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Prevalence of Gills Helminth of Clarias Gariepinus in Baga Side of Lake Chad

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ABSTRACT: The prevalence of helminth infection in the gill and stomach of Clarias gariepinus in Baga site of lake Chad was investigated by this study. Ninety samples of Clarias gariepinus were collected from Lake Chad in northeastern Nigeria between March and August of 2007 and examined for helminth parasites. The mean weight of Clarias gariepinus ranged between 0.3 and 1.7kg, standard length between 1.5 -55cm, while the total and head lengths were 58cm and 13cm for big fish; and 17 and 3cm for small fish respectively. Examination of Clarias gariepinus for helminthes found the gills and stomach to be most infested with Heterophytes species of Trematodes and Cestodes with a prevalence of 8 (44.4%) and 10 (55.6%) ($p > 0.05$) respectively. Male Clarias had a higher 12 (28.6%) parasites prevalence than females 6 (12.5%) ($p<0.05$).Examination conducted also revealed that the month of May showed the highest prevalence of infection with 7 (38.9%) for the gills 4 (57.1%) and the stomach 7 (38.9%) compared with the other months of the study. The study reveals that bigger fish have higher parasitic burden than smaller fish and parasite infection is higher during the dry hot season of the year. @ JASEM

Fish is a highly nutritious food and large production of it at cheaper price could also benefit the health of many of our people. Fish play an important part in the life and well-being of most population of Nigeria .Fresh, dried, smoked or roasted; they are sold in the remote areas, dehydrated and pounded into fish flour in some places. (Ukoli,1969). According to Simon Horner *et al* (1996), fish supplies about 20% of animal protein worldwide and as much 64% in some African diet. Most of this is caught by fishermen and women. Beside the importance of fisher men and those who are partly dependent upon fish for food, the fish industry provide gainful employment for many thousands of other people who trade in fish or fishing gear, as well as transporters and canoe makers as well. it therefore attention must be placed on this important industry. The burden of piscine parasitism had been recognized and documented by several workers in the study area. These studies were however limited to other fish species. An elaborate and detailed study of parasites of catfish in the Lake Chad is therefore required to complement the efforts of other workers. This study is therefore aimed at determining the morphometric characteristics of *Clarias garipienus* and also to conduct a survey on the prevalence gills parasite of *Clarias gariepinus* in Lake Chad.

The Study Area: Lake Chad is a large shallow endorheic lake. It is located between Latitude 12^0 N and 14.2^0 N and Longitude 13^0 E and 14^0 E. It lies at the centre of the Chad basin and is fed by two northernly flowing rivers, the Chari and Logone, which arise from the Cameroon Mountains. Over 80% of the water entering the lake comes from these rivers, and the size and distribution of the lake is determined by their annual discharge. The savannah environment is sparsely covered with shrubs. The populations of the region, who mainly live in rural villages, belong mainly to the Kanuri ethnic group, although Yedina, Fulani and Hausa are also important. The local economy is centered on farming and fishing. The main lake side town is Baga. The Lake Chad is endowed with vast agricultural livestock and fisheries potentials. The areas along the basin such as Baga, Mallam Fatori, Daban Masara and Kukawa have been supplying fish, beans, maize, corn, cowpea, onion and vegetables in commercial quantities on a daily basis to Borno State and other parts of the country, just as hundreds of thousands of people on the Nigerian side of the lake earn their daily livelihood through the means of the lake, (Neiland, 1993).

MATERIALS AND METHODS

A total of 90 fish sample made up of 42 males and 48 female fishes of *Clarias gariepinus* were examined from Lake Chad between the months of March and August, 2007. The sampling stations were visited in the morning forth nightly for a period of six months. The fish were bought directly from the fishermen at Lake Chad fishing areas. The fish of various sizes were caught mostly in gill nets using graded fleets of colored multifilament net of mesh size 25.4 – 127mm to the bottom surface and shore nets. Some fishes were also caught with cast nets, clap nets and hooks. They were collected alive in plastic bucket containing Lake Chad water. *Clarias gariepinus* was identified by using the keys of Reed *et al* (1967). The morphometric study observed include the total and standard length of each fish which were measured by taking the length from the snout to the tip of the caudal

