

AJGA 2008032/4402

Nematode infection of cultured fish (*Clarias gariepinus* and *Heteroclaris*) in intensive and semi-intensive fish tanks

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(Received March 26, 2008)

ABSTRACT: The Parasitic fauna of fish from intensive and semi-intensive fish tanks of the Department of Fisheries, University of Benin were investigated. A total of 74 fishes belonging to 2 species were examined. Routine body measurements of fish such as standard length, total length weight and sex were determined, after which the fishes were examined for both internal (endo-) and external (ecto-) parasites. The only parasite encountered was the nematode, *Procamallanus laeviconchus*. Of the two (2) fish species examined, only one (*Clarias gariepinus* from the intensive tank) was infected. The parasites were recovered from the intestines. Of the total number of fishes examined, only eight (8) representing 10.81% were infected with parasites. Sex did not influence the degree of parasite infection in the fishes.

The occurrence of parasites in the intensive tanks (housing *Clarias gariepinus*) and none in the semi-intensive tank (housing *Heteroclaris*) show that there is significant difference ($P < 0.05$) in parasitic burden between the two systems. This could be as a result of the higher stocking rate in the intensive system which could create conducive environment for parasite prevalence.

Key Word: Nematode; Cultured Fish; Fish Tank; Nigeria.

Introduction

The increased interest in all aspects of fish culture has created a need for information on the control of fish parasites. All species of fish are vulnerable to invasion by parasites. Leonard (1997) and Iman (1971) reported that many of the parasites that attack fish spend part of their life history on snails.

Studies on the parasites of fish are necessary and important because apart from affecting fishes directly, fishes are vectors of some parasites of man. In the above context, a wide range of parasitic infections of inland or freshwater fishes have been studied in various parts of the world. They include comprehensive reports on diseases prevalent in the African fish by Robert and Sommerville (1982), Paperna (1984) and Marcogliese and Cone (1996). Notable reports on Nigeria on fresh water fish parasites in different locations include the studies by Awharitoma and Okaka (1999), Onwuliri and Mgbemena (1987), Okaka (1998), Okaka and Omogberale (2006) Edosomwan et. al., (2002), Obano and Okaka (2007).

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The purpose of this study is to identify, isolate, compile and provide adequate information on freshwater parasites as observed in fish species raised in fish tanks of the department of Fisheries, University of Benin, Benin City, Edo State.

Materials and Methods

Study Area:

The fish tanks used for the study are located in the Faculty of Agriculture, University of Benin, Department of Fisheries, Benin City. The Benin City lies within latitude 6.5°N and longitude 5.8°E. Fish used for the study were reared under different conditions – intensive and semi-intensive. The main fish species cultured include *Oreochromis niloticus*, *Tilapia zilli*, *Clarias gariepinus* and the hybrid, *Heteroclaris*.

Collection of Fish Samples

In collecting the fish samples, the intensive tank (housing *Clarias gariepinus*) was totally drained and the fishes were handpicked. In the case of the semi-intensive tank (housing the hybrid), the water was partially drained after which a drag net of 1 inch mesh size was used to harvest the fish. The fish were transported live in a previously cleaned bowl to the laboratory for examination.

Fish Identification

In the laboratory, various fish organs including the gills, intestine, skin, and muscles were thoroughly examined for ecto and endo helminth parasites. Examination was done according to the method adopted by Obano and Okaka (2007). The parasites recovered were washed free of debris in saline, fixed and preserved in 3% formol-saline. The sites of parasite infection for each fish were recorded. Identification of parasites was done using appropriate keys provided by Yamaguti (1961), Paperna (1980, 1996) and Khalil *et al.* (1994).

Results

A summary of infection of the fishes with nematode parasites is given in Table 1. Of the 74 fishes examined, eight (8) were infected with nematodes. This represents 10.81% of the total number of fish examined. The nematodes recovered were of the species *Procamallanus laevisconchus* (family – Camallanidae).

The nematodes were recovered from fish intestines. No nematodes were found on the skin, gills, muscle or mouth. Also, no parasites were recorded in the specimens examined among the hybrid *Heteroclaris* samples. (reared in the semi-intensive tank)

The relationship between nematode infection and sex of fish revealed that male infection was 11.54% while female infection was 13.89% (Table 2). However, from t-test computations, there was no significant difference ($P>0.05$) in infection irrespective of the sex of fish.

Table 1: Summary of Nematode Infection of fish in the Intensive and Semi-intensive fish tanks.

Fish species	Family	No. examined	No. (%) Infected	Parasite recovered	No. % infected	Family	Location
i) <i>Clarias gariepinus</i>	Clariidae	61	8(13.11%)	<i>Procamallanus laevisconchus</i>	8(13.11%)	Camallanidae	Intestine
ii) Heteroclarias	-	13	0	-	0		
Total		74	8(13.11%)				

Table 2: Nematode Infection in Relation to Sex of fish.

Fish species	No. of males examined	No. (%) male infected	No. of females examined	No. (%) female infected
1. <i>Clarias gariepinus</i>	26	3 (11.54%)	36	5 (13.89%)
2. Heteroclarias	2	-	10	-
Total	28	3 (11.34%)	46	5 (13.89%)

Discussion

The 10.81% overall infection rate described in this study is low particularly when compared to the 16.5% reported from Asa river and its impoundment at Ilorin (Okaka, 1991) and 38.6% recorded in cultured fish at Ogba fish farm (Iwezue, 1988). In the same vein, Onwuliri and Mgbemena (1987) reported a higher prevalence of 60.4% parasitic infection in fishes from Jos Plateau, while Awharitoma and Okaka (1999) recorded 60.8% infection rate in fishes of Ikpoba River, Benin City, Nigeria. However, a much lower infection rate than the prevalence rate was reported in this study when compared with the 7.7% was recorded by Ugwuzor (1987). This confirms that infection rates (prevalence and occurrence) vary greatly from one locality to the other and may be attributable to availability of intermediate hosts, susceptibility of host to infection, ecological factors and variations in physical and chemical properties of the various study sites (Chandler and Read, 1981).

The main groups of parasites encountered in this study (nematodes) were found in the intestines and the *Clarias gariepinus* was infected. According to Smyth (1979), with a few exceptions, the food materials of adult nematodes appear to be solid or semi-digested food and debris. This, he reported may account for the presence of helminth parasites in, and their preference for the intestines of their host.

Variations in parasitic infection among the sexes of fish studied were not significant implying that higher infection rates in either the males or females were simply by a chance occurrence and there is no reason to believe that one sex should have more parasitic infection than the other.

In line with this study, Iwezue (1988) and Okaka (1999) reported the prevalence of nematodes in Ogba Fish Farm in Edo state and Asa river in Ilorin respectively. In contrast however, Onwuliri and Mgbemena (1987) as well as Obano and Okaka (2007) recorded cestodes as the most prevalent parasites in Panyan fish farm Jos and Ogba river in Benin City, Nigeria respectively.

The diversity of parasitic abundance in both species studied is much. *Clarias gariepinus* from the intensive tank had 13.11% infection rate while *Heteroclarias* from the semi-intensive tank had no infection at all. Although, it is possible that the higher stocking rate may create a conducive environment for

parasitic prevalence. The effect of the parasitic infection on the market value of the fishes was not readily obvious as there were no lesions seen on the fishes examined.

ACKNOWLEDGEMENTS: We thank Mr. U.S. Imoisi of the Department of Animal and Environmental Biology, University of Benin, Benin City, for assistance in slide preparation.

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