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Parasitic Helminths Infecting Anurans of Isiokpo, Rivers State, Nigeria

Robert, B.

Department of Animal and Environmental Biology, Rivers State University,

Port Harcourt, Nigeria.

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Abstract

There is need for more research to add to the growing data of species diversity and parasitic helminths of anurans in parts of Rivers State, Nigeria. This research was conducted at a sub-urban location of the state, Isiokpo. Sampling was done in May and June, 2019, using the visual encounter and acoustic survey technique. Parasitic examination of hosts was done using conventional techniques. Host and parasite specimens were identified using appropriate keys. Two anuran species were encountered: *Sclerophrys maculata* and *Hoplobatrachus occipitalis*. Nine helminth parasites were isolated from infected hosts: *Raillietiella* sp. (pentastomids), *Cephalochlamys compactus* (cestodes), *Mesocoelium monodi, Diplodiscus fischthalicus, Metahaematoloechus exoterorchis* (digenetic trematodes), and ascaridida larva, *Chabaudus leberrei*, *Cosmocerca ornata* and *Rhabdias* spp. Prevalence of infection ranged from 9.1% to 100%. Mean intensity of infection ranged from one to eighty-five parasites per infected host, the highest intensity being that of *Rhabdias* sp. in *S. maculata*. This research has contributed to the knowledge of the helminth parasites of two anuran species of Isiokpo.

Keywords: : parasitic helminths, Sclerophrys maculata, Hoplobatrachus occipitalis, sub-urban

INTRODUCTION

The anurans, frogs and toads, are found in humid habitats and are also reared as a source of meat in many countries including Nigeria (Baygar and Ozyur, 2010; Onadeko *et al*., 2011). These animals consume harmful insects therefore reducing their population. By doing so, they enhance agricultural production and contribute to the fight against malaria vectors (Channing, 2001).

Anurans are definitive hosts to helminth parasites (Amuzie *et al*., 2016) and also serve as intermediate hosts (Sessions *et al*., 1999) or as paratenic hosts (Moravec and Kaiser, 1994). Helminth parasites include monogeneans, digeneans and cestodes and acanthocephalans, pentastomids and nematodes (Smyth and Smyth, 1980).

Studies on the helminth parasites of anurans in Rivers State, Nigeria, have reported the presence of pentastomids, acanthoephalan cysthacanths, monogenetic and digenetic trematodes, cestodes and nematodes (Amuzie et al., 2016; Aisien et al., 2017; Amuzie and Akani, 2017). This research was aimed at identifying the helminth parasites infecting anurans of Isiokpo, an unexplored part of Rivers State, Nigeria.

Materials and Methods

Area of Study and Sample collection

The amphibians for this study were collected from Okpiriki Town in Isiokpo, Ikwerre Local Government Area, Rivers State, Nigeria. Specimens were collected in May and June, 2019, using the visual acoustic encounter survey (VAES) method. The anurans were hand-picked from their breeding and feeding sites between the hours of 8p.m and 1a.m, with the aid of powerful flashlights and transported in moist and aerated containers to the Laboratory for examination.

The anurans were identified according to the protocols of Rodel (2000).

Extraction, Fixing and Identification of Parasites

The anurans were euthanized in a solution of benzocaine. The gastrointestinal tract was sectioned into oesophagus/stomach, small intestine and large intestine/rectum. Each section was slit longitudinally in a Petri dish with 0.9% NaCl and examined under a dissecting microscope for parasites. Other sites examined for parasites include the lungs, liver/gall bladder, urinary bladder and coelomic cavity. Parasites found were isolated from the tissues and fixed appropriately, first in hot water and then stored in 70% alcohol.

Parasites were identified with keys from Prudhoe and Bray (1982) and Riley et al., (1988). Prevalence and mean intensity were computed for each parasite species according to Bush et al. (1997).

Result

Two anuran species were encountered - two specimens of Sclerophrys maculata and eleven of Hoplobatrachus occipitalis. From these, nine parasitic helminth species were encountered and included Raillietiella sp. (pentastomids), Cephalochlamys compactus (cestodes), Mesocoelium monodi, Diplodiscus fischthalicus, Metahaematoloechus exoterorchis (digenetic trematodes), and ascaridida larva, Chabaudus leberrei, Cosmocerca ornata and Rhabdias spp. (nematodes). Most parasites were encountered in the small intestine, others in the lungs and rectal region (Table 1).

All the specimens were infected resulting into a prevalence of 100%; there were more nematode parasites than other helminth groups. Raillietiella sp. and Mesocoelium monodi reached a prevalence of 100.0% in Sclerophrys maculata, while Metahaematoloechus exoterorchis also infected 100.0% of Hoplobatrachus occipitalis. The highest infection burden (85 parasites per infected hosts) recorded as the mean intensity of infection, was met by Rhabdias spp. in S. maculata (Table 2).

