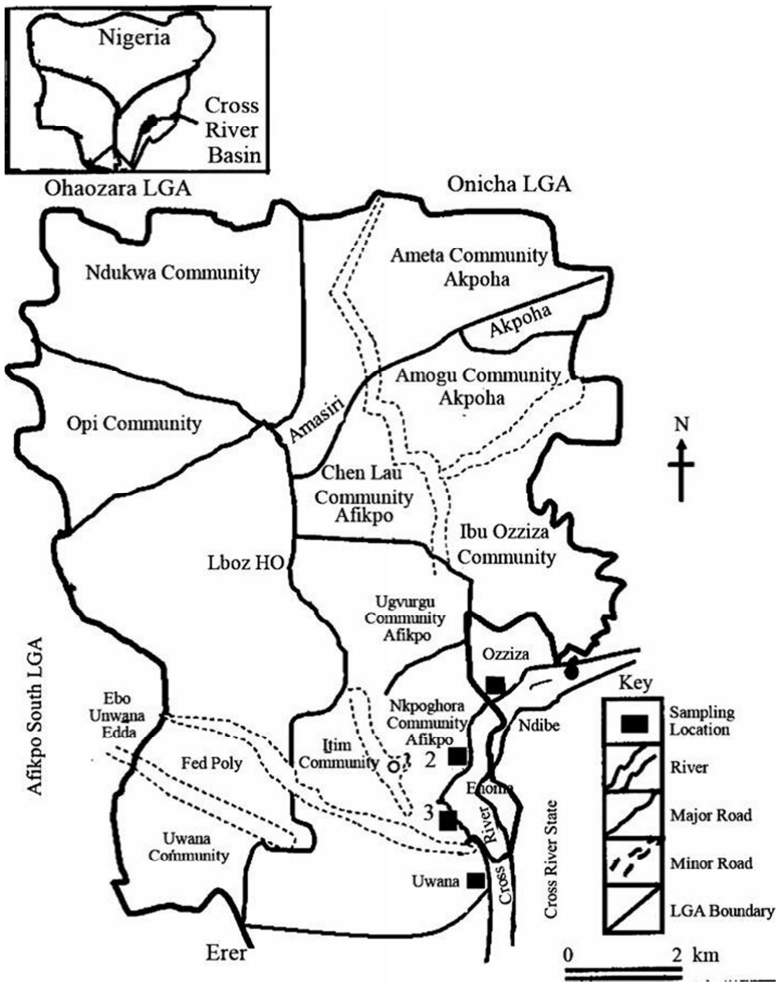

Fig. 1. *Map of Afikpo North Local Government Area showing the sampling locations in the Cross river flood system (Okoh et al., 2007).*

The mid Cross river flood system is located in Afikpo North Local Government area, Ebonyi state. The river system is located in between the longitude of 7^0 58' and $5^0$30' 20" East and latitude of 5^0 57' and $5^0$30' 20" North (Fig. 1). The river is also affected by the seasons of the year, which are dry and rainy season. During the rainy season (April-October), the level of the water increases so rapidly and water body becomes muddy due to the deposition silt from the resultant flood and the water transparency is reduced while during the dry season (November-March) the water level reduces and transparency increases.

2.2. Sample Procurement

The fishes were bought from the fishermen who caught the fish using cast net and lift net at the mid Cross river system, between September and October, 2013. Samples were then transported in plastic containers to the parasitology unit of the laboratory of the department of Applied Biology, Ebonyi State University, Abakakaliki, Nigeria to be examined for helminthes parasites. One hundred and twenty (120) fishes, Nile tilapia (*O. niloticus*) of different sizes were collected and preserved in 100% ethanol.

2.3. Laboratory Analysis

Nile tilapia was identified as described by (Teugels G.G. and Thys van den Audenaerde 1991). The total length was measured using a meter rule mounted on a dissecting board (Lowe McConnell, 1972). The fish were sacrificed using the mechanical stunning method. The sex of *O. niloticus*was determined only after dissection and noting the presence of testes or ovaries (Imam and Dewu 2010). The gastrointestinal tract of individual fish was dissected from the rectum to the oesophagus and all helminths seen were carefully detached, processed using standard parasitological methods as described by Olurin and Samorin (2006) and identified based on their morphological features as described by (Kabata, 1995). Thus parasites obtained were counted and placed in physiological saline overnight in a refrigerator and later fixed in 5% formalin later. They were stained overnight with Ehrlich's haematoxylin solution and passed through graduated alcohol levels (30, 50, 70, 90 % and absolute) for 45 minutes to dehydrate, cleared in xylene and mounted on a glass slide in Canada balsam for examination and identification under the light microscope at x10. Nematodes were cleared in lactophenol, and examined under the light microscope at x10 and x40 magnification (Biu and Akorede, 2013).

