

# The prevalence of Helminth parasites in the gastro-intestinal tract of wild African sharptooth catfish *Clarias gariepinus* (Siluriformes: Clariidae) in Gwagwalada, Nigeria

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## ABSTRACT

A study on the gastro-intestinal helminth parasites of wild *C. gariepinus* was carried out in Gwagwalada Area Council of FCT, Abuja, Nigeria. A total of 110 samples were examined which includes 42 males and 68 females. Forty-eight (43,64%) fishes were infected with various species of helminth, which includes *Wenyonia* spp. (28,18%), *Procamallanus laevis* (11,82%) and *Euclinostomum heterostomum* (3,64%). The female fish had the highest percentage prevalence (28,18%) while the males had 15,46% prevalence. Most of the parasites were recovered from the intestinal lumen. There was some degree of specificity in their distribution within the host but there was no significant difference ( $P > 0,05$ ) between the standard length, body weight, number of fish infected, prevalence and the intensity of infection.

## KEY WORDS

Helminth parasites, wild, *C. gariepinus*, gastro-intestinal tract, Gwagwalada.

## RESUMEN

Estudio sobre helmintos parásitos gastro-intestinales de *C. gariepinus* silvestre en Gwagwalada, Consejo del Área de FCT, Abuja. Un total de 110 muestras examinadas incluyeron 42 machos y 68 hembras. Cuarenta y ocho (43,64%) peces se encontraban infectados con diversas especies de helmintos como *Wenyonia* spp. (28,18%), *Procamallanus laevis* (11,82%) y *Euclinostomum heterostomum* (3,64%). Los peces hembra tenían el mayor porcentaje de prevalencia (28,18%), mientras que los machos tenían 15,46%. La mayoría de los parásitos se encontraron en el lumen intestinal. Hubo algún grado de especificidad en la distribución dentro del huésped, pero no hubo diferencia significativa ( $P > 0,05$ ) entre la longitud estándar, el peso corporal, el número de peces infectados, la prevalencia y la intensidad de la infección.

## PALABRAS CLAVE

Helmintos parásitos, silvestre, *C. gariepinus*, tracto gastrointestinal, Gwagwalada.

Interest in the development of fish farming and culture has increase tremendously in recent times in Nigeria. Some of the factors responsible for the cultivation of fish are consumption, scientific studies, economic benefits and ornamental purposes. The country has a large population of domesticated livestock comprising of cattle, sheep, goats as well as poultry, which constitute the major source of animal protein to the populace. However, in spite of these animals' resources, production has remained grossly inadequate in meeting national protein requirements (Okorie, 1981). But, fish is one of the cheapest sources of animal protein, especially with the rapidly increasing human population and consequent increase in protein demand.

A number of fish parasites have been discovered to be of known zoonotic potential to mammalian host including man therefore, making them of public health importance (Ukoli, 1984). The larval stage of the digenetic trematode parasite, *Diplostomum spatheceum* (eye fluke) has been shown to penetrate fish body and within 12 hours, 80% of the parasites are found in the lens of the eye, suggesting the existence of a powerful chemotaxis (Stabbles & Chapple, 1986). Digenetic trematodes, *Clinostomum* and *Euclinostomum* species were recovered from *Heterotis niloticus*, and *Clarias gariepinus* in which the adult trematodes are found in digestive tracts, liver, gall bladder and urinary bladder (Oniye & Annune, 1993). Khali (1971) listed over 50 species of trematodes from 15 families, occurring

in a variety of fresh water fishes in Africa, of these; only the extra intestinal species are potentially harmful to fish. Adult trematodes infecting the digestive tract of fishes are considered harmless even when their numbers are high. Paperna (1996) showed that extra intestinal trematode infections are potentially pathogenic.

Many researches on fish parasites has been conducted in Nigeria (Auta, Oniye, & Adakole, 1999; Yakubu, Omoriegie, Wade, & Faringo, 2002; Oniye, Adebote, & Ayanda, 2004; Emere & Egbe, 2006) but in spite of the high commercial value of *C. gariepinus* in Gwagwalada, the only documented work was that of Dankishiya and Zakari (2007). It is base on the above that the study was undertaken to review the parasite fauna of this importance species.

## METHODOLOGY

### Study area

The study was conducted in Gwagwalada the headquarters of Gwagwalada area council, which is one of the six area councils in Abuja the federal capital territory (FCT) of Nigeria. Abuja is located in the centre of Nigeria with a land area of 8 000km<sup>2</sup>. It lies between the Latitude of 8°25" and 9°25"N and Longitude 6°45" and 7°45"E. It is bounded to the North by Kaduna and Niger States, to the South by Kogi State, East by Nasarawa State and West by Niger State (Fig.1). From its Central location its vegetation combines the savannah grassland type of the North and middle belt with the tropical rain forest type of the South of Nigeria.

Gwagwalada with an area of 1 043km<sup>2</sup> is one of the largest satellite towns in the FCT with a population of 157 770 as at 2006 population census. Due to the large influx of people on a daily basis and the presence of River Usuma which is an important tributary of River Gurara in the study area besides numerous tributaries with a lot of fishing activities make Gwagwalada town an important commercial fish market.

