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Original article

Gastrointestinal helminth parasitesof *clariasgariepinus* (catfish) in lakehawassa, Ethiopia

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ABSTRACT

A total of 384randomly sampled catfishes (*Clariasgariepinus*) caught from Lake Hawassaduring November 2011 to June 2012 were examined to identify gastrointestinal helminth parasites. Of the 384, 292 (76.04%) were found infected with one or more helminth including cestodes, capillariaspps and contraceacumspps with prevalence of 52.8%, 39.84% and 27.60% respectively. There was no statistically significant difference in the distribution of infection between male and female of *Clariasgariepinus*. Basically, the infection rates in male and female sample were 76.44% and 75.65% respectively. The prevalence by classes of catfish was 2.74%, 63.36% and 33.90% in class I, class II and class III respectively, which were all significantly different.

1. Introduction

Fish helminthes parasites are generally found in all freshwater fishes. The parasite prevalence and intensity depend on many factors like parasite species and its life cycle, host and its feeding habits and the physical factors of water body where the fish inhabits. It also depends upon the presence of intermediate host such as snails and piscivorous birds for the onward transmission of parasites (like cestodes) infection to other hosts. The hygienic conditions of the water body are also very important in keeping aquatic environment free from introduction of any parasitic contamination from where fish are used for human consumption (Hafiz *et al.,* 2006).

Helminth parasites can cause damages such as compression and disruption of the vital organs including the gonads leading to sterility, eyes leading to blindness, poor growth rate and unthrifteness especially in young fish when they are found in large numbers in their body cavity and sometimes cause human diseases (Paperna, 1980; Roberts, 1989). The helminthes larval parsites belonging to the genera *Clinostomum*, *Euclinostomum*, *Amplicaenum* and *Contracecum* species are known to occur in most African fresh water fishes (Paperna, 1980; Shibru and Tadesse., 1979).

The increased human population and increased demand of animal protein has continued to raise the demand and consumption of fish and fish products worldwide. The aquaculture industry is believed to play a crucial role in food self-sufficiency in developing countries, since it requires very low working input, management time, working power and furthermore it can be handled as a par time activity. Limitation of information on fish parasites in Lake Hawassain particular andscarcity of documented information on fish disease in Ethiopiain general as well as poor fishing practices in the lake region initiated this study.

Cat fish is very common in swamps, lakes and rivers throughout Africa (Viveen*et al*., 1977). And they form an important group of game and food fishes in the study area because of their good size and gamely habits. Hence, determining the major gastrointestinal helminths of catfishes (*Clariasgariepinus*) was the principal objective of this study.

2. Materials and methods

2.1. Study design, area and population

A cross sectional study was conducted from November, 2011 to June, 2012to identify gastrointestinal parasite of catfish (*Clariasgariepinus*) cached from Lake Hawassa for human consumption. Lake Hawassa is at southwest of Hawassa city (former Awassa City) in Sidama Zone about 275km south of Addis Ababa, Ethiopia. Geographically the lake lies between 6˚ 14’ and 7˚18’N latitude and 37˚ 92’ and 39˚ 19’ E longitudes. The lake has a surface area of 88km^{2}and maximum depth of 22m. The lake water is used for fishing, irrigation of small scale agriculture, cloth washing, bathing, swimming, recreation, and cattle watering. Lake Hawassa support six fish species of which the commercial fishery depends mainly on Nile tilapia (*Oreochromisniloticus*),*Clariasgariepinus* andlarge barbusspps.

2.2. Sample size determination

The required sample size of the study determined by the formula given by Thrushfield (2005) with 95% of confidence interval, 5% desired precision and 50% expected prevalence (as there is no data from previous studies; the sample size was 384). One fish from each ten wooden vessel were randomly sampled twice per week.

2.3. Study methodology

The length of each fish was measured and data about the sex and length groups of fish was recorded. The fish length categorized into three classes, that is from 32cm to 50cm class I, from 51 to 74cm class II and from 75cm to 102cm class III.

The fish was dissected to expose the alimentary canal then its various sections (esophagus, stomach, intestine and rectum) were examined by visual inspection separately. Both stereomicroscopy and compound microscopy were used for further identification of parasites up to genus level in the parasitology laboratory,Hawassa University, using the standard procedures described by Paperna, (1980; 1996).

2.4. Data analysis

The data collected were entered and managed in Microsoft excel. An intercooled Stata 7 software (Stata Corporation, 2001) statistical program was employed for the data analysis. Chi-square ($\chi 2$) tests used to determine the association between the prevalence of helminths parasites and factors such as species of parasite, sex and length of fish groups. P value < 0.05 was considered significant.

Results

A total of 384*Clariasgariepinus* fishes were involved in the study where, 191(49.74%) weremale and193 (50.24%) females. The overall prevalence rate of gastro intestinal helminthinfection was 76.04% [292 out of 384]. The overall prevalence by sex was found relatively similar (Table 1). Out of three genus parasites identified, the predominant parasites were cestodes(Table 2).

