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PARASITES OF AFRICAN CATFISH (*CLARIAS GARIEPINUS*) CULTURED IN SELECTED HOMESTEAD PONDS IN RIVERS STATE, NIGERIA

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ABSTRACT

Fish are a major source of protein to humans and one of the constraints to improved fish production in Nigeria are parasites/parasitic diseases. A study to evaluate the parasites of African catfish (Clarias gariepinus Burchell, 1822) cultured in selected homestead ponds in Rivers State, Nigeria was conducted from January to June, 2023. One hundred and twenty catfish were randomly selected from two homestead ponds (sixty fish per pond) and categorized (sex, weight and length); each fish was analyzed for parasites (ecto and endo) using standard parasitological techniques. Descriptive analyses (mean and percentages) were used to represent data obtained and chi-square test was used to determine the level of significance with a P<0.05 considered significant. An overall parasite prevalence of 30 (25.0%) was recorded in this study (P<0.05) and four parasites were observed; Ichthiphitrius 14 (11.7%), Chilodinella 6 (5.0%), Trichodina 6 (5.0%) andCrytobia 4 (3.3%). Male and female fish had parasite prevalence of 8 (16.0%) and 22 (31.4%) respectively (P>0.05).According to weight, parasite prevalence values of 4 (16.0%), 4 (17.4%), 8 (28.6%), 8 (30.8%) and 6 (33.3%) were recorded for 140 – 160g, 161 – 180g, 181 – 200g, 201 – 220g and 221 – 240g respectively while according to length, parasite prevalence values of 8 (21.1%), 10 (24.4%), 7 (26.9%) and 5 (33.3%) were recorded for 20 – 22cm, 23 – 25cm, 26 – 28cm and 29 – 31cm respectively (P>0.05). Proper management practices should be adhered to in aquaculture to increase yield and reduce the detrimental effects of fish parasites.

Keywords:*Clariasgariepinus*, parasites, homestead ponds, Rivers State

INTRODUCTION

Fish is a vital animal protein in human diets and it contains several important nutrients (Oboh *et al*., 2018; Egun & Oboh, 2022). In rural areas, 60% of the total protein intake by adults comprises of fish and fish products (Egun & Oboh, 2022). The availability of fish increases food security and is a cheap source of nutritional diversity in many developing countries where there is a huge diet dependence on a small range of staple foods (FAO, 2018; Egun & Oboh, 2022). Fish is a major source of food which constitutes approximately 40% of the total animal protein consumed by individuals due to cultural acceptance, relative cheap and palatability in Nigeria (Egun & Oboh, 2022). Due to an increased awareness on the high nutritional importance of fish and population growth, there is an increased demand and consumption of fish (Liverpool-Tasie*et al*., 2021; Egun & Oboh, 2022). The African catfish (*Clariasgariepinus*Burchell, 1822) is a major

source of animal protein in Nigeria and it is cultured mainly in homestead ponds. It is a suitable aquaculture species in several African countries (including Nigeria) because it tolerates a wide range of environmental conditions, fast growth rate, high fecundity rate and easily accepts artificial feeds (Afolabi *et al*., 2020). A major productivity constraint in catfish culture is the detrimental effects of parasites (ecto and endo). Parasitic diseases weaken the immune systems of fish and alter the normal physiology; thereby reducing fecundity, causing mass mortalities, nutritive devaluation and subsequent economic losses. Also, some fish parasites could lead to zoonotic diseases in humans and most fish products are rarely screened for parasites before human consumption (Okoye *et al*., 2014). A study to evaluate the parasites of catfish (*Clariasgariepinus*Burchell, 1822) cultured in selected homestead ponds in Rivers State was conducted.

MATERIALS AND METHODS

Study Area

The study was conducted in Port Harcourt, Rivers State, Nigeria. Port Harcourt lies between latitude 4°45'N – 4°60'N and longitude 6°50'E – 8°00'E; the city experiences a mean monthly temperature of 31.29°C, a mean monthly humidity of 84% and a monthly rainfall of 20.303mm (Uko &Tamunoberetin-Ari, 2013).

Study Design and Sample

A cross-sectional survey was conducted using homestead ponds from two different farms (Farm A and Farm B) using 120 randomly selected catfish (60 per farm) from January to June, 2023; the fish were collected using a dragnet after draining a little quantity of water in the ponds. The fish were placed in a sterile container and transferred to the laboratory for analyses.

