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ACANTHOCEPHALAN PARASITES OF TILAPIA, PORT HARCOURT, NIGERIA

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ABSTRACT: *Tilapia from Okuru-Ama River, Port Harcourt, Nigeria, were surveyed for the presence of acanthocephalan parasites using standard parasitological techniques. Three of the twenty-seven specimens examined were infected with Acanthocephalus sp. at a prevalence of 11.1% and mean intensity of two parasites per infected host. Though the study was conducted during the rainy season when acanthocephalan abundance should be at its peak, a low infection rate and abundance was reported. This is attributed to the small sample size (n=27) and possible changes in the population of the parasite's intermediate hosts. Condition factor was good ranging from 34.3 to 48.6, possibly due to the low parasite infection rate observed. This study has revealed the incidence of acanthocephalan parasites in Tilapia from the study location. Ecological studies on the population dynamics of the parasite's intermediate hosts in the river are recommended.*

KEYWORDS: Acanthocephalus sp., Tilapia, Parasites, Condition Factor, Nigeria.

INTRODUCTION

Acanthocephalan parasites have been reported to infect the intestine of both freshwater and marine fish species (Wayland et al., 1999; Iyaji and Eyo, 2008). In Africa, they have been reported in Kenya by Aloo and Dezfuli (1997). In Lagos, Nigeria, Akinsanya et al. (2007) reported *Tenuisentis niloticus* from *Malapterurus electricus*, while Okoye et al. (2014) reported *Neoechinorhynchus* sp. from *Tilapia guineensis* and *Hepsetidae fasciatus* of Agulu Lake, southeast Nigeria.

Though harm is caused by the worm's attachment to the host intestine, hosts do not usually show visible signs of disease, but fibrous nodules are common in intestinal surface of infected hosts (Buron and Nickol, 1994; CABI, 2017). Jithendran and Kannappan (2010) found that the genus *Neoechinorhynchus* caused "massive epithelial sloughing and haemorrhages" in intestinal sections of grey mullets, *Mugil cephalus*.

They often employ arthropods as intermediate hosts (de la Cruz et al., 2013), and are efficient bio-monitors of heavy metal pollution (Sures et al., 1994). Their feeding activities may have adverse effects on the health status of hosts. This can be assessed by a computation of the condition factor of the fishes (Abowei and Ezekiel, 2013; Lazarus, 2018). This research was conducted to establish the presence of acanthocephalan parasites in Tilapia from Okuru-Ama River in Port Harcourt, Nigeria. We hypothesized that acanthocephalan parasites were uncommon and would not be found in the fishes.

MATERIALS AND METHODS

Fish specimens were purchased from artisanal fishermen landing at the fishing port at Okuru – Ama River (4^{o} 46' 50.352'' N and Latitude 7^{o} 31' 9.206'' E) in Port Harcourt City Local Government Area, Rivers State, Nigeria. Purchases were made between May and June, 2018, until a sample size of twenty-seven was achieved. They were moved in ice-chest to the Laboratory of Parasitology and Entomology, Department of Animal and Environmental Biology, Rivers State University, Port Harcourt, Nigeria, for identification and examination for parasitic infection.

The fishes were identified using taxonomic keys (Idodo-Umeh, 2003). Morphometric measurements (total length, standard length, wet body weight) were taken, and specimens were dissected for the examination of their alimentary canal in 90% saline solution. Parasite identification was aided by keys from Van Cleave (1923) and Paperna (1996), and they were fixed in 70% alcohol/saline solution.

This study was approved by the Academic Board of Department of Animal and Environmental Biology, Rivers State University, Port Harcourt, Nigeria. The parasites were deposited in the museum section of the Laboratory of Parasitology and Entomology (MDAEB 10030PA).

Prevalence and intensity of infection were computed after Bush et al., (1997) while the condition factor (CF) was computed according to Zhelev et al. (2015).

Statistical analysis: The body mass and total length were log transformed and used for the computation of condition factor using MS Excel.

RESULTS AND DISCUSSION

Acanthocephalan parasites were found at very low prevalence. Of the 27 hosts examined, three specimens were infected with *Acanthocephalus* sp. Prevalence of infection was only 11.1%, and mean intensity of infection was two parasites per infected host. Both female and male parasites were encountered (Plate 1A-C).

Reports from Ohtaka et al. (2002) and de la Cruz et al. (2013) indicated that acanthocephalan abundance may be influenced by seasonal differences and the availability of and exposure to their arthropod intermediate hosts. Differences in the susceptibility of exposed hosts also contributes to the incidence of the parasite.

