COMPARATIVE STUDY OF PREVALENCE OF SOME INTESTINAL PARASITIC HELMINTHS OF *CLARIAS GARIEPINUS* (BURCHELL, 1822) OBTAINED FROM AJIWA AND ZOBE RESERVOIRS IN KATSINA STATE, NIGERIA

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ABSTRACT
The research was conducted between September, 2020 and February, 2021 to determine the occurrence of parasitic fauna invading the African catfish *Clarias gariepinus* and the connected threat issues in two different locales (Ajiwa and Zobe reservoirs). A total of 180 fish samples covering ninety (90) from Ajiwa reservoir and ninety (90) from Zobe reservoir were sampled and identified. The Fish opened dorso-ventrally using a razor blade and the alimentary canals were removed, the intestine were sorted and cut into parts kept in different plate contained 0.9%saline solution parasites recovery. Nevertheless, the intestinal helminthic parasite were isolated and identified, similarly, incidence of intestinal helminthic parasite in relation to sex of *Clarias gariepinus* in both locations was determined. All helminthic infections observed were restricted to the stomach and intestine. The helminths identified belong to the cestodes, nematodes and digenean groups. Male *C. gariepinus* had the highest prevalence in Ajiwa reservoir 22 (46.80%), whilst in Zobe reservoir Female *C. gariepinus* has the highest prevalence of infection 29 (58.00%). *Monobothrium spp.,* and *Ascaris eggs* of Cestode and Nematode were the most frequent parasite observed. Upcoming researchers should develop their work with this baseline parasitological data in the studied areas.
Keywords: Ajiwa reservoir, *Clarias gariepinus*, Helminths Parasite, Zobe reservoir

INTRODUCTION
Fish and fish products are economical and cheap source of animal protein and within reach of the average populaces of most nations. Fish demand is always on the increase and this is due among additional reasons to the ever-increasing human populace, high price of other sources of animal protein and problems of illness and infections associated with the consumption of other sources of animal protein (Sadauki *et al*., 2022a). The African catfish *Clarias gariepinus* has continued to be a very important freshwater fish in Nigeria and its farming due to its profitable features such as its ability to withstand a fluctuating range of environmental conditions, exhibit a fast growing rate, high fertility/fecundity rate, easiness of artificial breeding and it commands good value (Hassan *et al*., 2010). The main sources of fish in Nigeria until in recent times were from streams, rivers and via importation and the first effort to practice aquaculture started in Onikan, Lagos in 1951 (Dauda *et al*., 2018), though, catfish farming was not commercially practicable until the period between 1991 and 2001 (Hassan *et al*., 2010). The major purpose of the reservoir is irrigation and water supply to the population of Katsina, Fish parasites regularly infect their hosts (fishes) by destroying the hosts' tissues, this can make it susceptible to secondary infections (Sadauki *et al*., 2022). High parasitic infections will result in death of the fishes. An augmented anthropogenic action in Ajiwa and Zobe artificial lakes, Katsina State, Nigeria, has demanded the need to scrutinise the occurrence of helminth parasites in fish, hence, this study focused on investigating helminth parasite *Clarias gariepinus* from the studied areas. Zobe and Ajiwa reservoirs in Dutsin-Ma and Batagarawa Local Government Areas respectively, are among the most important in the State. They have similar purposes of domestic water supply, fishing activities and irrigation of farmlands, and they are both surrounded by large areas of farmlands which is a great potential source of pollutants (Dauda *et al*., 2018). The study was conducted in Zobe and Ajiwa reservoirs. The study area 1, Zobe reservoir is an earth-fill structure completed in 1983 on the coordinates 12°23 '18" N (latitude) and 7°28'29" E (longitude) in Dutsin-Ma LGA of Katsina State. The dam has a height of 48 m, length of 360 m with a base width of 2,750 m. The reservoir has a storage capacity of 179 Mca, as it is impounded from two major rivers Karaduwa and Gada (Dasuki et al., 2014). The study area 2, Ajiwa reservoir (Figure 2) is on the latitude 12°98' N and longitude 7°75' E, in Batagarawa LGA, Katsina State. The main purpose of the reservoir is irrigation farming and water supply to the populace of Katsina, Batagarawa, Mashi and Mani LGAs. The reservoir was impounded in 1973 and commissioned in 1975. The capacity of the water is nearly 22,730,000 m3. It serves as a source of source of revenue for the nearest communities.