Sample Analyses

Fish samples were identified using their external features (Idodo-Umeh, 2003). The total length was taken from the tip of the snout to the end of the caudal fin using a rule calibrated in centimeters (cm), the fish samples were weighed to the nearest gram using Kinlee electronic sensitive weighing balance, and the sexes of the fish were identified by visual examination of the uro-genital papillae located behind the anus which is long/distend in males and round in females (Onojafe*et al*., 2021). Sex confirmation was also done after dissection of fish by observing the testes in males and ovaries in females. The live fish were anaesthetized using tricaine methanesulfonate (MS-222) for easy handling before examination (Onojafe*et al*., 2021). The skin, gills and fins of each fish were initially examined using a hand lens; a smear scrapping from the skin of each fish was obtained while fins were cut in smaller parts, placed on slides and examined microscopically. The gills were cut into smaller parts, put in Petri dishes containing normal saline and examined microscopically (Onojafe*et al*., 2021). Fish samples were placed on a clean dissecting board and dissected through the abdomen by making a longitudinal slit on the ventral surface from the anus to the pectoral fin level using a sterile surgical blade; the internal organs were carefully brought out and analyzed for parasites using standard parasitological diagnostic techniques (Afolabi *et al*., 2020; Deborah *et al*., 2003; Marcogliese, 2011). Descriptive analyses (mean and percentage) were used to represent the data obtained and chi-square test was used to determine the level of significance of the data with a $P<0.05$ considered significant.

RESULTS

An overall parasite prevalence of 30 (25.0%) was recorded in this study ($P<0.05$) (Table 1). Four parasites (two ecto and two endo parasites) were observed in the study; the ectoparasites were *Trichodina*spand *Chilodinella*spwith prevalence of 6 (5.0%) and 6 (5.0%) respectively while the endoparasites were *Ichthiphitrius*spand *Crytobia*spwith prevalence of 14 (11.7%) and 4 (3.3%) respectively (Table 2).

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Table 1: Overall parasite prevalence in the study

Study Location	Number Examined	Number Infected (%)	Number Uninfected (%)
Farm A	60	20 (33.3)	40 (66.7)
Farm B	60	10 (16.7)	50 (83.3)
TOTAL	**120**	**30 (25.0)**	**90 (75.0)**

Table 2: Distribution and Genera of parasites in the study

Study Location	NE	Parasite Prevalence (%)				Total Infection (%)
		ICH	TRI	CRY	CHI	
Farm A	60	10 (16.7)	2 (3.3)	3 (5.0)	5 (8.3)	**20 (33.3)**
Farm B	60	4 (6.7)	4 (6.6)	1 (1.7)	1 (1.7)	**10 (16.7)**
TOTAL	**120**	**14 (11.6)**	**6 (5.0)**	**4 (3.3)**	**6 (5.0)**	**30 (25.0)**

NE = Number Examined; ICH = *Ichthiphitrius*; TRI = *Trichodina*; CRY = *Crytobia*; CHI = *Chilodinella*

An overall parasite prevalence of 8 (16.0%) and 22 (31.4%) was recorded for male and female fish in this study (P>0.05) (Table 3). According to weight, overall parasite prevalence values of 4 (16.0%), 4 (17.4%), 8 (28.6%), 8 (30.8%) and 6 (33.3%) were recorded for 140 – 160g, 161 – 180g, 181 – 200g, 201 – 220g and 221 – 240g respectively (Table 4) while according to length, parasite prevalence values of 8 (21.1%), 10 (24.4%), 7 (26.9%) and 5 (33.3%) were recorded for 20 – 22cm, 23 – 25cm, 26 – 28cm and 29 – 31cm respectively (P>0.05) (Table 5).

Table 3: Sex-related parasite prevalence of *Clariasgariepinus* in the study

Sex	Farm A		Farm B		Total Infection	
	NE	NI (%)	NE	NI (%)	NE	NI (%)
Male	35	6 (17.1)	15	2 (33.3)	50	8 (16.0)
Female	25	14 (56.0)	45	8 (17.8)	70	22 (31.4)
TOTAL	**60**	**20 (33.3)**	**60**	**10 (16.7)**	**120**	**30 (25.0)**

NE = Number Examined; NI = Number Infected

Table 4: Weight-related parasite prevalence of *Clariasgariepinus* in the study

Weight (g)	Farm A		Farm B		Total Infection	
	NE	NI (%)	NE	NI (%)	NE	NI (%)
140 – 160	11	3 (2.7)	14	1 (7.1)	25	4 (16.0)
161 – 180	9	1 (11.1)	14	3 (21.4)	23	4 (17.4)
181 – 200	13	7 (53.9)	15	1 (6.7)	28	8 (28.6)
201 – 220	21	5 (23.8)	5	3 (60.0)	26	8 (30.8)
221 – 240	6	4 (66.7)	12	2 (16.7)	18	6 (33.3)
TOTAL	**60**	**20 (33.3)**	**60**	**10 (16.7)**	**120**	**30 (25.0)**

