Research Article
Published: 28 May, 2018

SF Journal of Environmental and Earth Science

Preliminary Survey of Heminth Parasites of Amphibians of Fiberesima Polo and ATC Sandfill, Okrika, Rivers State, Nigeria

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Abstract

Preliminary investigation was carried out into the helminth endoparasites of amphibians of two communities, Fiberesima Polo and ATC Sandfill, in Okrika, Rivers State, Nigeria. The amphibians encountered belonged to the following orders Bufonidae, Dicroglossidae, Ptychadenidae and Ranidae. Parasitic helminths isolated from the infected hosts were pentastomids (*Raillietiella* sp.), cestodes (*Cylindrotaenia jaegerskioeldii*), trematodes (*Metahaematoloechus exoterorchis* and *Mesocoelium monodi*), and nematodes (ascaridida larva, *Amplicaecum africanum, Cosmocerca ornata, Rhabdias africanus*). *Ptychadena pumilio* is reported as an accidental host for *Raillietiella sp*. Overall prevalence of infection were 66.67% and 46.15% for amphibians from Fiberesima Polo and ATC Sandfill, respectively. This paper is a preliminary report on the parasitic helminths of the amphibian community in Okrika. It is expected that more species of both amphibians and their parasites will be encountered with more surveys.

Keywords: Amphibians; Diversity; Parasitic helminths; Okrika; Niger Delta

Introduction

Research on the amphibian diversity in parts of Rivers State, Nigeria, as well as investigations into the parasitic helminths infecting them is increasing considerably. One of the earliest publications in this regard was that of Akani *et al*., [1]. The authors surveyed amphibian diversity in pristine lowland forests of the Niger Delta: the Ikpan Forest Block in Cross River National Park, Cross River State and the Upper Orashi Forest Reserve, Rivers State. They reported that "over 6300 amphibian specimens belonging to 28 species were captured. Species included three Bufonidae (genera *Bufo* and *Nectophryne*), two Pipidae (*Silurana* and *Hymenochirus*), nine Ranidae (*Hylarana, Ptychadena, Aubria, Conraua*, *Hoplobatrachus* and *Phrynobatrachus*), one Arthroleptidae (*Arthroleptis*), one Rhacophoridae (*Chiromantis*), one Microhylidae (*Phrynomantis*), and eleven Hyperoliidae (*Hyperolius, Afrixalus, Leptopelis, Phlyctimantis* and *Opisthothylax*)" [1].

Amuzie *et al*., [2] surveyed amphibian diversity of Rumuji-Emohua, Rivers State, Nigeria and found only five amphibian species belonging to three orders namely Bufonidae (*Sclerophrys* [syn. *Amietophrynus*] *maculata* and *S. camerunensis*]; Dicroglossidae (*Hoplobatrachus occipitalis*); and Ptychadenidae (*Ptychadena pumilio* and *P. oxyrhynchus*). They found pentastomids, cestodes, digenetic trematodes and nematodes in the infected amphibian hosts, and noted the co-occurrence of the pentastomid *Raillietiella* sp., and the nematode *Rhabdias africanus*, in the lungs of *Sclerophrys* species.

Aisien *et al*., [3] conducted a survey of the species of amphibians within the campus of the Rivers State University, Nkpolu-Oroworukwo, located within the Diobu area of Port Harcourt. They found eight amphibian species which were Bufonidae (*S. maculata* and *S. camerunensis*), Dicroglossidae (*Hoplobatrachus occipitalis, Phrynobatrachus* sp.), Hyperoliidae (*Afrixalus fulvovitatus, Hyperolius concolor*) and Ptychadenidae (*P. pumilio, P. mascareniensis*). From these host specimens, parasites belonging to pentastomid, cestode, monogenean, digenetic trematode and nematode classes of helminths were recovered.

Amuzie and Akani [4] recorded a richer amphibian and helminth parasite diversity in Agbada and Rumuesara. They encountered amphibians belonging to six orders- Bufonidae (*S. maculata, S. camerunensis, S. regularis*); Dicroglossidae (*H. occipitalis*); Hyperoliidae (*Hyperolius fusciventris, H. fusciventris burtoni*); Pipidae (*Silurana tropicalis*); Ptychadenidae (*P. bibroni, P. pumilio, P.*

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Received Date: *13 Apr 2018*
Accepted Date: *22 May 2018*
Published Date: *28 May 2018*
Citation: *Robert B, Amuzie CC, Okere SG. Preliminary Survey of Heminth Parasites of Amphibians of Fiberesima Polo and ATC Sandfill, Okrika, Rivers State, Nigeria. SF J Environ Earth Sci. 2018; 1(2): 1017.*
ISSN 2643-8070

Table 1: Prevalence (P%) and mean intensity (MI±SEM) of helminth infection in amphibian hosts, Fiberesima Polo (with number of infected hosts in parentheses).

