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ORIGINAL RESEARCH ARTICLE

Comparative Study of the Parasitic Helminth Burden of *Clarias gariepinus* and *Tilapia zilli* In Fresh Water Reservoir (Zobe Dam) Dutsin-Ma, Katsina, Nigeria.

Yusuf Buhari Shinkafi[1]*., Suleman Kauthar Muhammad[1]., Habiba Zakari[1] and Ibrahim Hamza Kankia[2]
[1]Department of Biology, Umaru Musa Yar'adua University, Katsina.
[2]Department of Biochemistry Umaru Musa Yar'adua University, Katsina.

ABSTRACT

Helminth infections can cause a range of health issues as well as financial hardships for fishing communities and fish growers. This study examined the prevalence of gastrointestinal helminth parasites in catfish (*Clarias gariepinus*) and redbelly fish (*Tilapia zilli*) from Zobe Dam, Dutsin-ma. A total of 100 samples, including 50 examples of each species, were gathered. Fish were recognized, weighed and measured, then dissected to look at the gut and stomach contents. To recover helminth parasites, these ingredients were put in petri dishes with 0.9% normal saline examined under compound microscope to recover the helminth. The study demonstrated a significant prevalence of helminth parasites overall, with *C. gariepinus* showing a higher prevalence rate of 68% and *T. zilli* showing a rate of 36%. The fish intestines contained parasites from the cestode, trematode, and nematode subcategories. Notably, cestodes were more common in *C. gariepinus* (62.71%), but trematodes were more common in *T. zilli* (54.55%). The most notable species of nematode found in *C. gariepinus* was *Procamallanus leavionchus*, followed by trematodes (*Diplostomum spathaceum*) and cestodes (*Polyonchobothrium clarias*). In *T. zilli*, *Cacullanus sp.*, *Diphyllobothrium spp.*, and *Hepsetidae fasciatus*, respectively, were the represented nematodes, cestodes, and trematodes. Significant gender differences were found, with males of both species showing a larger burden of helminth parasites than females. Statistics revealed no gender differences in *C. gariepinus*, however at a significance level of P 0.05%, a gender difference in *T. zilli* was found to be significant. The research also found a strong link between fish length, body weight, and the prevalence of helminth infections. These results highlight the significant helminth parasite burden in both *Clarias gariepinus* and *Tilapia zilli*. Therefore, there is a pressing need for efficient control methods such as Implementing appropriate treatments, including chemical and biological agents, can help manage helminth populations in fish farms to lessen the negative effects that parasite infections have on fish output.

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INTRODUCTION

Worldwide, helminth parasites are a prevalent and serious problem for freshwater fish populations (Jaiswal, *et al.,* 2022). A wide range of health difficulties and financial losses for fish farmers and fishing communities can result from helminth infections, which can affect different organs and tissues of fish (Radwan, *et al.,* 2023). Controlling the spread of these parasites is difficult since they frequently spread through contaminated water and infected intermediate hosts, like aquatic invertebrates (Gabriel, *et al.,* 2022).

According to variables including geographic location, water quality, fish species, and the existence of intermediate hosts, the prevalence of helminth parasites in freshwater fish might vary. A sizable part of fish populations in many freshwater habitats may harbor an infection from one or more helminth species (Sures and Nachev, 2022). Fish with helminth infections may have slower growth rates and less successful reproduction (Parker *et al.,* 2023). Fish growth and general health may be impacted by the parasites' effects on the digestive system, which can result in malnutrition and decreased nutritional absorption (Medina-Felix *et al.,* 2023).

Due to their smaller size, weight, and general look, fish with helminth infections may have a decreased market value (Sadauki *et al.,* 2022). Fish with parasite infestations may also be more susceptible to bacterial or fungal

Correspondence: Yusuf Buhari Shinkafi. Department of Biology, Umaru Musa Yar'adua University, Katsina . ✉ buhari.yusuf@umyu.edu.ng. Phone Number: +234 803 291 3440.

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illnesses, which would lower their quality even more (Thepot., 2021). Helminth infections can, in extreme situations; result in fish mortality, particularly in young or weak fish (Islam *et al.,* 2023). Massive infestations may result in swimming difficulties, organ damage, and increased predation risk (Hernandez-Caballero *et al.,* 2022).