NE = Number Examined; NI = Number Infected

Table 5: Length-related parasite prevalence of *Clariasgariepinus* in the study

Length (cm)	Farm A		Farm B		Total Infection	
	NE	NI (%)	NE	NI (%)	NE	NI (%)
20 – 22	18	5 (27.8)	20	1 (15.0)	38	4 (21.1)
23 – 25	22	8 (36.4)	19	3 (40.0)	41	4 (24.4)
26 – 28	10	4 (40.0)	16	1 (18.8)	26	8 (26.9)
29 – 31	10	3 (30.0)	5	3 (40.0)	15	8 (33.3)
TOTAL	**60**	**20 (33.3)**	**60**	**10 (16.7)**	**120**	**30 (25.0)**

NE = Number Examined; NI = Number Infected

DISCUSSION

The overall parasite prevalence (25.0%) recorded in this study is lower than values recorded in similar studies such as 68.3% (Okoye *et al*., 2016), 48.8% (Ani *et al*., 2017), 65.0% (Abidemi-Iromini&Adelegan, 2019) and 42.1% (Onojafe*et al*., 2021) but comparable to 20.0% (Afolabi *et al*., 2020), 30.0% (Keremiah& Inko-Tariah, 2013) and 33.3% (Tachia *et al*., 2010). Several factors influence the presence and intensity of parasites in fishes; availability of intermediate hosts, type of feed/food sources and host status(age, sex, health condition and behaviour pattern). The low parasite prevalence in this study could be due to improved management practices of cultured fish such as the use of screen nets around the homestead ponds to prevent access to piscivorous birds (which are hosts to some parasites and can introduce parasite eggs into fish ponds) and reduction in overcrowding of fish ponds.

Among sexes in the study, the prevalence of parasites was higher in females than males and this agrees with the findings of some similar studies (Ani *et al*., 2017; Omeji*et al*., 2013; Auta *et al*., 2019; Okoye *et al*., 2016; Igbani*et al*., 2019; Afolabi *et al*., 2020; Ogonna*et al*., 2017) but disagrees with some other studies that reported higher prevalence in males (Tachia *et al*., 2010; Biu & Akorede, 2013). Higher infection in female fish could be due to the physiological state of females as most gravid female fish have reduced immune resistance to parasites (the immune systems of female fish are compromised during gestation) (Afolabi *et al*., 2020). Female fish need increased food intake to meet their food requirements for the successful development of eggs and this could expose them to more contact with parasites (Omeji*et al*., 2013). The difference in the parasite prevalence between males and female fish in this study was not significant; the feeding in catfish is attributed to their quest for survival and differential feeding (quantity or quality of food) and not by sexes (Ogonna*et al*., 2017).

Higher parasite prevalence was recorded in larger catfish than smaller ones; an increase in size is also an indication of an increase in weight and length (Afolabi *et al*., 2020). The larger catfish have a larger surface area for parasite infestation/infection and larger fish cover wide areas in search of food; they take in more food which also exposes them to parasites (Omeji*et al*., 2013; Afolabi *et al*., 2020).

Good aquaculture practices should be strictly followed (e.g. use of good water devoid of contamination and clearing plants around ponds which could harbour parasite/parasite intermediate hosts), fish from unscreened sources (especially natural habitats) should be quarantined and treated first before introduction into cultured ponds, fish should be cooked properly before consumption to prevent zoonotic infections and fish farmers/sellers should be enlightened on the economic losses caused by fish parasites.

CONCLUSION

The presence of parasites elicits pathological effects on fishes, thereby reducing their growth, reproduction and could cause death. From data obtained in this study, fish parasites are a major constraint to productivity;

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therefore, adequate measures/proper management practices should be taken in aquaculture to curtail the detrimental effects of fish parasites and increase yield.

Competing Interest

The authors declare that there is no competing interest in this study.

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Authors' Contributions

All authors designed the study, performed the study analysis and wrote the first draft of the manuscript.

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REFERENCES

Abidemi-Iromini, A. O. &Adelegan, R. A. (2019). Growth status and parasitic fauna of *Clariasgariepinus* collected from Ogbese River and Owena River, South-west Nigeria. *Journal of Agriculture and Ecology Research International*, **19**(2): 1 – 12.

Afolabi, O. J., Olususi, F. C. & Odeyemi, O. O. (2020). Comparative study on African catfish parasites from cultured and natural habitats. *Bulletin of the National Research Centre*, **44**: 163.

