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# Helminth parasites of *Synodontis clarias* (Linnaeus, 1758), *Chrysichthys nigrodigitatus* (Lacepede 1802) and *Chrysichthys auratus* (Geoffrey Saint – Hilaire, 1808) in Asejire Dam, South – West Nigeria

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**Abstract:** The study was carried out to determine the prevalence, intensity and pathological effects of parasites in *Chrysichthys nigrodigitatus*, *Chrysichthys auratus* and *Synodontis clarias*, from Asejire Dam, a man-made lake in south-west Nigeria. A total of 250 randomly selected fish specimens consisting of 63 *C. nigrodigitatus*, 99 *C. auratus* and 88 *S. clarias* were sampled from January to June 2011. Fish body length, weight and sex were determined. Dissection to extract helminth parasites and histopathological examination of tissues of the intestines and stomachs were carried out. A total of 1775 parasites were recovered from *S. clarias* and *C. nigrodigitatus*. Parasite prevalence was higher in *S. clarias* (86.36%) than in *C. nigrodigitatus* (7.94%) while *C. auratus* were not infected. Helminths recovered included five cestodes: *Paraglaridacris limnodrili*, *Wenyonia longicauda*, *Wenyonia youdeoweii*, *Wenyonia virilis* and *Caryophyllaeus spp*., and two nematodes: *Procamallanus spp*. and *Cosmoxynema vianai*. Infection in males and females was not statistically different (P>0.05). No significant difference was found in the prevalence of helminths in relation to size, however bigger sizes of *S. clarias* and *C. nigrodigitatus* were more parasitized. Pathological conditions such as lymphocytic infiltration, moderate disruption of muscular mucosa and intestinal villi, edema were found in infected fishes.

**Keywords:** Fish parasites, Helminths, Asejire Dam, Nigeria

## Introduction

Fish is an important food source. It is an affordable source of animal protein with a very long list of dietary and health benefits even over muscle meat (Tossavi *et al*., 2014). Also fishing is a means of livelihood for many people. Some countries earn foreign exchange and overcome food shortages faced by their growing populations through fish farming (Otor *et al*., 2016). Parasitic diseases are not only a limitation to fish production but also a big problem to consumers of fish, especially in areas where freshwater fish are eaten raw or without sufficient processing. Fish parasites often have a detrimental effect on fish tissues and often also reduce fish growth yield, aesthetic value, marketability, palatability and reproductive potential (Owolabi, 2008), hence posing a major threat to fish culturists. Fish parasites are also commonly infectious- infecting other fish living in the same water body, and zoonotic-infecting humans and animals that eat raw or improperly prepared fish meat (Fagbenro *et al*., 1993). A number of cases of zoonotic diseases caused by fish parasites have been reported (Khalil *et al*., 2014).

Although incomparable to the major world aquaculture producers such as China and America, Nigeria as at 2012 was the largest African aquaculture producer with a yearly production output of about 620,000 metric tons (Ayinla, 2012). So also Nigeria has a capture fisheries production exceeding 37%, coming behind imported fish which is at over 54% of Nigeria's fish production (Adewunmi, 2015). Adedeji and Okocha (2011) earlier reported that the sector accounts for about 2% of Nigeria's national GDP, 40% of the animal protein intake and is a principal source of livelihood for well over three million people in the country. The high percentage contribution of the capture fisheries sub-sector, which is about 15 times more than that of culture fish production, makes it imperative to study the helminth parasites of feral fish as it can constitute a public health problem for people who consume improperly processed fish meat, reduce fish marketability, employment opportunities and economic productivity. Fish diseases are generally a substantial source of constraint to the development and sustainability of the fisheries industry in Nigeria from both the social and economic points of view. This is usually caused by an increased production cost, cost of treatment of diseases especially in culture fish production, and also a decreased quality and quantity

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of yield (Idowu *et al*., 2017). All these make the study of fish parasites a necessity as it will not only enhance the sustenance of fish in their natural environment but also serve as the basis for information on the potential risk of diseases and pathogens involved in fishing and fish farming in Nigeria.

*Synodontis clarias*, *Chrysichthys nigrodigitatus* and *Chrysichthys auratus* belong to one order (Siluriformes), two families: Claroteidae (*C. auratus* and *C. nigrodigitatus*), and Mochokidae (*S. clarias*), and the two genera of fish constitute fishes that are highly valued as food and fall among the dominant fishes in commercial catches. They are also closely related to those cultured in Nigeria (Adewumi and Olaleye, 2011; Ipinmoroti, 2013). Ipinmoroti (2013) has reported mochokid and bagrid catfishes among the dominant fish species captured from Asejire Dam. So also, Adewumi and Olaleye (2011) reasoned that the story of aquaculture in Nigeria is that of catfish culture, reporting *Clarias gariepinus, C. nigrodigitatus, Heterobranchus bidorsalis* and the hybrid Heteroclarias, to be the most farmed fishes in the country.

