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A SURVEY OF ECTOPARASITES ON THE GILLS, SKIN AND FINS OF *OREOCHROMIS NILOTICUS* AT BAGAUDA FISH FARM, KANO, NIGERIA

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ABSTRACT
Six hundred and two specimens of Oreochromis niloticus from Bagauda fish farm, Kano were examined for ectoparasites. Nine hundred and fifty six ectoparasites were found on two hundred and fourteen (35.6%) specimens. Piscine parasites recovered were protozoa and trematodes namely, Ichthyophthirius spp, Myxobolus spp, Clinostomum spp and Euclinostomum spp. Gill infestation was maintained to be higher throughout the year, than that on the skin and fins, and it was found to be statistically different by DMRT at 5% level of probability. Generally trematodes had higher frequency than protozoa in both the seasons (25.58%, 36.33% and 4.30%, 11.00% respectively). Frequency of protozoa infestation is higher in wet Season 11.00% than in dry season 4.30% so is the case with the trematodes, 36.33% in wet season and 25.5% in dry season.

Key words: Piscine, ectoparasites, gills, skin, fins, Oreochromis niloticus, Bagauda fish farm.

INTRODUCTION

Fish has continued to be the most easily affordable source of animal protein to the average Nigerian family (Haruna, 2006).Nigeria has an estimated 12.5mha of freshwater surface area of lakes, reservoirs and ponds (Ibeun, 2006) which are capable of producing 521,000 metric tons of fish but have not succeeded in attaining fish food sufficiency (FAO, 1990). Therefore, improvement and extension of inland fishing and fish culture are becoming quite important in the development program of Nigeria (Aken'Ova, 1999). The negative impact of parasites on host-growth and survival has been demonstrated in several parasite-fish host system both in aquaculture and in natural population (Yanong, 2002).Piscine parasites causes profound pathological changes which lowers the growth rhythm considerably and effect the quality of the fish and often leads to death of fish resulting in enormous economic losses to the fish industry (Geets and Ollevier, 1996). Some piscine parasites are transmissible to man and other fish-eating domestic and non domestic animals (Klinger and Francis-floyd, 2002).Therefore the study of fish parasites with a view to eliminating the disease they cause and prevent their transmission to man and other animals is of great importance.

Documented information on fish diseases is scanty in Nigeria and work was carried out in limited number of water systems. Some of the works done include, work done in Cross-River estuary by Obiekezie *et al* (1988), in Kainji lake and associated tubutaries of River Niger by Okaeme *el al* (1986), and Ukoli (1965), in Gwagwalada, Abuja by Dankishiya and Zakari (2007), in Zaria Area by Shotter (1980) and Oniye and Annune (1993). In Lake Chad basin by Ahmad (2007). In Kano, at Tiga Dam by Jimeta (1988) and Ndifon and Jimeta (1990).

The main objective of this work is to isolate, identify and compile types of parasites found on *Oreochromis niloticus* and to determine the incidence of parasitic infection of *Oreochromis niloticus* at Bagauda fish farm Kano.

MATERIALS AND METHOD

Study Area

Bagauda fish seed multiplication centre is a government owned fish farm, responsible for carrying out research and documentation on fish species in Kano waters, as well as for the production of viable fingerlings that can strive well in Kano environs for both research and commercial purposes. The farm is located 57 km away from Kano city along Kano - Jos Road, in Wak district of Bebeji Local Government Area. It is located between latitude $11^{0}20^{1}$ and $11^{0}45^{1}$ north of the equator and longitude $8^{0}15^{1}$ and $8^{0}30^{1}$ east of the Greenwich meridian.

Fish sampling and Examination for parasites

A total of 602 samples were obtained, comprising of 280 males and 322 females. Live fish were transported to the laboratory in oxygenated plastic bags. Sampling was done twice monthly for twelve calendar month. On each sampling day, surface water Temperature was recorded. In the lab all samples were examined and processed by method prepared by Marcogliese (2002). The external surface (Skin and Fins) of each sample were rinsed, and the body was grossly examined with the aid of a hand lens for presence of parasites. Fins were removed and examined under the dissecting microscope. The 2 opercula of each fish were removed and the inner side was examined under the dissecting microscope. Each gill arch was examined individually for presence of parasites.

Treatment of parasites

Parasites when recovered were noted, their number on each species recorded and location on the host noted on the data sheet.

Parasites were then removed relaxed and then preserved. Protozoans were preserved in 10% formaldehyde. Trematodes were relaxed in distilled water and then fixed in normal saline, and later preserved in 4% formalin. Cyst observed were also removed from the host body and some were rinsed and preserved in 4% formalin while others were removed and the cyst was gently punctured with a forceps to release the metacercaria/spores.