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Table I : Number of Clarias examined based on their sex and weight Parameters

Sex	No	%
Male	42	46.7
Female	48	53.3
Total	90	100
Weight Categories (kg)		
0.1 – 0.3	27	30.0
0.4 – 0.7	33	36.7
0.8 – 1.2	18	20.0
1.3 – 1.7	12	13.3
Total	90	100

peduncle (standard length), and from the snout to the end of the caudal fin (total length) respectively, using a meter rule. Head length and the body depth were also measured using a thread to measure the distance between the snout and the last bone of the bone covering the head (head length), and circling the thread around the stomach region and measuring the length against a meter rule for the body depth. Measurements were in centimeters. The weight of each fish was measured ungutted by using a three face beam balance with 0.1gm accuracy. Gills were removed and examined under the water. All parasites recovered were allowed to die and stretched in cold water before fixation in alcohol-formal acetic (AFA) and were later preserved in 70% alcohol with two drops of glycerine. For microscopic study, the specimens used were stained in acetocarmine (in 70% alcohol) for 15 minutes, placed in 1% acid alcohol for differentiation, dehydrated in graded alcohol series (70% - absolute alcohol), cleared in xylene and mounted with Canada balsam, (Ronald, 1978). All data on the morphological and parasitological studies were assessed for normality and homogenity of variance. Non normal data were transformed using one and two way analysis of variance (ANOVA).

RESULTS AND DISCUSSION

A total of ninety (90) fishes were examined from Lake Chad, 42 out of the 90 were males while the rest were female (Table 1). The fishes were categorized into four groups according to their weight to determine their age groups. Fish weighing 0.1 – 0.3 kg were classified as the fingerlings, 0.4 – 0.7 kg as juvenile, 0.8 – 1.2 kg were the young while 1.3 – 1.7 kg were the adult fish, each group representing 27, 33, 18 and 12 fishes respectively (Table 1). Out of the total number of fish infected twelve were found to be male while six were females or 13.3% and 6.7% respectively. A total of 18 parasite infection was encountered out of which 10 was in the gills and 8 from the stomach. Prevalence of infection was found to be equal in all age group except in the fingerlings which were not infected.

Examination of the specimen revealed no parasite infection in the gills and stomach, but there were no parasite found in the intestine, skin, eyes and mouth but eggs of fasciola were detected in the intestine. The helminth parasites collected from the gills were different from the ones collected from the stomach. Identification reveals that the parasites were trematodes and Cestodes. No specific part of the gill was more prevalent than the others parts. Parasites were detected moving about in the gills area while some were found attached strongly to the gills by their scolex. Table 2 shows the percentage of parasite infection in the gills of the male fish which was found to be higher with 11.9% than in female fish (6.3%), similarly the comparison of infection between male and female was found to be higher in males than in the females with 16.7% and 6.3% respectively. There was no variation in the percentage of infection in gills and stomach of the female fish.

Table 3 shows the distribution of parasite infection with months of study. Percentage infection was found to be highest in May in both organs (gills 26.7%, and stomach 20.0%). No parasite was encountered in the gills in the month of March and April, and the least infection in the stomach was found to be during the months of July and August with 6.7%. The intensity decreased between March and April followed by a sharp rise to its peak in May and then gradual decrease in June, July and August.

The rate of infection of Trematodes was found to be higher in males in each station compare to females in the same environment, while for Cestodes the infection rate is higher in males of station II. No Cestode was found in fishes of station I (Table 4). Table 4 shows 11 parasites were found in the gills of fish in station I, and only 7 were found in the gill area of samples from station II.