*S. clarias* is known commonly as the upside down red tailed catfish that occurs widely in freshwaters of Northern Africa and also other parts of the continent including Nigeria. It is known to be a bottom feeder in its natural habitat feeding as an omnivore (Shinkafi and Ipinjolu, 2001). *C. auratus* and *C. nigrodigitatus* on the other hand are highly valued omnivorous silver catfishes that have been reported by Atobatele and Ugwumba (2011) as threatened freshwater species. According to Atobatele and Ugwumba (2011) *C. nigrodigitatus* has a ubiquitous distribution status in Nigerian inland waters compared to *C. auratus*, although Inyang and Ezenwaji (2004) reported the exact opposite at Agulu Lake in Anambra State. However, both are part of the freshwater species that are commonly caught in Asejire Dam (Ipinmoroti, 2013). The omnivorous generalists feeding nature of all three species predisposes them to a wide range of parasites. Many studies conducted have reported helminths among the predominant groups of parasites that significantly affect these three species of fish (Ekanem *et al*. 2014; Ejere *et al*., 2014; Tossavi *et al*., 2014; Okpasuo *et al*., 2016) as well as other related species (Eyo *et al*., 2012; Salawu *et al*., 2013) in most freshwater bodies to include: cestodes, trematodes and nematodes. Other groups of parasites found in freshwater fishes are protozoans such as coccidia (Paperna, 1996; Hecht and Endemann, 1998).

This study was designed to investigate the helminth parasites of *S. clarias*, *C. nigrodigitatus*, and *C. auratus* fishes found in Asejire Dam in a south-western town of Nigeria.

## Materials and Methods

### Study Area

Asejire Dam (04°05'E; 07°21'N) is a Y-shaped, 19.5km long man-made reservoir constructed in 1970 on River Oshun and located about 30km East of Ibadan, Southwest Nigeria (Ayoade *et al*., 2006). The Dam with an approximate gross storage of 7,403 million litres, a normal pool elevation of 150 m and a maximum flood elevation of 152.4 m, has a 7,800km$^2$ catchment area above it and an impounded area of 2,342 hectares (Oyo State Water Cooperation). The physico-chemical parameters of the Dam have been reported earlier by Egborge (1979), and Lameed and Obadara (2006), and recently by Jenyo-Oni and Oladele (2016) to have pH (7.49 ± 0.30); Alkalinity (1.44 ± 0.13 mgL$^{-1}$); Conductivity (8.33±0.62 $\mu$Scm$^{-1}$); Nitrate-nitrogen content (below 250$\mu$gl$^{-1}$); Phosphate content (500$\mu$gl$^{-1}$-750$\mu$gl$^{-1}$); Dissolved oxygen concentration (5.72±1.18 mgL$^{-1}$); Temperature (28.47 ± 0.49 °C); Turbidity (233.4 FTC); Mercury, Hg (0.001 mgL$^{-1}$); Cadmium, Cd (0.036 mgL$^{-1}$); Iron, Fe (0.066 ± 0.00 mgL$^{-1}$); Lead, Pb (0.015 ± 0.028 mgL$^{-1}$). The Dam was created primarily to serve as a source of water for the people in the communities in and around the Dam's location with an additional benefit of fishing by the locals (Ayoade *et al.,* 2006).

### Sample Collection and Identification

The randomly selected fish specimens consisting of *C. nigrodigitatus, C. auratus,* and *S. clarias* were purchased alive from the local fishermen at Asejire Dam between the months of January to June 2011, and transported alive immediately to the laboratory where they were sorted out into different sizes and species. Identification was done on the basis of external body features (Idodo-Umeh, 2003). Sex determination as well as length and weight measurements were done in line with methods described earlier by Idodo-Umeh (2003). The fishes were immediately subjected to parasitological examinations.

### Gastrointestinal Parasite Examination

The fishes were rendered inactive by cervical dislocation for easy handling prior to dissection. Cuts were then made on the ventral and lateral sides of the fish to expose the visceral organs for easy access.

The intestines and stomach of the fish were removed and processed to aid parasite recovery. The observation of the recovered helminth parasites was done following recommendations by MAFF (1971). The parasites from different sites were picked, counted, and recorded before fixing in 70% alcohol. Whole mount preparations of the parasites were then made.

The parasites were stained for identification by placing in Ehrlich haematoxylin for 5 minutes and then counter stained in alcohol eosin for 1 minute after washing in 70% acid alcohol. The stained parasites were dehydrated in absolute alcohol and cleared in xylene before mounting in Canada balsam. The lactophenol method of Franklin and Goodey (1949) was also used for all groups of parasites. Microscopic examination was done using dissecting microscope (X20 magnification) and photomicrographs were taken. Identification of the parasites was done using the keys by Yamaguti (1959), Paperna (1996), Oros *et al.* (2010) and Bjoern *et al.* (2011).

