Parasitic Incidence in Cultured *Clarias gariepinus* (Burchell, 1822) Collected from Homestead Concrete Pond in Akwa Ibom State, Nigeria

[*1] Inyang-Etoh, Aniema, [2] George, Ubong

[1] Faculty of Oceanography, University of Calabar, Calabar, Nigeria
[2]Department of Zoology & Environmental Biology, University of Calabar, Calabar, Nigeria
talk2georgeubong@gmail.com

Abstract: The incidence of parasites of *Clarias gariepinus* from homestead concrete pond in Akwa Ibom State was investigated. A total of 50 Samples of fish were collected from the fish farm during the duration of study. These samples were examined for parasitic incidence and the results showed 78 % parasitic prevalence while infection was not sex dependent (P > 0.05). Parasitic prevalence within the sample increases as length and weight of fish increases. The prevalence of parasites encountered were Capillaria sp. (32 %), Dactylogyrus sp (12 %), Ichthophthirius sp. (8 %) Tricodina sp. (8 %), unidentified cysts (8 %), unidentified larvae (6 %) and Dibothriocephalus sp. (4 %). Homestead ponds operators should constantly resort for training in order to learn and update existing knowledge in fish culture. These would trim down incidence of parasitic infection, possible financial loss and poor aesthetic value of parasitized fish.

[Inyang-Etoh, A., George, U. **Parasitic Incidence in Cultured *Clarias gariepinus* (Burchell, 1822) Collected from Homestead Concrete Pond in Akwa Ibom State, Nigeria.** *Nat Sci* 2018;16(5):7-11]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). http://www.sciencepub.net/nature. 2. doi:10.7537/marsnsj160518.02.

Keywords: Parasites, Incidence, Cultured Clarias garieinus, Homestead Concrete Pond, Akwa Ibom.

1. Introduction

There is current increase in fish farming across the globe with preference in the Sub-Saharan Africa in particular Nigeria. Most of the increase in fish farming is due to increase in small scale homestead fish farming. Homestead fish farming is profitable (Obiekezie 2000; Olagunju *et al*. 2007) and has been posited to have potential of increasing fish production in Nigeria by 500,000 t (Obiekezie 2000). The increase in homestead fish farming leads to increase in number of untrained farmers. There is need to train fish farmers on better farming techniques (Ibrahim and Yahaya 2011). Poor home stead fish farming techniques results in stress, diseases and eventually death of fish.

Frequency of intense parasitic infection in fish has been reported worldwide because fish serves as reservoir and intermediate host to most stages of parasites ranging from protozoan to metazoans (Kabata, 1970; Pal and Ghosh, 1985). Several authors have worked on parasitic incidence of fish in Nigeria (Ukoli, 1963; Alfred-Ockiya, 1985; Awa, *et al*, 1988; Okaeme, 1991 and Adeyemo, *et al*, 2003) and discovered that in the natural environment healthy individuals co-exist with diseased ones and in most parasitic infections host may not be killed unless the parasitic burden is high. But usually, growth rate and market value of fish may be reduced while infection may also be of public health importance. Regards public health concerns, it is necessary to identify disease reservoirs in order to have adequate knowledge of the transmission mechanism. This will help to develop an effective method of preventing the access of pathogens and their reservoirs to healthy facilities or individuals.

One of the most culturable fish species in Nigeria, notably the Niger Delta region is *Clarias gariepinus*. It is widely acceptable for consumption and rearing. The study of parasitic incidence on this species will further help to understand its adaptation for culture purpose. This study will add to the current knowledge on parasitic infections of cultured fish species in Nigeria and also compliment existing data in this area of research.

2.0 Materials And Methods

2.1 Field sampling

A total of 50 fish samples were collected from a homestead fish farm in Akwa Ibom State located within Uyo metropolis for duration of three months (May – July, 2017). The sampled fishes were collected and transported in ice chest to Fisheries laboratory in the University of Uyo, Uyo for identification and parasitic examination.

