



INCIDENCE OF PISCINE PARASITES ON THE GILLS AND GASTROINTESTINAL TRACT OF *CLARIAS GARIEPINUS* (TEUGELS) AT BAGAUDA FISH FARM, KANO

*Bichi, A.H. and Yelwa, S.I.

Department of Biological Sciences, Bayero University, Kano, Nigeria

*Correspondence Author

ABSTRACT

The aim of this work is to investigate piscine parasites of gills and intestinal tract of *Clarias gariepinus*. Six hundred and forty five (645) specimens of specie were examined fortnightly for a period of one year from November, 2006 to October, 2007. One hundred and fourteen (114) and one hundred and ninety nine (199) were infested fish samples from gills and gastrointestinal tract respectively. Parasites recovered during the survey include two species from gills identified as *Ergasilus sarsi* ((24.60%) a crustacean (copepod), and one protozoan (myxosporean) named *Henneguya* sp (11.82%). However, parasites recovered from the GIT composed of four different specie of Cestodes (35.53%) comprising of *Anomataenia* sp, *Bothriocephalus aegypticus*, *polyonchobothrium polypetri* and *polychobothrium* sp, two species from nematodes (28.13%), with *Procaamallinus laevionchus* and unidentified specie. All these parasites were located in the intestinal lumen of the specie with the exception of *Anomataenia* and *Procaamallinus* species dominating the stomach region only. Females samples had higher incidence rate 235 (75.5%) than males 78 (24.9%), there was no significant difference ($P>0.05$) in infestation rate. Incidence of infestation among the three sized classes showed adults were mostly infested (69.03%) followed by sub adults (26.82%) with juveniles (4.2%) being the least parasitized. There was significant difference in incidence rate ($P<0.05$) among the three classes. Analysis of results indicated size influenced the degree of infestation rates in adults' size. And the sex of host did not influence the incidence of the parasites.

Keywords: Piscine, parasite, gills, GIT, *Clarias gariepinus*, Bagauda farm.

INTRODUCTION

Fish serve as a good source of animal protein for man and his livestock. A break down showed, fish accounts for more than forty percent of the protein diet of two – third of the global population (Eyo (1992), FAO (1999)). Due to increase in human population, demand for fish as a source of protein is on the increase (Abolarin, 1996). In recent times, there has been a tremendous increase in the development of fish farming and culture due to increase need for animal protein.

Disease is an important factor militating against fish production. Many diseases are closely linked to environmental deterioration and stress, once the environment is disturbed, the organisms under such culture systems are stressed (SEAFDEC, 1999). In Nigeria the level of awareness of the impact of disease to aquaculture is lacking as revealed by numerous personal interactions and the report of Kolndadacha, *et al*, (2007). Parasitic diseases of fish are very common all over the world and are of particular importance in the tropics (Roberts and Janovy, 2000). Fish is the most parasitize of all vertebrate (Arme and Wakey, 1970). The importance of parasitic infection on fish production has largely remained an issue of concern to fish farming industry. Some parasites have been discovered to have zoonotic potential in mammalian host including man

thereby making them of public health importance (Ukoli, 1981). However, in instances where hosts are over crowded such as in aquaria and fish farms, parasitic diseases can spread very rapidly causing gross mortalities (Paperna, 1996).

In fish farming or aquaculture, some parasites may be highly pathogenic and contribute to high fish mortalities and economic loss, while in natural systems they may threaten the abundance and diversity of indigenous fish species (Mashego, 2001). *Clarias gariepinus* is one of the most resistant and widely accepted and highly valued fish that could be cultivated in Nigeria, therefore the need for documented research on parasites which might constitute serious problems on this fish cannot be over emphasized (Anthony, 1982); Dankishiya and Zakari (2007). Nwuba (1987) reported that out of 107 *Clarias lazera* observed only three were free from helminth parasites infestation, and a single fish could have an average of about twelve helminth parasites. It has been observed that, no clinical disease or outbreak has been recorded in the country. There is assumption that fish disease does not affect the down fall of aquaculture systems (Kolndadacha *et al*, 2007). This paper aims at investigating piscine parasites of gills and gastrointestinal tract of *Clarias gareipinus* and to describe incidence in relation to sex size.

MATERIALS AND METHOD

Study area:

Bagauda fish farm is located in Kano State, Northern Nigeria, about 57km away from Kano city, along Jos road in Wak district of Bebeji Local Government Area. It is between latitude of 11°20' and 11°45' north of the equator and on longitude 8° 15' 30" of the Greenwich meridian.

A total live specimen of six hundred and forty five live (645) samples of *Clarias gariepinus* of various sizes were examined from the study area fortnightly for a period of one year from November, 2006 to October 2007 and were transported to the laboratory in a plastic bags containing pond water. Fish were identified using keys prepared by Holden and Reed, (1972). Fish were killed by cervical dislocation. The total and standard length of each fish were measured in centimeters (cm) using meter rule, while weight was taken in grams using an electronic mettler balance. The sexes were determined by both internal and external examination, with long external papillae in female sex organ.