Table 1: Helminth Parasites of anurans (Sclerophrys maculata and Hoplobatrachus occipitalis), Isiokpo, Rivers State, Nigeria

Parasite	Host Species	Habitat
Pentastomidea		
***Raillietiella* sp.**	***S. maculata***	**Lungs**
Cestoda		
Cephalochlamys compactus	***H. occipitalis***	**Small intestine**
Trematoda		
Mesocoelium monodi	***S. maculata***	**Small intestine**
	H. occipitalis	
Metahaematoloechus exoterorchis	***H. occipitalis***	**Lungs**
Diplodiscus fischthalicus	***H. occipitalis***	**Rectum**
Nematoda		
Cosmocerca ornata	***S. maculata***	**Small intestine**
	H. occipitalis	
Rhabdias sp.	***S. maculata***	**Lungs**
	H. occipitalis	
Ascaridida larva	***H. occipitalis***	**Body cavity**
Chabaudus leberrei	***H. occipitalis***	**Small intestine**

Table 2: Prevalence (P%) and mean intensity (MI) of parasitic infection in anurans (Sclerophrys maculata and Hoplobatrachus occipitalis), Isiokpo, Rivers State, Nigeria

Parasite	Host species	P%	MI±SD
Pentastomidea			
Raillietiella sp.	*S. maculata*	100.0	8.0±0.0
Cestoda			
C. compactus	*H. occipitalis*	18.2	1.0±0.0
Trematoda			
M. monodi	*S. maculata*	100.0	25.0±28.3
	H. occipitalis	18.2	5.0±5.7
D. fischthalicus	*H. occipitalis*	9.1	1.0±0.0
M. exoterorchis	*H. occipitalis*	100.0	14.1±17.1
Nematoda			
C. ornate	*S. maculata*	50.0	2.0±0.0
	H. occipitalis	9.1	1.0±0.0
Rhabdias sp.	*S. maculate*	50.0	85±0.0
	H. occipitalis	36.4	1.8±1.5
Ascaridida larva	*H. occipitalis*	45.5	8.4±6.6
C. leberrei	*H. occipitalis*	18.2	4.0±2.8

Discussion

Seven parasites were recovered from *Hoplobatrachus occipitalis* while five species were found in *Sclerophys masculata*. This is in agreement with most research done in Rivers State, Nigeria, where *Hoplobatrachus occipitalis* usually has a high burden of parasites because of its large size, habitat and food preference. It lives in seasonal pools of water in ditches and around vegetations and it feeds on a wide variety of organisms including smaller amphibians, like *Ptychadena* species (Robert *et al*., 2018; Amuzie *et al*. 2016).

Of all parasites encountered, *Rhabdias spp*. had the highest prevalence in *S. maculata*. *Rhabdias* lives in the lungs and causes a lot of pulmonary damage to infected hosts (Christin *et al*., 2003). All the helminth parasites isolated from both host species examined have been reported by previous researchers (Robert *et al*., 2018; Amuzie and Akani, 2017).

The small intestine and lungs were more parasitized than other organs. This is in line with the findings of Amuzie *et al*. (2016) who reported that the small intestine was significantly more parasitized than other organs in the anurans examined. This is connected with the availability of nutrients in the small intestine due to its physiological role in digestion. In consonance with other studies in Nigeria nematodes were found to be more dominant in the helminthic fauna of amphibians (Aisien *et al*., 2017; Amuzie *et al*., 2016; Robert *et al*., 2018).

This research presents the report of parasitic helminthes of some anurans from Isiokpo. This adds up to reports from other locations in Rivers State, Nigeria (Robert *et al.*, 2018; Amuzie and Wokem, 2018; Amuzie and Akani, 2017).

Conclusion

This study examined the helminth parasites of *Sclerophrys maculata* and *Hoplobatrachus occipitalis* and revealed the presence of *Raillietiella* sp. (pentastomids), *Cephalochlamys compactus* (cestodes), *Mesocoelium monodi, Diplodiscus fischthalicus, Metahaematoloechus exoterorchis* (digenetic trematodes), and ascaridida larva, *Chabaudus leberrei, Cosmocerca ornata* and *Rhabdias* spp. (nematodes) in infected hosts. A high prevalence of the lung nematode, *Rhabdias* sp., was also observed in *Sclerophrys maculata* of Isiokpo.

While admitting the need for further research into anuran species and their helminth parasites in unexplored regions, amphibian farming is recommended to reduce population declines of these organisms.

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