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Endo-Parasites of some Fresh Water Fish in Zobe Dam, Dutsin-Ma, Kastina State

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ABSTRACT
Parasites of fish, either external or internal constitute one of the major problems to fish health and also a great concern; since they often cause disease conditions in fish which can also be transferred to man, The study is aimed to identify the endo-parasites of some fresh water fish in Zobe dam Dutsin-Ma, Kastina State. A total of 180 fish were collected from 3 different fish species. The collected Fish samples were transported in a cool bucket containing ice flex to the Biology laboratory. The fishes were weighed and placed on a dissecting tray for proper dissection in order to reveal the internal organs. They were centrifuge and the content was place on a slide for microscopic examination. The total number of the parasite based on class were 37 and varies according to the fish species. *Oreochromis. niloticus* and *Clarias. garienpinus* had the highest number of parasites with a total of 15 and 12 respectively while *Bargus bayard* had the lowest parasite load with 10 parasites. The highest mean fish weight recorded in this study is 0.21kg with percentage infection of 40%. The sizes of the fish species are all within the range of 9–38cm, the longest fish has size range of 1 to 38 with percentage infection of 40%. This result therefore suggests that there were various fish parasites from fish sample collected from Zobe dam and fish should be properly cooked or smoked before consumption to avoid health risk due to some these parasites.

Keywords:
Endo parasites,
Fish,
Reservoir.

INTRODUCTION

Fish is very important to human populace in trade and economy; it is of importance in the diet of different countries, especially in the tropics and subtropics where malnutrition is a major problem (Alune and Andrew, 1996). Fish are abundant in most bodies of water. They can be found in nearly all aquatic environments. Approximately 32,000 species, fish exhibit greater species diversity than any other group of vertebrates (Fish Base, 2011). Fish are important resources for humans worldwide, especially as food. Commercial and subsistence fishers hunt fish in world fisheries or farm them in ponds or in cages in the ocean. In recent times, there has been tremendous increase in the development of fish farming and culture attributed to the increased need for affordable animal protein, especially in the tropics (Davies *et al.*, 2006). Therefore, catfish of the family Clariidae are increasingly being used for freshwater aquaculture in Africa, owing to several favorable cultural characteristics (Kaddumukasa *et al.*, 2006). Parasites are common in most ecological systems, and all free-living organisms can be potential hosts to parasites. Some of these parasites are either endoparasitic or ectoparasites. Endoparasitic diseases affect the normal health conditions and cause reduction of growth, abnormal metabolic activities and even death of affected fish. Factors that directly influence the abundance and prevalence of endoparasitic fauna of fish include; age, diet, environment of fish and season (Olurin and Somorin 2006). Many fish diseases are causing huge mortality both in aquaculture and capture fisheries and some are also causing diseases in human when consumed with the fish, consequently parasitic cases are very common in fresh water bodies and most parasitic organisms are opportunistic and may be present all on different species of fish in low numbers, and only cause disease when the fish is stressed (Onyedineke, 2010). Some of the detrimental effects of parasites in fish production are; causing fish diseases leading to reduction in growth rate, weight loss, mass mortalities and the need for increase farm inputs via increased treatment expenses and poor quality and quantity of fish thus resulting in consumer rejection and affect marketability of commercially produced fish in different parts of the country. These parasites while ingested by man may also lead to food intoxication or food poisoning health implications

(Hussein *et al.*, 2012). Therefore, the need to investigate the prevalence of endoparasites associated with fresh water fish in Zobe Dam in Dutsin-ma Katsina State.

MATERIALS AND METHODS

Study Area

This study was carried out in Zobe Dam which is located in the southern outskirts of Dutsin-Ma Local Government Area of Katsina State, Nigeria. As semi-urban area of Kastina State with latitude of 12º27'18" north and longitude of 7º29'29" east. This coordinate mapped the closest address of Dustinma, Kastina State, Nigeria. It has a total population of 169,671 (2006 census) whose main occupation is farming as well as animal rearing. The mean annual rainfall ranges from 473.8 mm to 750.6 while the mean temperature is between 34.2 to 34.5 °C (NBS, 2011). Zobe Dam now serves the purposes of tourism, fishing, and irrigation.