Examination and Identification of Piscine Parasites

Specimens were categorized as Juveniles, sub adults and adults according to Ugwuzor (1987), Basu *et al.*, (1993), Aken'Ova (1999) and Muhammed *et al.*, (2009). The heads of fish were cut – open with scissors and gills were exposed and placed in different Petri dishes and were observed with hand lens and dissecting microscope for parasites, using techniques of Chubb (1963). 4mls of saline solution was added to a cyst removed from gill arch and filament, and were pressed on a slide and cover with a cover slip for observation on light microscope. Body cavity of fish were dissected using a pair of scissors and different portion of the gut (Oesophagus, stomach, intestine and rectum) were isolated and kept in different Petri dishes, containing saline solution. The contents of the oesophagus, intestine and rectum were washed in separate Petri dish for sedimentation and floatation technique. The parasites found were collected and preserved in 10% formalin, mounted slides of the parasites were prepared using lactophenol as the clearing agent and observed under X40 objectives. Parasites recovered were photomicrographed and their number, species and location in the host recorded. Identification of the piscine parasites was carried out using standard text by Paperna (1996) with the assistance of a parasitologist. Duncan's multiple range tests of variables was used to compare the incidence of parasitism according to sex and size of the fish.

RESULTS

Out of six hundred and forty five (645) *Clarias gariepinus* examined, three hundred and thirteen (313) were infested. One hundred and fourteen (114) parasites were recovered from the gills and one hundred and ninety nine (199) were from the gastrointestinal tract of the specie.

Infestation of parasite according to sex indicates two hundred and twenty (220) males and four hundred and twenty five (425) females were examined (Table 1). The female had a higher incidence rate of 20.70% and 34.63% for the gills and GIT respectively, with parasite burden of one hundred and forty seven (147). The males had for the gills and GIT, 11.81% and 23.62% infestation rates with parasite load of eighty nine (89). These however, did not differ significantly (P>0.05).

Incidence varied among the three size classes of *Clarias gariepinus*, as Juveniles, sub adults and adults (Table 2). The incidence was found to increase as the fish grew. The adults showed the highest incidence (22.33%) (35.81%), followed by sub adults (12.9%) (32.2%) and the Juveniles (8.5%) (6.9%) all in gills and GIT respectively, which was significantly different (P<0.05),

The overall monthly incidence of the piscine parasites in Bagauda fish farm was 48.53%. Highest incidence of parasitism occurred in Cestodes (35.50%) with three different species recorded in the intestine; *Bothriocephalus aegypticus*, and two different species of *Polyonchobothrium*, named *Polyonchobothrium polypteri* and *Polyonchobothrium specie* with *Anomotaenia* sp obtained in the stomach. Followed by Nematodes (28.12%) with two specie; *Procamallinus laevionchus* and unidentified species recovered in the stomach. Two different species were found on the gills, a Crustacean specie named *Ergasilus sarsi* (24.60%) and a protozoan *Henneguya* sp (11.51%) showed least cause of parasitism (Table 3). No egg (ova) or cyst was found; other segments of the gut oesophagus and rectum were free from parasite. Cases of double infestation particularly Cestodes and Nematodes parasites were obtained.

Investigation of these study reveals the damaged inflicted by infestation of two different species of *Polyonchobothrium* (*Polyonchobothrium polypetri* and *polyonchobothrium* sp) a Cestodes were found blocked and attached firmly on the intestinal lining thus, induced lesion at site of attachment. Other species of Cestodes and nematodes obtained in the stomach, and those obtained on gills did not induce any damage.

Table 1: Incidence of Gills and GIT Infestation in Male and Female *Clarias gariepinus* from Bagauda Fish Farm.

	No. of Fish Examined	Mean Standard Length	No. of Fish Infested in gills	No. of Fish Infested in GIT	Total number of parasites
Male	220	27.29 ^a	26(11.8)	52(23.6)	89
Female	425	27.29 ^a	88(20.7)	147(34.6)	147
Total	645		114(17.7)	199 (63.6)	236

Mean with the same letter(s) within each column are statistically not significant using DMRT at 5% level of probability.

Table 2: Incidence of infestation Between Class Lengths of *Clarias gariepinus* with Gills and GIT Piscine Parasites.

Class size (cm)	No. of Fish Examined	Mean length (cm)	Standard	No. Infected in Gills (%)	No. Infected in GIT (%)	Total No. of Parasites
Juveniles (0 – 12)	87	11.01 ^c		07 (8.5)	06 (6.9)	96
Sub adults (12. 1 – 18)	186	15.28 ^b		24 (12.9)	60 (32.2)	572
Adults (18. 1 – above)	372	37.22 ^a		83 (22.3)	133 (35.8)	934
Total	645			114	199	1602

Mean with the same letter(s) within each column are statistically not significant using DMRT at 5% level of probability standard length (cm).