Helminth infections can result in considerable financial losses in aquaculture settings (Amakali *et al.,* 2023). Fish farmers may experience increased production expenses and poorer profitability as a result of infected fish's potential for reduced feed conversion efficiency (Kaur, *et al.,* 2023).

Some helminths that infect freshwater fish have zoonotic potential, which means they can spread to people (Ziarati, *et al.,* 2022). Even though infections from fish-borne helminths in people are relatively uncommon, eating raw or undercooked fish that has been contaminated with certain parasites, such tapeworms can be harmful to your health (Ziarati, *et al.,* 2022).

The ability of freshwater bodies to address the "triple burden of malnutrition" (micronutrient deficiencies, undernutrition, overweight, and obesity) may lay in sustainable healthy diets (UN, 2021; Obiageli *et al.,* 2022). Freshwater bodies are renowned for the variety of aquatic meals with Fish as Nigeria's primary protein source (Vries-Ten Have *et al.,* 2020; Obiageli *et al.,* 2022). As the human population grows, there is an inevitable increase in the need for fish as a protein source. Fish farming and culture have advanced significantly during the past few years as a result of the rising need for affordable animal protein, particularly in tropical regions (Adegbesan, *et al.,* 2018).

Fish is often the main source of protein for humans and their livestock, and aquaculture and natural water source fish production are currently receiving a lot of attention. Fish makes up more than 40% of the protein in the diets of two-thirds of the world's population, according to (FAO, 1999). A well-processed tropical fish product has a ready market in industrialized nations and can therefore be profitable internationally (Imam and Dewu, 2010).

Fish cannot keep up with the ever-increasing world population as a result of environmental destruction, overfishing, and pollution, which in turn led to the depletion of fish resources (Kawe *et al.,* 2016). As a result, stakeholder involvement in aquaculture is at an all-time high. The overpopulation, unfavorable environmental conditions, and pollution that resulted from this practice ultimately made fish more vulnerable to parasites and diseases and resulted in fish with lower immune systems (Murray, 2005; Biu, *et al.,* 2014; Sadauki, *et al.,* 2022).

The effects of parasite infection on the growth and consumption of freshwater fish are just one of the challenges Nigerian domestic fish production faces (Obiageli *et al.,* 2022).

These parasites, which could be internal or external, are present in these freshwater organisms and could, stunt their development. Infection by parasites poses a danger to the health and production of Nigeria's fisheries. Organ damage, fish population decline, disturbance of regular organ functions, and physiological alterations were all effects of parasitism. It also has the effect of lowering biomass and weight because parasites feed on the fish host (Adebambo, *et al.,* 2020).Studies have shown that fish are capable of transmitting quite several parasitic zoonoses. Anisakidosis is a fish-borne zoonosis caused by parasitic nematodes from the Anisakidae family, particularly from the genera Anisakis, Pseudoterranova, Hysterothylacium, and Contracaecu (Farinha *et al.,* 2022). In contrast, the analysis performed by (Chai, *et al.,* 2005) placed a strong emphasis on liver fluke infections including intestinal trematodiasis. Fish-borne zoonotic illnesses can spread to humans by contact with sick produce or, less commonly, through the consumption of tainted edible tissues or aquaculture products. More than 50 different helminth parasite species that are found in fish and other freshwater animals can infect humans and pose a serious health concern (Avishek, *et al.,* 2022).

The demand for fish in Nigeria is greater than the supply, and the average diet contains little animal protein. One of the main issues facing fish farmers seems to be parasitic fish infections (Akinsanya, *et al.,* 2008; Avishek, *et al.,* 2022). According to Paperna (1996), Keremah and Inko-Tariah (2013), Kawe *et al.* (2016), and Avishek, et *al.* (2022), parasitic infections are more recognized as one of the most harmful elements in fish farming.

The effects of pollution and environmental degradation on fish supplies were just one of the difficulties Nigerian domestic fish production faced. Fish is an essential source of protein for Nigeria's huge and quickly expanding population (Ikoyo-Eweto, 2022). To meet the rising demand, the nation is heavily dependent on fish imports, while domestic production finds it difficult to keep up for a variety of reasons (shuaib *et al.,* 2023). In Nigeria's seas, overfishing is a serious issue, particularly in the Niger Delta region and along the coast (Numbere and Maduike 2022). Fish populations are being depleted as a result of illegal and unsustainable fishing methods, such as the use of dynamite and small-mesh nets (Abakah and Owusu, 2023). Further affecting the availability of suitable fish breeding and feeding grounds is habitat damage brought on by practices like dredging, oil exploration, and land reclamation (Moslen *et al.,* 2022).