2.2 Identification / Examination of samples for ectoparasites

The sampled fishes were separated in to groups and identified using identification sheets by (Schneider, 1990) using morphometric and meristics characters. The identified fishes were measured to the nearest mm and checked for macro ectoparasites starting from the fins, skin and gills of the fish specimen. The scrape portion on each of the organs were smeared on clean glass slides, covered with

cover slides and examined under light microscopes for ectoparasites. The isolated parasites were collected and fixed in 4% phosphate buffered formalin (PBF) for further processing and species identification (Paperna, 1980; 1996). Each sample was examined independently for parasites according to the protocol outlined in Obiekizie and Ekanem (1995). Skin scrapings and wet mounts from fins, skin and gills were examined for abundance and distribution of ectoparasites. Identification of parasites was carried out according to Obiekezie and Enyenihi (1988), Obiekezie and Ekanem (1995) and Roberts (2000).

2.3 Examination of samples for endoparasites

Under aseptic conditions, the cavity of each fish was (slit) cut opened ventrally with a pair of scissors and the internal organs removed for examination. Some organs were squeeze (liver, spleen, heart, kidney) and examined as wet mounts under the microscope while other parts were fixed in phosphate buffered formalin (PBF) for isolation, and identification of parasites ((Paperna, 1980, 1996).

2.4 Determination of percentage incidence of fish parasites

The percent incidence of both ectoparasites and endoparasite were calculated according to Tombi and Bilong (2004).

Percentage incidence (%) = (n/N) x 100

Where;

n = the number of individual parasites species isolated,

N = the total numbers of parasites isolated from individual fish.

3.0 Results

A total of fifty (50) adults' specimen of *C. gariepinus* were collected and examined during the study period. Out of the 50 specimens examined, 39 specimens were infested with 16 capillaria sp., 4 Ichhophthirius sp., 4 Tricodina sp., 2 Dibothriocephalus sp., 3 unidentified larvae, 6 Dactylogyrus sp. and 4 unidentified cysts.

The percentage prevalence and incidence of the isolated parasites were (32 and 41.03 for capillaria sp, 8 and 10.26 for Ichhophthirius sp, 8 and 10.26 for Tricodina sp, 4 and 5.13 for Dibothriocephalus sp, 6 and 7.69 for unidentified larvae, 12 and 15.38 for Dactylogyrus sp and 8 and 10.26 for unidentified cysts) respectively (Table 1). Site of infestation of each endoparasite and ectoparasite is presented in table 1.

Table 2 shows the prevalence of infection of parasites based on the sex of *Clarias gariepinus*. Out of fifty (50) samples of *Clarias gariepinus* examined, 24 were male with 17 samples being infected while 26 were female with 22 samples being infected. The male had lower prevalence rate of 71% than the female with 85% ($p>0.05$).

Table 3 shows the prevalence and incidence of parasites in relation to the length-weight of *Clarias gariepinus*. Prevalence rates of 75%, 64%, 80%, 100% and 100% were observed in the length-weight groups of 23-24.5, 25-26.5, 27-28.5, 29-30.5 and 31-32.5 cm respectively while Incidence rates of 28.21%, 25.64%, 20.51%, 12.82% and 12.82% were observed in the length-weight groups of 23-24.5, 25-26.5, 27-28.5, 29-30.5 and 31-32.5 cm respectively.

Table 1: Parasitic incidence on cultured *Clarias gariepinus*

Parasites Isolated	Number of fish examined	Number of Infected fish	Prevalence NFI/ NFE x 100 (P) (%)	Incidence (%)	Site infected
Capillaria sp	50	16	32	41.03	Skin, Stomach, intestine
Ichhophthirius sp	50	4	8	10.26	Skin body surface
Tricodina sp	50	4	8	10.26	Stomach
Dibothriocephalus sp	50	2	4	5.13	Intestine
Unidentified larvae	50	3	6	7.69	Bodsy surface
Dactylogyrus sp	50	6	12	15.38	Skin, intestine
Unidentified Cysts	50	4	8	10.26	Skin
Total	**50**	**39**	**78**	**100**	

Table 2: Sex Ratio Analysis of Infected Cultured *Clarias gariepinus*

	Male	Female	Sex ratio
Number of fish examined	24	26	1:1.01
Number of fish infected	17	22	1:1.02
Prevalence	**71**	**85**	1:1.02

Table 3: Length-weight in relation to Parasitic infection

Length Range (cm)	Weight average (gm)	No within the group	No of infected Fish	Prevalence Within the Group (%) NFI/ NFE x 100	Incidence within the Group
23-24.5	106.31	16	11	75	28.21
25-26.5	125.40	14	10	64	25.64
27-28.5	180.60	10	8	80	20.51
29-30.5	202.50	5	5	100	12.82
31-32.5	255.00	5	5	100	12.82
Total		**50**	**39**	**78**	**100**

