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Journal of Veterinary Medicine and Research

Research Article

Prevalence of Haemoparasites in *Clarias* Species (Cat Fish) In Lake Chad

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Submitted: 17 March 2020

Accepted: 26 March 2020

Published: 27 March 2020

ISSN: 2379-948X

Keywords

- Prevalence
- Haemoparasites
- *Clarias* species
- Lake chad

Abstract

The prevalence of haemoparasites of *Clarias* species in Lake Chad was determined using standard parasitological techniques. Out of the 220 *Clarias* species collected, 37 [16.8%] were positive for various haemoparasitic infections. The parasites encountered in *Clarias* were *Ichtyobodo* species 25 [11.4%] and *Dactylosoma* species 12 [5.5%]. Infection with Ichtyobodo species was 11[8.3%] among the male *Clarias* while 14 [15.9%] was encountered among the female. Similarly, no statistical variation was observed between sexes. However, infection with *Dactylosoma* species was found to be 4 [3.0%] in males and 8 [9.1%] among the females. *Ichthyobodo* infection was observed to be 16 [13.3%] and 9 [9.0%] among adult and juveniles *Clarias*, respectively. Meanwhile, *Dactylosoma* infection were 7 [5.8%] and 5 [5.0%] among the adult and juvenile *Clarias*, respectively. However, general Sex-wise prevalence showed that female *Clarias* were significantly [0.001%] more infected 22 [25.0%] than the male 15 [11.4%]. According to age, adults were equally more infected than the juveniles 14 [14.0%]; however, no statistical variation was observed between age group. It is highly imperative to use other screening methods like molecular and serological techniques for more sensitivity and specificity.

INTRODUCTION

A substantial proportion of Nigeria's fish supply is still derived from feral fishes [1] which are at higher risk of diseases compared to cultured fish. Documented information on fish parasite taxonomy is few in Nigeria [2]. Fish is an important dietary protein in many parts of the world [3]. They are low in fat [4] and serves as a source of omega-3 (n-3) fatty acids. Fishing occur in a wide range of Nigerian cultures [5,6], Native Americans [7,8] and in the other parts of the world [9,10].

Fish diseases are not easily recognizable in the wild [11] because ill fishes often become prey to other fish predators or die quickly due to their inability to compete favourably for food and survival. The complexity of bionomics, arrays of biological vectors and scarce reference literature made studies on piscine parasites in Nigeria to be scanty and mostly relates to brackish and freshwaters in the south and the Kainji and Lake Chad [12-15]. The studies done in the Lake Chad basin were limited to Tilapia and *Clarias* species [16-18] Many facets of fish health however, remained hazy and more work is required to elucidate the epidemiology and menace of piscine parasitism in the study area on a broader perspective.

The African catfish *Clarias* gariepinus is one of the economically important freshwater fishes in Lake Chad basin with great dominancy in spatial distribution among other feral fish species. Its distribution spans from the Maghreb region to the South-West Cape [16-18]. It has been reared for nearly 30 years in Africa with poor performance due to the absence of reliable production techniques [17-19] and numerous diseases afflicting its health. It is found in all inland waters of Nigeria and recognized as an important food fish [15]. It has been a suitable choice for research due to its aquacultural potentials [19,20] and ability to survive for a prolonged period outside its habitat.

Fisheries constitutes up to 60% of total protein intake in adults of rural habitats and used as medications (fish oils), in recreations and vital inclusions of livestock feeds. Fish constitute 40% of animal protein intake in Nigeria [21] and had been observed to be a source of serious foreign exchange drain on Nigerian economy [22] a total of N100.5 million was spent in Nigeria on importation of fish and fisheries products as at 1986. Fish serve as a good source of animal protein for man and his livestock [5,23]. The role of fish in nutrition is recognized, as it supplies a good balance of protein, vitamins and minerals [22].

Parasitic diseases in aquatics features prominently in the tropics comparable to what is seen in terrestrial animals [17,18] knowledge on the prevalence of these parasites in the aquatic system will provide useful information on the potential hazards in fish health and the ecosystem and to enhance control measures

in fish health, because fish serve as good source of animal protein for man and his livestock.

