African Journal of Environment and Natural Science Research
Volume 2, Issue 3, 2019 (pp. 71-76)

www.abjournals.org

ENDO-PARASITIC HELMINTHS OF AMPHIBIANS, *PTYCHADENA MASCARENIENSIS* AND *PTYCHADENA PUMILIO* AT RUMUJI-EMOHUA, RIVERS STATE, NIGERIA

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ABSTRACT: *Scientific publications on helminth parasites of amphibians in Rivers State, Nigeria are increasing, greatly. However, there has been a dearth of research from Rumuji-Emohua, only one report has been published. This research was aimed at investigating the parasitic helminth community of Ptychadena species from that location in order to add to the growing body of literature. Two host species P. mascareniensis and P. pumilio were examined. They were collected from the wild in the wet seasons of the months of June and July, 2018, using nets, euthanized in benzocaine and dissected for the isolation of parasites. Fifty-seven hosts were examined, and comprised of 21 P. mascareniensis and 36 P. pumilio. Nine parasite species including monogeneans, digeneans, cestodes and nematodes were recovered from the infected hosts. The nematodes, Chabaudus leberrei and Cosmocerca ornata occurred in greater prevalence rates (69.4 - 71.4% and 39.0 - 47.6%, respectively) than other parasites which was accounted for by their transmission modes. In comparison with reports of similar species from Ogoni, about the same parasite species were recovered from these hosts in both locations, however, at higher prevalence rates in hosts from Ogoni. It is reported that Ptychadena species offer a similar host-parasite system across habitats and this can be used for inferences in parasite diversity or environmental parasitology studies.*

KEYWORDS: Anurans, Ptychadenidae, Endo-Parasites, Rain Forest, Amphibian Declines.

INTRODUCTION

The amphibian family Ptychadenidae comprises of over 50 species (Deichmann *et al*., 2017). *Ptychadena mascareniensis* and *P. pumilio* can tolerate a wide range of habitats but show preference for altered vegetation comprised mainly of grasses (Rödel, 2008).

An earlier study (Amuzie *et al*. 2016) provided the first report on the parasitic helmiths of amphibian species of Rumuji-Emohua. As such, this paper serves as a second report, focussing on the dominant *Ptychadena* species in that location. A related research on parasites of *Ptychadena* species in another location of Rivers State, Nigeria was conducted by Amuzie and Aisien (2018). In it, the authors reported on the parasites associated with *P. bibroni, P. mascareniensis* and *P. pumilio.* However, these frogs are preyed upon for food in the state, thereby increasing the predation pressure they are exposed to. Research into their diversity, conservation, food and feeding habits, parasite association etc. are therefore

required to forestall the problem of inadequate information that may result from depletion of the species (Kim and Byrne, 2006).

Therefore, this research was aimed at examining the *Ptychadena* species of Rumuji-Emohua for helminth parasites and comparing with the results obtained for same species from Ogoni.

METHODOLOGY

The study area, Rumuji community (N4º56'32'', E6º 46'57'') in Emohua Local Government Area of Rivers State, Nigeria, was characterized by sparse secondary vegetation which included standing bushes and grass fields and cassava farms. This habitat was surrounded by a stream from which the amphibian collections were made, using a hand net.

Captured frogs were moved in moistened and aerated plastic bottles to the laboratory where they were identified (Rödel, 2000) and euthanized in benzocaine. Host sex was determined by checking for the presence of vocal sacs and examination of the sex organs. They were dissected and the body cavity and organs (oesophagus/stomach, small intestine, large intestine/rectum, lungs, urinary bladder) were examined for parasites in Petri dishes half-filled with 0.72% NaCl.

All parasites found were enumerated and fixed as follows. Nematodes were stretched in hot water and fixed in 70% alcohol. Flatworms were flattened and fixed in 5% formal-saline. The fixed specimens were preserved in the same fixative in labelled specimen bottles. Parasite identification was aided with keys from Yamaguti (1971), Prudhoe and Bray (1982) and Khalil *et al*., (1994). Prevalence was computed according to Bush *et al*., (1994).

RESULTS AND DISCUSSION

Fifty-seven *Ptychadena* species were collected, being comprised of 21 *Ptychadena mascareniensis* and 36 *P. pumilio*. Trematodes (both monogeneans and digeneans), cestodes and nematodes were isolated from the hosts. Photomicrographs of some of the parasites are shown in Figure 1. The monogeneans, *Polystoma aeschlimanni* and *P. pricei*, were isolated from the urinary bladder; the digenean, *Mesocoelium monodi*, was from the small intestine. Similarly, the cestode (*Cylindrotaenia jaegerskioeldii*) and the nematodes (*Amplicaecum africanum* and *Chabaudus leberrei*) were isolated from the small intestine. However, ascaridida larvae were from the body cavity; *Cosmocerca ornata* from the large intestine; and *Rhabdias* sp. from the lungs. As shown in Table 1, *Chabaudus leberrei* and *Cosmocerca ornata* infected a greater number of hosts in comparison with the other parasites.