According to Kennedy (2006), acanthocephalans often exhibit aggregation or over-dispersion in hosts, and de la Cruz et al. 2013) made the same observation of *Acanthogyrus* sp. in the Nile Tilapia (*Oreochromis niloticus*), reporting a prevalence of 29%. The low prevalence and abundance reported from Tilapia of Okuru-Ama could be due to the low sample size of twenty-seven or other factors that affected the population dynamics of their intermediate hosts. One of such factors could be the dispersal or washing off of the intermediate hosts by rainfall since this study was conducted in the height of the rainy season (May-June). However, Matouke et al. (2011) reported peak acanthocephalan infection in *Tilapia zilli* in June and July, and found no significant effect of season (dry and wet) on the prevalence of infection.

We had expected to find mostly nematode parasites as is common with reports in Nigerian waters (Ogbeibu et al., 2014; Iyaji et al., 2015; Ani et al., 2017); however, nematodes and other helminthes were not encountered. Only acanthocephalans were found at low infection rate and abundance. Elsewhere in India, Jithendran and Kannappan (2010) also reported mono-infection of grey mullets by the acanthocephalan, *Neoechinorhynchus agilis*.

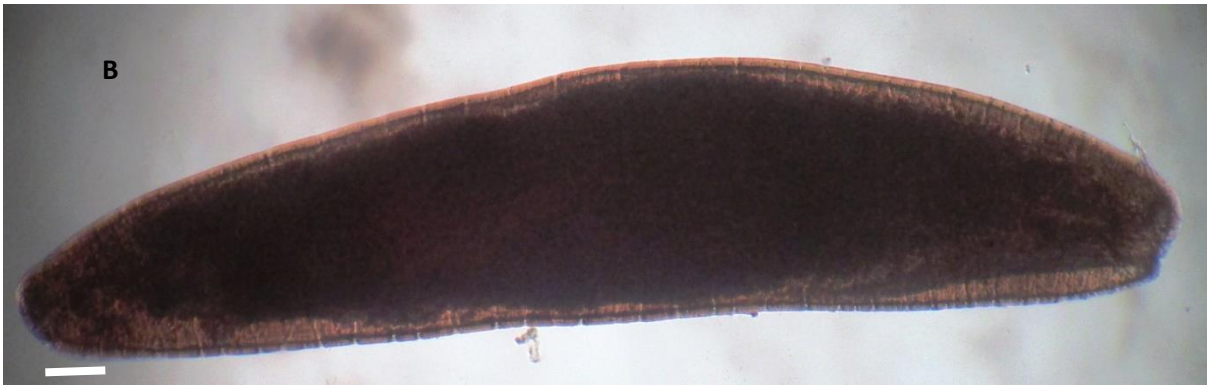

Plate 1: *Acanthocephalus* sp., A=female; B-C, male. (x40, bar 1.0mm)

The condition factor of the fish examined (Table 1) was very good (Abu and Agarin, 2016; Edoghotu, 2016; Lazarus, 2018) ranging from 34.3 to 48.6. This could be attributed to the low infection rate of parasites in the fishes.

Table 1: Range of body mass (g), total length (cm) and condition factor (CF) of Tilapia from Okuru-Ama, Okrika L.G.A., Rivers State

	Range	Mean±S.E
BM	8.76 – 42.66	24.57 ± 1.84
TL	8.20 - 14.0	11.15 ± 0.31
CF	34.34 - 48.63	43.16 ± 0.72

CONCLUSION

This study has revealed the incidence of *Acanthocephalus* sp. (acanthocephalan) in Tilapia of Okuru-Ama, Port Harcourt, Nigeria. Ecological studies on the population dynamics of the parasite's intermediate hosts in the river are recommended.

REFERENCES

Abowei, J.F.N. and Ezekiel, E.N. (2013). The length-weight relationship and condition factor of *Chrysichthys nigrodigitatus* (Lacepède, 1803) from Amassoma River flood plains. Scientia Agriculturae, 3(2): 30-37.

Abu, O.M. and Agarin, O.J. (2016). Length and weight relationship and condition factor of silver catfish (*Crysichthys nigrodigitatus*) from the lower reaches of New Calabar River. International Journal of Pharmacy and Biological Sciences 2: 1-7.

Akinsanya, B., Otubanjo, O.A., Hassan A.A. (2007). Helminth Parasites of *Malapterurus electricus* (Malapteruridae) from Lekki Lagoon, Lagos, Nigeria. Journal of American Science, 3(3): 5-10.

Aloo, P.A. and Dezfuli, B.S. (1997). Occurrence of cystacanths of Polyacanthorhynchus kenyensis larvae (Acanthocephala) in four teleostean fishes from a tropical lake, Lake Naivasha, Kenya. Folia Parasitologica, 44(3): 233-238.

Ani, O.C., Nnamonu, E.I. and Ejiogu, C. (2017). Prevalence of Intestinal Parasites of Fish Farmed and Harvested in Abakiliki, Nigeria: A Pointer to the Level of their Vulnerability. International Journal of Research in Pharmacy and Biosciences 4(9): 7-10.

