



Prevalence of Gastrointestinal Helminths of *Tilapia zilli* (Gervais 1848) in Maiduguri, Nigeria

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ABSTRACT

A study on the prevalence of gastrointestinal helminths of *Tilapia zilli* was conducted from August to September, 2010 using standard parasitological techniques. A total of 150 *Tilapia zilli* were examined. The result shows that *Caryophyllaeus* species has highest prevalence of 16 (57.10%), while *Cystacanthus* and *Diphylloporium* species had 8 (28.60%) and 4 (14.30%) respectively. Based on sex male *Tilapia zilli* had higher 64.30% (18) prevalence of helminthiasis compared to that of females 35.70% (10) ($p=0,021<0.05$). *T.zilli* within the length categories of 16-20 and 21-25cm recorded a significantly ($p=0.012<0.05$) higher infection of 25.00% (7) and 60.70% (17) respectively. The lowest 14.30% (4) rate was observed in fish with 20 to 30cm categories. In conclusion, smaller *Tilapia zilli* were more susceptible to parasitic infections than larger ones.

Keywords: Prevalence, Gastrointestinal parasites, *Tilapia*, Nigeria

INTRODUCTION

Tilapia is the common name for nearly a hundred species of Cichlid fish from the Tilapiine tribe. They are mainly freshwater fish inhabiting shallow streams, ponds, rivers and lakes, and less commonly in brackish water (De Silva *et al.*, 2004). *Tilapia* feeds on algae, or any plant based food, exposing them to sources of infection by fish parasites (De Silva *et al.*, 2004). 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 (Murray, 2005). There is appreciable documentation of parasites of *Tilapia* in Nigeria. One of the earliest reports in Nigerian inland waters concerning fish parasites was that of Awachie (1965) who documented preliminary information on the parasites of fish in the Kainji reservoir. He observed that not many fishes were infected. However, in a similar study, Ukoli (1969) observed heavy parasitic infection of fish species from the same reservoir. Similarly, the reports of Oniye *et al.* (2004) in Zaria and Yakubu *et al.* (2002) in Plateau State are of great value. Various parasites are associated

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with *Tilapia* species in the wild and cultured environment where they cause morbidity, mortality, and economic losses to aquaculture in various parts of the world (Subashinghe, 1995).

Awharitowa and Ehigiator (2012) isolated *Dichelyne* species, *Echinocephalus* species, *Procamallanus laeiconchus* and *Oxyuris* species of nematodes; *Clinostomum tilapiae*, *Nemagasolena chaetodipteri* and Metacercariae of trematodes; *Wenyonia virilis*, a Cestode and *Acanthogyrus tilapiae*, an acanthocephalan, all from rivers in southern Nigeria.

There is paucity of information on helminths of *Tilapia* in Maiduguri; hence this study was designed to determine the identity and prevalence of parasites and to evaluate the relationship between infection, the sex, and length of *Tilapia* helminths.

MATERIALS AND METHODS

Sample procurement

Tilapia zilli used in this study were purchased alive from fish vendors at Lake Alau dam, Maiduguri between August and September, 2010. Samples were then transported in a plastic bucket containing clean tap water to the Veterinary Parasitology laboratory, University of Maiduguri to be examined for helminths

Laboratory methods

Tilapia zilli was identified as described by Teugels and Thys van den Audenaerde (1991). The standard length (from the tip of the snout to the end of the base of caudal peduncle) was measured using a half meter rule mounted on a dissecting board (Lowe McConnell, 1972). The fish were sacrificed using the mechanical stunning method. The sex of *Tilapia* 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 Zdensk, (1977) and Kabata, (1985). Photomicrographs were taken using Canon Powershot A470 Digital camera (Model: PC 1267 Canon Inc New York U.S.A.).

Statistical analysis

The student's t-test was used to compare prevalence rates based on parasite species, sex and length of groups of *Tilapia* with "p" values equal to or less than 0.05 considered significant (Steel and Torrie, 1980).

RESULTS

Out of hundred and fifty (150) samples of *Tilapia zilli* were investigated, the overall prevalence of intestinal helminths infection was 18.70% (28) with 64.3% (18) as male and 35.70% (10) as female ($p < 0.05$). *Tilapia* length categories between 16-20 cm and 21-25 cm recorded significantly higher helminths prevalence of 7 (25.00%) and 17 (60.70%) respectively, while prevalence was minimal in group with 26 -30cm 4 (14.30%) (Table 1).

Table 1: Prevalence of helminthosis based on the sex and length (cm) of *Tilapia zilli* (n=150)

	No. Infected	Prevalence (%)
Overall	28	18.70
Sex:		
Male	18	64.30
Female	10	35.70
Length (cm):		
16-20	07	25.00
21-25	17	60.70
26-30	04	14.30

No. of *Tilapia* examined: 150

Table 2 shows the prevalence of helminths of *Tilapia zilli* in Maiduguri. *Caryophyllaeus* species had the highest prevalence with 16 (57.10%), while *Cystacanthus* or *Acanthocephalus*, and plerocercoid of *Diphyllobothrium* species had 4 (14.3%) and 8 (28.60%) respectively ($p \leq 0.05$).

Table 2: Prevalence of helminths species infecting *Tilapia zilli* in Maiduguri.

Helminths	No. of <i>Tilapia</i> infected (%)
<i>Caryophyllaeus</i>	16 (57.10)
<i>Cystacanthus</i>	4 (14.30)
<i>Diphyllobothrium</i> (Plerocercoid)	8 (28.60)

DISCUSSION

This study on the prevalence of helminths in *Tilapia* in Maiduguri has revealed an overall prevalence of 18.7% consisting of *Caryophyllaeus*, *Cystacanthus* and Plerocercoids of *Diphyllobothrium*. Similar studies have been reported on helminth infections in *Tilapia* in Kainji Lake (Awachie, 1965); in Jos plateau (Onwuliri and Mgbemena, 1987) and in river Oshun and Owa stream both of Southwest Nigeria (Olurin and Samorin, 2006; 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 (Chandra, 2006; Martinez-Aquino and Anguillar-Anguillar, 2008; Doreen *et al.*, 2009; Shukerova *et al.*, 2010; Hussen *et al.*, 2012).

In this study more males were infected than female *Tilapia* ($p \leq 0.05$). However, there are inconsistent explanations in

literature as regards the relationship between sex and prevalence, indicating a 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.

Tilapia in length categories between 16-20 cm and 21-25 cm recorded significantly higher helminths prevalence compared with groups between 26 -30cm. 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 Torres *et al.* (1977) and Olurin and Samorin (2006) who observed that the longer 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 (Richard 2008; Hussen *et al.*, 2012).

It is concluded that there is occurrence of helminths in *Tilapia zilli* in Maiduguri, and thus good culinary practices should be adopted to decimate risks to human health.

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