2.4. Statistical Analysis

Chi square analysis was used to compare prevalence rates based on parasite species, sex and length groups of the sampleswith "p" values equal to 0.05 considered significant.

3. Results

A total number of hundred and twenty (120) samples of *O. niloticus* were examined for the prevalence of intestinal helminth. Total numbers of twenty four (24) samples were infected with prevalence rate of 20.0% (Table 1). Two intestinal worms were encountered, *Procamallanus laevinochus* and *Spironoura pisicola*. According to size (length based), the length class 16-20 cm TL had the highest prevalence rate 13(10.8%) while the length class 21-25 cm TL had the least prevalence rate 4(3.3%) (Table 1). Prevalence rate based on sex showed that 15(12.5%) males were infected while 9(7.5%) were infected (Table 2). Two species of helminthes were found in the intestine of the samples with 17(14.2%) samples harbouring *P. laevinochus* and 7(5.8%) samples infected by *S. pisicola* (Table 3).

Table 1. *Prevalence of helminths parasite based on size of O. niloticus in mid Cross river system.*

Size (length cm)	Total no. examined	No. infected	Percentage infected
10-15	40	7	5.8
16-20	53	13	10.8
21-25	27	4	3.3
Total	120	24	20.0

Table 2. *Prevalence of helminths parasite based on sex of O. niloticus in mid Cross river system.*

Sex	No Examined	No. Infected	% Infected
Male	62	15	12.5
Female	58	9	7.5
Total	120	24	20.0

Table 3. *Prevalence of helminths species infecting O. niloticus in mid Cross river system.*

Helminth parasites	No. of fish samples infected	% Infected
Procamallanuslaevinochus	17	14.2
Spironourapisicola	7	5.8
Total	24	20.0

4. Discussion

This study on the prevalence of helminths of Nile *Tilapia* in Cross river flood system has revealed an overall helminths parasite prevalence of 20.0% consisting of *Procamallanus and Spironoura* spp indicating one fifth of the sampled population being infected. Similar studies have been reported on helminth infections in from some rivers in Southern Nigeria (Awharitowa and Ehigiator, 2012), in Jos Plateau (Onwuliri and Mgbemena, 1987) and in river Oshun and Owa stream both in Southwestern Nigeria (Olurin and Samorin, 2006) and (Olurin*et al*., 2012). Also previous reports have shown that helminths are generally found in all freshwater fishes, with their prevalence and intensity dependent on factors of parasite species and their biology, host and its feeding habits, physical factors and hygiene of the water body, and presence of intermediate hosts where necessary (Hussen *et al*., 2012). In this study more males were infected than female with no significant difference (χ^2 = 1.15, df = 2,p = 0.05). However, there are inconsistent explanations in literature as regards the relationship between sex and prevalence, some indicating positive correlation and others showing the converse (Olurin *et al*., 2012). Nonetheless, (Emere, 2000) reported differences in the incidence of infestation between male and female fish, and attested it to differential feeding either by quantity or quality of food eaten, or as a result of different degrees of resistance or infection. (Emere and Egbe 2006) also reported that due to the physiological state of the female, most gravid females could have reduced resistance to infection by parasites. *O. niloticus* in length categories between 10-15 cm and 16-20 cm recorded higher helminths prevalence compared with groups between 21 -25cm with no significant difference (χ^2 = 1.41, df = 1,p = 0.05). This agrees with (Akinsanya *et al.*, 2007), that the low level of immunity in the smaller sized fish could explain the high prevalence of helminthosis, but contradicts (Olurin and Samorin 2006) and (Ray, 2005) who observed that the larger the fish, the greater the susceptibility to parasite infection, as adult fish consumes a great variety of foods and exhibit a great variety of feeding styles, hence the correlation of prevalence of parasitic infections with fish length which in turn corresponds to fish age [Hussen *et al*., 2012].

In conclusion, there is occurrence of helminth parasites in Nile Tilapia (O. *niloticus*) of the mid Cross river flood system, and thus good culinary practices should be adopted to decimate risks to human health and also such information will help in control of helminthes parasites in fresh water by manipulating environmental parameters to reduce helminthes parasitic infections within the ecosystem so as to establish changes in the environment, whether natural or manmade and to proffer probable biological control of helminthes parasites in the water system.

