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PARASITE FAUNA OF ELEPHANT SNOUT FISH, *Mormyrus rume* (Valenciennes 1846) FROM RIVER OSE, SOUTH-WESTERN NIGERIA

[1]Odedeyi, D.O. and [2]Fagbenro, O.A.*

[1]*Department of Environmental Biology and Fisheries, Adekunle Ajasin University, Akungba.*
[2]*Department of Fisheries and Aquaculture Technology, Federal University of Technology, Akure.*

Abstract

A total of 360 specimens of *Mormyrus rume* (Valenciennes 1846) randomly sampled from fish landings along River Ose in southwestern Nigeria were examined for external and internal parasite fauna between April 2005 and March 2007. 39(10.83%) were infected with one or more parasites. The parasites recorded were Monogenea: *Dactylogyrus sp***,** Crustacea: *Argulus sp***,** Nematoda: *Anguillicola sp* and Digenea: *Clinostomum sp*. Most of the parasites were recovered from the gills, skin and swim bladder. Larger and older fish were significantly more infected than smaller and younger ones ($p<0.05$). The difference in prevalence between wet and dry seasons was statistically insignificant ($p> 0.05$). There was also no significant difference ($p>0.05$) in prevalence between males and females.

Key words: *Mormyrus rume*, parasite fauna, prevalence, River Ose.

Introduction

The study of the parasites and diseases of fish under natural conditions is important because it serves as a basis for information on the potential risk of disease expected under intensive culture because fingerlings, juveniles and sometimes parent brood stock of most cultivated fish species in Africa are collected from the wild (Fagbenro *et al.*, 1993). Parasitic infections and diseases are some of the factors hindering high productivity in fish farming. Fish mortalities and consequent losses in production are most likely to occur in cases of heavy infection with bacteria, protozoan, helminth, crustacean and annelids parasites. Not only that these parasites attack the vital organs of fish but also the rapidity with which their incidence builds up to epizootic proportions (Awachie, 1971) is of concern.

The diagnosis, treatment and control of fish parasites and diseases are important in achieving an efficient and profitable aquaculture venture. Common fish parasites and diseases have been reported in Nigeria. Awa *et al.* (1996) and Opara and Okon (2002) reported the parasites of *Oreochromis niloticus*, Emere (2000) examined the parasitic infection of *Lates niloticus* in River Kaduna and Awharitoma and Okaka (1999) reported the parasitic infections of cichlid fishes in Ikpoba River while Awa et al.(1996) described the parasite fauna of *O. niloticus* in IITA lakes, Ibadan. This study investigates and identifies the parasite fauna that infest *M. rume* in its

*Corresponding author:
Email: dapo_fagbenro@yahoo.co.uk

natural environments, River Ose, with the hope that the result will identify the potential damages which parasites pose to fish and man.

Materials and methods

River Ose flows over 300 km through the savanna, rain forest, mangrove forest, series of creeks and lagoons and discharges into the Atlantic Ocean. The river lies between longitudes 5°20′E to 6°10′E and latitude 6°20′N to 8°00′N (Fig. 1).