Due to oil spills, industrial discharges, and poor waste management practices, Nigeria's aquatic bodies are severely polluted (Ewim *et al.,* 2023). The Niger Delta has witnessed significant oil contamination, which has a terrible impact on fish populations and other aquatic life in one of the world's most ecologically sensitive regions (Aa, *et al.,* 2022). Consumer health is put at risk as a result of the further contamination of water bodies by chemical pollutants from industries and agricultural runoffs (Das, *et al.,* 2022).

Fish breeding patterns, migration routes, and eating habits can be affected by changes in water temperature and chemical composition due to climate change (Abisha, *et al.,* 2022). The habitats of fish and coastal people that depend on fishing for a living are also in danger due to rising sea levels and extreme weather patterns (Thamizoli and Rengalakshmi 2022).

Controlling helminth infections in freshwater fish requires a multi-faceted approach, including (MacKinnon, et *al.,* 2023):

Water Quality Management: Ensuring good water quality is crucial for reducing stress on fish and minimizing the risk of infection. Proper waste management and avoiding the discharge of untreated sewage and industrial effluents into freshwater bodies can help maintain a healthy aquatic environment.

Regular Monitoring: Regular surveillance and monitoring of fish populations are essential to detect helminth infections early. This allows for timely intervention and prevents the parasites from spreading further (MacKinnon, et *al.,* 2023).

Quarantine and Biosecurity Measures: For fish farms, implementing quarantine and biosecurity measures can help prevent the introduction and spread of helminth parasites. This involves screening new fish stock and maintaining proper hygiene in fish rearing facilities (MacKinnon, et *al.,* 2023). **Proper Cooking:** To minimize the risk of zoonotic infections, it is essential to cook fish thoroughly before consumption (Golden, *et al.,* 2023).

Sustainable Fishing Practices: In wild fish populations, sustainable fishing practices can help maintain fish populations at healthy levels, reducing the risk of overfishing and related stressors that may contribute to the spread of helminth parasites (Madsen, *et al.,* 2022).

Overall, addressing the prevalence and impact of helminth parasites in freshwater fish requires a combination of scientific research, effective management strategies, and public awareness to ensure the health of both fish populations and human consumers (Tidman, *et al.,* 2023). The prevalence of the intestinal helminth parasite in northern Nigeria, notably in the research region of Zobe Dam Dutsinma, Katsina state, is, nevertheless, poorly known. To compare and quantify the helminthic burden and to assess the relationship between infection, sex, weight, and length of *C. gariepinus* and *T. zili* found in Zobe Dam, these studies set out to determine the prevalence of intestinal helminths of *Clarias gariepinus* and *Tilapia zilli*.

MATERIALS AND METHODS

Study area

The Zobe Dam in Katsina state's Dutsinma local government region served as the site for this investigation. The earth-filled dam has a height of 19 meters and a length of 2,750 meters. The dam has an irrigation potential of 8,000 hectares and a storage capacity of 179 mca. The dam's design dates back to the late 1970s when it was intended to help irrigation farming in the Dutsinma region and provide Katsina state with 50% of its drinking water needs. Even though the dam was finished in 1993, it is still only used for local irrigation and not for power generation or water supply to Katsina City (Muyideen, 2010). The Zobe Dam is located between latitudes 12°20'34.62" and 12°23'27.48"N and longitude 7°27'57.12"a E. Located at 7°34'47.68"E in the Dutsin-ma Local Government Area of Katsina State. It covers a space of about 968.544 km2. A couple of the important streams that feed into the Zobe Dam are the Rivers Karaduwa and Gada.The dam, which has a length of around 7 km and a surface area of roughly 4,500 acres, was built on the Karaduwa River's bedrock (Sadauki*et al.,* 2022).

The area's average annual temperature is about 25°C, and its average annual rainfall is between 600 and 700mm (Adediji, 2005). Depending on the season and the month, the climate changes with the hot dry season beginning in March and lasting until May, whereas the cool dry (harmattan) season begins in December and ends in January. May through September is the beginning and end of a warm, rainy season. The yearly rainfall is between 700 and 800 mm, which is quite little. During the winter, it is between 21 and 28 °C and between 34 and 40 °C during the summer. The main sources of income for the population are farming and fishing, and the Hausa tribe is primarily responsible for the wet and dry season agriculture on the flooded ground surrounding the dam. For numerous purposes, including fishing, irrigation, bathing, washing, and collection for domestic use, the majority of the locals visit the dam at least twice a day (Muyideen, 2010).