References

[1] Luque J., and PoulinR. (2004). Use of fish as intermediate host by helminth parasites. *J. of Ani. Parasitology* 49(4): 353-36.

[2] FAO. (2012). The State of World Fisheries and Aquaculture, Rome, 209.

[3] Kabata Z. (1995). Parasite and diseases of fish cultured in the tropics. *Appl. J. of Hydrobiology* 9(3): 45-67.

[4] Ukoli F.M. (2007). Occurrence, morphology and systematics of Caryophyllaeid cestodes of genus *Wenyonia* from fishes of river Niger, Nigeria. *The Journal of the West African Science Association* 17(1): 49-67.

[5] Oniye S.J., Adebote D.A. and Ayanda O.I. (2004). Helminth parasites of *Clarias gariepinus* in Zaria, Nigeria. *J. Aqu. Science* 19(2): 71-76.

[6] Murray A.G. (2005). A framework for understanding the potential for emerging diseases in aquaculture. *Prev. Vet. Med*. 67: 223-235.

[7] Olurin K.B. and Samorin C.A. (2006). Intestinal helminths of the fishes of Owa stream, South-west Nigeria. *J. Fish. Hydrobiology* 1(1): 6-9.

[8] Teugels G.G. and Thys van den Audenaerde D.F.E. (1991). Tilapia. In: Daget (J.), Gosse (J.-P.), Teugels (G.G.), Thys van den Audenaerde (D.F.E.) (eds.): Check-List of the Freshwater Fishes of Africa. CLOFFA IV. Cichlidae, ISNB, MRAC, Orstom, 482-508.

[9] Lowe McConnell R.H. (1972). *Fresh water Fishes of the Volta and Kainji lake*. Ghana University Press. Accra, 3rd ed. Pp. 154-158.

[10] Imam T.S., and Dewu R.A. (2010). Survey of Piscine ecto and intestinal parasites of *Clarias spp*. sold at Galadima Road Fish Market, Kano Metropolis, Nigeria. *J. Biosci. Res. Communications* 22(4): 209-214.

[11] Biu, A. A. and Akorede, G. J. (2013). Prevalence of Endoparasites of *Clariasgariepinus* (Burchell 1822) in Maiduguri, Nigeria. *Nigerian Journal of Fisheries and Aquaculture* 1(1): 1-6.

[12] Awharitowa A.O. and Ehigiator F.A.R. (2012). Helminth parasites of fishes from some rivers in Southern Nigeria. *African Scientist* 13(2): 65-69.

[13] Onwuliri C.O.E. and Mgbemena M.O. (1987). The Parasitic fauna of some Freshwater fish from Jos Plateau, Nigeria. *Nig. J. Appl. Fishery Hydrobiology* 4(2): 33-37.

[14] Olurin K., Okafor J., Alade A. and Oronaye O. (2012). Helminth parasites of *Sarotherodon galilaeus* and *Tilapia zilli* from river Oshun, Southwest Nigeria. *Intern. J. Aquacul. Sciences* 3(2): 49-55.

[15] Hussen A., Tefera M. and Asrate S. (2012). Gastrointestinal helminth parasites of *Clarias gariepinus* (Catfish) in lake Hawassa, Ethiopia. *Sci. J. Ani. Science* 1(4): 131-136.

[16] Emere M.C. (2000). Parasitic infection of the Nile perch (*Lates niloticus*) in river Kaduna, Nigeria J. Aqua. Science4 (15): 51-54.

[17] Emere M. C. and Egbe N .E .L. (2006). Protozoan parasites of *Synodontis clarias* (A freshwater fish) in river Kaduna, Nigeria. *Best J. Appl. and Nat. Sciences* 3(3): 58-64.

[18] Akinsanya B., Otubanjo O. A. and Ibidapo C.A. (2007). Helminth bio-load of *Chrysichthys nigrodigitatus* (Lacepede 1802) from Lekki lagoon Lagos, Nigeria. *Turk. J. Fish Aquacul. Science* 7(4): 83-87.

[19] Ray J. (2005). *Fish diseases recorded in New zeal and with a discussion on potential source and certificationprocedures*. Fish resource development occasion.Publication of New Zealand Ministry of Agriculture. 34pp.

[20] Okoh F. A., Eyo J. E. and Ezenwaji H. M. G. (2007). Species composition and abundance of castnet fishery of a tropical lotic freshwater ecosystem. *Bio-Research* 5(1): 201-206.