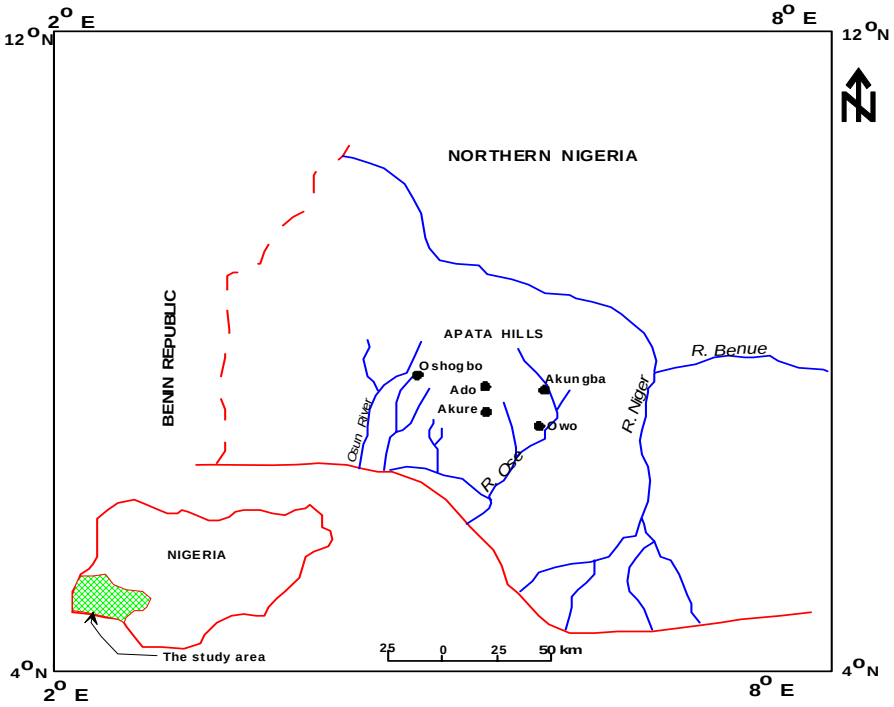

Fig 1 : Location of River Ose Southwest, Nigeria.

Three hundred and sixty live specimens of *M. rume* were procured from artisanal fishermen who regularly fished at River Ose between April 2005 and March 2007. The specimens were transported in plastic buckets to the laboratory, where the total and standard lengths as well as the weights were measured. Fins and skin of specimens were examined with hand lens for ectoparasites, and for pathological conditions (lesions, scars, ulcers, cysts). Scrapings of the slime from the skin and fins were smeared on a microscope slide, covered with slips and examined under low (x40) and medium (x100) magnifying powers. The fins and gills were removed, placed in Petri dishes containing normal saline (0.09%) and examined under a dissecting microscope for ectoparasites. The abdominal cavity of each fish was cut open and the coelomic cavity examined for endoparasites. The viscera (stomach, intestine, pyloric caeca, swim bladder) were dissected and examined in Petri dishes containing normal saline. The parasites detected were washed free of debris in saline, fixed and preserved in 10% formalin. The number of parasite per fish and site of infection were recorded. Whole

mount of the parasite were made using Leishman's stain. Identification of parasites was done using the identification keys of Post (1987) and Paperna (1996). Parasites were analyzed on the basis of prevalence and intensity. Data were subjected to descriptive statistics such as mean, standard deviation, range and percentage. Regression and correlation analysis were done to determine the relationship between fish size, sex, season and parasite abundance.

Results

Out of the 360 *M. rume* specimens examined, 39(10.83%) were infected with one or more parasites (Table 1). The parasites detected were *Dactylogyrus* spp. (5.0%), *Clinostomum spp* (0.56%), *Anguilllcola* spp. (1.67%) and *Argulus* spp. (3.60%). Protozoa, Cestoda, Acanthocephala and Hirudinea were not detected. The distribution of the various parasites in *M. rume* is shown in Table 2. Ninety parasites (89.1%) were obtained from the gills, eight parasites (7.92%) from the swim bladder while three parasites (2.97%) were obtained from the skin. Figure 2 presents the monthly prevalence rate of parasites of *M. rume*. The prevalence of infection was higher during the wet season (April-October) than in the dry season (October to March). The peak of infection was observed in July. Table 1 shows 6.94% and 3.89% prevalent rates for wet and dry seasons, respectively. The difference in prevalence between wet and dry seasons was not significant ($p>0.05$). Table 3 shows the mean intensity of parasites obtained from *M. rume. Dactylogyrus* sp a monogenean trematode had the highest intensity range of 0.0-6.0 (mean, 3.3$\pm$ 0.08).

Parasitisation had some relationship with the size of the fish. 17 (4.72%) sub-adults and 22 (6.11%) adult fish were infected while no juveniles were found infected. Larger fishes harboured more parasites (Table 1). The relationship between fish size and number of parasites obtained per fish showed a positive low correlation coefficient ($r^2 = 0.1165$). Females were infected more than males but the difference in prevalence were not significant ($p>0.05$). There were no pathological effects observed due to the parasite infection. The prevalence and intensity of infection varied with the seasons, being more prevalent during the rains (April to October). However, the higher prevalence in wet season than dry season was statistically insignificant ($p>0.05$).