MATERIALS AND METHODS

Description of Study Area

The study was conducted in Zobe and Ajiwa reservoirs. The reservoirs are coordinated; on latitude 12° 20' 34.62N to 12° 23' 27.48N] and Longitude [7° 27' 57.12E to 7° 34' 47.68E] in part of Dustin-ma and Matazu Local Government area of Katsina State (Nababa *et al.,* 2022). Hitherto, Ajiwa reservoir is on the latitude 12° 98° N and longitude 7°75° E, in Batagarawa LGA, Katsina State.

Samples collection

A total of 180 live fish samples of *Clarias gariepinus* were collected from fishermen at the study sites, five fish samples were randomly collected monthly from three (3) sampling sites from artisanal fishermen using various fishing gears (Long line, nets and Traps) carefully chosen to represent a given population of *C. gariepinus,* of each reservoir for six month (September, 2020 and February, 2021). The fish samples as soon as collected were promptly transported to the Biology Laboratory, Federal University Dutsin-Ma, in an ice chess container for helminth examination (Nababa *et al.,* 2019).

Identification of Experimental Fish

The experimental fish were identified using the description of (Olaosebikan and Raji, 2013).

Sexing of Experimental Fish

Sexing of samples was done after careful physical observation of the urogenital papillae. Observation of the testes in male and ovaries in the female was confirmatory (Nababa *et al.,* 2019).

Examination of specimens for parasites

The specimens were immediately examined for helminths parasites, the total length and the weight of each fish were measured and recorded following the procedures described by Paperna (1996). According to the method described by Noga (2010) the fishes were opened dorso-ventrally using a razor blade and the alimentary canals were removed, the intestine were sorted and cut into parts kept in different plate contained 0.9%saline solution parasites recovery, the intestines were further carefully slit opened longitudinally for the examination of parasite, there is no emergence of any intestinal helminths parasitic worms were recognized by their wriggling movement. Thereafter, the light microscope was used to magnify (x40) the samples and the observed helminth parasites were identified field guide to warm water fish diseases (FAO, 2019). The prevalence of parasites infection was calculated for sex, location, length and weight using the model described by Sadauki *et al.* (2022): The prevalence was calculated by the formula below:

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

Identification of parasites

The intestinal helminths parasites were identified by morphological and parasitological-techniques using standard identification keys and pictorial guides by Kabata, (1985) and Pouder *et al*. (2005).

Statistical Analysis

Data obtained were analysed by descriptive statistics to show the number of intestinal helminths isolated, prevalence and percentage of occurrence in relation to sex.

RESULTS

Prevalence of parasites of *Clarias gariepinus* in relation to sex in Ajiwa and Zobe reservoirs was presented (Table 1). Parasitic helminths isolated from the intestine of *Clarias gariepinus* in Ajiwa and Zobe reservoirs showed various degrees of compositions between the two studied locations. Ninety (90) fish samples was examined from both locations, and Ajiwa reservoir showed higher percentage of prevalence (54.45%) infection compared with Zobe reservoir with (46.66%) total prevalence. Similarly, female *C. gariepinus* in Ajiwa showed higher percentage of infection compared with male *C. gariepinus* that happen to be slightly higher (40.80%) than the female *C. gariepinus* (46.52%) respectively.

