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ARTICLE

Prevalence and Haematological Changes Associated with Trypanosome infection in Wild Tilapia Fish in Ibadan, Nigeria

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ABSTRACT

There is paucity of information on the incidence and haematological changes associated with trypanosome infection in Nigerian fishes. This investigation examined randomly buffy coat and blood smears of Tilapia in the wild by direct microscopy for Trypanosomes and complete haematology were analyzed. Of the 200 samples collected, 17.5% were positive for trypanosome by buffy coat examination. The Packed cell volume (PCV) of trypanosome-infected fish was 15.3± 0.9% compared to non-infected fish ($p<0.01$) with PCV of 38.4+1.3%. All the haematocrit values obtained in trypanosome-infected fish showed the pattern of anaemia in trypanosomiasis. The report establishes the fact that trypanosomiasis in fish is similar to those find in animals.

KEYWORDS: Tilapia, Wild, Trypanosome, Haematology.

INTRODUCTION

Trypanosomes are usually uncommon blood infection in cultured fish but could be observed in wild population. Trypanosomes occasionally may be found in blood films of fish especially those in the wild caught (Mandal, 1977). *Trypanosome borreli* has been reported in carp (Pienar 1962), catfish, salmond, cold fish and in both freshwater and salt water fish. *Trypanosoma carassi*, *T. danliewski* infecting goldfish, common carp, and some non cyprinds (Woo, 1987; Dykova and Lom 1979) *T. cobitis* infecting weatherfish (cobitids) (Letch 1980). The common pathogenic trypanosomes in fish include *T. danliewski* (Woo 1987) which is common in carps and some non cryprinids. (Negm-Eldin 1997). The species of trypanosomes in freshwater fish across Africa may be a single species (*T. mukasai*) (Woo 1987). However, there is paucity of information on trypanosomes infection in fish in Nigeria. This communication reports for the first time the incidence and haematological changes associated with trypanosome infection in Nigerian fishes.

MATERIALS and METHODS

The Tilapa fish sample used for this study was taken from the wild in Eleyele dam in Oyo State which is the major source of water in Ibadan. The sample collection was taken during rainy season of the year (between the month of June and July 2012) and was collected for a period of 4 weeks.

200 Fish were collected for a period of 4 weeks. The blood of all the fish were collected through the heart using 2mls syringe and in the sodium citrate anticoagulant bottle and were well

examined for haemoparasite following the standard procedure. Full blood count and white blood cell differential counts were taken.

The blood was collected through the heart of the fish in the 2mls syringe and in the sodium citrate anticoagulant sample bottle to present blood clot. Full blood count was done for all the samples that were positive for trypanosome by buffy coat smear examination. Trypanosome organism was also examined in the blood smear stained with Giemsa stain.

RESULTS

The prevalent rate of trypanosomes infection is fish sampled was 17.5% (TABLE I). Comparing the haematological values of infected to the non infected (TABLE II), there was moderate anaemia with PCV 15.30 $\pm$0.920 (%) characterised by lower values of haemoglobin 4.63 $\pm$ 0.3964(g/dl) and red blood cells 1.5280 $\pm$0.09559(10^6/µl) while the WBC was 15333.0 $\pm$ 773.247(µl) with differential of lymphocytes 8280 $\pm$ 4.634(µl), heterophils 6134 $\pm$4.732(µl), monocytes 306 $\pm$0.389(µl),as compared to the non infected with PCV 38.40$\pm$1.288(%), haemoglobin12.220 $\pm$0.3929(g/dl) red blood cells 3.6100 $\pm$ 0.14117(10^6/µl) while the WBC is 17610.0 $\pm$ 670.149(µl), differential lymphocytes 10918 $\pm$ 5.398(µl), heterophils7044 $\pm$ 5.389(µl), monocytes 176 $\pm$ 0.374(µl).

The parasite was identified morphologically in blood smear (Fig 1) as Trypanosoma species with it similar characteristic of their varying size, staining properties, location of nucleus, flagellum length and host fishes infected.

The number of fish positive for trypanosome infection were 35 in 200 hundred samples surveyed (TABLE II) Comparing the infected to the non infected, there was marked normocytic normochromic anaemia characterized by lower values of white blood cells while the differential count showed reduced values as compared to the non infected. However the monocytes values were more in infected group.