4.0 Discussion

Unlike the wild African catfish cultured in homestead ponds are equally exposed to parasitic infections as a result of management practices which predispose the fish to infection. In this study, fifty (50) samples of *Clarias gariepinus* were examined for ectoparasites and endoparasites out of which 78% were infected. This finding corroborates with the report of Adeyemo and Falaye (2007) in a similar research but contradicts that of Eyo *et. al* (2015) in a similar research. This may be due to the differences in mode of feeding, water quality management, parent stock, pond type and general hygiene conditions of the farms were samples were collected and also the period and duration of study. Males had a lower prevalence rate of 71% than the female with 85% which was not statistically significant ($p>0.05$) using chi ^{2} analysis. This agrees with the findings of Alam *et. al* (2010) and Eyo *et. al* (2015) who reported that female fishes were more infected than the male fishes. However, Emere, (2000), attributed the infestation rate between male and female to be due to differential feeding either by quality or quantity of food eaten or as a result of different degrees of resistance and infection. Emere and Egbe (2006), also reported that due to physiological status of female fish, most gravid females could have reduced resistance to infection by parasites. Similarly, Aloo *et al*. (2004) explained that the main reason for the variation in parasitic infestation in relation to sex may be credited to changes in physiological factor.

In this study, five species of parasites namely capillaria sp., Ichhophthirius sp., Tricodina sp., Dibothriocephalus sp., Dactylogyrus sp were isolated with unidentified larvae and cysts. This could result to huge losses in fish productivity as parasites are reported to interfere with the absorption of nutrients in the intestine of fish and may reduce food intake. The metabolites produced by some of these parasites could adversely affect vital systems of the fish (Bichi and Yelwa, 2010). The numerical abundance of parasitic species isolated followed the pattern capillaria sp > Dactylogyrus sp > Ichhophthirius sp., Tricodina sp., unidentified cysts > unidentified larvae > Dibothriocephalus sp.

Capillaria sp., unidentified larvae and unidentified cysts were found to cause skin irritation, which favours secondary infections and may lead to transmission of bacterial hemorrhagic septicemia (Moore *et al*, 1984). The two common protozoan, Ichhophthirius sp and Tricodina sp were found from the skin scrapings and stomach contents respectively, but there was no lesions observed on any of the samples. Dactylogyrus sp a monogenetic trematode was described by Hendrix (1994) to be cosmopolitan in nature and could be ecto or endoparasite. In a related research Awa, *et al*. (1988) also reported incidence of monogenetic worms on *Sarotherodon galileans* at the Ikoyi fish farm, Lagos. Others include Harris (1993); Reed *et. al* (1996); Khalil and Mashego (1998) and Eyo *et. al* (2015). Dactylogyrus sp. had been known to cause heavy mortalities of fry and fingerlings (Sarig, 1971, Paperna, 1996). Dibothriocephalus sp is a tapeworm described by Needham and Wooten (1978) as broad fish tapeworm of man, which is known to occur in a variety of fresh water fish species. It is also of public health importance, because tapeworm of Diphyllobothrium sp has been found to be of zoonotic significance. (USDHEW, 1973).

It was however; observed that the rate of infection and percentage prevalence of infection increased with increasing length, size, and weight of *Clarias gariepinus*. These findings are similar with the findings of Robert (2000), Mohammed *et al*. (2009), Bichi and Dawaki (2010) and Allumma and Idowu, (2011) who stated that these parameters are synonymous to age, and that the higher rate of infection in adults compared to young fishes may be attributed to longer duration of time the older fish were exposed to pathogens in the environment which increases their chances of acquiring the parasites with time. In their assertion, Robert (2000), reported that longer fish provides larger surface area for infection than smaller fishes, while Bichi and Dawaki (2010), also reported increase in the abundance of parasites with host size and Mohammed *et al*. (2009), reported that prevalence was found to increase as the fish

grows and could be attributed to the longer time of exposure to the environment by body size.

