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INTESTINAL PROTOZOAN PARASITES OF *Oreochromis niloticus* OF DADIN KOWA DAM, YAMALTU DEBA L.G.A OF GOMBE STATE

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ABSTRACT

Fishes are greatly affected by many parasites causing diseases or harm to the fish. Parasitic protozoans are among these organisms that infect fish and other aquatic organisms. The parasitic protozoans were investigated in *Oreochromis niloticus* from Dadin-Kowa Dam. Fifty (50) fish was collected, weighed and the sexes were identified by observing the genitals. After dissecting the fish, the gut contents of each was emptied in to a container with 0.9% of saline solution. A small portion of the sample was taken and observed under microscope. Out of the 50 sample, 43 (86%) were not infected by any protozoan parasite while 7(14%) were infected with protozoan parasites *(Cryptobia iubians* and *Ichthyophthirius multifiliis).* Females (14.79%) harbour the parasites more than the males (13.28%) and the fishes with higher weight have more parasites load when compared with the smaller fishes. At the end of the research two protozoa parasites were identified in the intestinal tract of *Oreochromis niloticus* from Dadin-kowa reservoir.

Keywords: Fish, parasites, protozoa, Dadin-kowa Reservoir

INTRODUCTION

Fishes are abundant in most bodies of water. They can be found in nearly all aquatic environments. Fishes exhibit greater species diversity than any other group of vertebrates (Fish Base, 2011). Currently, tilapia is the second most important group of fish for the world fish culture. In 2014, it reached a production volume from 200 000 tones contributing China approximately 35% and Taiwan and Indonesia, being the main exporters of whole product and frozen fillet, while the trade in fresh fillets in Latin America has been led by Guatemala, Costa Rica and Honduras (FAO, 2014).

Tilapia is considered relatively resistant to diseases (Coward and Bromage, 2000), but it can be affected by different parasites. Like other animals, fish are affected by parasites and other diseases causing pathogens. Fish parasites cause fish diseases and spoil the appearance of fish thus resulting in consumer rejection (Gulelat *et al.*, 2013). Several groups of parasites belonging to helminths, arthropods, protozoans and other groups of miscellaneous taxa are known to infect fish and produce harmful effects to their hosts (Paperna, 1996).

Protozoa are single celled eukaryotic organisms of the Kingdom Protista, which includes members of the phyla Ciliophora (Ciliates), Sarcomastigophora (Flagellates), Microsporea and Apicomplexa, with regard to fish parasites. Their life styles range from free-living through various forms of

commensalisms to parasitism in most animals, plants and even other protozoans (Woo, 1995). Reproduction and transmission of protozoan parasites is very diverse. During direct life cycle, protozoa are usually released either through faeces, especially for intestinal parasites, or when the host dies and the spores or cysts can also be shed directly into water through lesions. Some tilapia parasites are also important for public health (Tesana *et al*., 2014). Since the time when parasitic Protozoa were discovered, they have become one of the most studied groups of parasites. This may be due to the fact that they are still killing, mutilating, and debilitating more living organisms throughout the world than any other group of disease causing organism (Roberts and Janovy, 2005). Some of the more common protozoan that infects fishes are *Trichodina* species and *Ichthyophthirius multifillis*, also known as Ich (Plumb, 1999).

Endo-parasitic infection often gives an indication of the quality of water since they are generally increased in abundance and diversity in more polluted waters (Poulin, 2000). A moderate number of endo parasite are found to infect fish in Africa (Sarig, 2005). These parasites represent one of the hazardous threats to fish health. These parasites attacked the fish and caused massive destruction of the gut lumen, stomach, liver, blood and intestine to mention but few (Sterud *et al.*, 2008). Even moderate infection of these organisms may cause a fatal disease, since the infected fish lose their appetite and stop feeding (Mayer, 2000).

Tilapia is considered relatively resistant to diseases (Coward and Bromage, 2000), but it can be affected by different parasites. There are reports about protozoa presence as: *Ichthyophthirius multifiliis, Trichodina, Chilodonella, Ichtyobodo necatrix;* Fishes are host for many parasites. Some of the parasites cause disease affecting fish health and reproduction, making them fall easy prey to predators. In fish farming, parasites may lead to epidemics and mortalities resulting to economic losses (Khalil and Polling, 2012). The study aimed at identifying the intestinal protozoan parasites of *Oreochromis niloticus in Dadin-kowa Reservoir,* Gombe State, Nigeria.

MATERIALS AND METHODS

Description of study Area

Dadin kowa dam is located in Yamaltu Deba local government area of Gombe state in the north eastern part of Nigeria. The dam is about 35 kilometres to the east of Gombe town with latitude 10˚, 19^{1}, 19^{11} N and longitude 11˚, 28^{1} 54^{11} E. The Dam was built by the federal government of Nigeria in 1984 on the Gongola River with the goal of providing water for irrigation practice and electricity. The reservoir has a capacity of 800 million cubic meters of water and a surface area of 300 square kilometres and has potential sources of fish.

The Dam is presently supplying Gombe metropolis and other settlements along the road with portable drinking water for both human and animal use, which supply about 30,000 cubic meters daily. The Dam also irrigates about 600 hectares of farmland yearly. The Dam also serves as hydro-electric power plant and is a popular tourism attraction site (Tinawus, 2010).

Samples collection

Fifty (50) species of *O. niloticus* were collected from the study area. The fish were stored in sampling bucket and transported alive to the laboratory of Biological Science Departmental of Gombe State University and kept for further analysis.

