



## Prevalence of Gut Helminth Parasites of *Clarias gariepinus* in Lake Abu'ja, Dekina LGA, Kogi State, Nigeria

Agieni, M. G., Okpanachi, M. and Idakwo, J.

Department of Animal and Environmental Biology, Prince Abubakar Audu University, Anyigba. Kogi state.

Corresponding author's email: [ayelomopah@gmail.com](mailto:ayelomopah@gmail.com)

Received 11-02-2026

Accepted 26-03-2026

Published on line 14-04-2026

### Abstract

This study investigates the distribution and prevalence of gut helminth parasites in *Clarias gariepinus* African Catfish from Lake Abu'ja, located in Ojofu-Anyigba, Dekina Local Government Area of Kogi State, Nigeria. The study involved examining 162 fish samples obtained from local fishermen between March and August 2024, covering both dry and rainy seasons. The gut helminth parasites identified in the fish included cestodes *Monobothrium sp.*, *Diphyllobothrium sp.*, trematodes *Diplostomum sp.*, and nematodes *Procamallanus sp.*, *Capillaria sp.*. The results revealed an overall infection rate of 56.79%, with cestodes being the most prevalent group 46.94%, followed by nematodes 40.75% and trematodes 12.24%. The study also identified a significant association between parasite prevalence and fish sex, with females exhibiting higher infection rates 67.14% than males 48.91%. Additionally, fish size and weight were correlated with infection rates, with smaller fish showing higher susceptibility. Parasites were more abundant in the intestine compared to the stomach. The findings underscore the zoonotic potential of these parasites, especially *Capillaria sp.*, which is of particular public health concern due to its transmission via undercooked fish. This study provides crucial baseline data for future research on parasitic infections in aquaculture and wild fisheries and offers recommendations for better management practices to control parasitic diseases in aquaculture systems.

**Keywords:** Gut helminths, Lake Abu'ja, *Clarias gariepinus*, Prevalence, Parasites.

## Introduction and literature review

Fish, especially freshwater species like *Clarias gariepinus* African catfish, are crucial for food security and economic stability in many developing regions, particularly in Africa Ali *et al.*, 2022. The global reliance on fish for high-quality protein, particularly in sub-Saharan Africa, highlights the significance of understanding the health of fish populations and the risks posed by parasitic infections Maulu *et al.*, 2021. *Clarias gariepinus* is a species of considerable economic value in the aquaculture industry due to its rapid growth, resilience, and adaptability to various environmental conditions Afolabi *et al.*, 2020. However, the productivity of fish in both wild and farmed populations is often compromised by parasitic infections, which can affect their health, growth, and marketability Aliyu and Abubakar, 2024.