Ani, O. C., Nnamonu, E. I. & Ejiogu, C. (2017). Prevalence of intestinal parasites of fish farmed and harvested in Abakaliki, Nigeria: A pointer to the level of their vulnerability. *International Journal of Research in Pharmacy and Bioscience*, **4**(9): 7 – 10.

Auta, I., Badaru, A., Ibrahim, B. & Abdullahi, S. (2019). Occurrence of helminthes on *Clariasgariepinus* (African catfish) caught in selected points along River Kaduna, Nigeria. *Science World Journal*¸ **14**(3): 110 – 115.

Biu, A. A. & Akorede, G. J. (2013). Prevalence of endo-parasitized *Clariasgariepinus* (Burchell 1822) in Maiduguri, Nigeria. *Nigerian Journal of Fisheries and Aquaculture*, **1**(1): 1 – 6.

Deborah, P. B., Eric, C. W. & Roy, Y. P. (2003). Common freshwater fish parasites pictorial guide: Monogeneans.

Egun, N. K. & Oboh, I. P. (2022). Potential contribution of captured fishes to the recommended nutrient intakes (RNIs): A case study of commercial fish species from Ikpoba reservoir, Edo State, Nigeria. *Elsevier Measurement: Food*, **5**(100014): 1 – 5.

Food and Agriculture Organization (FAO) (2018). *The state of world fisheries and aquaculture*. Retrieved from http://www.fao.org/documents/card/en/c/19540EN

Idodo – Umeh, G. (2003). *Freshwater fishes of Nigeria (Taxonomy, ecological notes, diet and utilization).* Idodo – Umeh Publishers Limited, Benin City, Edo State; 232p.

Igbani, F., Sadiq, H. &Eyiseh, T. (2019). A review of the parasites of catfishes and tilapias in the wild and homestead ponds in Nigeria. *International Journal of Fisheries and Aquatic Studies*, **7**(5): 307 – 310.

Keremiah, R. I. & Inko-Tariah, M. B. (2013). Comparative study on ectoparasites on Nile tilapia (*Oreochromis niloticus*) cultured under integrated and un-integrated pond systems. *African Journal of Biotechnology*, **12**(19): 2711 – 2714.

Liverpool-Tasie, L., Sanou, A., Reardon, T. & Belton, B. (2021). Demand for imported versus domestic fish in Nigeria. *Journal of Agricultural Economics*, **72**: 782 – 804.

Marcogliese, D. L. (2011). *Parasitology Module Steering Committee (PMSC) Protocols for measuring biodiversity: parasites of fishes in freshwater update*. Protocols manual for water quality sample in Canada. Ecological Monitoring and Assessment Network (EMAN), Canada.

Oboh, I. P., Sanni, O. A. & Egun, N. K. (2018). Nutritional composition of *Synodontisnigrita*&*Tilapia mariae* from the Jamieson River, Sapele, Delta State, Nigeria. *Biologija*, **65**(2): 116 – 121.

Ogonna, C. A., Emmanuel, I. N. & Michael, D. A. (2017). Survey of ectoparasites of cultured fish from selected farms in Ebonyi State: potential for food and nutrient security. *International Journal of Research in Pharmacy and Bioscience*, **4**(7): 1 – 6.

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

Okoye, U., Ndupuh, E. & Adeleye, S. (2016). A survey on endo-parasites of *Clariasgariepinus* in some selected fish farms in Owerri West Local Government Area of Imo State, Nigeria. *International Journal of Fisheries and Aquatic Studies*, **4**(5): 624 – 631.

Omeji, S., Solomon, S. &Uloko, C. (2013). Comparative study on the endoparasites infestation in *Clariasgariepinus* collected from earthen and concrete ponds in Makurdi, Benue State, Nigeria. *IOSR – Journal of Agriculture and Veterinary Science*, **2**(1): 45 – 49.

Onajefe, J. O., Egwunyenga, A. O. & Eke, S. S. (2021). Helminthes parasites of *Clariasgariepinus*in Abraka, Delta State, Nigeria. *Asian Journal of Fisheries and Aquatic Research*, **12**(4): 15 – 24.

Tachia, M., Omeji, S. & Odeh, L. (2010). A survey of ectoparasites of *Clariasgariepinus* caught from the University of Agriculture Research Fish Farm, Markurdi.

Uko, E. &Tamunobereton – Ari, I. (2013). Variability of climatic parameters in Port Harcourt, Nigeria. *Journal of Emerging Trends in Engineering and Applied Sciences*, **4**(5): 727 – 730.