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Prevalence of protozoan parasites in some freshwater fishes of Dangana Lake Lapai, Niger State Nigeria

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Abstract

Prevalence of protozoan parasites in some freshwater fishes of Dangana Lake Lapai were studied. A total of 184 fish from four (4) species were examined for ecto-parasites in the lake which were *Clarias gariepinus* (55), *Tilapia zilli* (51), *Oreochromis niloticus* (41), and *Leptocypris niloticus* (37). The parts of the fish that were examined are gills, skin, and fins. In all, 5 different protozoan parasites were isolated from the fish samples examined. The overall prevalence of protozoan parasites in sampled fishes was 84.76%. The percentage incidence revealed that *Clarias gariepinus* recorded 23.36%, *Tilapia zilli*, 22.28%, *Oreochromis niloticus*, 20.10%, and *Leptocypris niloticus* and 19.02% incidence. Five (5) species of protozoan parasites were encountered namely *Ichthyobodo* sp *Gyrodactylus* sp. *Trichodina* sp *Caprina* sp. and *Microsporideans* sp. The study revealed high protozoan prevalence from the study area.

Keywords: Lake, bacteria, fishes, sample, Lapai

1. Introduction

Fish are rich source of protein and contains lipids, mineral oils, and vitamins. They have remarkable impact on the lives of many individual and communities, as a major source of relatively cheap and affordable animal protein [1, 2]. The ever-increasing cost of beef leaves fishes as the most feasible option in resolving protein shortage. Another product of fish aside fish meal is fish oil which contains omega-3-essential fatty acid necessary for the proper functioning of the brain, heart and immune system [1, 3]. Fishes interact with various level of food chain and influence the structure of their habitat, as they are usually restricted to particular mode of life related to their food source and reproductive requirement [2]. Globally there has been tremendous increase in the development of fish farming and culture attributable to the increased need for affordable animal protein especially in the tropics [4]. Fishing is one of the main reasons communities settles around water bodies [5]. As these communities settles around the water bodies, they are known to participate in changing the ecology of the water [5]. Parasites are capable of causing harm to fish host notwithstanding the species, either through injury to the tissues or organs in the process of burrowing or consuming food or the removal of digested food in the gut of the fish as well as the secretion of proteolysis enzymes [6]. Among fish parasites protozoans, occupy a very important sector as one of the hazardous threats to fish health. These parasites attack the fish, causing massive destruction of skin and gill epithelium. Even moderate infection of these organisms on small fish may prove a fatal disease, since the infection may cause the fish to stop feeding [4]. Protozoan parasites cause serious losses in fishponds in Nigeria and their lesions render the fish unmarketable. Fish carrying protozoan parasites are capable of passing on the infective disease to man after its consumption [4, 6]. The role of freshwater fish in transmitting parasites had been known for a long time. Fish parasites and disease remain one of the problems confronting the fishery biologist, as fish may serve as a parentenic intermediate or definitive host of parasites that are harmful to man and animal [7]. Many fishes have being found to harbour plenty of protozoan, helminthes, nematodes and bacteria which are either ecto or endoparasites. These parasite are known to affect fish health, growth and survival. The effect of parasites on fish include nutrient devaluation, alteration of biology and behaviour, lowering of immune capability, induction to blindness, morbidity, mortality growth, fecundity reduction and mechanical injuries depending

on the parasite species and the load [8]. Parasites are capable of causing harm to fish host notwithstanding the species, either through injury to the tissues or organs in the process of burrowing or consuming food or the removal of digested food in the gut of the fish as well as the secretion of proteolysis enzymes [6]. Protozoan parasites cause serious losses in fishponds in Nigeria and their lesions render the fish unmarketable. Fish carrying protozoan parasites are capable of passing on the infective disease to man after its consumption [6]. This study investigated the presence of protozoan parasites of fishes from Dangana Lake and possible health implications to fish consumers.

2. Materials and Methods

2.1 Description of Study Area.

The study was carried out at Dangana lake, Lapai, Niger state, Nigeria. This lake is located within longitude 6°36'29.6'E and latitude 9°02'12.02N with elevation of 159m above the sea level. The vegetation of the area reflects that of Savannah zone, the vegetation are mixed, prominent ones include Malaina (*Gmeliana arborea*) Locust beans (*Parkia biglobosa*) Neem (*Azadirachta indica*) and other sparsely native trees and grasses. The climate presents two distinct seasons, a rainy season between April and October, and a dry season (November-March) completely devoid of rain.