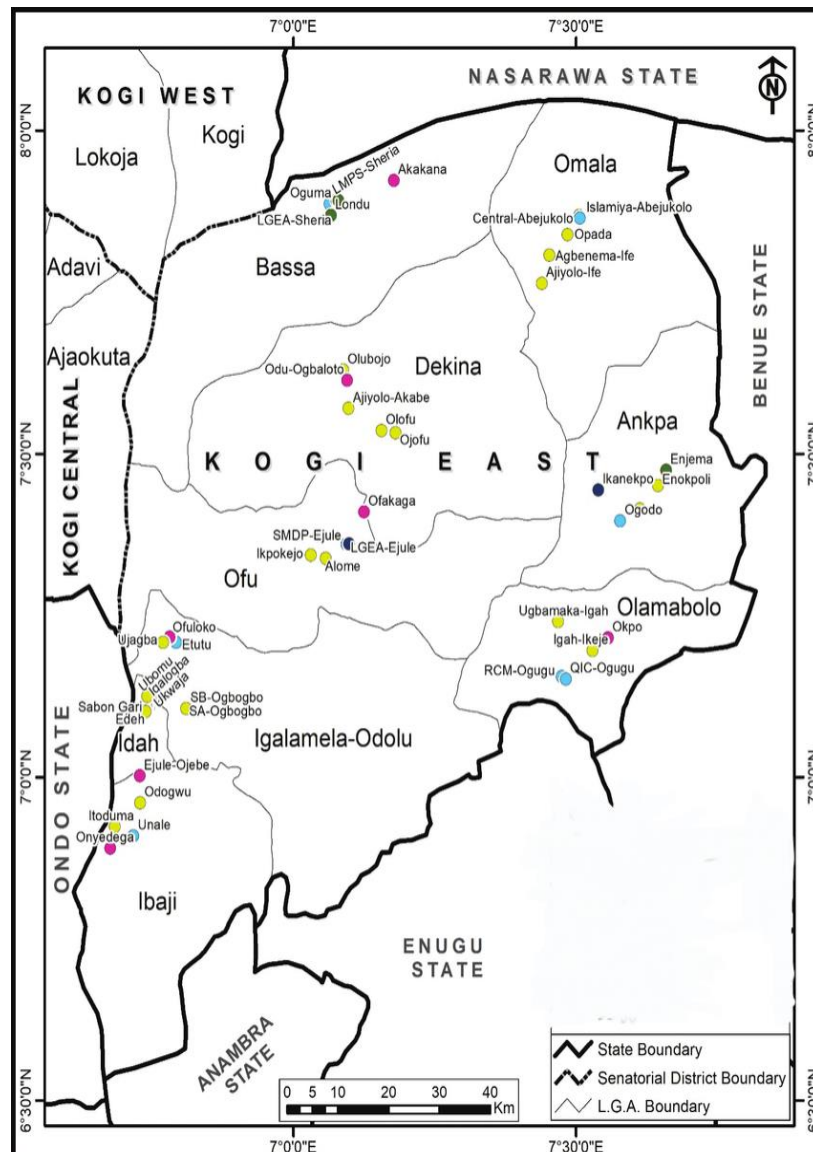
Helminth parasites, including cestodes, trematodes, and nematodes, are among the most prevalent pathogens in fish Shivam *et al.*, 2021. These parasites can cause significant economic losses due to reduced fish health and increased treatment costs Sures *et al.*, 2017. Parasitic infections, particularly those affecting the gastrointestinal tract of fish, can result in stunted growth, tissue damage, and in severe cases, mortality Iyaji and Eyo, 2009. Moreover, certain helminths, such as *Capillaria sp.*, possess zoonotic potential, posing a risk to human health if infected fish are consumed raw or inadequately cooked Betson *et al.*, 2020. Infections by these parasites can be exacerbated in aquaculture environments, where high fish stocking densities create ideal conditions for the rapid spread of parasites Rowley *et al.*, 2024.

Studies on the

parasitology of *Clarias gariepinus* in various regions have reported the presence of a wide range of parasitic helminths, including *Monobothrium sp.*, *Diphylobothrium sp.*, *Procamallanus sp.*, and *Capillaria sp.* Aliyu and Abubakar, 2024; Auta *et al.*, 2019. However, the prevalence and distribution of these parasites in *C. gariepinus* populations in Lake Abu'ja, Kogi State, remains underexplored. This study aims to fill this gap by investigating the prevalence, distribution, and impact of gut helminths in *C. gariepinus* from this locality.

## Experimental Methods

### Study Area



**Figure 1:** Map of Kogi East Showing Ojofu, Dekina, Kogi State (Source: Yaro *et al.*, 2020)

The study was conducted at Lake Abu'ja, located in Ojofu, Anyigba, Dekina Local Government Area of Kogi State, Nigeria. The lake, formed by a spring in 1994, spans an area of approximately 8 hectares with dimensions of 1.60 km in length and 15 m in width at the upper section. It has a mean depth of 10.50 meters, and the area is situated at an altitude of 420 m above sea level Yaro *et al.*, 2017.

### Collection of Fish Samples

A total of 162 *Clarias gariepinus* fish samples were purchased from local fishermen between March and August 2024, covering both dry and rainy seasons. The fish were obtained from the shore of Lake Abu'ja, identified using a guide for freshwater fish species Omeji *et al.*, 2013, and transported to the Animal and Environmental Biology Laboratory, Prince Abubakar Audu University, Anyigba, for further analysis.

**Measurement of Fish Sample**

The total length of each fish was measured with a meter rule, while the weight was recorded using an electronic kitchen scale QE-KE-4. The fish were categorized based on their length and weight to determine their correlation with parasitic prevalence.

**Sex Identification of Fish**

The sex of each fish was determined through physical examination of the urogenital papillae. Males typically exhibited long or distended papillae, while females had round and reddish papillae. Gonads were also observed visually to confirm the sex of each specimen Imam *et al.*, 2010.