Study Design and Sample Size

The study design used is cross sectional study where fish samples were collected for a period of the study (May to November, 2023). One hundred and eight (180) of three different samples of *Oreochromis. niloticus* and *Clarias. garienpinus* and *Bargus bayard* were purchased from local fishermen at the landing site for this study.

Collection, Identification and Dissection of Fish Species

Collected fish samples were kept chilled under ice-blocks in a plastic cooler, and immediately transported to the laboratory the Biology Laboratory of Federal University Dutsin-Ma. In the laboratory, fish specimens were sorted and identified using the Pictorial guide of Commercially Important Freshwater Fishes of Nigeria well as the guide to the identification of freshwater fishes of Nigeria by Idodo-Umeh (2003) and the description keys of Olaosebikan *et al.* (1998).

Fish were sacrifice using mechanical stunning method (Biu and Nkechi, 2013). Dissecting scissor were used to make a medial line that cut on the ventral part of the fish in longitudinal way which stretched to the cloaca from the neck region. This exposed the internal anatomy

Recovery and Morphological Identification of Parasites

Fish intestinal contents were transferred to a petri dishes were a slits were made to expose the gut content in aqueous medium. Parasites were searched using hand lens and also examine under power binocular dissecting microscope (Mikail and Bozdoğan, 2020). Parasites gotten were counted manually under the microscope as described by Sures (2008). Morphological identification of specimens to the least possible taxon was done with the aid of pictorial guide of Medihat *et al.* (2020) and the identification keys of Paperna (1996).

Morphometric Measurements

The sex and other biometric data were recorded, weight was taken to the nearest 0.01 g by placing the fish on a scale balance and read as practiced by Adeleke *et al.* (2019). The standard and total lengths were measured to the nearest 0.01 cm using meter rule and thread as described by Mgbemena *et al.* (2020). The sex was identified by examining external sexual features where the ovaries/testes where observed after dissection.

Data analysis

A descriptive statistic of frequency and percentage was used in the analysis of data obtained during the laboratory experiments. All data were presented as mean ± standard mean error (SEM), data were evaluated using a single factor analysis of variance, after which the individual mean were calculated using multiple comparison tests of Chi square. In all cases the differences were considered statically significant at $p<0.05$.

RESULTS AND DISCUSSION

Prevalence of infection by species and sex of the fish examined

The prevalence of infection by species and sex of the fish examined was presented in Table 1. From the table equal number of the fish species was examined for both male and female species. Out of 60 *Clarias garienpinus* sampled, male had the percentage prevalence of infection of 14(23.33%) while the female percentage prevalence is 10(16.67%). The *Oreochromis niloticus* had the overall highest infection which was noted I the male fish. *Bagrus bayard* had the least infection in all the fish sampled both in male and female fish (table 1).

Table 1: Prevalence of infection by species and sex of the fish examined

SPECIES	MALE FISH			FEMALE FISH		
	No. Of Fish Observed	No. Of Fish Infected	% Infected	No. Of Fish Observed	No. Of Fish Infected	% Infected
Clarias garienpinus	60	7	23.33	60	5	**16.67**
Oreochromis niloticus	60	9	30.0	60	6	**20.0**
Bagrus bayard	60	6	20.0	60	4	**13.0**
TOTAL	**180**	**22**	**73.33**	**180**	**15**	**49.67**

Numerical abundance of endo parasite in the fish sampled

The numerical abundance of endo-parasite of the fish sampled based on the class of the fish and the location where it was found is presented in table 2. The total number of the parasite based on class is 37 and varies according to the fish species. However, *Oreochromis niloticus* and *Clarias garienpinus* had the highest number of parasites with a total percentage of 40.5% and 32.4% respectively while *Bagrus bayard* had the lowest with 27.0% of parasites. The table revealed that class trematoda have the highest percentage parasite which was observed in the stomach of fish.