The prevalence of capillaria species in stomach of male catfish was relatively lower (32.98%), than that of female (37.82%) with ($p > 0.05$) indicating the variation between sex statistically insignificant. This results show that both sexes of catfish stomach were relatively equally affected by capillaria specie. The prevalence of capillaria in intestine of male catfish was relatively lower (2.09%), than that of female (5.70%). The prevalence of cestode in stomach of male catfish was slightly higher (2.09%) than that of female catfish (2.07%). The prevalence of cestode in intestine of male catfish slightly higher (52.36%) than that of female catfish (49.22%). with ($p=0.539$) which is greater than 0.05 indicating the variation on sex was statistically not significant.

Table 1

Prevalence of total helminths on sex.

Total helminths	Male	Female	Total
Negative	45	47	92
	23.56%	24.35%	23.96%
Positive	146	146	292
	76.44%	75.65%	76.04%
Total	191	193	384
	100%	100%	100%

Table 2

Prevalence of infected catfish on genera of helminths

Helminthes	No. examination	No. positive	Percentage
Capillaria	384	153	39.84
Contraceacum	384	106	27.60
Cestodes	384	195	50.78

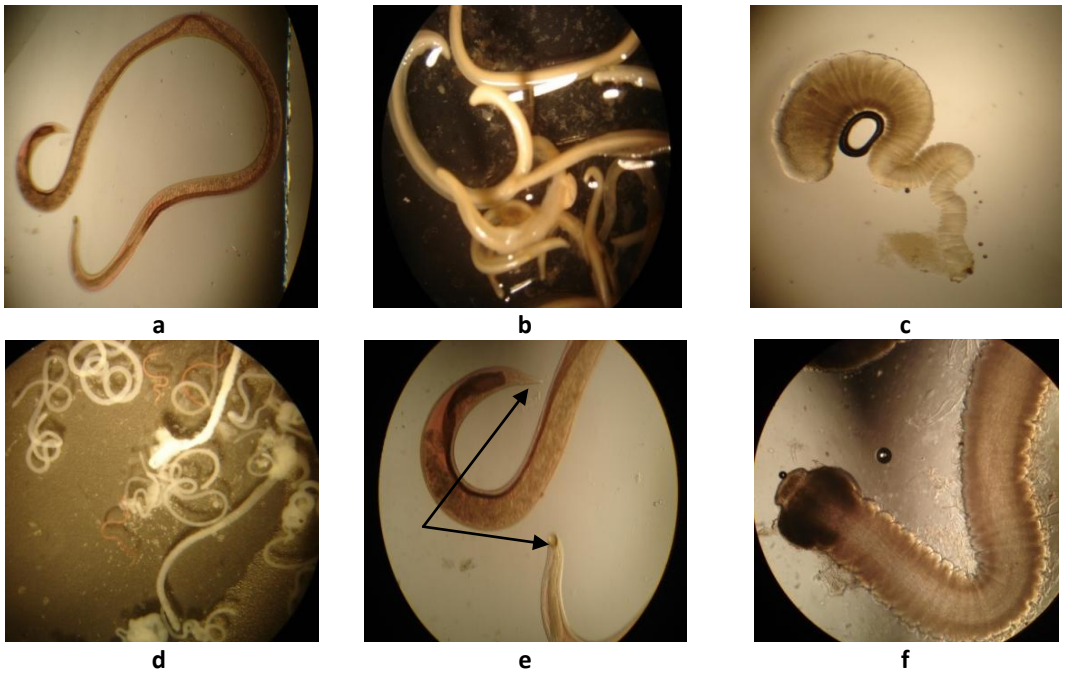

Fig. 1. a (active motile capillaria species from stomach of catfish), b (Larval stage of contraceacum species from catfish messentryof cat fish c (scolex of cestode species from intestine of catfish), d (cestode and capillaria under stereomicroscope), e (anterior and posterior end of capillaria spp.) and f (scolex and segmentation of cestode).

Table 3
Prevalence infected on sites of catfish

Sites in fish	No. of examined	No. of positive	Percentage
Messentry	384	106	27.60
Stomach	384	136	35.42
Intestine	384	195	50.78