### Fish Sampling

One hundred and ten live specimens of *C. gariepinus* of different sizes were bought from local fishermen landings along secretariat road in Gwagwalada, Nigeria. The fish were identified using Olaosebikan and Raji (2004) and Holden and Reed (1972). The total lengths, standard lengths and body weights were measured using standard methods described by Olatunde (1977). The sexes of the

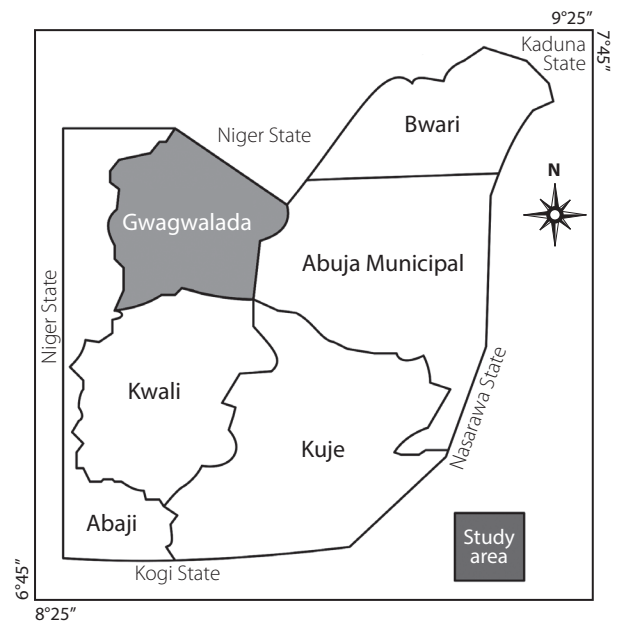


Fig. 1. Abuja, Federal Capital Territory of Nigeria Showing the Study Area.

fishes were determined by visual examination of the urogenital system.

For the parasites survey, the fishes were dissected through the abdomen by making a longitudinal slit on the ventral surface from the anus to a point level with the pectoral fins using a surgical blade. The alimentary canals of the dissected fishes were grouped into Oesophagus, Stomach and Intestine, and placed into three separate Petri dishes containing 0,85% normal saline. Each portion was washed in the normal saline and then examined for parasites under a dissecting microscope. Parasites found were transferred into another Petri dish containing normal saline and counted. The recovered parasites were placed in normal saline overnight in a refrigerator. This enables the parasites to stretch and relax. The parasites were preserved in specimen bottles containing 5% formalin and labeled with the autopsy number, name of host, date of collection and the sites from which the parasites were recovered. For the fixing the parasite was mounted on a slide and covered with a cover slip then placed on ice block for 3-5 minutes, to arrest the cells then it was removed and dried, finally it was fixed using Canada balsam.

Parasites were identified using texts by Paperna (1996), Kabata (1985) and Roberts (1978).

## RESULTS

A total of 110 wild *C. gariepinus* were examined out of which 42(38,18%) were males and 68(61,82%) were females. The total number of parasites, percentage infection, prevalence and sites of infection is showed in Table 1. A total of 302 helminthes parasites belonging to three classes, the Cestoda, Nematoda and Trematoda were recovered from the oesophagus, stomach and intestine respectively. The highest number of parasites was recovered from the intestine (224 parasites). This was followed by the stomach with 67 parasites while; the oesophagus was the least (11 parasites). Thirty-one fishes were infected with cestodes of the genus *Wenyonia* spp with a prevalence rate of 28,18%, 13(11,82%) fishes were infected by the Nematode (*P. laevionchus*) while the trematode (*E. heterostomum*) infected 4(3,64%) fishes.

The rate of infection of wild *C. gariepinus* with parasites in relation to their standard length is presented in Table 2. Fishes with standard length between 26-30cm had the highest parasites load of 219(72,52%) with a prevalence of 32,73% and mean intensity of 6,08. This was followed by fishes of length range of between 31-35 cm having a parasites load of 72(23,84%) with a prevalence rate of 8,18% as well as mean intensity of 8,00. The least was fishes within the range of 21-25cm with a parasites load of 11 representing 3,64% of the total parasites recovered with a prevalence rate of 2,73%. While those within the range of 36-40cm were not infected.