TABLE I: THE NUMBER AND PERCENTAGE OF FISH POSITIVE FOR TRYPANOSOME INFECTION

Batches of Fish	No of fish positive for trypanosome infection	% of fish sample positive for trypanosome	No of fish negative for trypanosome infection	% of fish Sample negative for trypanosome	Total no of fish collected
1st Batch	16	16	84	84	100
2nd Batch	19	19	81	81	100
Total	35	17.5	165	82.5	200

TABLE II: HAEMATOLOGY OF INFECTED AND NON-INFECTED FISH

	INFECTED n=35±SEM	NON-INFECTED n=40 ± SEM
Pack cell Volume (%)	15.30 ±0.920[a]	38.40±1.288[b]
Haemogblobin (g/dl)	4.630 ± 0.3964[a]	12.220 ±0.3929[b]
⁶/µl)	1.5280 ±0.09559[a]	3.6100 ± 0.14117[b]
MCV (fl)	104.90 ±7.894	111.47 ± 2.576
MCHC(g/dl)	29.295 ± 1.489	31.18 ± 0.3897
White Bloods cells(µl)	15333.0 ± 773.247[b]	17610.0 ± 670.149[a]
Platelets (µl)	151600 ± 11313.905	220000 ± 46024.993
Lymphocytes (µl)	8280 ± 4.634	10918 ± 5.398
Heterophils (µl)	6134 ±4.732	7044 ± 5.389
Monocytes (µl)	306 ±0.389[b]	176+0.374[a]
Eosinophils(µl)	153 ±0.340	352 ± 0.200
Basophils (µl)	0 ±0.100	0 ± 0.245
Plasma protein(g/dl)	5.74± 0.481	6.32 ± 0.335

significantly different P< 0.05 . a=(P<0.05), b=(P<0.02), n=Number of samples examined, SEM=Standard Error of Mean. Different superscripts a, b on the same row indicate significant difference between the mean.

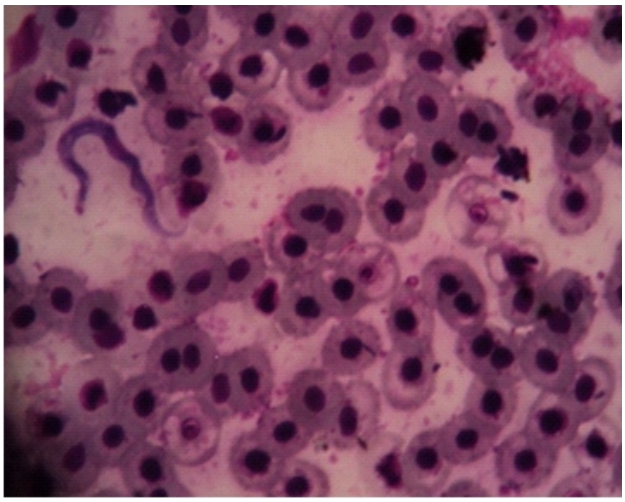

Fig 1: Showing Trypanosome in A: stained blood smear of Tilapia

DISCUSSION

This report appears to be the first documented evidence on the incidence and haematological changes associated with trypanosome infection in wild tilapia fish in Nigeria. The trypanosome observed was morphologically similar to *Trypanosome mukasi* species which has characteristic varying size, staining properties, location of nucleus and flagellum length. The presence in fish could be due to the strategies that trypanosome adapts to evade host immunity as opined by Jamie *et al.* (2011).

The haematological changes observed revealed a moderate anaemia in the infected group which is a consistent feature of trypanosomiasis in animals other than fish (Losos and Ikede, 1972,

Amole *et al.,* 1982). The decrease in haematocrit and haemoglobin levels which were evidences of anaemia and accelerated haemopoiesis respectively as observed has been reported in some trypanosome infections in fish (Khan, 1976, Nazrul Islam and Woo, 1991). Leucopeania observed in infected group is also consistent with findings on trypanosomiasis in other animals (Anosa and Isoun 1980a). Monocytosis observed in the infected group was due to increase in phagocytic demand to phagocytize the trypanosome and the affected (deformed) red blood cell as observed in animal trypanosomiasis (Jenkin *et.al*. 1980).

CONCLUSION

In conclusion, trypanosomiasis is a disease to note in aquaculture, though mostly found in the wild can cause immunosuppression in fish as indicated in the haematological findings thus making the fish more susceptible to other diseases resulting in economic losses. The intermediate host known as leech should be possibly reduced in the pond or water bodies used for fishery to reduce the trypanosome transmission to fish. A survey should be conducted to know associated factors that enhance spread, pathogenic role and characterization of the species obtained.

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