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The Parasites of Cultured and Feral Nile Tilapia (*Oreochromis niloticus*) in Umudike, Nigeria

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Abstract

Fifty eight specimens of Nile tilapia (*Oreochromis niloticus*) were collected between the months of August and November with the use of siene net from the culture ponds of Michael Okpara University of Agriculture, Umudike and the water reservoir of National Root Crops Research Institute, Umudike impounded from Ohii Stream. Vital morphometric data of the specimens were recorded with the aid of calibrated metre rule while visual examination of the external part of the fish specimens were carried out immediately with the naked eye and hand lens for ectoparasites. This was followed by dissecting the specimens to obtain the internal organs which were properly labeled and preserved in 4% formalin for further examination. The preserved organs were subsequently sliced separately into piece, mixed with water and examined under stereo microscope for endoparasites. The recovered parasites were placed on covered slides and examined under the light microscope. The parasites obtained from each specimen were then properly counted and classified. No significant difference was observed in the level of parasitic infection between the pond cultured (89.65 %) and the wild (93.10 %) *O. niloticus*. This may be because both the ponds and reservoir have Ohii Stream as source of water. Trematodes, Cestodes and Copepods were the major parasites found on *O. niloticus* from both habitats. Trematodes and Cestodes constituted 48.8% and 41.38% respectively for cultured *O. niloticus*, while the feral *O. niloticus* had 13.8%, 17.2% and 62.0% Trematodes, Copepods and Cestodes respectively. The Cestodes were found in the intestine of *O. niloticus* while the Trematodes and Copepods were found on the gills. Among the size groups 11–15 cm in the culture ponds had the highest occurrence of Trematodes (24.14%) while 6–10 cm class of feral habitat had the highest occurrence of Cestodes (58.62%). Similarly 6–10 cm class of reservoir *O. niloticus* had the highest (10.34%) infection of Copepods.

Keywords: Cestodes, Copepods, Nile Tilapia, parasites, trematodes

INTRODUCTION

A parasite is an organism that lives in or on another organism (its host) and benefits by deriving nutrients at the host's expense. It is also an organism which is not only in continuous, intimate association with another organism, as well metabolically dependent, directly or indirectly on its host

to some degree. Machinnis, (1976) defined parasitism as an association in which one partner, the parasite of a pair of interacting species is dependent upon a minimum of one gene or its products from the other interacting species defined as the host, for its survival. Parasites, causing little apparent damage in feral fish populations, may become causative agents of diseases of great importance in farmed fish, leading to pathological changes, decrease of fitness or reduction of the market value of fish. Parasites can be classified according to their life cycles, the position in or on the host and other features. Parasites, when classified according to their life cycles exhibit two types of life cycles. Animals parasitized by a larval stage are intermediate hosts while final hosts harbor the adult. It is quite possible for a fish to be both a final host to some parasites and an intermediate host. Few parasites are pathogenic. It is quite common to find a seemingly healthy fish with hundreds of monogenetic trematodes on its gill or tens of digenetic trematodes in its stomach. Occasionally, some parasites particularly protozoa will cause extensive harm, even leading to death. Crofton (1971) proposed that the term parasite should be restricted to organisms which are potentially capable of killing their host. But an efficient parasite will take its nourishment without causing much harm to the host. With the growing interest in development of fish culture, there is an increasing awareness of the importance of diseases and parasites as the major detrimental factors in fish culture (Paperna, 1980). Parasites affect fish production by affecting their normal physiology and reducing productivity (Kabata 1985). With mere visual observations on the fish, one can reveal symptoms that considerably facilitate the diagnosis of parasites. Some of the signs to be considered are: increased frequency of breathing, sluggish movement with no escape reaction, swimming abnormally only at the bottom or at the surface and leaping out of the water gulping air (Aderibigbe 1990).

The fish *Oreochromis niloticus* belongs to the family Cichlidae. This species of Tilapia is practically universally available while the majority of Tilapia species are still restricted to their home ranges. *Oreochromis niloticus* cultured in the University pond is in an artificially created environment for effective fish production. It involves the manual feeding of the fish in the pond, unlike the feral environment which is a natural habitat of the fish. They exist there untamed and uncultivated, feeding only on the available food present in the lotic water. In the feral environment there are no control measures to check the parasite load and the water quality. This may lead to a reduction in production of *Oreochromis niloticus* since parasites affect the physiology of fish. This study was carried out to determine the parasitic load of cultured and feral *O. niloticus* under culture conditions.