The rate of infection in relation to body weight of fish with helminthes parasites is shown in Table 3. The fish with body weight range between 101-151g considered as juveniles has no parasitic infection. Sub juvenile with body weight range between 156-210g was infected with a total of 42(13,91%) parasites and an intensity of 8,40. The highest infection of 149(49,34%) parasites was recorded in the adult with body weight range of 266-320g with an intensity of 7,10. Fishes with body weight of 321-375g were

**TABLE 1**  
Prevalence of intestinal Helminth parasite in wild *C. gariepinus* in Gwagwalada, Nigeria

Parasites Taxonomy/Species	Number of fish infected	% Prevalence	Location of parasites			Total number of parasites recovered (%)
			Oesophagus	Stomach	Intestine	
Cestoda <i>W. acuminata</i>	31	28,18	11	42	162	215 (71,19)
Nematoda <i>P. laevionchus</i>	13	11,82	0	25	53	78 (25,83)
Trematoda <i>E. heterostomum</i>	4	3,64	0	0	9	9 (2,98)
Total	48	43,64	11	67	224	302

**TABLE 2**  
Rate of Infection of wild *C. gariepinus* with Helminthes parasites in relation to standard length

Standard length (cm)	Number of fish examined	Number of fish infected	Total number of parasite recovered	% Prevalence	Average intensity of infection/fish
21-25	23 (20,91)	3 (13,04)	11 (3,64)	2,73	3,67
26-30	49 (44,45)	36 (73,47)	219 (72,52)	32,73	6,08
31-35	30 (27,27)	9 (30,00)	72 (23,84)	8,18	8,00
36-40	8 (7,27)	0	0	0	0
Total	110	48 (43,64)	302	43,64	17,75

\*Figures in parenthesis represent percentages

**TABLE 3**  
Helminthes infection in relation to body weight in wild *C. gariepinus* from Gwagwalada

Body weight (g)	Number of fish examined	Number of fish infected	Total number of parasite recovered	Intensity
101-155	8 (7,27)	0	0	0
156-210	41 (37,27)	5 (12,20)	42 (13,91)	8,40
211-265	2 (26,36)	14 (48,28)	57 (18,87)	4,07
266-320	23 (20,91)	21 (91,30)	149 (49,34)	7,10
321-375	6 (5,45)	5 (83,33)	45 (14,90)	9,00
376-422	3 (2,73)	3 (100,00)	9 (2,98)	3,00
Total	110	48 (43,64)	302	31,57

\*Figures in parenthesis represent percentages.

**TABLE 4**  
Sex specific rate of intestinal Helminthes infection in wild *C. gariepinus* from Gwagwalada

Sex	Number of fish examined	Number of fish infected	Total number of parasite recovered	% Prevalence	Intensity
Male	42 (38,18)	17 (40,48)	85	15,46	5,00
Female	68 (61,82)	31 (45,59)	217	28,18	7,00
Total	110 (100,00)	48 (43,64)	302	43,64	12,00

\*Figures in parenthesis represent percentages.

infected with 45(14,90%) parasites with intensity of 9,00. While, fishes with body weight range of 376-422g had the least infection of 9(2,98%) parasites and intensity of 3,00.

The relationship between sex and rate of infection is as showed in Table 4. Out of 110 fishes examined, 42(38,18%) and 68(61,82%) were males and females respectively. Seventeen males were infected representing 40,48% of the total males sampled with a prevalence rate of 15,46% and mean intensity of 5,00. While, 31(45,59%) females fish were infected with a prevalence of 28,18% with an intensity of 7,00 throughout the study period.

## DISCUSSION

The study on gastrointestinal helminthes parasites of wild *C. gariepinus* in Gwagwalada, Nigeria showed that the fishes were infected with 3 species of parasites involving the cestodes (*Wenyonia* spp), Nematode (*Procamallanus*

*laevionchus*) and Trematode (*Euclinostomum heterostomum*). This is in conformity with other researchers. Dankishiya and Zakari (2007) identified the Cestodes, Nematode and Trematode, in wild *C. gariepinus* in Gwagwalada. Onwuliri and Mgbemena (1987), Oniye and Annune (1993) found the trematode (*Euclinostomum* spp.) in the intestine and digestive tracts of *Clarias gariepinus*. Yakubu et al. (2002), found *C. gariepinus* infected by *Procamallanus laevionchus* in River Uke, Plateau State.

The prevalence rate of 43,64% in the present study is in conformity with previous work in Gwagwalada (Dankishiya & Zakari, 2007). While other researches in Nigeria such as Onwuliri and Mgbemena (1987) reported a prevalence of 63,00% in wild population of *C. gariepinus* and 59,8% in cultured *C. gariepinus* in Jos, Plateau State. Anosike, Omoriegie, Ofojekwu, and Nweke, (1992) reported a prevalence of 34,7% in wild population of *C. gariepinus* in Plateau State, while Oniye et al. (2004), reported a prevalence of 19,17% in Zaria, Kaduna State.

An increase in size is a reflection of increase in length and weight, which is hereby considered as a measure of age. Therefore, the juvenile fish had no parasite while the sub-adults and adults had higher prevalence this implies that infestation increased with age of fish. This was attributed to change in diet from weeds, seeds, phyto and zooplanktons as juveniles to insect larvae, snail's, crustaceans, worms and fishes as adult is attained (Reed, Burchard, & Hopson, 1967; Anosike et al., 1992). Also the lower prevalence rate of adult fish to parasitaemia might be due to the fact that adult fish may have acquired immunity as a result of an earlier exposure to parasites and other factors. Onwuliri and Mgbemena (1987) showed that the environment is known to play an important role in parasite prevalence.

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