MATERIALS AND METHODS

Study Area

Lake Chad lies between Latitude 120N-140 20'N; Longitude 130 -150 30'E and is located in the Sahelian vegetation zone south of the Sahara, with less than 600mm of rain annually [24] The vegetation terrain around the lake consists of thorny grasses and shrubs in the highlands and swampy grasses in low land areas.

Fish Sampling and Preservation

Clarias species were collected randomly at the Custom fish market in Maiduguri. Sampling was conducted from the catches of five fish vendors who are known to procure their stocks from Lake Chad waters.

A total of 120 adult and 100 juvenile feral *Clarias* were collected at Custom fish market, consisting of 132 males and 88 females. Live fishes were transported to the laboratory in covered plastic buckets with perforations at the top to provide for aeration.

Laboratory Identification of *Clarias* species

Live *Clarias* were collected at landing and identified using taxonomic guides to Nigerian freshwater fishes as described by Reed et al., [25-27]. Sampling was done on weekly basis for five months. Each *Claria* species was examined morphometrically for proper classification. Order and Family characteristics were first applied followed by taxonomic features of individual species. Fins, mouth, teeth, nostrils, gills and lateral line were the features employed in distinguishing specie from another.

Identification of parasites

Blood samples were collected by salvaging the fish and blood collected in heparinised capillary bottles. Thin blood Giemsa stained smear and haematocrit centrifugation technique [28] were employed for the detection of haemoparasites. Slides were examined for parasites with the aid of binocular light microscope using immersion objective (x100). Parasites were identified using taxonomic features as described by [15] and photomicrographs taken using digital camera with 10.0 Mega pixels of resolution and Optical image stabilizer (Canon IXUS 900IS).

Statistical Analysis

One-way analysis of variance with Tukey-Kramer multiple comparisons (Post-Hoc) test was employed to compare means for standard threshold alpha of less than 0.05. GraphPad InStat, Version 3.00 (1998) and Microsoft office excel (2010) software packages were employed in all statistical analyses and graphical presentations of results respectively.

RESULTS

Out of the 220 *Clarias* species collected, 37(16.8%) were positive for haemoparasitic infections (Table 1). Infection in females 22(25.0%) was significantly higher than in Male *Clarias* 15(11.4%) with a two sided P-value of 0.01. Two parasites were observed to be responsible for the infection in *Clarias* species in the study area, which comprise of *Ichthyobodo* sp (Plate 1) responsible for 25(11.4%) of the infection and *Dactylosoma* sp (Plate 2) responsible for 12(5.5%). Infection with *Ichthyobodo* sp. was 11(8.3%) in male *Clarias* while 14(15.9%) was recorded in females.

On the other hand, infection in adult *Clarias* accounted for 23(19.2%) when compared with the infection in juveniles 14(14.0%). There was no significant difference in infections observed between the juvenile when compared with the adult *Clarias* species (Table 2). Infection with *Dactylosoma* sp was observed to be 4(3.0%) in males and 8(9.1%) in female whose differences were insignificant P> 0.05. *Ichthyobodo* infection was observed to be 16(13.3%) and 9(9.0%) in adult and juvenile *Clarias*, respectively. While for *Dactylosoma* sp., infection rates were 7(5.8%) and 5(5.0%) in adult and juveniles, respectively.

DISCUSSION

Reports of piscine haemoparasites in Nigeria are scanty. In this study, two parasites were observed to be responsible for infecting *Clarias* sp. which comprises of the *Ichthyobodo* sp

Table 1: Distribution of haemoparasites in male and female *Clarias* species in the Lake Chad.

Sex	Number examined	Number positive (%)	Specie positive (%)		Relative risk	95% Confidence interval
			Ichthyobodo sp.	*Dactylosoma sp*		
Male	132	15(11.4)[a]	11(8.3)[a]	04(3.0)[a]	0.4545	0.0651 -0.1807
Female	88	22(25.0)[b]	14(15.9)[a]	08(9.1)[a]		0.1638 - 0.3531
Total	220	37(16.8)	25(11.4)	12(5.5)		

Rows with different superscripts are statistically significant.

Table 2: Distribution of haemoparasites in adult and Juvenile *Clarias* species in the Lake Chad.