Laboratory Analysis

The specimens were identified using the meristic features provided by Willoughby (1974), while the weight was taken in grams using electronic weighing balance (GF-2000). The sex was determined by examination of genital pore and dissection to expose the gonads (Robert and Yoshitaka, 2002).

Determination of parasite from the stomach and intestine

The fish was knock down with the help of small wood to prevent it from struggling during dissection, and place on dissecting board. The body cavity was open with the aid of a dissecting kit starting from the genital papillae down to the gill region (Becky, 2004). The intestine and the stomach of each of the fish was cut open and contents squashed into Petri-dish containing 0.9% saline solution, place in a separate dish. Each drop of the residue was placed on the slide and view at × 10 and × 40 objective light microscope.

The observed parasites were compare with the standard reference identification keys by Debora *et al.,* (2005). The parasites species and location in the host were counted and recorded.

Analysis of data

The prevalence was calculated using simple percentage.

Prevalence = Number of fish species infected with a particular parasite species ×100

Total number of Fish examined. (Bagherpour *et al.,* 2011)

Results

Table 1 display the results of parasites load and their location in *Oreochromis niloticus* from Dadin kowa dam. Out of the 50 *Oreochromis niloticus* collcted, 43 (86%) were not infected by any Protozoan parasite while 7(14%) were infected with protozoan parasites. The Table further shows that, *Cryptobia iubians* was found be the most abundant in the stomach and intestine with prevalence of 4 (8%) and *Ichthyophthirius multifiliis* with prevalence of 3 (6%) was also found in the stomach and intestine. Table 2 shows the occurrence of protozoan parasites in relation to the sex of the fish. There was higher parasitic load in female fish with14.79%, whereas the male fish is having 13.28% respectively. Table 3 Prevalence of protozoa parasites in relation to the weight of *Oreochromis niloticus* in Dadin kowa dam. The fish with body weight between 550-649g has the highest prevalence (50%) and those with 250-349g and 450-549 have 0% and fishes with 550-649g weight have 50% prevalent

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Table 1: Protozoan parasites and their locations in *Oreochromis niloticus* from Dadin kowa dam.

Parasites	Number of fish examine	Number of fish infected in %	Location of parasite
Cryptobia iubians	50	4(8%)	Stomach and intestine
Ichthyophthirius multifiliis	50	3(6%)	Stomach and intestine

Table 2: Protozoan parasites in relation to different sexes of the fish in Dadin kowa Dam..

Sex	Number of fish examine	Number of fish infected	prevalence%
Male	22	3	13.28%
Female	28	4	14.79%
Total	50	7	14%

Table 3: Prevalence of protozoa parasites in relation to the weight of *Oreochromis niloticus* in Dadin kowa dam.

Weight (gram)	Fish examined	Fishes infected	Prevalence %
>54.5	10	1	10%
150-249	8		12.5%
250-349	11	-	0.00
350-449	9	2	22.2%
450-549	6	-	0.00
550-649	6	3	50%

DISCUSSION

The results of this work revealed that out of the fifty (50) *Oreochromis niloticus* examined, 43(86%) were not infected while 7(14%) were infected by protozoan parasites; *Cryptobia iubians* and *Ichthyophthirius multifiliis* with prevalence of 4 (8%) and 3 (6%) respectively, *Cryptobia iubians* was the most abundance. The infection rate of 14% obtained in this study is low compare to the work of (Qasim and Ayub, 2012; Ogbeibu *et al.,* 2014; Edeh and Solomon, 2016) which recorded 17.9%, 18.5% and 23.33% in *Oreochromis niloticus* respectively. Its agrees with work of Okoye (2016) which recorded high prevalence of *Cryptobia iubilans* in freshwater fish (*Clarias gariepinus*) and also disagrees with the work of Omeji *et al.,* (2011) which recorded high prevalence of *Ichthyophthirius multifiliis* in *C. gariepinus*. *Cryptobia iubians* was found in the stomach and intestine of C. gariepinus (Omeji *et al.,* 2010); Adam *et al*., 2009) have reported heavy presence of *Cryptobia iubilans* in the stomach, intestine and liver of *C.gariepinus*. The lower prevalent in the present study could be due to the fact that, the water is a little bit clean this can reduce the accumulation of these organisms.

The female *Oreochromis niloticus* were infected more with the parasites than the males. This might be due to the physiological state of the females as most gravid female could have a reduced resistance to infection by parasites this is similar to the findings of Emere and Egbe (2006) who reported that due to the physiological state of the female, most gravid females could have reduced resistance to infection by parasites.

This study shows that bigger *Oreochromis niloticus* are more infected with parasites than their smaller counterparts, this is similar to the work of Obano *et al*., (2010b) which recorded high infection in bigger fish than the small ones. It could be attributed to the fact that bigger fishes provides larger surface area for the infection to multiply in numbers than in smaller ones, and also as a result of changes in diet from phytoplankton and zooplankton to insect larvae, snails, worms and crustaceans for food as smaller fishes grow into bigger ones (Obano *et al*., 2010b).

CONCLUSION

Based on the findings of this study, out of the fifty (50) species of *Oreochromis niloticus* of Dadin Kowa Dam examined, only two species of Protozoa parasites; *Cryptobia iubians* (flagellate) and *Ichthyophthirius multifiliis* (Ciliate) were found in which the *Cryptobia iubians* was the most prevalent. Among the fifty species of *O. Niloticus* examined, female fishes were more infected with the parasites than the male fishes and Bigger fishes with greater weight are more infected than the fish with smaller weight.

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