### Histopathological Techniques

The infected as well as uninfected parts of the alimentary canal were placed in bottles containing Bouin fluid (fixing reagent) for about six hours. The tissues were then transferred into bottles containing 10% phosphate buffer formalin to prevent shrinking of the cells as well as decomposition by enzymes, bacteria and subsequent treatment. Random selection of the preserved tissues was done on the basis of the presence of infection and were taken to the Department of Veterinary Pathology, University of Ibadan for histopathological processing. The dehydration of the tissues was done in increasing concentrations of alcohol (70%, 95%) and then twice in absolute alcohol at 30 minutes duration. The tissues were impregnated in molten paraffin wax three times and later embedded in molten paraffin wax and allowed to solidify. The blocked tissues were sectioned at 4-5microns, floated into pre-coated slides and dried. The sections were stained properly to differentiate the nucleus from the cytoplasm. The stains were washed off in tap water and the tissues dried. They were examined and their photomicrographs taken at X40 and X100 magnifications (Fisherbrand™ Micromaster binocular Microscope, Germany).

### Statistical Analysis

The overall prevalence of the parasites was calculated. Chi-square was used to calculate the significant difference of the levels of infection and to compare the parasitic load in fish hosts in the study sites. Chi-squared Goodness of fit was employed in order to statistically determine if there was any significant difference between prevalence of infection and sex, and prevalence of infection and standard length of the samples.

## Results

The helminth parasites recovered included five cestodes: *Paraglaridacris limnodrili* (Yamaguti, 1934), *Wenyonia longicauda* (Woodland, 1937), *Wenyonia youdeoweii* (Ukoli, 1972), *Wenyonia virilis* (Woodland, 1923) and *Caryophyllaeus spp*. (Kulmatycki, 1923), and two nematodes: *Procamallanus spp*. (Baylis, 1923) and *Cosmoxynema vianai* (Travassos, 1949) (Tab. 1, Figs 1 and 2). Concurrent infections of *Wenyonia spp* were common. No trematode and acanthocephalan were recorded.

**Tab. 1: Types of helminth parasites in fish host from Asejire Dam.**

| Fish Host | Parasite | Type |
|---|---|---|
| *C. nigrodigitatus* | *Caryophyllaeus spp.* | (cestode) |
| | *Cosmoxynema vianai* | (nematode) |
| *S. clarias* | *Paraglaridacris limnodrili* | (cestode) |
| | *Wenyonia longicauda* | (cestode) |
| | *Wenyonia youdeoweli* | (cestode) |
| | *Wenyonia virilis* | (cestode) |
| | *Caryophyllaeus spp.* | (cestode) |
| | *Procamallanus spp.* | (nematode) |

A total of 1775 helminth parasites were recovered from *S. clarias* and *C. nigrodigitatus* among the three fish species examined. *S. clarias* with 86.36% parasite prevalence was the most infected fish species (Tab. 2). 32.4% was the overall helminth parasite prevalence observed. The larger sized fishes were observed to have the highest percentage of infection (Tab. 3), although, the prevalence of infection in relation to size was not statistically significant ($P>0.05$). There was also no significant differences ($P>0.05$) in the level of infection among the different sexes (Tab. 4). The parasitic load was higher in *S. clarias*. The comparison of parasitic load in the different fish hosts (Tab. 5) showed a significant difference ($P<0.05$). All helminth infections observed and recorded were from the intestine and stomach for both fish species, with the preferred location of infection being the intestines.