Table 1: Prevalence of Helminth parasites of *Clarias gariepinus* in relation to sex in Ajiwa and Zobe reservoirs

	Zobe Reservoir			Ajiwa Reservoir		
Sex	**Number of examined**	**Number of infected**	**Prevalence of infection (%)**	**Number of examined**	**Number of infected**	**Prevalence of infection (%)**
Male	47	22	46.80	40	20	50.00
Female	43	20	46.52	50	29	58.00
Total	**90**	**42**	**46.66**	**90**	**49**	**54.45**

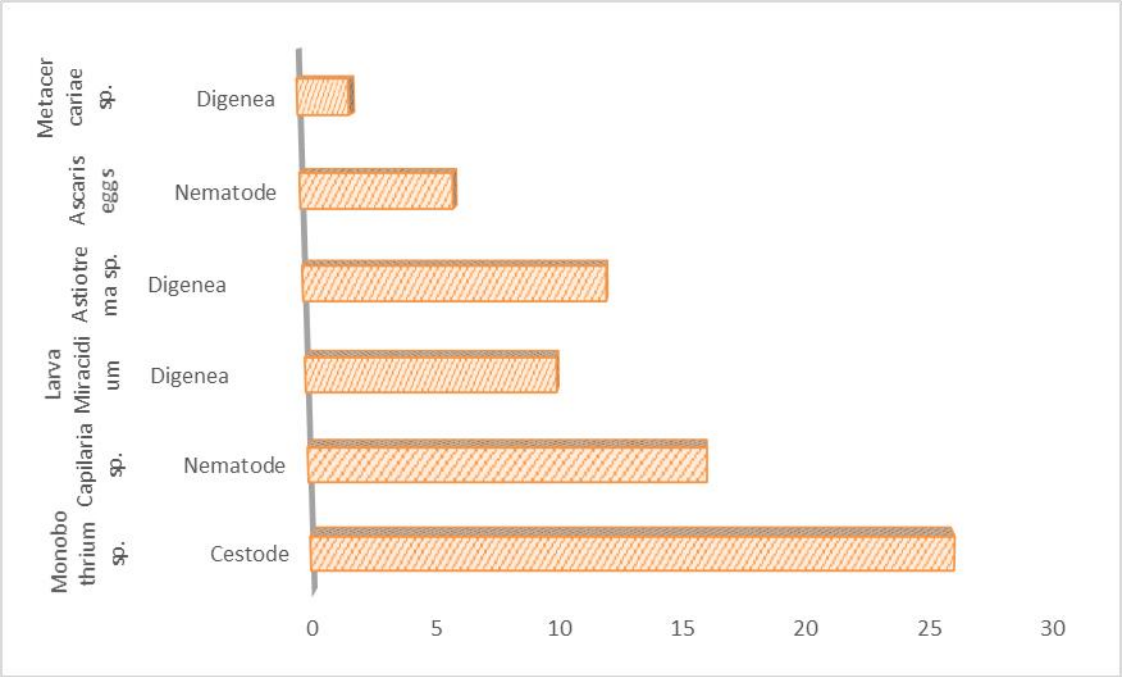

Figure 1: Parasitic Helminths isolated from the intestine of *Clarias gariepinus* from Ajiwa reservoir