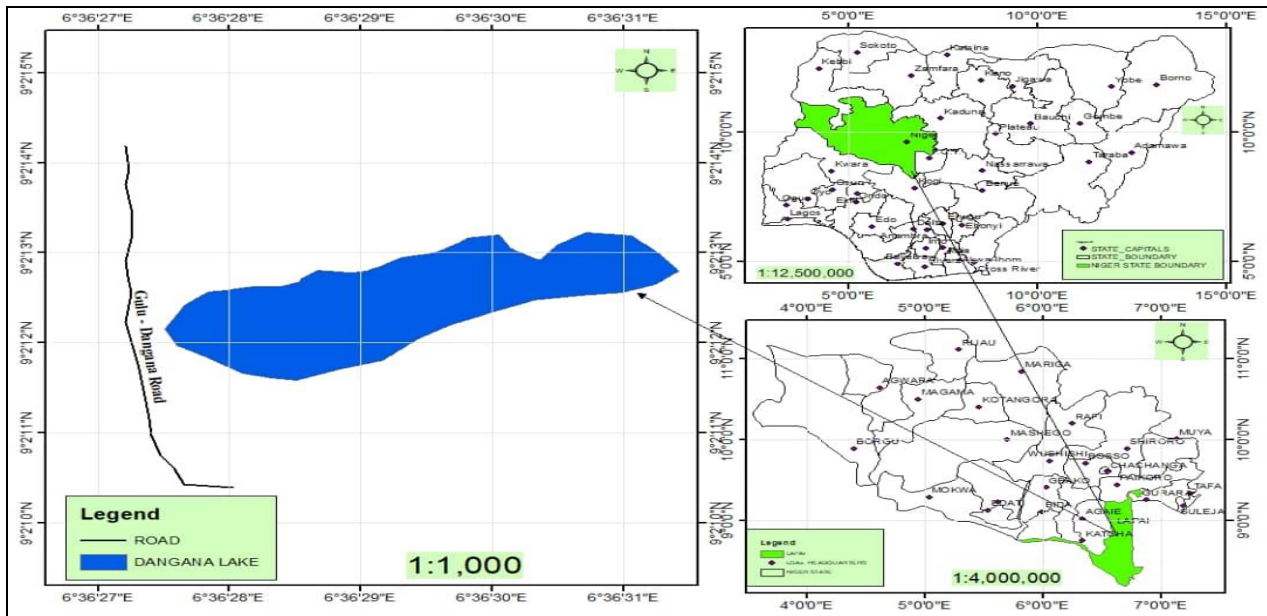


Fig 1: Geographical location of Dangana Lake Lapai, Niger State Nigeria.

2.2 Fish Collection, Identification and sample Examination.

Fish samples were obtained using gill net and cast net during the sampling period of 10months, February to November 2014 with the assistance of hired fishermen in the lake. The fishes collected were identified with the aid of keys [9, 10]

The fish samples were examine for ectoparasites using hand lens. Thereafter scraping from fins, skins, and gills were done with the use of swab stick, this was smeared on clean glass slide and examined under light microscope for external parasites in the Department of Biology Laboratory. Each sample where examined independently according to the method described by Ekanem *et al.* (2011). Identification of parasite was carried out with the aid of keys [11, 12].

2.3 Data analysis

Data were analysed using simple descriptive statistical tool was used to analyse the data with aid of Microsoft excel 2010

3. Results and discussions

From table1 a total 184 fish from four (4) species were examined in the lake which were *Clarias gariepinus* (55), *Tilapia zilli* (51), *Oreochromis niloticus* (41), and *Leptocypris niloticus* (37) respectively. Out of the 55 fishes sampled for *Clarias gariepinus* 43 were infected and *Tillapia zilli* recorded 41 infected fishes. Similarly out of the 41 fishes examined for *Oreochromis niloticus*, 37 fishes were infected