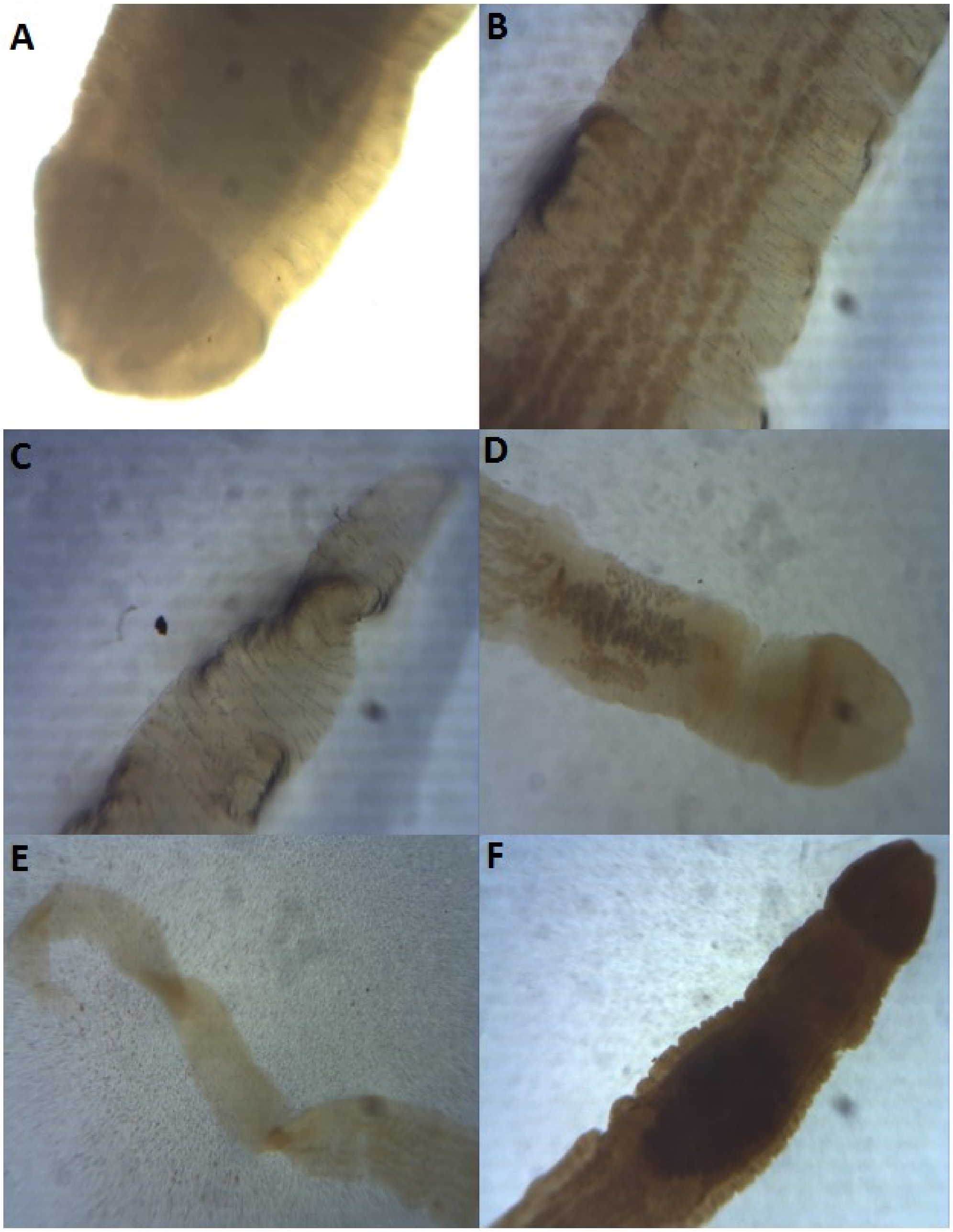


**Fig. 1: Photomicrographs of helminth parasites.**

A: Cephalic region of *Paraglaridacris limnodrili* in *Synodontis clarias* (X20), B: Body region of *P. limnodrili* in *S. clarias* (X20), C: Caudal region of *P. limnodrili* in *S. clarias* (X20), D: Cephalic region of *Wenyonia longicauda* in *S. clarias* (X20), E: Caudal region of *W. longicauda* in *S. clarias* (X20), F: Cephalic region of *Wenyonia youdeoweii* in *S. clarias* (X20)