Sample collection and identification

From September to November 2020, 100 samples overall were taken, 50 of which included *Clarias gariepinus* and 50 *Tilapia zilli*. The fish were randomly selected alive from the dam and transferred there in a 25-liter plastic container that was almost filled with water to the Biology lab of Umaru Musa Yaradua University Katsina, where they were sorted into various sizes. The fish were identified based on their exterior characteristics as given by (Olurin and Smorin, 2006; Sadauki*et al.,* 2022).The fish's lengths and weights were calculated using a ruler calibrated in centimeters (cm) and an electronic kitchen scale (QE-KE-4), respectively. The sexes of the fish were determined by visual examination of the urinogenital system(Olurin and Smorin, 2006; Sadauki*et al.,* 2022).

Dissection and Examination of endoparasites

Before being dissected on a dissecting board, the fish were rendered immobile via cervical dislocation for simple handling. By employing a surgical blade to cut a longitudinal slit on the ventral surface of the fishes from the anus to a position level with the pectoral fins, the fishes were dissected through the abdomen. After dissecting the fish, the alimentary canal was apparent.

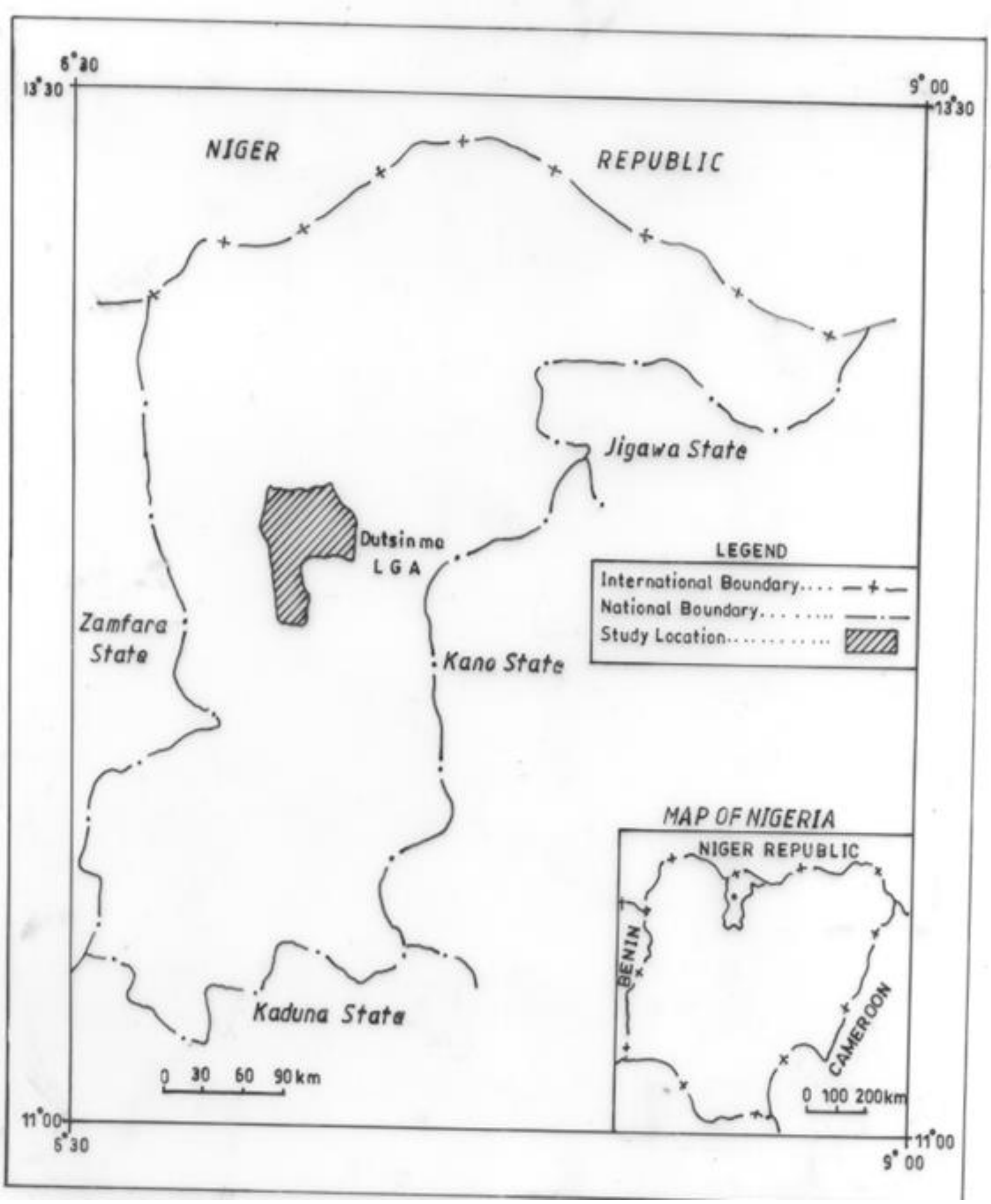

Fig: I:Katsina State showing the study area (Google Earth, 2011)

Separately cut from the alimentary canal, the stomach and intestine were removed. The stomach was chosen for parasite testing because it houses the majority of the parasites' feeding sources. Each location received its own set of Petri dishes containing 0.9% normal saline (Paperna, 1991). Any worm's emergence was instantly noticeable due to the writhing motion it made in the saline solution (Paperna, 1991; Bichi and Ibrahim, 2009; Sadauki*et al.,* 2022). Each portion was split longitudinally and examined for parasites under a dissecting microscope at magnifications ranging from x 10 to x 30 (Sadauki*et al.,* 2022).

Identification of parasites

Parasites were found, counted, fixed, and preserved in 5% formalin. The cestode and trematode were stained with a diluted Ehrlich's hematoxylin solution overnight, passed through graduated alcohol (30, 50, 70, 90% and 100%) for 45 minutes to dehydrate, and then cleared in methylsalicylate. Nematodes were cleared with lactophenol. On a slide made of Canada balsam, the parasites (nematodes, cestodes, and trematodes) were mounted. Additionally, pictures were taken (Olurin and Smorin, 2006).

Statistical analysis