Table 2: Prevalence of Helminth infection in different organs based on fish sex

Parasite infection (No/%) Body organs	Male	Female
Gills	5(11.9)	3(6.3)
Stomach	6(16.7)	3(6.3)
Intestine	0	0
Eyes	0	0
Body surface	0	0
Head	0	0

Table 3: Distribution of endo-parasite infection in fish for each of the months

Parasite infection (No/%) Months	Gills	Stomach	Overall
March	0(0)	1(6.7)	1(6.7)
April	0(0)	2(13.3)	2(13.3)
May	4(26.7)	3(20.0)	7(23.3)
June	0(0)	2(13.3)	2(13.3)
July	2(13.3)	1(6.7)	3(10.0)
August	2(13.3)	1(6.7)	3(10.0)

Table 4: Distribution of endo-parasite infection in fish based on stations studied

PARAMETERS	**STATIONS**			
Total No. of fish examined	I		II	
	Male	Female	Male	Female
Nematode	-	-	-	-
Trematode	7(38)	4(22.2)	5(27.7)	2(11.1)
Cestodes	-	-	4(66.6)	2(33.3)
Protozoa	-	-	-	-
Acanthocephalan	-	-	-	-

Two classes of helminth parasites were recovered from fish samples in this study and this tally with the work of Ugwuzor (1987) and Onwuliri and Mgbemena (1987) except that there were no acanthocephalans and nematode*s* seen in this study. The reason for the absence of the acanthocephalans could be due to the fact that they have seasonal variation in their occurrence (Shotter, 1974). Among the helminth parasites trematodes were found to be most prevalent, followed by cestodes. The reason for high prevalence of trematode infection may be due to the low host specificity of the adult stages of these parasites which makes them capable of infecting different fish genera and species. It may also be because of the availability of the different host required for the completion of the life cycle of these parasites. These host include the piscivorous carnivorous and man as final hosts and gastropod mollusks and fishes as intermediate hosts (Yanong, 2002). The fish may act as intermediate host in some parasites while in others it is the final host. Trematodes reported to be of zoonotic importance include the Opistorchis species and Chlornorchis species, and the cestode parasite of zoonotic importance is Diphyllobothrium latum, the broad fish tape worm of man (Healy, 1970; Meyer, 1970). The reason for the absence of nematodes in this study may be due to the narrow host range of these parasites and their sizes which are very small making it difficult to be recognized during the process of isolation from the samples.

There is no considerable difference observed between fishes from the two stations in this. The two sources from the Lake do not differ probably because they were exposed to the same environmental conditions.

The study also showed that females were less susceptible to parasites infection compared to males. This could be due to certain ecological factors emanating probably from feeding differences between males and females. This observation contradicts the findings of Mhaisen *et al* (1988) that female fishes were generally more liable than males to infections with cestodes, nematodes and trematodes.

The study also revealed a higher prevalence of parasite infection in the adults and the young with little or no infection in the juvenile and the fingerlings. Larger fishes were heavily parasitized than the smaller ones. The intensity and prevalence of parasites infection increased with increasing length, size and age of the fish host. Age and sex were shown to influence the degree of parasite infection (Ugwuzor 1987). The reason for the higher infection rate in adult and young may be because of the longer duration of time the older fish were exposed to the agents in the environment. This increases their chances of acquiring the parasite infection with time. Similar observation of infection being higher in adult was reported by Roberts (1978) who noted that longer fish provide greater surface for infection than smaller fish. Among the organs that were observed only the gills and the stomach were found to be infected. The distribution of the parasites in the gut of fishes could be due to the physio-chemical factors operating in the gut, such as nutritional level, pH, osmotic tension and oxygen tension.

Parasite infection was found to be higher in May both in the gills and the stomach compared to the other months of the study period. The prevalence, intensity and abundance of helminthes parasites in *Clarias* for dry season are higher than in wet season of the year. Fishes were susceptible to heavy infestation with parasites mainly in early rain (May/June) when fishes were weakened by hibernation. The higher infection in this period could be attributed to the suitability of the environmental condition to the parasites or low resistance of the fish to parasitic infestation as a result of poor feeding habit and lower food abundance which is likely to weaken their immunity at that period. Multiple infections were common due to the fact that the environment supports several parasites species thereby exposing the host to simultaneous infection with many of them. The presence of one parasite and its activity within the host weaken the resistance which makes concurrent infection feasible. Parasite infection affects palatability, productivity, market and aesthetic value of fish, it is necessary to eliminate all condition that favours parasitic infection.

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