**Identification of Parasites**

The identification of gut helminth parasites was performed following the method described by Sadauki *et al.* 2022. Fish were immobilized by cervical dislocation, and their gastrointestinal tracts were dissected. The gut samples were placed in Petri dishes with normal saline, longitudinally cut, and examined under a light microscope at magnifications of x10 and x40. Parasites were identified based on their morphological characteristics and confirmed through their wriggling movement in the saline solution.

**Statistical Analysis**

Data for the parasite distribution and prevalence were presented using frequency and percentage while the Chi-square test of independence was used to test the relationship between infection prevalence and the risk parameters sex, location of sampling, length and weight of the fish.  $P < 0.05$  was considered significant. All analyses were done using IBM Statistical Package for the Social Science SPSS version 23.

**Results and Discussions**

**Results**

**Table 1:** Distribution of gut helminths associated with *C. gariepinus* (African Catfish) from lake Abu’ja.

Parasitic Helminths	Taxonomic Group	Number of Parasites	Prevalence (%)
Monobothrium sp.	Cestode	16	16.33
Diphylobothrium sp.	Cestode	30	30.61
Diplostomum sp.	Trematode	12	12.24
Procamallanus sp.	Nematode	22	22.45
Capillaria sp.	Nematode	18	18.37
Total	—	98	100.00

**Table 2:** Prevalence of gut helminths associated with *C. gariepinus* (African Catfish) with respect to Sex from lake Abu’ja

Sex of fish	Number examined (%)	Number infected (%)
Male	92 (56.79)	45 (48.91)
Female	70 (43.21)	47 (67.14)
<b>TOTAL</b>	<b>162 (100)</b>	<b>92 (56.79)</b>

$\chi^2$  (df=1, n = 162) = 5.374, p =0.0203

**Table 3:** Prevalence of gut helminths parasites of *C. gariepinus* (African Catfish) with respect to Weight of Fish from lake Abu’ja

Wieght of Fish (g)	Number examined	Number infected (%)
401 – 500	58	40 (68.97)
501 – 600	50	30 (60.00)
601 – 700	36	17 (47.22)
701 – 800	12	4 (33.33)
801– Above	6	1 (16.67)
<b>TOTAL</b>	<b>162</b>	<b>92</b>

$\chi^2$  (df=4, n = 162) = 11.68, p =0.020

**Table 4:** Prevalence of gut helminths parasites of *C. gariepinus* (African Catfish) with respect to Length of Fish from lake Abu’ja

Length of Fish (g)	Number examined	Number infected (%)
40.00 – 44.90	41	27 (65.86)
45.00 – 49.90	40	19 (47.50)
50.00 – 54.90	50	30 (60.00)
55.00 – 59.90	7	5 (71.43)
60.00 – 64.90	24	11 (45.83)
<b>TOTA</b>	<b>162</b>	<b>92 (56.79)</b>

$\chi^2$  (df = 4, n = 162) = 2.99, p = 0.311

**Table 5:** Distribution of gut helminths associated with *C. gariepinus* (African Catfish) from Lake Abu’ja with respect to site of infection

Parasite	Site of infection	
	Stomach	Intestine
Monobothrium Sp	8 (8.16)	10 (10.21)
Diphylpobothrium Sp.	11 (11.22)	15 (15.31)
Procamallanus Sp.	8 (8.16)	11 (11.22)
Capillaria Sp	5 (5.10)	12 (12.24)
Diplostomum Sp	13 (13.27)	5 (5.10)
<b>TOTAL</b>	<b>45 (45.91)</b>	<b>53 (54.08)</b>

**Discussion**

*Distribution of Gut Helminths and their prevalence*

The distribution and prevalence of gut helminths in *Clarias gariepinus* from Lake Abu’ja indicate a relatively high level of parasitic infection, with an overall prevalence of 56.79%, as shown in Table 1. This suggests that more than half of the examined fish population was infected, reflecting favorable environmental conditions for

parasite transmission and persistence. The dominant helminths identified were cestodes, particularly *Diphylobothrium* sp. (30.61%) and *Monobothrium* sp. (16.33%), which together accounted for the highest proportion of infections. This dominance highlights the ability of cestodes to thrive within the host due to effective life cycle adaptation and the availability of suitable intermediate hosts. Nematodes, represented by *Procamallanus* sp. (22.45%) and *Capillaria* sp. (18.37%), also contributed significantly to the infection burden, while trematodes (*Diplostomum* sp.) recorded the lowest prevalence (12.24%).