Utilizing a percentage (%) distribution, the infection's prevalence was determined. The association between the parasites retrieved and the parameters of interest was examined using Microsoft Excel's Chi-square test. The threshold for significance was fixed at 0.05.

RESULTS AND DISCUSSIONS

Out of the 50 specimens, each of both *Clarias gariepinus* and *Tilapia zilli* examined, 34 (68%) and 18 (36%) respectively were found to be infected by helminth parasites. The result of helminth burden showed that cestode had the highest prevalence in *C. gariepinus* representing 62.71%, followed by nematode with 35.71% the least prevalence was recorded in trematode representing 1.80%. In the case of *Tilapia zilli,* trematode had the highest prevalence representing 54.55%, followed by nematode with 40.91%, and the least prevalence was recorded in cestode representing 4.55%. According to the investigation's findings, *Tilapia zilli* had a lower helminth prevalence than *Clarias gariepinus*. This might be a result of the former being more vulnerable to helminth infestation than the latter. Three different kinds of helminths: Nematodes, Cestodes, and Trematodes were discovered to be present in both fish species. These findings concur with those of other researchers. According to Goselle, et *al.* (2008), Sadauki, et *al.* (2022), and Okeke, et *al.* (2022), Cestoda, Nematoda, and Trematoda were discovered to be present in wild catfish (*C. gariepinus*) in Zobe Dam Dutsinma. Out of the three classes that infected *C. gariepinus*, cestode was the one with the highest prevalence. Trematode predominated in *Tilapia zilli*, followed by nematode and cestode, with trematode having the lowest frequency.This finding conflicts with earlier studies by Goselle, et *al.* (2008), who found the greatest prevalence of nematodes **.** Helminth infections can hinder the growth and development of fish by affecting their feeding behavior and nutrient absorption. This could result in stunted growth, reduced reproductive success, and overall poor fish health (Bunge, *et al.,* 2023). Helminths can invade different organs and tissues within fish, causing physical damage and impairing organ function. This can lead to long-term health issues and increase fish susceptibility to other diseases (Abbas, *et al.,* 2023). Humans who consume fish infected with helminths can potentially ingest parasite larvae or eggs, which may survive cooking and pose health risks (Della-Morte, *et al.,* 2023). Some helminths that infect fish can also infect humans, leading to zoonotic infections. This is particularly concerning when fish is consumed raw or undercooked, as is the case with certain dishes like sushi or ceviche (Ziarati, *et al.,* 2022) (Table 1).