Table 2: Distribution of Gastrointestinal Parasites Species Recovered in the Study Area

Fish species	Nematode		Trematode		Cestode		Acanthocephala		
	INT (%)	STM (%)	INT (%)	STM (%)	INT (%)	STM (%)	INT (%)	STM (%)	Total (%)
Clarias garienpinus	3 (25.0)	1 (8.3)	0 (0.0)	4 (33.3)	0 (0.0)	2 (16.7)	1 (8.3)	1 (8.3)	**12(32.4)**
Oreochromis niloticus	0 (0.0)	2 (13.3)	1 (6.7)	3 (20.0)	2 (13.3)	1 (6.7)	4 (26.7)	2 (13.3)	**15(40.5)**
Bagrus bayard	2 (20.0)	0 (0.0)	1 (10.0)	3 (30.0)	2 (20.0)	2 (20.0)	0 (0.0)	0 (0.0)	**10(27.0)**
Total	**5**	**3**	**2**	**10**	**4**	**5**	**5**	**3**	**37**

* INT = intestine and STM = stomach

Prevalence of parasite in relation to weight of fish

The weight of the fish species examined are presented in table 3. The highest mean fish weight recorded in this study is 0.21kg for *Clarias garienpinus* while the lowest mean weight in all the fish sampled is 0.15g in *Oreochromis niloticus*. The highest percentage fish infection (50.0%) is receded in *Oreochromis niloticus* with a mean weight of 0.16kg while the lowest percentage infection (33.3%) is recorded in the fish with the mean weight of 0.15kg

Table 3: Prevalence of parasite in relation to weight fish

Species	Mean Fish Weight (Kg)	Number Examined	Number Infected	% Infected
Clarias garienpinus	0.21	60	12	**40.0**
Oreochromis niloticus	0.16	60	15	**50.0**
Bagrus bayard	0.15	60	10	**33.3**
Total	**0.52**	**180**	**37**	**123.3**

Prevalence of parasite in relation to weight of fish

The size of the fish species examined are presented in table 4. The sizes of the fish species all fall in within the range of 1 – 38cm. *Clarias garienpinus* had the highest size range of 1-38cm with 40% infection rate while *Bagrus Bayard* had the lowest size range of 1-15cm with 33.3% infection rate among the three fish species sampled. *Oreochromis niloticus* had the highest infection rate of 50.0% with the size range of 1-28cm

Table 4: Prevalence of parasite in relation to size of the fish

Species	Fish Size (cm)	Number Examined	Number Infected	% Infected
Clarias garienpinus	1 – 38	60	12	**40.0**
Oreochromis niloticus	1 – 28	60	15	**50.0**
Bagrus bayard	1 – 15	60	10	**33.3**
Total		**180**	**37**	**123.3**

Table 5 reveals the parasites identified and their various taxonomy. Nematodes, Trematodes, Cestoda and Acanthocephalan were the various class under which the parasites were identified. Trematodes and Cestoda have the highest number of parasite that infected the fish sampled n this study.

Table 5: Parasite isolated in relation to their taxonomy

Class	Parasite identified	No. identified
Nematode	*Procamallanus spp*	5
	Ascaridia spp	4
	Trichuris trichiura	7
Trematode	*Phyllodistomum spp*	10
	Clinostomum spp	7
Cestoda	*Diphyllobothrium latum*	9
	Proteocephalus spp	8
Acanthocephalan	*Acanthocephalus spp*	7
	Pallisentis nandai	4

Discussion

Fish are intermediate hosts of transient forms of a vast number of parasites (Ayanda, 2009). The muscle of fish is habitat of larvae whereas adult parasites very often occur in their gastrointestinal tract, liver and other internal organs as well as on their skin. The most dangerous are those, when ingested may undergo developmental stages in the internal organs or muscles of humans, hence may influence onset of life-threatening human diseases. Since the time when parasitic Protozoans were discovered, they have become one of the most studied groups of parasites (Roberts and Janovy, 2005).