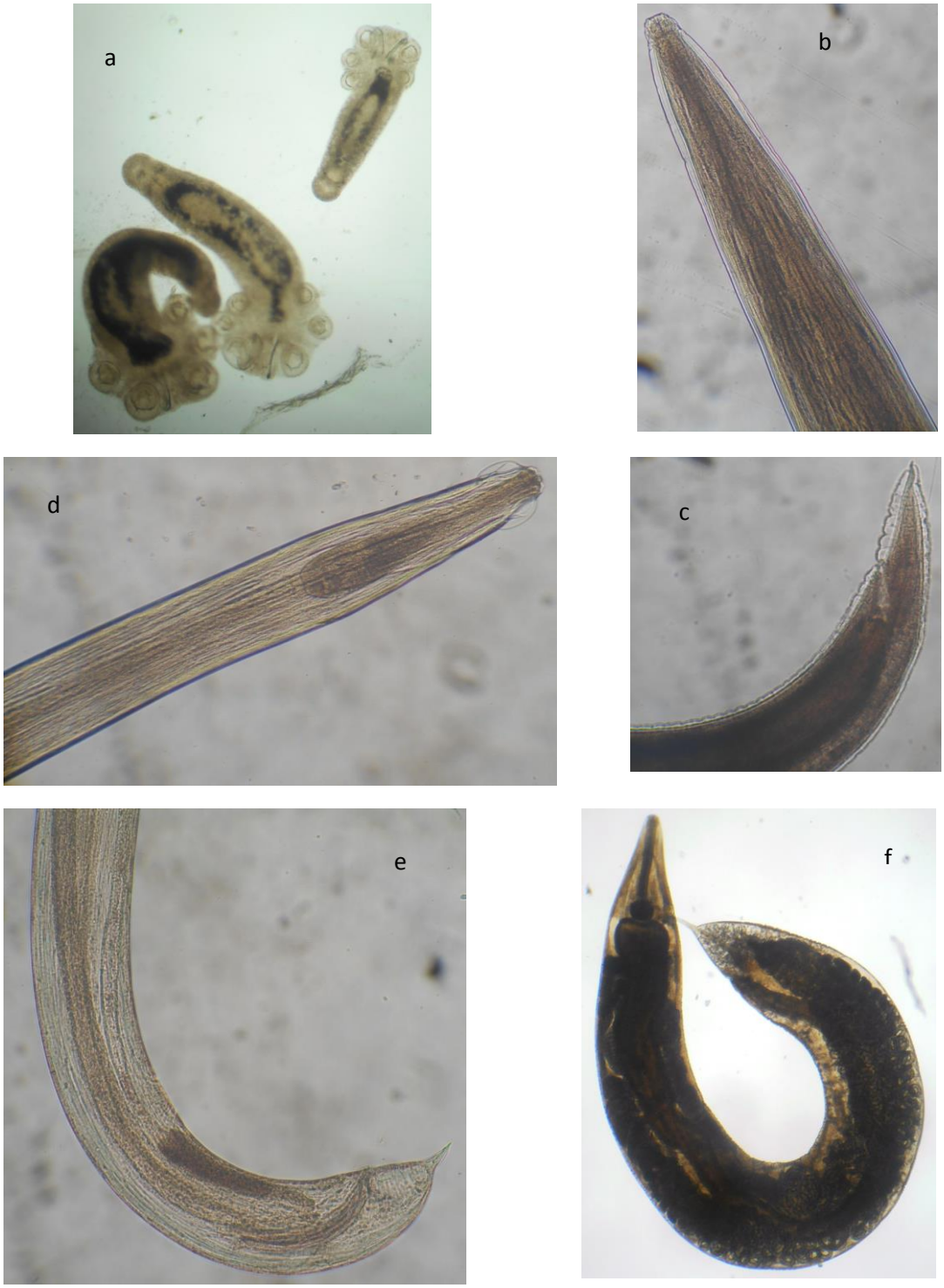

Figure 1: Photomicrographs of Some Parasites of *Ptychadena* Species, Rumuji-Emohua, Rivers State, Nigeria.

(Key: a, Polystoma aeschlimanni, juveniles; b, Amplicaecum africanum, anterior; c, A. africanum, posterior; d, Chabaudus leberrei, anterior; e, C. leberrei, posterior; f, Cosmocerca ornata. [x4]).

Table 1: Prevalence Percentage (%) and Mean Intensity (MI) of Parasite Infection in *Ptychadena* Species from Rumuji-Emohua, Rivers State.