The site-specific distribution of parasites further reveals that a greater proportion of helminths were recovered from the intestine (54.08%) compared to the stomach (45.91%), as shown in Table 5. This pattern is consistent with the biological preference of many intestinal helminths, as the intestine provides a nutrient-rich environment that supports parasite growth, attachment, and reproduction. The higher intestinal occurrence, particularly of *Diphylobothrium* sp., underscores its adaptation to this ecological niche within the host.

Sex-related variation in infection prevalence shows that female fish exhibited a higher infection rate (67.14%) compared to males (48.91%), as presented in Table 2. The observed difference was statistically significant ( $\chi^2 = 5.374$ ,  $p = 0.0203$ ), indicating that sex plays an important role in susceptibility to infection. This higher prevalence in females may be attributed to physiological stress associated with reproduction, hormonal influences, and possible differences in feeding behavior, which can increase exposure to infective stages of parasites.

An inverse relationship between parasite prevalence and fish weight is evident, as shown in Table 3. Smaller fish within the weight range of 401–500 g recorded the highest infection rate (68.97%), while larger fish weighing 801 g and above had the lowest prevalence (16.67%). The association between weight and infection was statistically significant ( $\chi^2 = 11.68$ ,  $p = 0.020$ ), suggesting that smaller or younger fish are more susceptible to parasitic infections. This vulnerability may be due to their relatively immature immune systems, higher metabolic demands, and increased feeding activity, which expose them to parasite larvae in the environment.

A similar pattern was observed with fish length, where shorter fish (40.00–44.90 cm) showed higher infection prevalence (65.86%), while longer fish (60.00–64.90 cm) recorded lower infection rates (45.83%), as indicated in Table 4. However, the relationship between length and parasite prevalence was not statistically significant ( $\chi^2 = 2.99$ ,  $p = 0.311$ ), suggesting that length alone may not be a decisive factor influencing infection levels. Other ecological and behavioral factors may interact with size to determine infection risk.

Generally, the findings demonstrate that helminth infections in *C. garipepinus* are influenced by parasite type, site of infection, host sex, and body size. The predominance of intestinal parasites, higher infection rates in females, and increased susceptibility in smaller fish highlight important epidemiological patterns within the study area.

These observations provide valuable insights into host–parasite interactions and underscore the need for effective monitoring and management strategies to improve fish health and ensure food safety.

## Conclusions

This study provides valuable insight into the prevalence of gut helminths in *Clarias gariepinus* from Lake Abu’ja, revealing a significant occurrence of parasitic infections in this species. The prevalence was notably influenced by various factors, including fish sex, size, and weight. Females and smaller fish were found to be more susceptible to these parasitic infections. The findings underscore the importance of understanding the epidemiology of parasitic diseases in aquatic species, as such infections can have serious public health implications. The zoonotic potential of these parasites poses a risk to humans who consume undercooked fish. Therefore, proper fish handling, effective cooking methods, and regular monitoring of fish health are crucial to reduce the risk of transmission. Ongoing surveillance is essential to ensure both public safety and the continued health of aquatic ecosystems in the region.

## Acknowledgements

The authors would like to thank the local fishermen of Lake Abu’ja for their assistance in providing the fish samples. Special thanks to the Animal and Environmental Biology Laboratory, Prince Abubakar Audu University, Anyigba, for providing the facilities required for the laboratory analyses. We also acknowledge the support of the local communities in Dekina Local Government Area, Kogi State, for their cooperation during the study.

## Supplementary Material

Not applicable.