The overall prevalence of endo parasite of fish observed in this study was high (37%), it was higher that the percentage recorded in the study by reported by Ekanem *et al.* (2011) in the Great Kwa River (6.5%) and Ugwuozor, (1987) in Imo river who reported a prevalence of 13.6%. There was also a reports of high prevalence (60.23%) of parasitic infection by Olofintoye, in 2006 in some freshwater fish species in Ekiti State; 43.3% by Bichi and Ibrahim (2007) in Tiga Lake Northern Nigeria. This indicates that the distribution of parasites varied from one habitat to the other which could be attributed to host-parasite relationship and some abiotic factors like dissolved oxygen, temperature and pH. This is corroborated by Ekanem *et al.* (2011) who also reported low infection, the low infestation rate in these fish could be attributed to the sanitary condition of the study areas, the location of the river from living place, number and classes of people visiting the river and their purposes. The prevalence number of trematode and cestodes isolated from this study was found to be higher than that of nematode and acanthocephalan. This observation is similar to Ekanem *et al.* (2011) and Onyedineke *et al.* (2010), Ekanem *et al.* (2011) reported that most endoparasites of trematode and cestodes are known to occur in body cavities and subcutaneous tissues. Host specificity of these parasites agrees with the findings of Akinsanya *et al.* (2007) and Onyedineke *et al.* (2010). In the present study, acanthocephalans were found in the intestine of fish examined which agrees with the findings of Kayis *et al.*, (2009), Onyedineke *et al.* (2010) and Olurin and Somorin (2006) from Kainji Lake and Owa stream respectively. This finding also supports the work of Rosas and Perez (2010) who reported that parasites show some level of preference for the host they parasitize which is supported by the findings of Miah, *et al.,* (2013). Furthermore, Out of 63 parasites isolated in this study, 29 were isolated from the intestine and 34 from the stomach. This observation could be associated with the fact that most digestive activities take place in the intestine resulting in the activity of many parasites Onyedineke *et al.* (2010). The results also revealed that *Oreochromis niloticus* had highest number of infected in Male while *Bagrus Bayard* had the least infected in male while *Oreochromis niloticus* had the highest in female and *Bagrus bayard* had the lowest infected fish. The findings are in agreement with the report of Kayis *et al.,* (2009) who also found that intestinal parasites were harbored by many other indigenous fish such as *O. niloticus* and *H. bidorsalis* and the *C. anguillaris*. Miah, *et al.* (2013) also reported that *C. punctatus* were infected with 7 species of parasites, of these four were trematodes (*Genarchlopsis bangladnesis*, *Allogamtitrema attu*, *Phyllodistomum* sp., *Neoppecocline saharanpuriensis*); two were nematodes (*Ascaridia* sp., *Procamallanus* sp.) and one was an Acanthocephalan (*Pallisentis nandai*). The presence of these endoparasites (Nematode, Trematode, Cestode and Acanthocephalan) in *Clarias garienpinus*, *Clarias garienpinus* and *Bagrus* shows that it had significant impact on their weights resulting in economic depreciation as well as pose a threat to human health upon consumption. Therefore proper ecological measures in Zobe Dam are necessary for fish to survive, thrive within the aquasystem and in turn reduce risk of human health conditions when consumed.

CONCLUSION

A total of 3 species *Clarias garienpinus*, *Bagrus bayard*, and *Oreochromis niloticus* were infected with different species of endo-parasite. The parasite was identified to be from four classes namely; nematodes, cestodes, trematodes and acanthocephalans. The most predominant species were identified from the classes of nematode and cestodes while trematodes and acanthocephalans were lowest species isolated. The presence of these endoparasites necessitates that fish from the Zobe dam

should be properly cooked or smoked before consumption to avoid health risk.

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