Table 1. Prevalence of parasitic infection in M. *rume* from River Ose

		Wet season			Dry season			
		No. examined	No. infected	Prevalence (%)	No. examined	No. infected	Prevalence (%)	Total
Adults	Male	30	7	3.89	20	3	2.22	6.11%
($\geq$ 35.0cm)	Female	42	7		18	5		
	Sub-Total	72	14		38	8		
Sub-adults	Male	50	3	3.05	40	3	1.67	4.72%
(20.1-	Female	50	8		40	3		
34.5cm)	Sub-Total	100	11		80	6		
Juveniles	Undifferentiated	40	0	0	0	0	0	0
(<20.0cm)								
	Total	212	25	6.94	148	14	3.89	10.83%

Table 2. Distribution (number from all fish examined) of the parasites in *M. rume* of River Ose

Family	Parasite genera	Location		
		Gill	Skin	Swim bladder
Dactylogyridae	*Dactylogyrus spp*	60	–	–
Clinostomatidae	*Clinostomum spp*	–	3	–
Anguillicolidae	*Anguillicola spp*	–	–	8
Argulidae	*Argulus spp*	30	–	–

Table 3. Mean intensity of parasites obtained from *M. rume* in River Ose

Parasite group	No. of fish examined	No. of fish infected	Parasites recovered	Mean parasite intensity	Range
Nematode (round worms)	360	6	8	1.33±0.52	0.00-2.0
Digenea (flat worms)	360	2	3	1.50±0.71	0.00-2.0
Monogenea (flat worms)	360	18	60	3.33±0.08	0.0-6.0
Crustacea (fish lice)	360	13	30	2.31±0.75	0.0-4.0