Table 1: Helminth parasite's burden in *Clarias gariepinus* and *Tilapia Zilli*

Fish specie	Nematode	Cestode	Trematode	Total
C.gariepins	20(35.71%)	35(62.50%)	1(1.79%)	56(71.80%)
T.zilli	9(40.91%)	1(4.55%)	12(54.55%)	22(28.21%)
Total	**29(37.20%)**	**36(46.20%)**	**13(16.70%)**	**78**

The results for different species of helminth parasites found to infect *Clarias gariepinus*, along with the site where they were recovered showed that out of the 50 *Clarias gariepinus* fish examined for helminth parasites, a total of 56 helminths were recovered, indicating an overall prevalence of 89.3%. Among the 50 fish samples examined, 20 were found to be infected with the nematode *Procamallusleavionchus*, accounting for 35.7% of the total. The next most prevalent parasite was the cestode *Polyonchobothriumclarias*, which infected 35 fish (62.5%). Finally, only one fish was found to be infected with the trematode *Diplostomum species*, representing a prevalence of 1.8%while in the case of *T. zilli*,out of the 50 fish that were analyzed, a total of 22 helminths were discovered, yielding a prevalence of 44% across all species of helminth that were reported to infect *T. zilli*. Only 9 out of the 50 fish were discovered to have the nematode *Callanus spp*., which corresponds to a prevalence of 40.9%. The cestode *Diphyllobothrium spp*., which had a prevalence of 4.5% in one fish, was also present. Additionally, trematodes of the *Hepsetidae fasciatus* species were found in 12 different fishes, resulting in a prevalence of 54.5%.*Procamallanusleavionchus* in *C. gariepinus* and *Cacullanus sp.* in *T. zilli* are just two examples of the nematode species that have been identified. These species demonstrate the wide variety of nematode infections that affect fish. Similar, the trematodes are *Diplostomumspathaceum* in *C. gariepinus* and *Hepsetidae fasciatus* in *T. zilli*, the cestodes are *Polyonchobothriumclarias* in *C. gariepinus* and *Diphyllobothrium spp*. in *T. zilli*. These results are in agreementwith the work of Okeke, et *al.,* (2022) and Goselle, et *al.,* (2008) who reported the same species of helminth in fish(Tables 2 and 3). The results of the sex prevalence showed that males had a higher prevalence compared to their female counterparts in both species. In *C. gariepinus*, males had a prevalence of 72%, whereas females had a prevalence of 64%. Similarly, in *Tilapia zilli*, males had a prevalence of 42%, while females had a prevalence of 29%.Statistical analysis was conducted to determine if there were significant differences between the sexes in each species. The results indicated that in *C. gariepinus*, there was no significant difference between the sexes ($p < 0.05$). However, in *T. zilli*, the statistical analysis revealed a significant difference ($p < 0.05$) between males and females.Although the prevalence rate was somewhat greater in males than in females for both *Clarias gariepinus*and *Tilapia zilli*, there was no discernible difference between the sexes. Because of their innate need to survive, males may have a relatively greater infection rate than females. Additionally, it might imply that there were more males available for parasite infestation than females. This finding was not in agreement with other findings that reported an increased proportion of infection in females and islinked to the physiological conditions of the female fishes, which led to a decline in their resistance to parasitic infections (Goselle*et al.,* 2008 and Mgbemen, *et al.,* 2020) (Table 4).