Buron, I. and Nickol, B.B. (1994). Histopathological effects of the acanthocephalan Leptorhynchoides thecatus in the ceca of the green sunfish, Lepomis cyanellus. Transactions of the American Microscopical Society, 113(2): 161-168.

Bush, A.O., Lafferty, K.D., Lotz, J.M. and Shostak, A.W. (1997). Parasitology meets ecology on its own terms: Margolis et al. revisited. Journal of Parasitology, 83(4): 575–583.

Centre for Agriculture and Biosciences International (CABI) (2017). Acanthocephalan infections of fish. Retrieved from https://www.cabi.org/isc/datasheet/95446, August 28, 2019.

De la Cruz, C.P.P., Bandal, M.Z., Jr., Avila, A.R.B., and Paller, V.G.V. (2013). Distribution pattern of *Acanthogyrus* sp. (Acanthocephala: Quadrigyridae) in Nile Tilapia (*Oreochromis Niloticus* L.) from Sampaloc Lake, Philippines. Journal of Nature Studies, 12 (1): 1-10.

Edoghotu, J.A. (2016). Fishes and fishers of Kugbo creek. P.hD thesis submitted to the Department of Animal and Environmental Biology, University of Port Harcourt, River State, Nigeria.

Idodo-Umeh, G. (2003). Freshwater fishes of Nigeria: Taxonomy, Ecological Notes, Diet and Utilisation. Idodo-Umeh publishers Ltd., Edo State, Nigeria.

Iyaji, F.O. and Eyo, J.E. (2008). Parasites and their fresh water host. *Journal of Biological Research*, (6): 328-338.

Iyaji, F.O., Eyo, J.E., Falola, O.O. and Okpanachi, M.A. (2015). Parasites of S*ynodontis sorex* (Gunther, 1866 Mochokidae, Siluriformes) in Rivers Niger and Benue at the confluence area in Lokoja, Nigeria. FUTA Journal of Research in Sciences, 1: 87-94.

Jithendran, K.P. and Kannappan, S. (2010). A short note on heavy infection of acanthocephalan worm (*Neoechinorhynchus agilis*) in grey mullet, *Mugil cephalus.* Journal of Parasitic Diseases, 34(2): 99–101.

Kennedy C.R. (2006). Ecology of Acanthocephala. Cambridge University Press.

Lazarus, O.T. (2018). Ichthyofaunal survey of seasonal freshwater swamps of Engenni. M.sc thesis submitted to the Department of Animal and Environmental Biology, Rivers State University.

Matouke, M.M., Aken'Ova, T.O. and Nock, I.H. (2011). Acanthocephalan infections of cichlids and mormyrids in River Galma, Zaria, Nigeria. Journal of Tropical Biosciences, 9: 56-62.

Ogbeibu, A.E., Okaka, C.E. and Oribhabor, B.J. (2014). Gastrointestinal helminth parasites community of fish species in a Niger Delta tidal creek, Nigeria. *Journal of Ecosystems*, 10 pages, http://dx.doi.org/10.1155/2014/246283.

Ohtaka, A., Saito, T., Kakizaki, T., Ogasawara, S., Ohtomo, C. and Nagasawa, K. (2002). Seasonal and regional occurrence of *Acanthocephalus* sp. (Acanthocephala: Echinorhynchidae) in fishes and isopods (*Asellushilgen dorfi*) in lake system in northern Japan. Limnology, 3: 143-150.

Okoye, I.C., Abu, S.J., Obiezue, N.N.R. and Ofoezie, I.E. (2014). Prevalence and seasonality of parasites of fish in Agulu Lake, Southeast, Nigeria. African Journal of Biotechnology, 13(3): 502-508.

Paperna, I. (1996). Parasite, infections and disease of fishes in Africa—An update. CIFA Technical Paper, 31: 1-220.

Sures, B, Taraschewski H, and Jackwerth E. (1994). Lead content of *Paratenuisentis ambiguus* (Acanthocephala), *Anguillicola crassus* (Nematodes) and their host *Anguilla anguilla*. Diseases of Aquatic Organisms 19: 105-107.

Van Cleave, H.J. (1923). A Key to the Genera of Acanthocephala. Transactions of the American Microscopical Society, 42(4): 184-191.

Wayland, M.T., Sommerville, C. and Gibson, D.I. (1999). Echinorhynchus brayi n. sp. (Acanthocephala: Echinorhynchidae) from Pachycara crassiceps (Roule) (Zoarcidae), a deep-sea fish. Systemic Parasitology, 43(2): 93-101.

Zhelev, Z.M., Popgeorgiev, G.S. and Mehterov, N.H. (2015). Changes in the hepatosomatic index and condition factor in the populations of *Pelophylax ridibundus* (amphibia: ranidae) from anthropogenically polluted biotopes in southern Bulgaria. Part II. *Bulgarian Journal of Agricultural Science*, 21: 517-522.