Parasite	Host	Predilection Site	P(%)	MI
Pentastomidea				
Raillietiella sp.	*P. pumilio*	Lungs	14.29 (1)	1.0±0.0
Cestoda				
C. jaegerskioeldii	*P. pumilio*	Small intestine	28.57 (2)	7.0±5.0
Trematoda				
M. monodi	*S. maculata*	Small intestine	33.33 (3)	68.7±42.6
Nematoda				
A. africanum	*S. maculata*	Small intestine	11.11 (1)	1.0±0.0
Ascaridida Larva	*P. pumilio*	Body cavity	14.29 (1)	1.0±0.0
C. ornata	*S. maculata*	Large intestine/ Rectum	*88.89 (8)*	*4.13±0.8*
	P. pumilio	Large intestine/ Rectum	*14.29 (1)*	*1.0±0.0*
R. africanus	*S. maculata*	Lungs	*66.67 (6)*	*2.33±0.6*

mascareniensis, P. oxyrhynchus, P. schubotzi); and Ranidae (*Hylarana galamensis*). They also found 21 parasite species belonging to six helminth classes which included pentastomids, acanthoephalan cysthacanths, monogenetic and digenetic trematodes, cestodes and nematodes.

These previous studies reveal the pattern of amphibian diversity and their helminth community structure in the State, whose habitat has been largely modified by anthropogenic activities. However, several communities have not been explored in the State. This research therefore, aims at investigating the diversity of two locations in Okrika, a community which has witnessed a lot of communal clashes in recent times.

Materials and Methods

In November 2017, Fiberesima Polo and ATC Sandfill were visited for the purpose of collecting amphibians in order to investigate their helminth community structure. Sampling was accomplished using search and capture techniques for about three hours from 7.00pm to 10.00pm. Captured specimens were transported in wet, perforated containers to the parasitology laboratory of the Rivers State University for identification and dissection. They were all dissected within 24hours of capture.

Amphibian identification was accomplished following Roedel [5]. The sexes of the amphibians were determined by examining their ventral surfaces for the presence of vocal sacs, and also examining the sex organs after they were dissected. They were euthanized in chloroform vapour and dissected. The small intestine, large intestine/ rectum, lungs, urinary bladder and body cavity of the specimens were properly examined in saline for helminth parasites. Standard protocols were followed in the fixation of helminth parasites recovered [6]. Parasite identification was done with the aid of keys from Prudhoe and Bray [7]. Prevalence and mean intensity of infection were computed according to Bush *et al.*, [8].

Results and Discussion

Eighteen host species were collected from Fiberesima Polo, and were comprised of *Sclerophrys* (Syn. *Amietophrynus*) *maculata* (9), *Ptychadena pumilio* (7) and *P. mascareniensis* (2). All the *S. maculata* were infected while both *P. mascareniensis* collected were free of helminth endo-parasites, and three host specimens of *P. pumilio* were infected giving an overall prevalence of 66.67%. The helminth parasites recovered from these amphibian hosts were comprised of pentastomids (*Raillietiella* sp.), cestodes (*Cylindrotaenia jaegerskioeldii*), trematodes (*M. monodi*), and nematodes (*Amplicaecum africanum*, ascaridida larva, *Cosmocerca ornata* and *Rhabdias africanus*).

Table 2: Prevalence (P%) and mean intensity (MI±SEM) of helminth infection in amphibian hosts, ATC Sandfill (with number of infected hosts in parentheses).