Sex	Number examined	Number positive	Specie positive (%)		Relative risk	95% Confidence interval	
			Ichthyobodo sp.	*Dactylosoma sp*		Lower	Upper
Adult	120	23	16(13.3)	07(5.8)	1.369	0.1254 - 0.2732	
Juvenile	100	14	09(9.0)	05(5.0)		0.0786 - 0.2237	
Total	220	37	25(11.4)	12(5.5)			

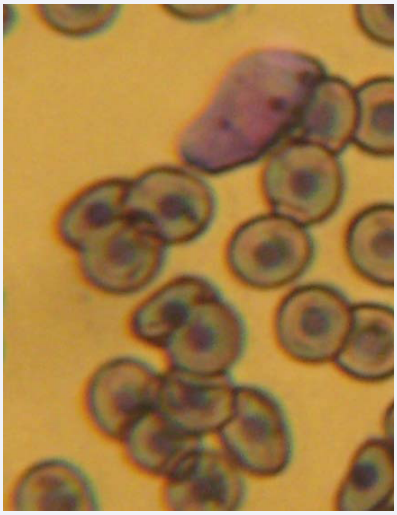

Plate 1 *Ichthyobodo* sp. from skin lesions (Giemsa x1000).

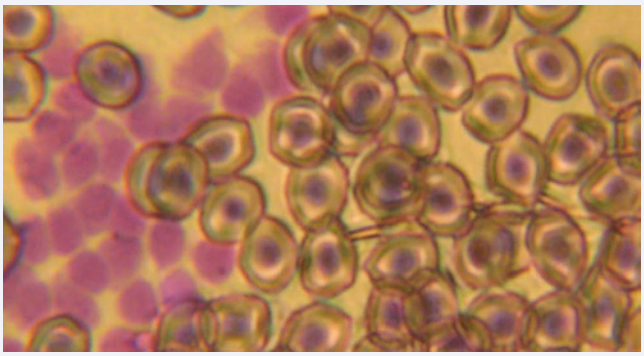

Plate 2 *Dactylosoma sp*; numerous extra-erythrocytic cystozoites in peripheral blood.

and *Dactylosoma* species. *Ichthyobodo* sp and *Dactylosoma* sp collectively constituted for about 16.8% prevalence which is higher than previous findings [14,15,18] The higher prevalence recorded in this study may not be unconnected with the constant proliferation of the parasite in the study area couple with paucity of awareness by the populace and low research interest on fish parasites by researchers as a whole.

As reported by earlier reports, the verse complexity of bionomics [17] the wide range of biological vectors and other intermediate host, coupled with scarce reference on literatures on piscine parasites in Nigeria [12,15] led to the paucity of information on fish parasites in the study area and the country at large. The low prevalence of protozoan parasites in piscivorous species such as *Clarias* indicated that endogenous stages of protozoan parasites do not contribute significantly in the transmission of the infection.

It is also worthy of note that this study indicates that female *Clarias* appeared to be more at risk than their male counter parts. This may be as results of the female's domiciliation in the lithoral region of the water body particularly during nesting as earlier reported by Karshima and Ahmed [17] in a similar related scenario. The preponderance of leeches in these water bodies may also have been responsible for the propagation of the parasite in fish population. In a similar survey *Ichthyobodo* sp and *Dactylosoma* sp were reported in freshwater fishes (*Synodontis* species) of Lake Victoria with 19.6% and 23% prevalence rates, respectively [10].

CONCLUSION

This study has at least help in contributing to the existing body of knowledge concerning the parasitic diseases in aquatics by demonstrating the presence of two parasitic species of the *Ichthyobodo* and *Dactylosoma* in Lake Chad, region of Nigeria. This study also indicated sex related risk of infection in which female *Clarias* are more vulnerable to infection than their male counterparts. It is further recommended that more research on other aspect of fish parasites, more especially the *Clarias* sp. be conducted in order to provide more knowledge on the prevalence of parasites in the aquatic system and provide useful information on the potential hazards in fish health and the ecosystem looking at the growing demand of fish as good source of animal protein for man and his livestock.

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Cite this article

Mohammed KM, Mbaya AW, Ahmed MI, Mohammed K, Kyari F (2020) Prevalence of Haemoparasites in Clarias Species (Cat Fish) In Lake Chad. J Vet Med Res 7(2): 1186.