MATERIALS AND METHOD

This study was carried out between August and November, 2000. The fish samples were harvested from the different habitats – the University fish culture ponds and the National Root Crop Research Institutes (NRCRI) reservoir both in Umudike, Umuahia, Abia State. Cultured samples of *Oreochromis niloticus* were collected from the University fish pond while the feral samples were collected from the NRCRI reservoir. The specimens were immediately examined for both ecto and endo parasites. Fifty eight samples of *Oreochromis niloticus* were collected from the two habitats (culture and feral) with the use of a seine net. The vital morphometric data were recorded with the aid of a calibrated meter rule. Visual examination on the external part of the fish samples were done thoroughly with the naked eye and a hand lens for ectoparasites. Necropsy (that is post mortem examination) was done on the fish samples collected. The fish samples were killed and dissected from the anal opening to the bronchial cavity. The internal organs were carefully removed and preserved in 4% formalin for further examination. The intestine and the gill were carefully sliced separately into pieces, mixed with water and examined under the stereo microscope for endoparasites. The parasites recovered were placed on slides (covered) and examined under the light microscope. The parasites were picked out carefully from each individual fish sample and were

counted to know their prevalence, intensity and abundance in that sample. Identification of the recovered parasites to their generic level was according to Parpena, (1980).

RESULTS AND DISCUSSION

Out of 29 specimens collected from the culture pond, 26 were infected with parasites (Table 1). Of the 29 specimens from the wild, 27 were infected with parasites. These parasites can be broadly divided into Trematoda, Cestoda and Copepoda. Copepods-Ergasilus sp. were absent in the samples collected from the culture ponds. The class of parasites that have prevalent occurrence on *Oreochromis niloticus* in the cultured pond are: Trematodes (48% and Cestode 41.38%). Table 1 shows also, the class of parasites that has prevalent occurrence *Oreochromis niloticus* collected from the feral habitat: Trematodes (13.8%), copepods (17.2%) and Cestode (62.0%). Cestoda had the highest percentage of infestation in the feral population and were found in the intestine of the host. The gills of the examined specimens were found to have parasites obtaining nutrients from the well supplied blood vessels. The size of the samples affected the intensity of the parasites, as indicated in tables 2 to 4. For cultured fish, the size range of 16 – 20cm had the highest percentage of infestation (75% and 100% for Trematoda and Cestoda respectively). Copepods were only encountered in the feral populations (Table 4). Its absence on cultured population may be attributed to its sensitivity to pond management operations.

Table 1: Occurrence of Parasites on Culture and feral population of *O. niloticus* in Umudike

Type of Parasite	No. of fish examined		No. infected		% Infection		Mean intensity	
	Cultured	Feral	Culture	Feral	Culture	Feral	Culture	Feral
Trematode	29	29	14	4	48.28	13.8	2.07	7.25
Cestode	29	29	12	18	41.38	62.0	2.41	1.61
Copepod	29	29	-	5	-	17.2	-	5.8

Table 2: Occurrence of Trematoda on various Size Classes of culture and feral *O. niloticus* in Umudike

Size Range	No. Examined		No. Infected		% Infected		Mean Intensity	
	Culture	Feral	Culture	Feral	Culture	Feral	Culture	Feral
0-5	-	2	-	1	-	50.0	-	2.0
6-10	10	24	4	1	40	4.17	2.5	24.0
11-15	15	3	7	2	70	66.67	1.43	1.5
16-20	4	-	3	-	75	-	1.33	-

Table 3: Occurrence of Cestoda of various size classes of culture and feral *O. niloticus* in Umudike

Size Ranges	No. Examined		No. Infected		% Infected		Mean Intensity	
	Culture	Feral	Culture	Feral	Culture	Feral	Culture	Feral
0 - 5	-	2	-	1	-	50	-	2
6 – 10	10	24	2	17	20	70.83	5	1.41
11 – 15	15	3	6	-	40	-	2.5	-
16 – 20	4	-	4	-	100	-	1.0	-

Table 4: Occurrence of Copepoda on various size classes of cultured and feral *O. niloticus* in Umudike

Size Ranges	No. Examined		No. Infected		% Infected		Mean Intensity	
	Culture	Feral	Culture	Feral	Culture	Feral	Culture	Feral
0 - 5	-	2	-	1	-	50	-	2
6 – 10	-	24	-	3	-	12.5	-	8
11 – 15	-	3	--	1	-	33.3	-	3
16 – 20	-	-	-	-	-	-	-	-

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