Parasite	Host	Predilection site	P (%)	MI
Cestoda				
C. jaegerskioeldii	*P. mascareniensis*	Small intestine	25.00 (1)	4.0±0.0
Trematoda				
M. monodi	*S. maculata*	Small intestine	66.67 (2)	33.0±24.0
M. exoterorchis	*H. occipitalis*	Lungs	100.00 (1)	20.0±0.0
Nematoda				
C. ornata	*S. maculata*	Large intestine/ Rectum	33.33 (1)	5.0±0.0
	P. pumilio	Large intestine/ Rectum	20.0 (1)	1.0±0.0
R. africanus	*S. maculata*	Lungs	66.67 (2)	13.5±10.5

At ATC Sandfill, thirteen specimens were collected comprising of five species: *S. maculata* (3); *P. pumilio* (5), *P. mascareniensis* (3); *Silurana tropicalis* (1) and *Hoplobatrachus occipitalis* (1). As in Fiberesima Polo, all the *S. maculata* were infected. Only one individual each of *P. pumilio* and *P. mascareniensis* were infected; no parasite was recovered from *S. tropicalis* and the only *H. occipitalis* found was infected. Thus, there was an overall prevalence of infection of 46.15% at this location. The following helminth parasites were recovered from the host specimens in this location: cestodes (*C. jaegerskioeldii*), trematodes (*M. monodi* and *Metahaematoloechus exoterorchis*), and nematodes (*C. ornata* and *R. africanus*).

The parasitic helminth species isolated from hosts from both locations were similar. However, seven species were recovered from hosts in Fiberesima Polo, while five species were recovered from hosts in ATC Sandfill. Tables 1 and 2 present the parasite species isolated from infected hosts in Fiberesima Polo and ATC Sandfill, respectively.

The amphibian species diversity in this preliminary survey is quite low. It is expected that more amphibian fauna will be encountered with further investigations. However, the locals frequently hunt *H. occipitalis* for meat, and this is thought to have contributed to reducing the population size of the species. The species recorded in this research have been reported in other locations in the State [2-4]. *Sclerophrys* species are commonly found around human habitations and altered habitats. *Hoplobatrachus occipitalis* is common in temporary pools of water along bush paths; and *P. pumilio* is usually abundant in areas of grassland, where standing forest vegetation has been lost. So, these species serve as indicators of habitat degradation due to anthropogenic presence. Aisien *et al.*, [3] mentioned that altered habitats usually have influence on both the diversity of amphibian hosts and that of the parasites infecting them.

At the Diobu area of Rivers State, Aisien *et al.*, [3] recorded an overall prevalence of helminth infection of 67.4%. In this research, an overall prevalence of 66.67% and 46.15% were recorded in Fiberesima Polo and ATC Sandfill, respectively. The pentastomid, *Raillietiella* sp., commonly parasitic in the lungs of *Sclerophrys* species, and the

cestode, *C. jaegerskioeldii*, were recovered in this research as well as in those of [2-4]. However, this is the first report of *Raillietiella* sp. infecting *P. pumilio*; it is thought to have been accidental.

The digenetic trematodes, *M. monodi* and *M. exoterorchis*, were found infecting amphibians from both locations in this research. Amuzie *et al*., [2] and Aisien *et al*., [3] both reported *M. monodi* and *Diplodiscus fischthalicus* from the locations they investigated. Amuzie and Akani [4], on the other hand, reported six trematodes, namely, *M. monodi, Diplodiscus fischthalicus, Prosotocus exovitellosus, Ganeo africana, Metahaematoloechus exoterorchis* and *M. micrurus*.

Similarly, more nematode parasites were reported by Amuzie and Akani [4] than those reported in this research and in those of [2,3]. Actually, the Agbada location which was surveyed by [4] was a forested site providing better conditions for both amphibians and their parasites.

Monogeneans were not isolated from the amphibians in this present research as well as in [2]. However, [3] reported one monogenean, *Polystoma pricei* from *Ptychadena mascareniensis*. Amuzie and Akani [4] reported three species- *P. pricei* from *Ptychadena mascareniensis*; *P. baeri* from *Ptychadena bibroni*, and *P. aeschlimanni* from *Ptychadena pumilio*. Monogeneans are more encountered in areas of clean, unpolluted water [9].

Conclusion

In conclusion, like some other locations in Rivers State, the amphibian fauna of Fiberesima Polo and ATC Sandfill, Okrika, are low being comprised of *S. maculata, H. occipitalis, P. pumilio* and *P. mascareniensis and S. tropicalis*. The helminth parasites associated with them have also been identified to include *Raillietiella* sp. (pentastomid), *C. jaegerskioeldii* (cestode), *M. monodi, M. exoterorchis* (digeneans), *C. ornata*, ascaridida larva, *R. africanus*, and *A. africanum* (nematodes). This being a preliminary report, it is expected that with more survey in these and other locations in Okrika town, more species of both amphibians and their helminth parasites will be discovered.

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