The parasites were placed on a slide, drops of formal acetic acid (FAA) was added to fix the parasites and few drops of a cleaning agent (Lacto phenol) were added and the parasites was observed under the microscope with the x40 objective. Photographs of parasites were shot using a digital camera (Sony Model No: DSC – T100). Parasites recovered were identified using taxonomic guides by Paperna (1996) with the assistance of a parasitologist. Duncan's multiple range tests and students' t-test were used to analyze the results and to determine the relationship between incidence of infestation with regards to season.

RESULTS

Two hundred and fourteen (35.55%) fish samples were found infested with nine hundred and fifty six ectoparasites. Summary of distribution of the piscine parasite is presented in table 1. During the course of this work, temperature experienced was significantly different throughout the year. Hottest surface water temperature recorded was in June (29.95^0C) and coldest in January (19.00^0C). Number of fish positive for parasitism was highest in August (25) and September (25) and least in March (8).

Table 2 presents seasonal prevalence of piscine ectoparasites. In dry and wet season, 302 and 300 samples were examine respectively of which 87 (28.81%) and 127 (42.33%) were infested respectively. Mean surface water temperature was highly significant to infestation in both seasons (T=12.00** and 3.66**). Prevalence on the gills (T = 9.28** and T=11.02**) and skin (T = 3.97**and T=6.18**) were also highly significant in both season but on the fins, it was not significant in dry season ($T = 1.74^{ns}$). A number of the piscine host had multiple infestations on their body.

Piscine parasites recovered are protozoa and trematodes namely *Ichthyophthirius spp, Myxobolus spp, Clinostomum spp* and *Euclinostomum spp* (Table 3). Generally trematodes have higher frequency than protozoa in both the seasons, 25.58%, 36.33% and 4.30%, 11.00% (table 3) respectively. Frequency of protozoa infestation is more in wet Season 11.00% than in dry season 4.30%, so is the case with the trematodes, 36.33% in wet season and 25.5% in dry season. *Ichthyophthirius* spp has higher frequencies in both season 2.65% and 7.62% than *Myxobolus*. *Clinostomum* predominately have higher frequency of distribution 16.23% and 21.33% than *Euclinostomum*, 9.27% and 15%.

DISCUSSION

In this study, piscine host was found to harbors two groups of ecto parasites namely Protozoa and trematodes. Akinpelu (1983), Awa *et al* (1996) and Adeyemo and Agbede (2008) all reported infestation of *Tilapia species* by trematodes. Onwuliri and Mgbemena (1987) reported protozoan infestation as well. Ahmad (2007) observed higher prevalence of trematodes and Cestodes in *tilapia species* than in all the other species examined.

Parasites uncounted in this study include two protozoa namely *Ichthyophthirius spp* and *Myxobolus spp*, and two trematodes identified as *Clinostomum spp* and *Euclinostomum spp*. These parasites have been observed in *Oreochromis niloticus* and various other piscine hosts in Nigeria. Onwuliri and Mgbemena (1987) recorded *Oreochromis niloticus* as the most parasitized and bears the highest parasite load among the fish species examined at Panyam fish farm Jos. Parasites recovered include *C.tilaipae, Euclinostomum* and *Myxobolus spp*. Of the six parasites observed on *Oreochromis niloticus* by Awa *et al,* (1996), *Clinostomum* and *Euclinostomum* were most prevalent. Eleven protozoa species were recorded from fishes of the Lake Chad basin including *Ichthyophthirius spp* (Ahmad 2007).

Generally, Incidence and intensity of parasitism varied with the season being more prevalent during the rainy season (42.33%) {Table 2}.Hicks and Threlfell (1973) attributed the availability of suitable intermediate host(s) as part of the factors contributing to the variation. High numbers of snails (Bulinus and Melanoides) were seen at the farm during the raining season. Wickins and Marcfarlene (1973) relate it to availability of more food which possibly harbors the infective stage. Increase in food and availability of the host during the rainy season increase the possibility of infestation since infectious agents are also more abundant, examples trophonts of parasites. Optimum temperature for the development of eggs of *Clinostomadae* and subsequent hatching of miracidia is $25–30^0$C. The optimum temperature for the development of icht trophonts is between $25\text{-}26^0$C, thus outbreak of the disease occur in spring and summer (Paperna, 1996) when the conditions are ideal for their development. Aken'Ova, (1999) is of the view that higher infestation during the raining season may be due to increase in host population due to spawning, abundance of food and increase host activity in larger volume of water hence increase encounter with the infective agent. Wootton (1992) emphasize seasonal diet shift of fish during the various seasons through out the year, this may result in difference in degree of resistance to infestation. Joadder (2007) and Shallof and Khalifa (2009) reported poor feeding of adult fish during spawning period, with the abdominal cavity occupied with ripe gonads.