5.0 Conclusion

The rapid intensification of aquaculture, particularly in the Niger Delta region due to incessant pollution of the region calls for greater management practices in homestead fish farm. Parasites incidence can be a source of the downwards trend in the growth of aquaculture in the region if unchecked. The proliferation of parasites can easily be checked by proper hygiene, good feeding (in sufficient quality and quantity), water quality management, good parents stock, avoiding overcrowding and regular monitoring and treatment in case of clinical symptoms. Homestead ponds operators should constantly resort for training in order to learn and update existing knowledge in fish culture. These would trim down incidence of parasitic infection, possible financial loss and poor aesthetic value of parasitized fish.

References

1. Adeyemo, A. O., Agbede, S. A., Taiwo, V. O. and Adedeji, B. O. (2003). Prevalence, abundance and intensity of Clinostomum tilapiae on cultured *Oreochomis niloticus*. Tropical Vetenarian, 21(3): 129 – 133.
2. Adeyemo, A. O. and Falaye, A. E. (2007). Parasitic incidence in cultured Clarias gariepinus. *Animal Research International*, 4(2): 702– 704.
3. Alam MJ, Rakibuzzaman M, Hasan MM. Comparative study of endoparasitic infestation in *Channa punctatus* (Bloch, 1793) collected from hatchery and sewage lagoon. *Nat Sci* 2010; 8(5): 52-6.
4. Alfred-Ockiya, J. F. (1985). Preliminary survey of parasites of Clarias sp. in the Delta area of Nigeria. Pages 210 – 215. In: ITA, E. O. (Ed). Poceedings of the 4 th Annual Conference of Fisheries Society of Nigeria (FISON).
5. Allumma, M. I. and Idowu, R. I. (2011). Prevalence of gill helminths of *Clarias gariepinus* in Baga side of Lake Chad. *J. Appl. Sci. Environ Manage,* 15(1):47 – 50.
6. Aloo P. A., Anam R. O. and Mwangi J. N. (2004). Metazoan parasites of some commercially important fish along the Kenyan Coast. *West Indian Ocean J Mar Sci*, 3(1): 71-8.
7. Awa, J. N., Anyanwu, P. and Ezenwa, B. (1988). Incidence of parasites infection of pond raised Tilapia sp and some cultivable fish species from three ecological areas of Lagos State. Pages 20 – 21. In: Nigerian Institute for Oceanography and Marine Research (NIOMR) 1988 Annual Report.
8. Bichi, A. H. and Yelwa, S. I. (2010). Incidence of piscine parasites on the gills and gastrointestinal tract of *Clarias gariepinus* (Teugels) at Bagauda fish farm, Kano. *Bayero Journal of Pure and Applied Science,* 3(1):104 – 107.
9. Bichi, A. H. and Dawaki, S. S. (2010). A survey of ectoparasites on the gills, skin and fins of *Oreochromis niloticus* at Bagauda fish farm, Kano, Nigeria. *Bayero Journal of Pure and Applied Science,* 3(1):83 – 86.
10. Emere, M. C. (2000). Parasitic infection of Nile perch (*Lates niloticus*) in river Kaduna. *J. of Aqua. Sci.,* 15:51 – 54.
11. Emere, M. C. and Egbe, N. E. L. (2006). Protozoan parasites of *Synodntis clarias* (A freshwater fish) in river Kaduna. *BEST Journal,* 3(3):58 -64.
12. Eyo, V. O., Edet, T. A. and Ekanem, A. P. (2015). Monogenean parasites of the African catfish *Clarias gariepinus* from two fish farms in Calabar, Cross River State, Nigeria. *Journal of Coastal Life Medicine,* 3(6): 433-437.
13. Harris, P. D. (1993). Interactions between reproduction and population biology in gyrodactylid monogeneans - a review. *Bull Fr Peche Piscic*, 328:47-65.
14. Hendrix, S. S. (1994). Marine Flora and Fauna o the Eastern United States. National Oceanic and Atmospheric Administration (NOAA) Technical Report. National Marine Fisheries Services (NMFS) 121. US Department of Commerce, US. 106 pp.
15. Ibrahim H.Y. and Yahaya, H. (2011). Women participation in homestead fish farming in North central Nigeria. *Livestock Research for Rural Development*. 23: 35.
16. Kabata, Z. (1970). Crustacean as enemy of fishes. In: Sniezko, S. F and Axel, R. (Eds.). Diseases of fishes. TFH, New Jersey.
17. Khalil, L. F. and Mashego, S. N. (1998). The African monogenean gyrodactylid genus *Macrogyrodactylus* Malmberg, 1957, and the reporting of three species of the genus on *Clarias gariepinus* in South Africa. *Onderstepoort J Vet Res,* 65: 223-31.
18. Mohammad, A., Hassan, A. and Fatman, E. M. (2009). Studies on Diseases of fish caused by henneguya infestation. *Ph. D. Thesis*. Fac. Vet. Med. Suez, Canal University.
19. Moore, B. R., Mitchell, A. J., Griffin, B. R. and Hoffman, G. L. (1984). Parasites and diseases of pond fishes. Pages 177 – 205. 3rd Annual Report of United States Department of Interior Fisheries and Wildlife Services.