Table 2: Prevalence of Heliminth Burden of *Clarias gariepinus* in Zobe Dam Katsina State

Class and species of parasite	Site of infection	No Fish examined (%)	No infected (%)	No parasites Recovered(%)
Nematode:				
Procamallanus. Leavionchus	Intestine/stomach	50	20(20)	35.7
Cestode:				
Polyonchobothriumclarias	Intestine/Stomach	50	35(35)	62.5
Trematode:				
Diplostomumspathaceum	Intestine/Stomach	50	1(1)	1.8
Total		**50**	**56**	**89.3**

Table3: Prevalence of Helminth burden of *Tilapia zilli*in Zobe Dam Katsina State

Class and species of parasite	Site of infection	No.of Fish examined (%)	No infected (%)	No.of parasites Recovered (%)
Nematode:				
Cacullanus sp.	Intestine/Stomach	50	09(09)	40.9
Cestode:				
Diphyllobothrium spp	Intestine/Stomach	50	1(1)	4.50
Trematode:				
Hepsetidae fasciatus	Internal body walls	50	12 (12)	54.5
		50	**22**	**44.0**

Table 4: The prevalence of the intestinal helminth to sex in both *Clarias gariepinus* and *Tilapia zilli*

Clariasgriepinus				***Tilapia zilli***		
Sex	**No. Examined**	**No. Infected**	**Prevalence (%)**	**No. Examined**	**No.infected**	**Prevalence (%)**
MALE	25	18	72	26	11	42
FEMALES	25	16	64	24	7	29
TOTAL	**50**	**34**	**68**	**50**	**18**	**36**
χ^2**= 5.200**				χ^2**= 20.696**		

The result of prevalence to standard length revealed that those within the ranges of 25-29.9 and 30-34.9 had the highest prevalence representing (100%) each in *C. gariepinus* while the range 20-24.9 showed the highest prevalence representing (100%) in *T. zilli* followed by 15-19.9 representing (75%) in *C. gariepinus* and 15-19.9 representing (42.9%) in *T. zilli*. The least prevalence was recorded in 20-24.9 representing (51.9%) in *C. gariepinus* while the least prevalence in *T. zilli* was recorded in the range of 10-14.9 representing (22.2%). No infection was recorded within the ranges of 5-9.9 and 10-14.9 in the case of *C. gariepinus* while in the case of *T. zilli*, no infection was recorded in the ranges 25-29.9 and 30-34.9. Statistical analysis shows a significant difference in *T.zilli,* while there is no significant difference in the case of *C. gariepinus* at ($p<0.05$) level of significance (Table 5).

The results of weight distribution of the intestinal helminths revealed that out of 50 (68%) were found infected. The highest prevalence was recorded in 250-299 representing 100% in both *C.gariepinus* and *T.zilli* in addition the ranges (200-249 and 300-349)revealed high prevalence in the case of *T.zilli* representing 100% each followed by 200-249 representing 84.6 in the case of *C.gariepinus* and 50-99 representing 40% in the case of *T.zilli*. The least prevalence was recorded in 100-149 representing 57.7% and 16.7% in both *C.gariepinus* and *T.zilli* respectively. No infection was recorded in 1-49 and 50.99 in the case of *C.gariepinus*. Statistical analysis shows a significant difference in *Tilapia zilli* while no significant difference in *C. gariepinus* at (p<005) level of significance. Both fish species had parasites found on them, although the helminth load was higher in the weight ranges of 250–399g for *C. gariepinus* and 200–249 to 300–349g for *T. zilli*. According to the findings of Oniye, et *al.* (2004), fish weighing 150–299,9 g were clear of illness(Table 6).In this study, fish with greater lengths and weights inboth *C. gariepinus* and *T. zilli*displayed higher helminth burdens than fish with fewer lengths and weights. They were more vulnerable to helminth infection, which is related to changes in their dietary habits brought on by aging. Older fish have a propensity to consume more, making them more prone to ingesting parasites (Akinsanya and Otubanjo, 2006).Another theory is that the fish's diet might simply change as it gets older from eating weeds, seeds, and zooplankton to eating animal products (such snails, worms, and insects that act as intermediate hosts for contagious parasite larvae). Akinsanya and Otubanjo (2006) and Mgbemena *et al.* (2020) found that younger fish with supposedly stronger immune systems showed higher infection resistance than older fish with reduced immune systems.The length experiment's findings indicated that a fish's susceptibility to parasite infection increases as its length increases. While those in *T. zilli* with a length range of 20-24.9 showed high helminth load, those in *C. gariepinus* with a length range of 30-34.9 and 25-29.9 had a higher prevalence. It was shown that fishes with a standard length range of 20 to 30 cm (82.4%) were more likely to be infected than fishes that were longer, measuring 40 to 30 cm (61.5%) and 30 to 40 cm (65.0%). According to Mgbemena, et *al.* (2020), the longer the fish, the more susceptible it is to parasite infection. Their findings are in agreement with this one. Akinsanya, *et al.*, (2007) stated that the prevalence of infection was higher in short fishes than in long fishes and explained this by random selection and low immunity in the small-sized fishes. This conclusion, however, is in contrast to their findings.