## References

- Afolabi, O. J., Oladele, O. O., & Olususi, F. C. 2020. Assessment of bacterial loads of *Clarias gariepinus* Burchell, 1822 obtained from cultured and natural habitats. *The Journal of Basic and Applied Zoology*, 811. <https://doi.org/10.1186/s41936-020-00030-7>.
- Ali, A., Wei, S., Ali, A., Khan, I., Sun, Q., Xia, Q., Wang, Z., Han, Z., Liu, Y., & Liu, S. 2022. Research Progress on Nutritional Value, Preservation, and Processing of Fish—A Review. *Foods*, 1122, 3669. <https://doi.org/10.3390/foods11223669>.
- Aliyu, A. A., & Abubakar, B. S. 2024. Prevalence of gastrointestinal parasites of African catfish *Clarias gariepinus* from River Nasarawa, Nasarawa State, Nigeria. *Sahel Journal of Life Sciences*, 22, 232–237.
- Auta, I. K., Badaru, A. A., Ibrahim, B., & Abdullahi, S. A. 2019. Occurrence of helminths on *Clarias gariepinus* African catfish caught in selected points along River Kaduna, Nigeria. 143, 110–115. <https://doi.org/10.20355/1bcf5g>.
- Betson, M., Alonte, A. J. I., Ancog, R. C., Aquino, A. M. O., Belizario Jr, V. Y., Bordado, A. M. D., Clark, J., Corales, M. C. G., Dacuma, M. G., Divina, B. P., & Dixon, M. A. 2020. Zoonotic transmission of intestinal

helminths in Southeast Asia: Implications for control and elimination. *Advances in Parasitology*, 108, 47-131. <https://doi.org/10.1016/bs.apar.2020.06.003>.

Imam TS, Dewu RA. Survey of Piscine ecto and intestinal parasites of *Clarias* sp. sold at Galadima road fish market, Kano metropolis, Nigeria. *Bioscience Research Communication*. 2010;224:209.

Iyaji, F., & Eyo, J. 2009. Parasites and their Freshwater Fish Host. *Bio-Research*, 61. <https://doi.org/10.4314/br.v6i1.28660>.

Maulu, S., Nawanzi, K., Abdel-Tawwab, M., & Khalil, H. S. 2021. Fish Nutritional Value as an Approach to Children's Nutrition. *Frontiers in Nutrition*, 8. <https://doi.org/10.3389/fnut.2021.780844>.

Omeji, S., Solomon, S.G. and Uloko, C. 2013. Comparative study on the Endo-parasitic infestation in *Clarias gariepinus* collected from earthen and concrete ponds in Makurdi, Benue State, Nigeria. *Journal of Agriculture and Veterinary Science*, 21.

Rowley, A. F., Baker-Austin, C., Boerlage, A. S., Coline Caillon, Davies, C. E., Léo Duperret, Martin, S. A. M., Guillaume Mitta, Fabrice Pernet, Jarunan Pratoomyot, Shields, J. D., Shinn, A. P., Warangkhan Songsungthong, Gun Srijuntongsiri, Kallaya Sritunyalucksana, Jeremie Vidal-Dupiol, Uren, M., Suparat Taengchaiyaphum, Ratchakorn Wongwaradechkul, & Coates, C. J. 2024. Diseases of marine fish and shellfish in an age of rapid climate change. *IScience*, 279, 110838–110838. <https://doi.org/10.1016/j.isci.2024.110838>.

Sadauki M.A., Dauda A.B. and Yusif, A.M. 2022b. Prevalence of gastrointestinal helminths of African catfish *Clarias gariepinus* Burchell 1822 in Zobe reservoir, Katsina state, Nigeria. *Fudma Journal of Agriculture and Agricultural Technology*, 8 1: 123-130.

Shivam, S., El-Matbouli, M., & Kumar, G. 2021. Development of Fish Parasite Vaccines in the OMICs Era: Progress and Opportunities. *Vaccines*, 92. <https://doi.org/10.3390/vaccines9020179>.

Sures, B., Nachev, M., Selbach, C., & Marcogliese, D. J. 2017. Parasite responses to pollution: what we know and where we go in “Environmental Parasitology.” *Parasites & Vectors*, 101. <https://doi.org/10.1186/s13071-017-2001-3>.

Yaro, C.A., Iyaji, F.O. and Tope, M.O. 2017 Rapid Diagnostic Test Kits Detection of Malaria Parasites among Pregnant Women Attending Antenatal in Selected Hospitals in Anyigba, Kogi State, Nigeria. *Advances in Bioscience and Biotechnology*, 8, 249-258. <https://doi.org/10.4236/abb.2017.88018>.

Yaro, C. A, Kogi E., Luka, S. A and Kabir, J (2020). School-based Cross-sectional Survey on Soil-transmitted Helminths in Rural Schools of Kogi East, Nigeria. *Dr. Sulaiman Al Habib Medical Journal* 2(1) 10–19.

**By checking the following box, the senior author acknowledges that they and the other authors have read, understood, and complied with the Instructions to Authors (ItA).**