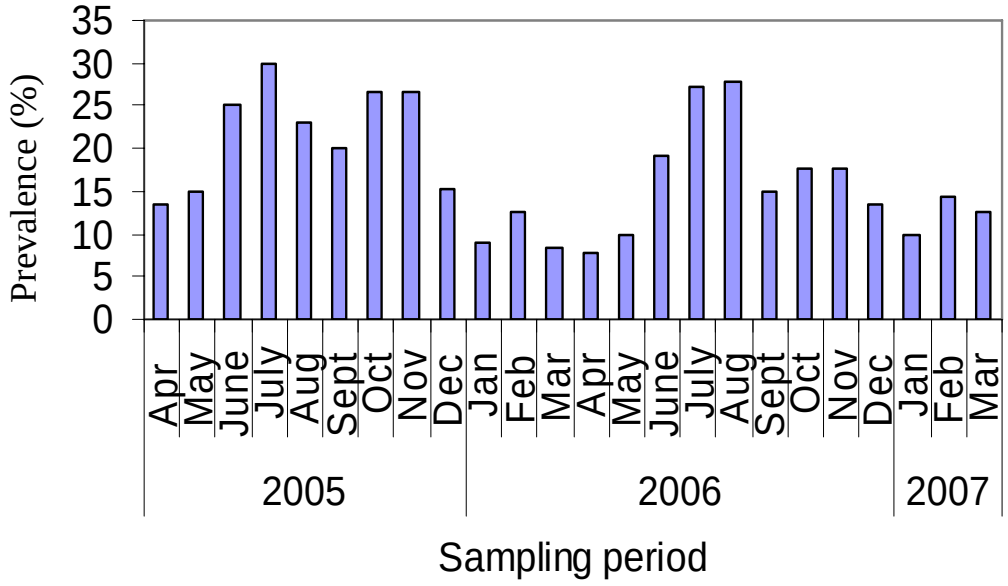

Fig. 2. Monthly prevalence of parasitic infection in *M.rume* in River Ose

Discussion

The number of parasites found in *M. rume* increased with length and could be attributed to long exposure to the infective stage of these parasites and probably also to a larger gill surface in older, larger fishes. The increase in parasitisation with the size of a fish could also be due to parasitic larvae accumulating from year to year. Emere (2000) showed that larger sizes of the Nile perch, *Lates niloticus* haboured more parasites than smaller ones. Gonzalez *et al*. (2001) reported that prevalence and intensity of the Monogenean trematode, *Neoheterobothrium* sp. and the copepod, *Holobomolochus chilensis* in bigeye flounder, *Hippoglossina macrops* increased with host age. The result of this study however, does not agree with that of Awharitoma and Okaka (1999) who reported that small to medium sized cichlid fishes in Ikpoba River had a higher parasite infection.

Host sex did not have a significant influence on the parasites fauna of *M. rume* suggesting that habitat use and diet are similar for both sexes of this species. This agrees with the findings of Gonzalez *et al*. (2001) who did not detect any significant difference on the parasite fauna of *H. macrops* between males and females. However, these results did not agree with Opara and Okon (2002) who reported that the degree of infection of the parasites of *O. niloticus* was higher in males than females while Emere (2000) reported that the females of *L. niloticus* harboured more parasites than males. Ndifon and Jimeta (1990) reported a higher infection rate for female of *Chrysichthys auratus* in Tiga Lake, Nigeria and attributed it to hormonal changes in gravid females.

The higher prevalence in wet season observed in the present study agrees with the general seasonal pattern of parasitic infection (Chubb, 1982). This result also agrees with Awharitoma and Okaka (1999) who reported higher prevalence of parasites in wet season for cichlid fishes in Ikpoka River. The high prevalence in wet season coincides with the breeding period of mormyrids, thereby exposing a greater number of the fish to infection. These results agree with Emere (2000) who reported a higher prevalence of infection during wet season for *L. niloticus* in Kaduna River. Contrastingly, Opara and Okon (2002) reported a higher prevalence of infection in *O. niloticus* during the dry season in a pond in southeastern Nigeria.

Parasites were more predominant in the gills, which along with the buccal cavity provide good condition for parasites especially monogeneans, protozoans and crustaceans (Avenant and Van As, 1985). Paperna (1996) reported that *Dactylogyrus vastator* infection in the gills of carp induced severe hyperplasia of the gill filament epithelium but this did not apply to *M. rume. D. vastator* recovered in this study, preferentially settled at the extremities of the gill filaments. The presence of *Argulus africanus* in the gills agreed with the reports of Avenant and Van As (1985) and Paperna (1996), who reported that *A. africanus* occur only on the buccal and branchial cavity mucosa in scaled fish. *Anguillicola papernai* from the swim-bladder of *M. rume* in this study agreed with Paperna (1996) who reported that majority of nematodes occur in the alimentary system and only a few enter tissues or inner cavities. The presence of

Anguillicola in *M. rume* did not agree with the report of Moravec and Taraschewski (1988) that species of *Anguillicola* will only infect *Anguilla spp. Clinostomum cutaneaum* found on the skin of *M. rume* agrees with Paperna (1996) that bottom-dwelling fish and shallow water inhabitants are most vulnerable. Definitive hosts for *Clinostomum* and *Euclinostomum* are herons, pelicans, cormorants and darters (Paperna, 1996). Herons are common in the River Ose basin. Fagbenro *et al.* (1993) reported a high prevalence of *Clinostomum* and *Euclinostomum spp.* in *Heterobranchus bidorsalis* in River Ogbese, a tributary of River Ose.

The prevalence and intensity of parasitic infection in *M. rume* was low. Prah (1969) also observed that the cichlids examined from Volta Lake and rivers draining into it were uninfected; and was attributed to the lotic environment of the water body because the flow of water reduces the occurrence and population of protozoans. Morover, *M. rume* are benthic feeders, they are less likely to be in contact with protozoans. Okaeme *et al.* (1986) reported that disease and parasite problems could constitute significant economic losses in fish production if not controlled. Knowledge of the parasite fauna of *M. rume* is worthy of note, being a fish under consideration for aquaculture.

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