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PREVALENCE AND INTENSITY OF HELMINTH PARASITES OF *CLARIAS GARIEPINUS* FROM THE WILD AND POND HABITAT IN ANAMBRA STATE

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ABSTRACT

Clarias gariepinus is an important source of protein to humans. Parasitic infections in the fish has led to decreased production that results in economic loss through fish mortality. The specific objective of this study was to determine the prevalence of helminthic parasites in relation to sex, and the intensity of helminthic parasites of *C. gariepinus* from the wild and pond habitats in Anambra state. A total of 40 live adults (15 *C. gariepinus* each from wild and 10 from pond habitats) which include 34 males and 6 females were randomly purchased from local fishermen at Otuocha and Awba-Ofemili rivers, as well as Afik pond, and were subjected to examination for helminth parasites. The sexes were identified by physical observation of the urogenital papillae in males, as well as round and reddish in the matured females. These were later confirmed after dissection by visual observation of the testes in males and ovaries in the females. Out of the total 40 *C. gariepinus* examined, the total prevalence was higher (47.5%) in natural habitat than the cultured habitat (0%), while the parasite intensity was more in the wild habitat (3.11%) than the pond habitat (0%). Male *C. gariepinus* 17 (50%) has the highest parasite intensity than the female fish 2 (33.33%). There was no significant difference in prevalent rates between male and female *Clarias gariepinus* (X^2 =1.040, P=0.308). Higher prevalence recorded from natural habitat could be attributed to many factors such as feeding habit of fish, pollution of water bodies, and availability of intermediate hosts. A detailed study on seasonal prevalence and the impact of helminth infestations on production of fish and probable intervention measures is recommended.

Keywords: Prevalence, Intensity, Helminthic Parasites, *Clarias gariepinus*, Habitats

INTRODUCTION

Fish is a food commodity that is distributed worldwide and regarded as an important source of animal protein (Osuigwe and Obiekezie 2007) and other essential elements that are necessary for the maintenance of healthy body to the human, especially in the developing countries. The protein contents of fish and its products are higher than those of other similar food items such as meat and eggs. Fish is also an important source of income for fishermen and fish farmers especially in Nigeria and other developing countries (FAO 1996). It contributes significantly to the economic development of countries that are involved in aquaculture and fisheries' programs.

The African catfish, *Clarias gariepinus* is a freshwater fish species in the family Clariidae and belongs to the order Siluriformes. Catfishes are a highly diverse and widely distributed group of fish including more than 3000 species around the world. *C. garipienus* has been reported to be a suitable aquaculture species in Nigeria and other countries in Africa due to several favorable characteristics which include its ability to tolerate a wide range of environmental conditions and high stocking densities under culture conditions, fast growth rate, acceptability of artificial feed, and high fecundity rate among others (Eyo *et al*., 2015). However it is not devoid of risks due to the possibility of them harboring infectious or pathogenic parasites particularly if such organisms are of zoonotic importance (Leal *et al*., 2008), owing to the fact that fish are sometimes cultured under potentially stressful conditions which may proliferate existing infections to become more severe and precipitate disease outbreaks, and these may compromise the fitness of such fish for human consumption.

Fish parasites are organisms that live in or on fish, whose attachment, feeding activities, movement, and reproduction among other physiologic responses inflict damage to the fish. These parasites are broadly categorized into external (ecto) parasites and internal (endo) parasites. External parasites inhabit the organs of fish: the gills, skin, fins while internal parasites often times inhabit the stomach, intestine, and muscles. The ecto-parasites show external organ specificity mainly because these organs possess many blood vessels that supply the parasites with necessary food nutrients and provide space for growth (Muchlisin *et al*., 2014). Endoparasites on the other hand can have their infective stages ingested along with some food materials.

Some researchers have reported various prevalence rates for *C. gariepinus* in wild population, they include Onojafe *et al*. (2021), who recorded a prevalence rate of 31.1%, Abdel-Gaber *et al*. (2015) reported a prevalence rate of 65%, Kawe *et al*. (2016) reported a prevalence of 67.5%, 55% prevalence was reported by (Yakubu *et al*., 2002).In the pond habitat, these researchers reported various prevalence rates; Onojafe *et al.* (2021) reported a prevalence of 11%, while Ayanda (2009) reported 0% for the cultured fish samples. In the same vein, some researchers have reported prevalence rates of helminth parasites by sex; Hussen *et al*. (2012) recorded a high prevalence rate

among the males (76.44%), Ali *et al*. (2020) observed the highest prevalence rate among males to be 26.67 %, while Dan-kishiya *et al*. **(**2013) reported the highest prevalence of (28.18%) among the females; Otor *et al*. (2016) recorded a higher prevalence of infection in male (53.90%%) than the female catfishes (46.10%). This study was designed to determine the prevalence of helminthic parasites in relation to sex, and the intensity of helminthic parasites of *C. gariepinus* from the wild and pond habitats in Anambra state.

MATERIALS AND METHODS

Study Area

The study sites selected for this research were Afik fish pond (latitude 6° 12′ 37″ N, longitude 7° 4′ 20″ E), which is located within Awka, in Awka-South local government of Anambra State; while the two natural habitats used were Otuocha river (latitude 6° 20′9 N, longitude 6° 51′4 E), which is situated across Otuocha River located in the suburb of Otuocha town in Anambra East of Anambra State and Awba River (latitude 6° 13′19 N and longitude 7° 4′ 55 E) situated in Awba-Ofemili town is in Awka North, Anambra State.