The higher prevalence of trematodes infestation observed is in line with the works of Falieva (1971) and Onwuliri and Mgbemena (1987) which shows heavy infestation by these trematodes in areas of large population of fish eating birds (their definitive host), as observed in the current study where large number of herons and egrets were seen around the study area during the study.

Overall prevalence of piscine parasite observed in this study (35.55%) is relatively lower than those reported in previous studies at other sites such as the 60.4% reported for Panyam fish farm (Onwuliri and Mgbemena, 1987) 44.9% from Zaria dam (Aken'Ova, 1999). Awa *et al,* (1996) suggest that difference may be due to ecological differences and presence or absences of source of infestation.

CONCLUSION

The present investigation shows highly significant infestation (P< 0.05) of *Oreochromis niloticus* by ecto parasites. The project site Bagauda fish farm is a government owned fish seed multiplication center responsible for supplying individual fish farmers with fingerlings. The prevalence rate is alarming and call for proper fish management in terms of preventing serious out breaks. Fish parasitism can be reduced/ controlled by avoiding over crowding, eliminating intermediate/definitive host of the parasites through occasional surveillance and treatment. With the increase interest in aquaculture, it is essential to have facilities and services for diagnosis, treatment and control of fish disease on ground especially in northern Nigeria where such facilities are non existence.

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Table 1: Summary of distribution of piscine ectoparasites infestation on *Oreochromis niloticus* at Bagauda fish farm

DATE	MEAN TEMPERATURE(^{O}C)	NO. OF FISH EXAMINEED	NO.OF FISH INFESTED	GILL INFESTATION	SKIN INFESTATION	FINS INFESTATION
NOV	21.00^{j}	52	20(38.46%)	20(0.83^{ab})	4(0.15^{bcd})	0(0.00^{b})
DEC	20.00^{k}	50	21(42.00%)	21(1.14^{a})	0(0.00^{d})	0(0.00^{b})
JAN	19.00^{l}	50	10(20.00%)	10(044^{ab})	0(0.00^{d})	0(0.00^{b})
FEB	24.00^{i}	50	15(130%)	15(0.26^{c})	0(0.00^{d})	1(0.00^{b})
MAR.	26.05^{h}	50	8(16.00%)	6(0.29^{c})	0(0.00^{d})	0(0.08^{b})
APR.	27.95^{d}	50	13(26.00%)	10(0.44^{bc})	0(0.00^{d})	3(0.16^{abd})
MAY	29.00^{b}	50	20(40.00%)	18(0.48^{bc})	3(0.64^{ab})	3(0.08^{b})
JUN	29.95^{a}	50	22(44.00)	22(0.92^{ab})	3(0.41^{abcd})	1(0.16^{ab})
JUL	27.00^{f}	50	12(24.00%)	12(0.25^{c})	1(0.31^{bcd})	2(0.08^{ab})
AUG.	26.25^{g}	50	25(50.00%)	25(1.08^{a})	4(0.56^{abc})	4(0.38^{ab})
SEP	27.06^{e}	50	25(50.00%)	20(1.00^{a})	6(0.32^{bcd})	3(0.41^{ab})
OCT	28.70^{c}	50	23(46.00%)	20(0.82^{ab})	5(0.49^{abcd})	5(0.41^{a})

Means with the same alphabet(s) in same column are statistically not different by DMRT at 5% level of probability.

Table 2: Seasonal distribution of piscine ectoparasites infestation on *Oreochromis niloticus*

Season	No Of Fish Examined	No. of Fish Infested	Mean Tempt.^{0}C	Gills Infestation	T.Value	Skin Infestation	T.Value	Fins Infestation	T.Value
Dry	302	87(28.81%)	12.0.00**	82	(9.28**)	4	(3.97**)	4	(1.74$^{NS)}$
Wet	300	127(42.33%)	3.66.05**	117	(11.02**)	22	(6.18**)	18	(4.24**)

** And ^{ns} represent highly significant and not significant respectively

Table 3: Seasonal distribution of piscine parasites species on *Oreochromis niloticus*

SEASON	TREMATODE			PROTOZOA		
	No infested	Clinostomum	Euclinostomum	No infested	Ichthyophthirius	Myxobolus Spp.
DRY	77(25.58%)	49(16.23%)	28(9.27%)	13(4.30%)	8(2.65%)	5(1.66%)
WET	109(36.33%)	64(21.33%)	45(15.00%)	33(11.00%)	23(7.62%)	10(3.33%)
TOTAL	**186(38.98%)**	**113(18.77%)**	**73(12.13%)**	**46(7.64%)**	**31(5.15%)**	**15(2.49%)**