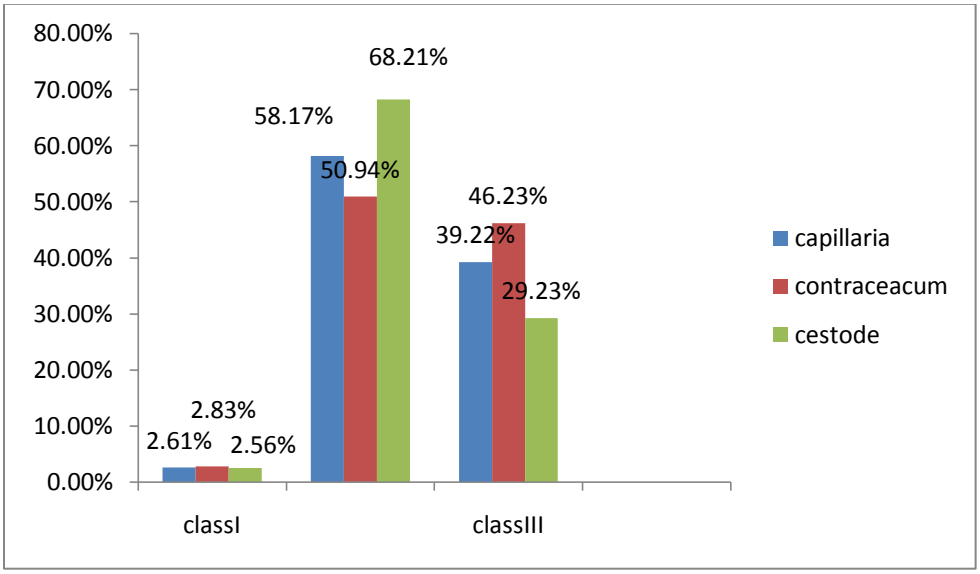

Fig. 2. Prevalence of individual genera by classes of catfish.

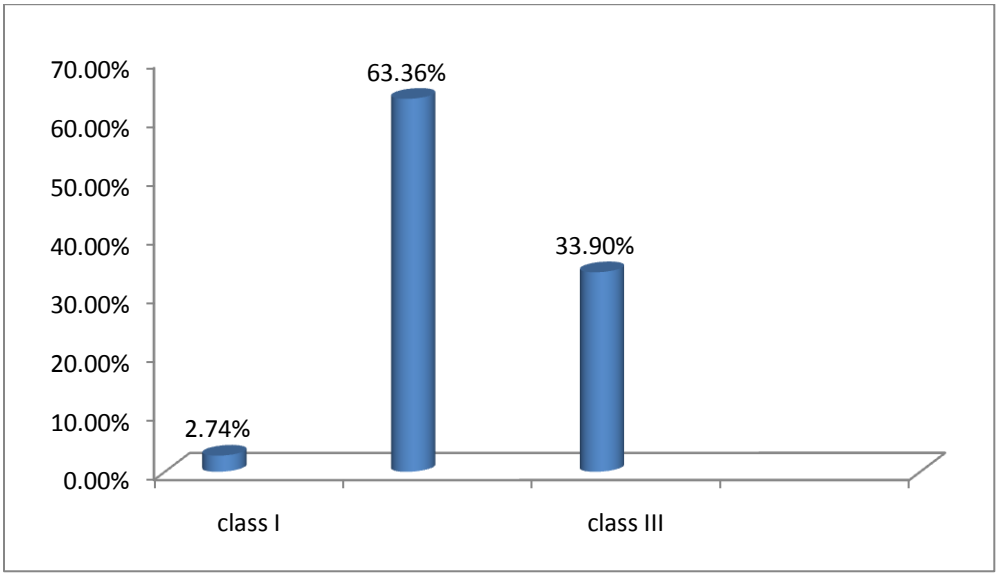

Fig. 3. Prevalence of total helminths in classes of catfish length
Pearson chi2 (2) = 28.9674 pr =0.00

3. Discussion

Catfish in Lake Hawassa found infected with helminth parasites which comprisecontraceacum, cestodesand capillaria. The overall prevalence rate of gastrointestinal helminthes of catfish infection in this study was 76.04% [292 out of 384]. This prevalence is higher as compared to the findings of Akinsanya&Otubanjo, (2000), Anosike*et*

al., (1992) and Onwuliri and Mgbemena (1987) who reported4.72%, 34.7% and 63.0% respectively,all reports are from Nigeria. As reported by Williams and Jones (1994) parasitism varies from one aquatic ecosystem to the other and this is influenced by the interplay of mixed biotic and abiotic factors.

The prevalence of Cestodes (50.78%) in this study foundto be higher as compared to the reports of Hafiz *et al*., (2006) who reported 32% prevalence at the Mangla Lake, Punjab and Ayanda, (2009)also reported 27% prevalence, Nigeria. This shows the variation in level of contamination. Capillaria was found the second most abundant parasite 39.84%.The third most abundant parasite was contraceacum27.60% and this finding is lower than the reports of Barson (2004) 42.6 %Zimbabwe. However it is by far higher than the reports of Yimer, (2000) 5.33% (n=75) from Ethiopia.As described by Paperna, (1980) the present of intermediate hosts and prevailing physicochemical factors will affect parasitic diseases. Moreover the hygienic conditions and the prevailing climatological factors may affect the distribution of parasites.

The overall prevalence by sex was 76.44% [146 out of 191] and 75.65% [146 out of 193] in male and female catfish respectively. Indicating both male and female cat fish are equally affected by parasites. In this study variations in the infections of the different length categories were recorded.The overall prevalence of helminth parasites was higher (63.36 %) in class II (51-74cm length catfish) than that of class III (75-102cm) and class I(32-50cm) with prevalence of 33.90% and 2.74% respectively. The difference between the classes of catfish was significant and it might be due to the difference between exposure periods to the parasitic infestation. Moreover as described by Richard, (2008) adult fishes consume a great variety of foods and exhibit a great variety of feeding styles which is further supported by the reports of Lagler*et al*. (1979)regarding the correlation of prevalence of parasitic infections with fish length which in turn corresponds to fish age.

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