Sample Collection

A total of 40 live adults (15*C. gariepinus* each from wild and 10 from pond habitats) which include 34 males and 6 females were randomly purchased from local fishermen at Otuocha and Awba-Ofemili rivers, as well as Afik pond, and they were transported live in a clean plastic keg containing water to the Zoology Research Laboratory Nnamdi Azikiwe University Awka for examination for helminth parasites. The fish were identified based on external features according to Edeh and Solomon (2016).

Sex Determination

The fish were rendered inactive for easy handling; the sexes were identified by physical observation of the urogenital papillae in males, as well as round and reddish in the matured females according to Lagrue *et al*. (2011). These were later confirmed after dissection by visual observation of the testes in males and ovaries in the females.

Parasitological Examination

External examination of the fish surface was first carried out for the detection of ecto-parasites based on the procedures as described by Tachia *et al*. (2010), while detection of parasites from the gills of the sampled fish was made by using the methods described by Adeyemo and Falaye (2007) and Ekanem *et al*. (2014). The fish was later placed on the dissecting board and a cut was made on the ventral side of the fish from the anal opening to the lower jaw using a dissecting scissors to expose the body cavity and most of the internal organs (Iboh and Ajang, 2016). The oesophagus, stomach and intestine were carefully extracted and kept in different sample plates containing 0.9% saline solution. The helminth parasites were identified using a standard text by Ajala and Fawole (2014) and Kawe *et al*., 2016.

Epidemiological Analysis

Epidemiological analysis of prevalence and intensity were determined according to Oscar *et al*., (2015).

$$\text{Prevalence}(\%) = \frac{\text{Number of Fish infected}}{\text{Number of Fish examined}} \text{ x } 100$$

$$\text{Intensity} = \frac{\text{Number of Parasites}}{\text{Number of fish infected}}$$

RESULTS

Prevalence and Intensity of Helminths from Studied Habitats

The result presented in Table 1,showed that out of the total 40 *Clarias gariepinus* examined, a total of 19 (47.5%) harbored different parasites. The prevalence of helminth parasite infection in Otuocha river (60%) and Awba river (66.67%) were significantly higher than that of the pond (0%) ($P < 0.05$). Generally, the total prevalence was higher in natural habitat (47.5%) than in the cultured habitat (0%). The parasite intensity was more in the wild habitat (3.11%) than the pond habitat (0%)

Table 1: Prevalence and Intensity of Helminth Parasite from Wild and Pond Habitat

Location	Examined Fishes	Infected Fishes	Prevalence (%)	Parasite	Intensity
Pond	10	0	0	0	0
Otuocha	15	9	60	25	2.78
Awba	15	10	66.67	34	3.4
Total	40	19	**47.5**	59	**3.11**

Prevalence of Helminth Parasites in *Clarias gariepinus* in Relation to Sex

The result in Table 2,showed the prevalence of parasites in both male and female *Clarias gariepinus* sampled from cultured and natural habitats. The obtained results showed that out of 34 males 17(50%) were infected with parasites, while in the female, a total number of 2(33.33%) out of 6 female *C. gariepinus* examined were infected with parasites; male *C. gariepinus* had the highest parasitic distribution in the study area. Meanwhile, chi-square analysis of the data on sex showed no significant difference in prevalent rates between male and female *C. gariepinus*(X^2=1.040, p=0.308).

Table 2: Prevalence of Helminth Parasites in *Clarias gariepinus* in Relation to Sex

Gender	Number Examined	Number Infected	Prevalence	Number Uninfected	Percentage Uninfected	*Chi-square*	P-value
Male	34	17	50	15	44.1		
Female	6	2	33.3	4	66.7	1.040	0.308
Total	**40**	19	**47.5**	19	47.5		

DISCUSSION

The results of this work revealed a total prevalence of 47.5% in wild fish samples and 0% in pond samples. The overall prevalence of helminth parasites in this study agreed with what was recorded by Onojafe *et al*. (2021) who reported a prevalence rate of 31.1%; Abdel-Gaber *et al*. (2015) who reported a prevalence rate of 65%; Kawe *et al*. (2016) who also reported a prevalence of 67.5% in wild population of *C. gariepinus*, 55% prevalence as reported

by (Yakubu *et al*., 2002). Higher prevalence recorded from natural habitat could be attributed to many factors such as feeding habit of fish, pollution of water bodies, and availability of intermediate hosts (copepods, insects, molluscs, etc.) which harbored the infective larval stage of some of these parasites making them available to fish in the water (Kawe *et al*. 2016).The 0% prevalence of fish helminth parasites recorded in this study agreed with the work of Ayanda (2009) who reported 0% prevalence of parasites from fish obtained from cultured habitat; Onojafe *et al*. (2021) who also reported lower prevalence of 11% in cultured habitat(pond).The low prevalence recorded from cultured habitat could imply that there has been an improvement in management practices of cultured fish such as the reduction in overcrowding of fish ponds carried out by the fish farmer in the study areas (Ayanda, 2009). The prevalence of catfish parasites in relation to sexes as reported by this study was not significant. The result showed a prevalence of 50% for the male whereas the female was 33.3%. This agrees with the report of Otor *et al*. (2016) which recorded a higher prevalence of infection in males (53.90%) than the female catfish (46.10%) and Ali *et al*. (2020) which also recorded higher infection in males (26.67%) than the females (6.67%).Factors such as contaminated water and availability of the intermediate host could be responsible for this.

Conclusions

Prevalence and intensity of *Clarias gariepinus* helminths was higher in the wild than in the pond. Also, male *C. gariepinus* had higher prevalence of the helminth parasites than the female fish. A detailed study on seasonal prevalence and the impact of helminth infestations on production of fish and probable intervention measures is recommended.

Ethical Approval

The ethical clearance for this research was sought and obtained from the Animal Research Ethics Committee of Nnamdi Azikiwe University Awka with the reference number NAU/AREC/2021/00049.

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