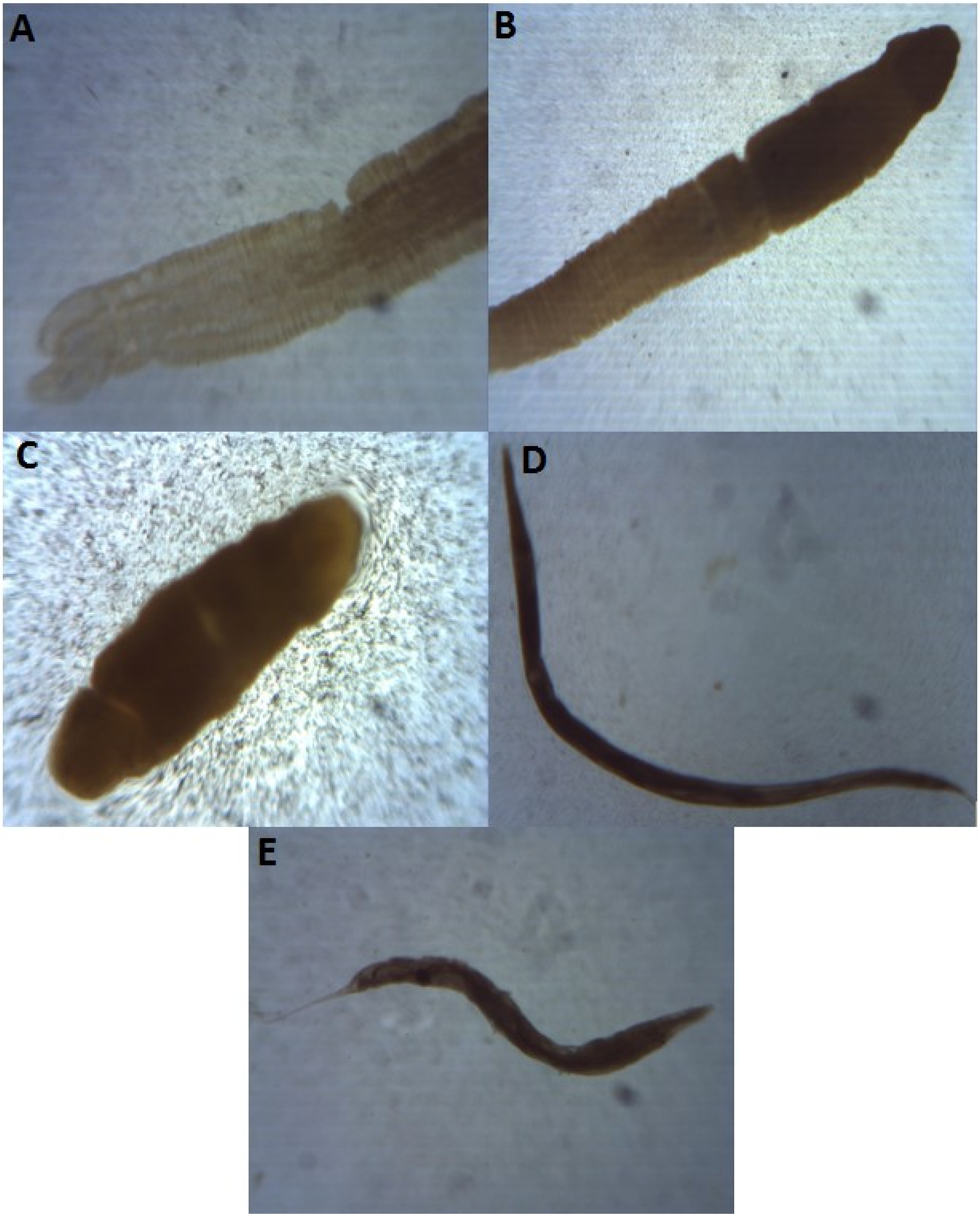


**Fig. 2: Photomicrographs of helminth parasites.**
A. Caudal region of *Wenyonia youdeoweii* in *Synodontis clarias* (X20), B. Caudal region of *Wenyonia virilis* in *S. clarias* (X20), C. Caryophyllaeus spp. in *S. clarias* and *Chrysichthys nigrodigitatus* (X20), D. *Procamallanus laevionchus* in *S. clarias* (X20), E. *Cosmoxynema vianai* in *S. clarias* (X20)

**Tab. 2: Overall parasites prevalence of fishes in Asejire Dam.**

| Fish Host | No. Examined | No. infected | Prevalence (%) | Total recovered |
|---|---|---|---|---|
| *C. nigrodigitatus* | 63 | 5 | 7.94 | 29 |
| *C. auratus* | 99 | 0 | 0 | 0 |
| *S. clarias* | 88 | 76 | 86.36 | 1746 |
| Total | 250 | 81 | 32.40 | 1775 |

**Tab. 3: Prevalence of helminth infection in relation to size of *C. nigrodigitatus* and *S. clarias***

| ***C. nigrodigitatus*** | | | |
|---|---|---|---|
| **Length Range (cm)** | **No. Examined** | **No. Infected** | **Prevalence (%)** |
| 11.00-13.9 | 18 | 1 | 5.56 |
| 14.00-16.9 | 26 | 3 | 11.54 |
| 17.00-19.9 | 14 | 0 | 0 |
| 20.00-22.9 | 5 | 1 | 20 |
| Total | 63 | 5 | 7.94 |
| $x^2 = 2.216$, df = 3, P>0.05 | | | |
| ***S. clarias*** | | | |
| **Length Range (cm)** | **No. Examined** | **No. Infected** | **Prevalence (%)** |
| 8.00-10.9 | 13 | 10 | 76.92 |
| 11.00-13.9 | 51 | 46 | 90.20 |
| 14.00-16.9 | 23 | 19 | 82.61 |
| 17.00-19.9 | 1 | 1 | 100 |
| Total | 88 | 76 | 86.36 |

$x^2 = 0.02$, df = 3, P<0.05

**Tab. 4: Prevalence of helminth infection in relation to host sex.**

| Fish Host | *C. nigodigitatus* | | *C. auratus* | | *S. clarias* | |
|---|---|---|---|---|---|---|
| Sex | Male | Female | Male | Female | Male | Female |
| No. Examined | 33 | 30 | 63 | 36 | 74 | 14 |
| No. infected | 3 | 2 | 0 | 0 | 64 | 12 |
| Infection rate (%) | 9.10 | 6.67 | 0 | 0 | 86.49 | 85.71 |

$x^2 = 0.11$, df = 1, P>0.05
$x^2 = 0.00044$, df = 1, P>0.05
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**Tab. 5: Comparison of parasitic load between fish hosts from Asejire Dam.**

| Fish Host | Observed | Expected |
|---|---|---|
| *C. nigrodigitatus* | 7.94 | 33.33 |
| *C. auratus* | 0 | 33.33 |
| *S. clarias* | 86.36 | 33.33 |

$x^2 = 137.04$, df = 2, P<0.05

Infection by helminth parasites induced a number of pathological lesions that varied with the intensity of helminth parasites. The intestines of *S. clarias* with helminth infection showed short and stunted villi with marked heterophilic and lymphocytic infiltration into the intestinal mucosa (Fig. 3a) while another showed moderate disruption of the intestinal mucosa, edema of the lamina propria and submucosa with moderate lymphocytic and heterophilic infiltration (Fig. 3b). Intestines with no helminth infection showed varying lengths of villi and slight desqamation of the enterocytes into the intestinal lumen (Fig. 3c). Stomach with helminth infection appeared normal with slight hyperplasia of the enterocytes towards the tip of individual columnar epithelium (Fig. 3d), while another showed moderate disruption of the muscular mucosa (Fig. 3e). The stomach with no helminth infection showed marked stunting of the columnar epithelium (Fig. 3f).