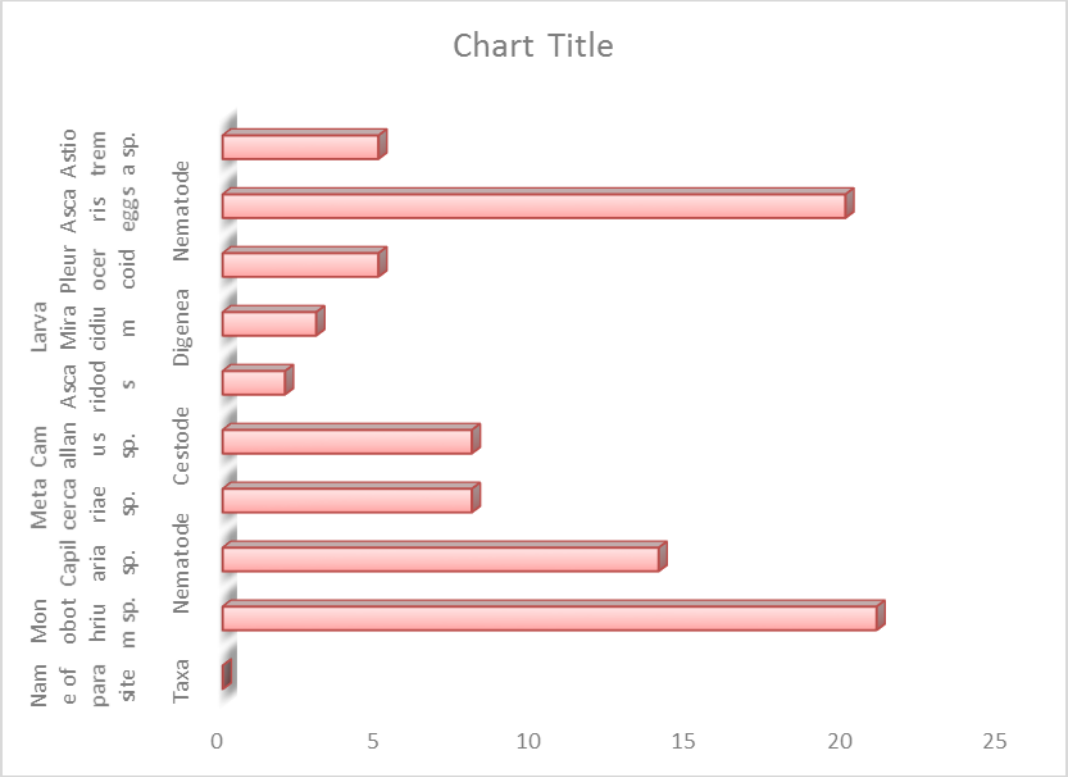

Figure 2: Helminth parasite isolated from the stomach of *Clarias gariepinus* Zobe reservoir

DISCUSSION

Abdel-Gaber *et al*. (2015) from their findings implied that fish from African freshwater (ponds, dams, river and streams) were infested by a variety of mature parasitic helminths ranging from monogeneans, digeneans, cestodes, nematodes, acathocephalans and aspidogastreans. Similarly, fish farmers are constrained with massive fry and fingerling deaths, predominantly in culture system due to the attack of parasitic fauna by frequently causing lesions- on their hosts (fishes) thereby destroying the tissues, providing location for growth of secondary infections or taking blood and cellular fluids from the host (Sadauki *et al*., 2022). The gastrointestinal helminths fauna isolated from this survey is comparable to the discoveries of Amaechi (2014) and Absalom *et al*.~~,~~ (2018) who~~se~~ documented the flowing gastrointestinal parasitic helminths *hirudinae and Ascaris lumbricoid* from the stomach of *Oreochromis niloticus* from Asa Dam, Ilorin, Kwara state Nigeria and *Taenia saginata and liver fluke* in *Clarias gariepinus* from River Gudi in Nasarawa State. On the other hand, in dissimilarity to the current study, Goselle *et al.* (2008) and Ibohand Ajang (2016), observed a richer parasite species diversity in *Clarias gariepinus* from Lamingo Dam, Jos Plateau state Nigeria, which possibly will be attributed to the alterations in the site/location and level of water contamination or anthropogenic activities. Subsequently parasitic infestation and their diversity may have a direct connection with anthropogenic activities or water contamination.

CONCLUSIONS

Comparative Study on Prevalence of intestinal parasitic helminths of *Clarias gariepinus* from Ajiwa and Zobe reservoirs displayed a diminutive prevalence of gastro internal parasitic infestations and publicized three classes of parasitic species existing in fish. Observed sampled showed *Monobothrium spp.*, and *Ascaris eggs* belonging to Cestode and Nematode were the most frequent parasite observed. Upcoming researchers should develop their work with this baseline parasitological data.

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