and *Leptocypris niloticus* recorded 35 infected fishes from Dangana lake. The overall prevalence of protozoan parasites (84.76%). The percentage incidence revealed that *Clarias gariepinus* recorded 23.36%, *Tilapia zilli*, 22.28%, *Oreochromis niloticus*, 20.10%, and *Leptocypris niloticus* and 19.02% incidence respectively. The overall prevalence of protozoan parasites (84.76%) was high compared to 32.9% recorded for fish in Warri River [3], 3.33% in Great Kwa River [1] and 70% in natural waters of Owerri [13]. This variation in rate of parasitism could be attributed to biotic and abiotic condition of the environment where the study was carried out [14]. Also unfavourable condition may affect fish physiology thereby favoring parasitic infection and invasion [3], pollution of the fish environment may also contributes to parasitizing of fish significantly [15]. Parasite of fish can either be external or internal. Parasitic infections often give an indication of the quality of water, since parasites generally increase in abundance and diversity in more polluted waters [6, 16]. Parasites are capable of causing harm to the fish host notwithstanding the species, either through injury to the tissues or organs in the process of burrowing or consuming food or the removal of digested food in the gut of the fish as well as the secretion of proteolytic enzymes. Fish parasites result in economic losses not only mortality, but also from treatment expenses, growth reduction during and after outbreak of disease and this militate against expansion of aquaculture [4, 6].

Table 1: Fish species and percentage incidence of parasites of fishes in Dangana Lake Lapai, Nigeria

Fish specie	Number of fish examined	Number of fish infested	Percentage incidence of parasites in fish species (%)
<i>Clarias gariepinus</i>	55	43	23.36%
<i>Tilapia zilli</i>	51	41	22.28%
<i>Oreochromis niloticus</i>	41	37	20.10%
<i>Leptocypris niloticus</i>	37	35	19.02%
Total	184	156	84.76%

Table 2: Protozoan parasites and their location on each sampled fish species in Dangana Lake Lapai Nigeria

Fish species	Protozoan parasites	Location of parasites
<i>Clarias gariepinus</i>	<i>Ichthyobodo</i> sp.	Gill, skin
	<i>Gyrodactylus</i> sp.	Gills
	<i>Trichodina</i> sp.	Gill, skin
	<i>Caprina</i> sp.	Gill, skin
	<i>Microsporideans</i> sp.	Gill, skin
<i>Tilapia zilli</i>	<i>Ichthyobodo</i> sp.	Gill, skin, Fins
	<i>Gyrodactylus</i> sp.	Gill, skin, Fins
	<i>Trichodina</i> sp.	Gill, skin
	<i>Microsporideans</i> sp.	Gill, skin
<i>Oreochromis niloticus</i>	<i>Trichodina</i> sp.	Gill, skin, Fins
	<i>Gyrodactylus</i> sp.	Gill, skin
	<i>Trichodina</i> sp.	Gill, skin, Fins
<i>Leptocypris niloticus</i>	<i>Trichodina</i> sp.	Gill, skin, Fins
	<i>Microsporideans</i> sp.	Gill, skin, Fins
	<i>Gyrodactylus</i> sp.	Gill, skin, Fins

From Table 2 Different kinds of protozoan parasites were observed to be present in different locations in the sampled fishes. The parasite encountered in this study are *Ichthyobodo* sp. *Trichodina* sp. *Gyrodactylus* sp. *Caprina* sp. and *Microsporideans* sp. *Trichodina* sp. and *Gyrodactylus* sp. were both found on the gill, skin and fins of all the sampled fishes. All the sampled fishes were infested with *Microsporidean* sp. except there absent in *Oreochromis niloticus*. *Ichthyobodo* sp. were only found in *Clarias gariepinus* and *Tilapia zilli*. *Clarias gariepinus* was the only fish species infested by *Caprina* sp. The protozoans were found on the gills, fins and skin of sampled fishes. Many researchers have reported the presence of these parasites on freshwater fishes [1, 4, 17, 18]. Excessive mucus secretion, epithelial proliferation and chemical erosion of fish association with the pathology of protozoan parasites [19]. The gills of many fishes has been infested by different protozoan parasites, and the sieving ability of the gill rakers may help to trap some organisms, and this could be attributed to the presence of the protozoan parasites [20, 21].

4. Conclusion

Fish parasites are of economic importance because they lower the quality of the fish meat. It is therefore important that fish farmers should endeavor eliminate environmental factors and conditions that would favor increase in parasites infestation on fish as observed in this study. Parasite affect fish health, growth and survival, some parasites causes much dangerous and serious disease to the host fish. The effect of parasites on fish include nutrient devaluation, alteration of biology and behaviour, lowering of immune capability, induction to blindness, morbidity, mortality growth, fecundity reduction and mechanical injuries depending on the parasite species and the load.

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