The intestines of *C. nigrodigitatus* with helminth infection showed moderate to marked disruption of the intestinal villi, lymphocytic and heterophilic infiltration into the sub-mucosa, slight edema of the lamina propria and a few foci of macrophages with golden yellow pigments (hemosiderosis) (Fig. 4a). The intestines with no helminth infection showed moderately congested intestinal blood vessels with no visible lesion (Fig. 4b). The stomach with helminth infection showed short and stunted columnar epithelium (Fig. 4c) while that with no helminth infection showed no visible lesion and with a fairly normal architecture (Fig. 4d)

## Discussion

The parasitological examination of fish species from Asejire Reservoir showed a low parasite prevalence (32.4%), comprising of only two parasite taxa with eight parasite species. In the present study, only cestodes and nematodes were recovered from *S. clarias* and *C. nigrodigitatus*. Among the parasites isolated, the cestodes *Caryophyllaeus spp.* (common to both fish hosts) and *Paraglaridacris limnodrili* as well as the nematode *Cosmoxynema vianai* are rarely reported among Nigerian freshwater fish species. However, in conformity with this study, Eyo *et al*. (2012) isolated *Caryophyllaeus spp.* from *Synodontis batensoda* at the confluence of Rivers Niger and Benue. The presence of *Caryophyllideans* in the reservoir indicates the possible presence of freshwater annelids used by some *Caryophyllideans* as intermediate hosts (Caira and Jensen, 2017). The present study has recorded *Paraglaridacris limnodrili* and *Cosmoxynema vianai* in *C. nigrodigitatus* as well as in *S. clarias* from Asejire Dam. The other parasites recovered in this study have been reported, they include: *Procamallanus spp*. (Eyo *et al*., 2012; Tossavi *et al*., 2014; Uneke *et al*., 2015 and Okpasuo *et al*., 2016) and *Wenyonia* spp. (Salawu *et al*., 2013).

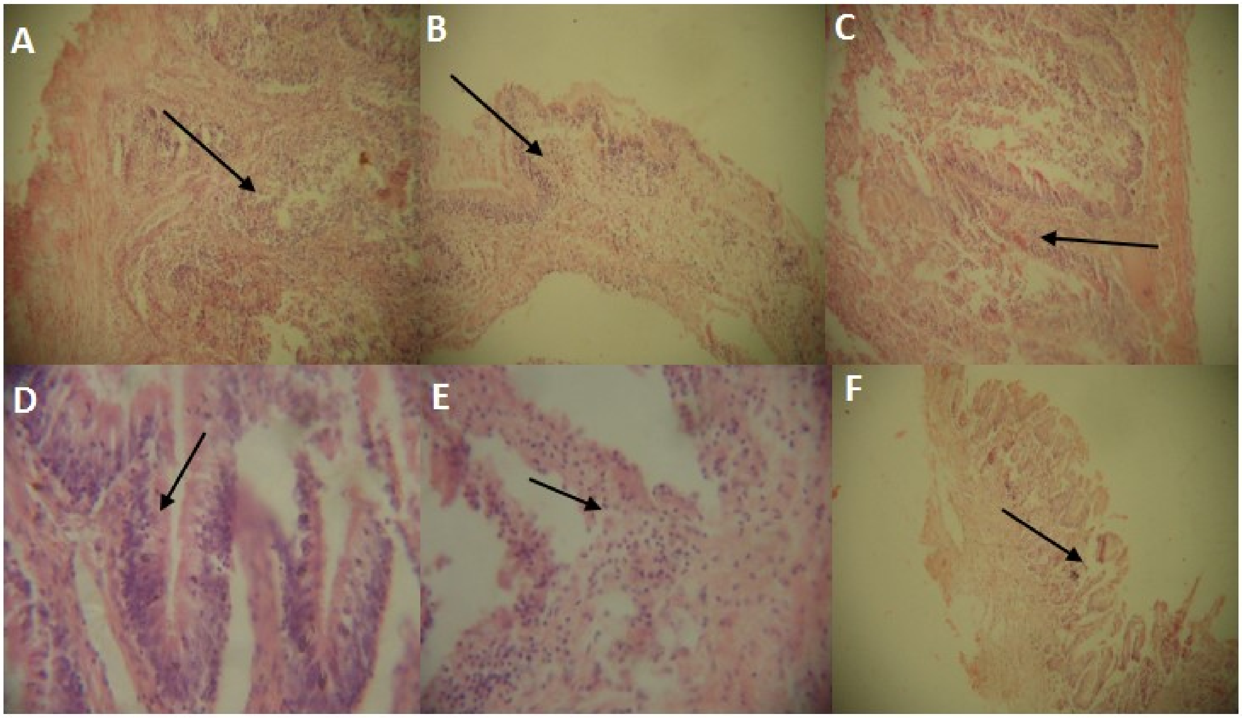


**Fig. 3: Pathological effects of helminth parasites on *S. clarias.***
A: Lymphocytic infiltration of intestinal mucosa of infected intestine, B: Edema of the lamina propria of infected intestine, C: Slight desquamation of enterocytes in the intestinal lumen of uninfected intestine, D: Slight hyperplasia of enterocytes at the tip of columnar epithelium of infected stomach, E: Moderate disruption of the muscular mucosa of infected stomach, F: Marked stunting of the columnar epithelium of uninfected stomach