Table 5: The prevalence of the intestinal helminth to length in both *Clariasgariepinus* and *Tilapiazilli*

	C. gariepinus			***Tilapiazilli***		
Length(cm)	**No. of fish Examined**	**No. of fish Infected**	**Prevalence (%)**	**No. of fish Examined**	**No. of fish Infected**	**Prevalence (%)**
05-9.90	00	00	00	25	08	32
10-14.9	00	00	00	09	02	22.2
15-19.9	12	9	75	14	06	42.9
20-24.9	27	14	51.9	2	02	100
25-29.9	09	09	100	0	00	00
30-34.9	02	02	100	0	00	00
TOTAL	**50**	**34**	**68**	**50**	**18**	**36**

χ^2 =7.009 **χ^2= 21.575**

Table 6: The prevalence of the intestinal helminth to body weight in both C. *gariepinus and* T. *zilli*

	C. gariepinus			***T. zilli***		
WEIGHT (g)	**NO. EXAMINED**	**NO. INFECTED**	**PREVALENCE (%)**	**NO. EXAMINED**	**NO. INFECTED**	**PREVALENCE (%)**
1-49	00	00	00	27	08	29.6
50-99	00	00	00	05	02	40
100-149	26	15	57.7	06	01	16.7
150-199	10	07	70	07	02	28.6
200-249	13	11	84.6	02	02	100
250-299	01	01	100	02	02	100
300-349	00	00	00	01	01	100
TOTAL	**50**	**34**	**68**	**50**	**18**	**36**

χ^2= 5.208 **χ^2=22.90**

Plate 1: Anterior view of Nematode under a microscope

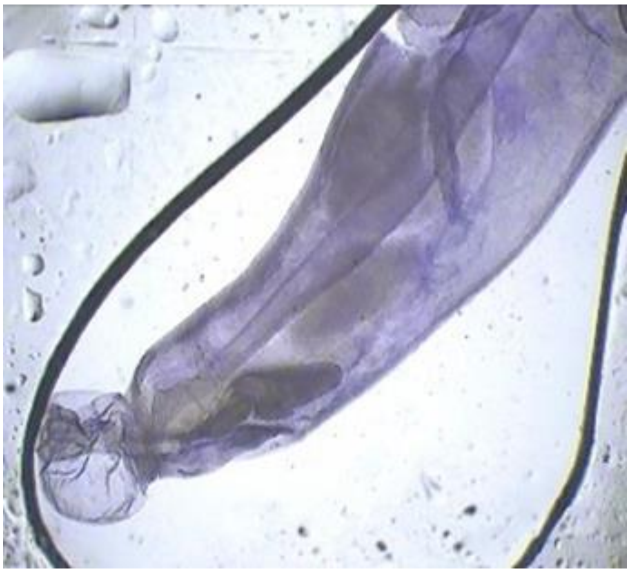

Plate 2: Posterior view of trematode under a microscope

Plate 3: Anterior view of cestode under a microscope

CONCLUSIONS AND RECOMMENDATIONS

Nematodes, cestodes, and trematodes were discovered to be the most prevalent types of helminths in both fish species, and the analysis revealed that *C. gariepinus* had a larger helminth burden than *T. zilli*. The prevalence of parasite infection was shown to be associated with fish length and weight, with bigger and heavier fish exhibiting a higher sensitivity to helminth infestation. The incidence of parasites in the Zobe Dam was also linked to environmental conditions, including how farmers dispose of their garbage and feces.Form

Recommendations: Based on the findings of this investigation, it is recommended that fish farmers in the Zobe Dam area should take measures to control the disposal of waste and fecal matter into the dam. This can be achieved through the introduction of appropriate waste management practices and regulations. Additionally, fish farmers should monitor the length and weight of their fish populations and take appropriate measures to control the population size to avoid over-crowding, which can lead to increased susceptibility to parasitic infections. Regular screening and monitoring of fish populations should also be conducted to detect and manage infections early. Finally, further research should be conducted to explore the effectiveness of different treatment methods for controlling helminth infestations in fish populations in the Zobe Dam and other similar aquatic environments.

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