Table 3: Monthly Incidence of Piscine Parasites, site preferences and frequency distribution of various groups of *Clarias gariepinus*, from Bagauda fish farm.

Months	No. of Fish Examined	No. of fish infested in gills	No. of fish infested in stomach	No. of fish infested in intestine	Frequency distribution of parasites			
					Cestodes (%)	Nematodes (%)	Crustacean (%)	Protozoa (%)
Nov. 06	54	07	09	13	10(18.3)	12 (22.2)	07(13.0)	00
Dec. 06	54	13	12	12	13 (24.1)	11 (20.4)	13 (24.1)	00
Jan. 07	54	08	00	09	00	09 (18.5)	08 (14.8)	00
Feb. 07	54	19	05	14	00	19 (35.2)	12 (22.2)	07 (9.3)
Mar. 07	54	19	07	07	00	14 (13.0)	06 (9.3)	13 (24.1)
Apr. 07	54	18	05	15	20 (18.5)	00	08 (14.8)	10 (20.4)
May. 07	54	11	02	29	21 (44.4)	10 (5.6)	04 (5.6)	07 (13.0)
Jun. 07	54	04	02	04	06 (5.6)	00	04 (7.4)	00
Jul. 07	54	04	02	02	01 (1.9)	03 (3.3)	04 (7.4)	00
Aug. 07	54	02	00	13	13 (24.1)	00	02 (3.7)	00
Sept. 07	54	03	03	19	17 (33.2)	05 (9.3)	03 (5.6)	00
Oct. 07	52	06	01	14	10 (25.0)	05 (11.5)	06 (9.6)	00
Total	645	114	48	151	35.53%	28.13%	24.60%	11.82%

Means with the same letter (s) within each column are statistically not significant using DMRT at 5% level of probability.

DISCUSSION

The piscine parasites of gills and GIT have been reported from *Clarias gariepinus* in the area of study for the first time, as no documented work has been recorded on the project site. Works recorded include investigations from various workers like Yola (2007), on the biology nutrition, fecundity and feeding of fish. The recovery of two different parasites from the gills of the specie in this investigation is not surprising as they have been recorded previously from the specie or related species else where (Paperna, 1996). *Henneguya* sp was obtained as whitish cyst of variable sizes which usually attach to aborescent organ, few were observed on the gill filament of infected fish. Onwuliri and Mgbemena (1989) and Oniye (2000) reported high prevalence of the parasite in different fish specie from various fish farms and river respectively. Haladu (2003) reported similar incidence in Tiga dam. *Ergasilus sarsi* was reported by Aken'Ova, (1999), Haladu (2003) and Oniye (2000) from different water bodies in *Mormyrus rume* species. The rate of parasites infestation on gills of *Clarias gariepinus* in Bagauda fish farm was observed to be slightly low (17.7%). Emere and Egbe, (2006) reported prevalence of 12.17% in river Kaduna.

The results of GIT infestation in this study showed that majority of the parasites especially Cestodes occurred in the intestine. Mohammed *et al.*, (2009) reported more infestation in the intestine only few existed in the stomach throughout the period. Shotter (1974) reported the blocking of the lumen of the alimentary canal of fish by acanthocephalans and the development of lesions at the site of attachment as was observed in this study. Low prevalence in the stomach could be

attributed to the effect of acidic pH of the gastric fluid. This regional localization of these helminth parasites could be attributed to several factors including chemotactic response, food reserves as well as hydrogen ion concentration this is expected because helminths differ in their nutritional and respiratory requirements as reported by Onwuliri *et al.*, (1989). The incidence of these endo helminth parasites 199 (30.9%) was quite high and consistent with the work of Anosike *et al.*, (1992) who reported a prevalence of 34.70% in wild population of *Clarias gariepinus*, Oniye *et al.*, (2004) reported prevalence of 19.17%, Dankishiya and Zakari (2007) reported 40.85% prevalence.

Emere, (2000) reported differences in the incidence of infestation between male and female fish which may be due to differential feeding either by quantity or quality of food eaten or as a result of different degrees of resistance and infection. Emere and Egbe, (2006) reported that due to physiological state of the female, most gravid females could have reduced resistance to infection by parasites. The high incidence of infestation obtained in adult fish is an indicator that size of the fish is important in determining the parasite load compared to juveniles. Geets and Ollevier (1996), Oniye and Aken'Ova (1999) also reported increase in the abundance of parasites with host size. Anosike *et al.* (1992) reported that number of parasites and its diversity increase with age of fish. Mohammed *et al.*, (2009) reported prevalence was found to increase as the fish grows, and that could be attributed to the longer time of expose to the environment by body size.

CONCLUSION

Different classes of piscine parasites recovered and regional segmentation exhibited by these parasites

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