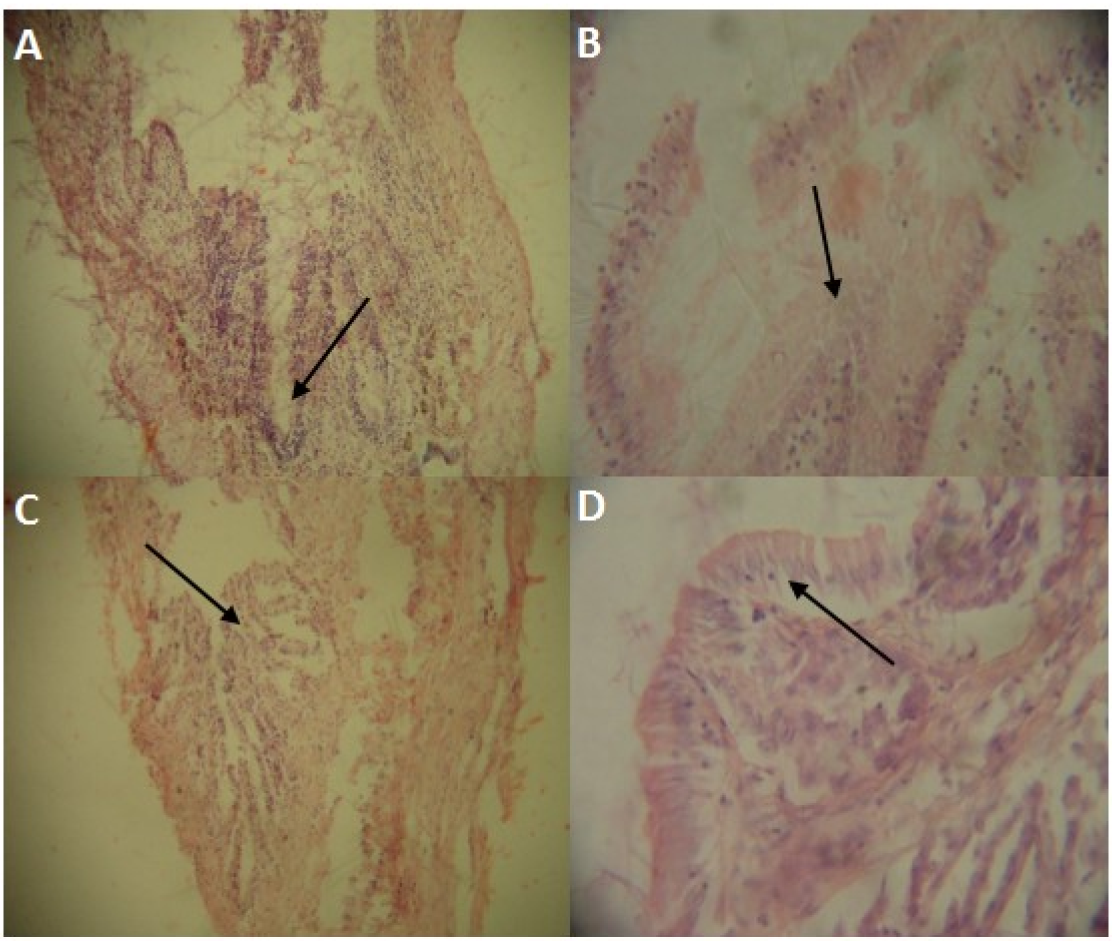


**Fig. 4: Pathological effects of helminth parasites on *C. nigrodigitatus*.**
A: Moderate to marked disruption of the intestinal villi of infected intestine, B: No tissue change in uninfected intestine, C: Short and stunted columnar epithelium of infected stomach, D: No visible lesion in uninfected stomach

*Wenyonia* species has therefore been known to infect members of the family Mochokidae.