20. Needham, T. and Wooten, R. (1978). Parasitology of Teleost. Pages 144 – 182. In: ROBERTS R.J (Ed). Fish Pathology. Cassell Limited. Great Britain.
21. Obiekezie, A. I. (2000). "Poverty Alleviation through Fisheries Production: The way Forward". Proceedings of the 14th Annual Farming Systems Research and Extension workshop in Southeastern Nigeria. Edited by Enyinnia, NRCRI, Umudike, Nigeria.
22. Obiekezie, A. I. and Ekanem, D. (1995). Experimental infection of Heterobranchus longifilis (Teleosti: Clariidae) with Trichodina maritinkae (Ciliophora: Peritrichida). *Aqua. Liv. Res*., 8: 439-443.
23. Objekezie, A. I. and Enyenihi, U. K. (1988). Henneguya Chrysichthyo Sp. Nov (Protoza: myxozoa) from the gills of the estuarine catfish, Chrysicthys nigrodigitatus (Lacepede) in the Cross River Estuary Nigeria. *J. Afr. Zool*., 102: 33-42.
24. Okaeme, A. N. (1991). Helminthes fauna of tilapia of lake Kainji in pre and post impounded conditions. Jounal o Aquaculture, 6(1): 1 – 8.
25. Olagunju, F. I., Adesiyan, I. O. and Ezekiel, A. A. (2007). Economic Viability of Catfish Production in Oyo State, Nigeria. *J. Hum. Ecol.* 21(2): 121 – 124.
26. Pal, R. N. and Ghosh, A. K. (1985). Identification and control of commonly occurring diseases in fresh water aquaculture. Aquaculture Extension Manual Series, Volume 9, Central Inland Fish Institute, India. 23 pp.
27. Paperna, I. (1980). Parasites, infections and diseases of fish in Africa. Food and Agricultural Organization. *C.I.F.A. Technical Paper* 7: 2l6.
28. Paperna, I. (1996). Parasites infections and disease of fishes in Africa. CIFA Technical paper no. 31 Food and Agriculture Organization, Rome.
29. Reed, P., Francis-Floyd, R., Klinger, R. and Petty, D. (1996). Monogenean parasites of fish. Florida: University of Florida IFAS Extensio. [Online] Available from: http://edis.ifas.ufl.edu/fa033 (Accessed on 29th January, 2015).
30. Roberts, L. S. and Janovy, J. (2000). *Foundation of Parasitology*, 6th Ed. Mcgraw – Hill International Edition, Boston, 105 – 113.
31. Sarig, S. (1971). Prevention and treatment of warm water fish diseases under sub-tropical conditions with special emphasis on intensive fish farming. TFH, New Jersey.
32. Schneider, W. (1990). Field guide to the commercial marine resources of the Gulf of Guinea. FAO species identification sheets for fishery purposes.
33. Tombi, J. and Bilong, C. F. (2004). Distribution of gill parasites of the Freshwater fish Barbusmartarelli Roman, 1971 (Teleosteri: Cyprinidae) and Tendency to inverse intensity evolution between myxosporidia and management as a function of the Host Age.
34. Ukoli, F. M. A. (1963). Preliminary reports on the helminthes infection of fishes in River Niger at Shagumu. Pages 70 – 73. In: White E. (Ed). 1st Scientific Report of Kainji lake Biological Research Team.
35. USDHEW (1973). Epidemiological aspects of some of the zoonoses. Centre for Disease Control Public Health Service of United States Department of health, Education and Welfare (USDHEW). No CDC 75-8182.

3/17/2018