Parasite	Host	No. of Infected Hosts	Prevalence (%)	MI ± sem
Monogenea				
Polystoma aeschlimanni	*P. pumilio*	2	5.6	1.5±0.5
P. pricei	*P. mascareniensis*	3	14.3	1.3±0.3
Digenea				
Mesocoelium monodi	*P. mascareniensis*	2	9.5	7.5±3.5
	P. pumilio	2	5.6	5.0±0.0
Cestoda				
Cylindrotaenia jaegerskioeldii	*P. mascareniensis*	2	9.5	2.0±1.0
	P. pumilio	1	2.9	6.0±0.0
Nematoda				
Ascaridida larva	*P. mascareniensis*	2	9.5	2.0±1.0
	P. pumilio	2	5.6	1.5±0.5
Amplicaecum africanum	*P. mascareniensis*	2	9.5	2.0±1.0
Chabaudus leberrei	*P. mascareniensis*	15	71.4	3.7±0.7
	P. pumilio	25	69.4	3.4±0.5
Cosmocerca ornata	*P. mascareniensis*	10	47.6	5.3±1.8
	P. pumilio	14	39.0	4.7±1.3
Rhabdias sp.	*P. pumilio*	1	3.0	4.0±0.00

Sem= standard error of the mean

Two hosts and nine parasites species were encountered in this research. Both *Ptychadena mascareniensis and P. pumilio* are disturbance-tolerant species that are commonly located in altered habitats. In an earlier research in the same location, Amuzie *et al*. (2016) found *P. oxyrhynchus* and *P. pumilio. Ptychadena mascareniensis* was not encountered in that research, however, other hosts including *Sclerophrys maculata, S. camerunensis* and *Hoplobatrachus occipitalis* were also examined. In a related research, Amuzie and Aisien (2018) examined *P. bibroni, P. mascareniensis* and *P. pumilio* from markets in Ogoni, Nigeria. The absence of *P. oxyrhynchus* in this research could be due to the restriction of the survey to the freshwater body (stream) in the study area, excluding the bush paths and farms from where other species could have been encountered. However, there have been noticeable declines in amphibian populations all over the State with surveys yielding very little number of hosts. Amphibian calls are rarely heard even after rainfalls, indicating that the global amphibian decline phenomenon has encroached into this anthropogenically altered rainforest area of Nigeria.

Nine parasites were identified. Species-specific monogeneans (*Polystoma pricei* and *P. aeschlimanni*), one digenean (*Mesocoelium monodi*), one cestode (*C. jaegerskioeldii*), and

five nematodes were isolated from the hosts. The higher diversity of nematodes than other helminth classes observed here is common, and has been reported by several authors (Aisien *et al*., 2009; McAllister *et al*., 2010).

Chabaudus leberrei and *C. ornata* both had higher prevalence rates and mean intensities of infection. This could be attributed to their infection routes and the ecology of the habitat. *Chabaudus leberrei* is transmitted via blood-sucking insects which are common in the humid habitat of the study area (Amuzie *et al*., 2019). *Cosmocerca ornata*, on the other hand, penetrates as a larva, directly into its host (Kirillova and Kirillov, 2015). The aquatic medium from where the hosts were collected could have enhanced larval survival and aided its penetration to new hosts.

With the exception of the monogeneans and *Rhabdias* species, all other parasites encountered, were recovered from both hosts in similar prevalence rates and mean intensities. This indicates that they provide similar host-parasite systems that can be used for inferences in parasite diversity or environmental parasitology studies.

In comparison with the study on the helminth parasites of *Ptychadena* species collected from Ogoni (Amuzie and Aisien, 2018), a similar trend was observed. The presence of monogeneans was reported at both locations, although in higher prevalence rates at Ogoni. Same single digenean, *M. monodi*, was encountered at both locations, nematode parasite diversity was higher than other helminth taxa in both locations. However, in *Ptychadena* species from Ogoni, acanthocephalan cystacanths, larval ascaridida and *Oswaldocruzia hoepplii* were part of the parasite assemblage. These were not found in Rumuji, while *Rhabdias* species and *C. jaegerskioeldii* recorded in Rumuji were absent from the reports at Ogoni. These however, are not significant variations as increase in sample size and length of survey could have made up for them. The more obvious difference is that parasite prevalence rates were generally higher in hosts from Ogoni (4.0 - 87.0%; mean, 33.4%) than in those from Rumuji (2.9 - 71.1%; mean, 19.5%). The reason for this disparity cannot be fully provided here. Nevertheless, differences in the micro-environmental characteristics of both locations must have been contributory.

CONCLUSION

Ptychadena species offer a similar host-parasite system across habitats. With the exception of the species-specific monogenea parasites, most of the other parasite species (digenea, cestode, and nematode) isolated could establish infection in all of them. As is commonly observed in other host-parasite systems, nematodes are more diverse than other helminth taxa. A comparison with results from Ogoni indicates that the parasite assemblage at both locations were similar but higher prevalence rates were recorded in those from Ogoni.

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