The low overall internal parasite prevalence (32.4%) in this study is in conformity with the observation by Salawu *et al*. (2013), who reported a similarly low parasite prevalence and infection rate of two fish species from the same reservoir. This might be as a result of the absence of any source of pollution to the reservoir (Salawu *et al*., 2013) as well as the strict supervision of activities within the Dam's catchment area (Oyedotun, 2011). This is possible because high parasite prevalence in freshwater ecosystems have been associated with pollution in the form of waste dumpsites at these water bodies and the release of effluents and other wastes from human activities in industries and abattoirs (Kelly *et al*., 2010). The absence of a heavy parasite prevalence in Asejire Dam from this study could also be as a result of the appropriateness of dissolved oxygen, pH and other water parameters that have been suggested by Ayoade *et al*. (2007), and Jenyo-Oni and Oladele (2016), to be the basis for the thriving aquatic life of the lake. The recent study by Jenyo-Oni and Oladele (2016) on the physico-chemical parameters of water samples from the Dam, found the pH, temperature, Dissolved oxygen, conductivity, total alkalinity, total hardness, total dissolved solids as well as heavy metals to be within beneficial levels which support human and aquatic animal usage. The low prevalence also agrees with the findings by Edema *et al*. (2008), Ekanem *et al*. (2011, 2014), Ejere *et al*. (2014), Okpasuo *et al*. (2016), although with a number of variations in the rate of parasitism. Thompson and Larson (2004) opined that these variations could be attributable to abiotic and biotic conditions of the environment where the study is carried out. The different environmental conditions could have either direct or indirect impact on fish physiology including immune functions that either favour or protect against parasite invasion. In contrast to this study, Onyedineke *et al*. (2010) and Salawu *et al*. (2013) reported higher overall parasite prevalence in fishes at Ilushi, River Niger in Edo (60.6%) and Ogun River (62.6%) respectively, attributing the observation to high pollution. Other studies with high overall parasite prevalence include Auta *et al*. (1999) and Eyo *et al*. (2012). This study however recorded higher parasite prevalence for *S. clarias* (86.36%) as opposed to 7.94% for *C. nigrodigitatus*. Male fishes had higher infection rates than females for both fish species. Similar observations have been made by Ejere *et al*. (2013) although, the prevalence recorded (39.1%) was much lower than that recorded in this study attributable to different conditions in the affected water body. Ejere *et al*. (2013) and Dauda *et al*. (2016) observed a higher prevalence in females than males. In contrast to the observation of higher prevalence in *S. clarias* compared to *C. nigrodigitatus*, Ekanem *et al*. (2011) and Tossavi *et al*. (2014) recorded higher prevalence for *C. nigrodigitatus* than *Synodontis* species. Differences in feeding habits and environment could be the reason for this. This study also showed the absence of parasites in *C. auratus* as opposed to a high prevalence observed by Okpasuo *et al*. (2016).

The present study also revealed a higher parasite prevalence among the largest sizes of *C. nigrodigitatus*, although, Chi-squared analysis showed a non-significant relationship between prevalence and size ($P>0.05$). *S. clarias* on the other hand showed a statistically significant relationship ($P<0.05$) between prevalence and size. Eyo *et al*. (2012) reported similar result for *Synodontis batensoda*, suggesting an increase in parasitism with size or age.

The highest numbers of helminth parasites were recorded in the intestine of the fishes, this conforms to the work of Onyedineke *et al*. (2010) in which more parasites were recovered from the intestines of the fishes. Different groups of helminth parasites were recovered from the different organs of the fish species. This is attributable to the fact that helminth parasites depend on the presence of absorbable food materials in the lumen of the gut. The availability of certain classes of nutrient, their different sites of digestion and absorption will play a definite role in determining the kind of parasite and their distribution in the intestine, this also agrees with the work of Morenikeji and Adepeju (2009). From a similar observation to this study, Ekanem *et al*. (2011) suggested that the higher number of parasites in the intestines could be the result of the many digestive activities that takes place in the intestines resulting in the release of parasite ova/cysts in food particles.

Comparison of parasitic load between *S. clarias*, *C. auratus* and *C. nigrodigitatus* from Asejire dam using Chi-squared analysis revealed that there was significant difference between the helminth parasitic loads in the different species of fish. Large numbers of helminth parasites were recovered from *S. clarias* (86.36%).

The pathological effects of helminth parasites in the various organs of *S. clarias* and *C. nigrodigitatus* from Asejire dam were investigated. The histopathological study revealed various degrees of tissue change in infected intestine and stomach of *S. clarias* and *C. nigrodigitatus*, similar to the observations by Akinsanya and Kuton, (2016). The histopathological screening revealed pathological conditions such as lymphocytic infiltration, moderate disruption of muscular mucosa and intestinal villi, edema while there was no morphological changes in uninfected tissues of *C. auratus*.

## Conclusion

The findings in this study underscores the importance of parasitic infection and its intensity in *S. clarias* and *C. nigrodigitatus* at Asejire dam which is created primarily for the provision of public water supply with fisheries development as a major ancillary benefit. The Dam supports aquatic lives and serves as a source of water to the populace. *S. clarias* and *C. nigrodigitatus* and not *C. auratus* were found to be infected with helminth parasites which included nematodes and cestodes. Most fish health problems occurred possibly due to environmental problems like overcrowding of fish, dietary deficiencies, poor water quality and feeding habit of fish.

The extent of damage caused by parasite depends not only on the intensity of the infection but also on how deep the developmental stages of the parasites reach within the intestinal and stomach wall. Fish farmers and sellers should be enlightened on the potential risk of parasitic infestation in fishes in order to avoid economic loss. Consumers are advised to cook their fish food very well so as to destroy any piscine parasite harbored in the fish.

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