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# Helminth community structure of *Sclerophrys maculata*, Fouchee community, Degema, Rivers State, Nigeria

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**ABSTRACT**

Ninety-six (96) *Sclerophrys maculata* specimens were hand-picked from Fouchee community, Degema Local Government Area, Rivers State, Nigeria, for investigation of the community structure of their helminth parasites. Standard parasitological techniques were used. The parasite community structure used comprised of one pentastomid (*Raillietiella* sp.), four nematodes (*Amplicaecum africanum, Cosmocerca ornata, Rhabdias africanus*, and ascaridida larva) and one trematode (*Mesocoelium monodi*). Nematodes were generally more prevalent than pentastomids and trematodes. Single infection was more prevalent (37.5%) than multiple infections with two parasite (32.29%) and three parasite (7.29%) species. Research in other species of amphibians from this community is encouraged to add to the growing knowledge of helminth parasite infections in amphibians of the Niger Delta region of Nigeria.

**Key words:** Amphibians, anurans, helminth parasites, Kalabari, riverine, Degema, Rivers State, Nigeria.

## INTRODUCTION

Helminth parasites include the flatworms (monogeneans, digeneans and cestodes), acanthocephalans, pentastomids (tongue worms) and nematodes (Smyth and Smyth, 1980). Helminth parasites of amphibians have been widely investigated (Bursey and Goldberg, 1998; Aisien et al., 2001, 2003; Khidr et al., 2002; Dare et al., 2008; Amuzie et al., 2016).

*Sclerophrys maculata* (syn. *Amietophrynus maculatus*) is a common toad in Africa often found close to human habitations (Rodel, 2000). It feeds indiscriminately (Aho, 1990) including items such as beetles, ants, grasshoppers, termites and odonates (Rodel, 2000). A sewing needle and the spotted blind-snake, *Typhlops punctatus punctatus*, were recovered from *Sclerophrys* spp. in Port Harcourt, Nigeria (Akani et al., 2007). Most surveys on amphibians and their parasites in parts of the African continent often include this species (Ibrahim, 2008; Akani et al., 2011; Aisien et al., 2011; Amuzie et al., 2016).

Investigations into the helminth parasites of amphibians in Rivers State, Nigeria, included the following locations: Diobu (Aisien et al., 2017a), Egbeda, Odioko and Degema (Aisien et al., 2017b); Rumuji-Emohua (Amuzie et al., 2016) and Mgbuoba and Choba (Amuzie and Ekerette, 2017). Though, Aisien et al. (2017b) reported parasite species in amphibians from Degema, the particular location was not mentioned. This research was therefore, conducted in order to examine *S. maculata* species from a named community in Degema and to increase the wealth of knowledge on the helminth community structure of amphibians from Rivers State, Nigeria.

## MATERIALS AND METHODS

Amphibian sampling was carried out in Fouchee community (E4°.73', N6°.96'), Degema Local Government Area, Rivers State, Nigeria, in the months of April and May, 2018. Fouchee is a rural community in the Kalabari region

**Table 1:** Predilection sites of helminth parasites of *S. maculata*, Fouchee Community, Degema, Rivers State, Nigeria.

| Parasite | Predilection site |
|---|---|
| Pentastomidea | |
| *Raillietiella* sp. | Lungs |
| | |
| Trematoda | |
| *M. monodi* | Small intestine |
| | |
| Nematoda | |
| *A. africanum* | Small intestine |
| Ascaridida larva | Body cavity |
| *C. ornata* | Large intestine/Rectum |
| *Rhabdias africanus* | Lungs |

of Rivers State, Nigeria. The locals are fishers and farmers.

Due to security concerns, sampling was accomplished by the involvement of locals and sample duration was restricted to the early hours of dusk (7.00 to 8.00 pm). Specimens collected were taken to the Parasitology Laboratory Section of the Department of Animal and Environmental Biology, Rivers State University, Nigeria, for examination within 24 h of capture.

They were euthanized with chloroform vapour and dissected to reveal their internal organs. The entire gastrointestinal tract was cut off and sectioned into the oesophagus/stomach, small intestine and large intestine into Petri dishes filled with 0.72% normal saline. The body cavity, lungs and urinary bladder were also examined for parasites.

Nematode parasites were stretched in hot water and fixed in 70% alcohol, and cleared in lactophenol before viewing under a light microscope. Tongue-worms were fixed in 70% alcohol/saline, while trematodes were flattened under cover slip pressure in 5% formol saline and fixed in the same solution. The trematodes were later washed in changes of water at one hour intervals for six hours to wash off the fixative. They were then stained over night in acetocarmine, dehydrated in alcohol series (50, 70, and 90%, Absolute), respectively, cleared in xylene and mounted in Canada Balsam. Parasites were identified with keys from Prudhoe and Bray (1982) and Riley et al. (1988). Prevalence rates of parasites were computed according to the method described by Bush et al. (1997).

## RESULTS

A total of ninety-six (96) *S. maculata* were examined; 76 were infected giving an overall prevalence of 79.17%. Six species of helminth parasites were recovered from the infected hosts with nematode parasites having the highest occurrence. The parasites included one pentastomid (*Raillietiella* sp.), four nematodes (*Amplicaecum africanum, Cosmocerca ornata, Rhabdias africanus*, and ascaridida larva) and one trematode (*Mesocoelium monodi*). Table 1 shows the predilection sites of the helminth parasites. Parasites were not recovered from the oesophagus/stomach and urinary bladder. Table 2 shows total prevalence of infection with these parasites. The nematodes, *A. africanum* and *C. ornata* were more prevalent than other parasites recovered.

Single and multiple infections were observed. Single infection was observed in 36 individuals resulting into a prevalence of 37.5%. Double infections were observed in 31 hosts accounting for 32.29% prevalence, and multiple infections with three parasite species recorded in seven individuals accounting for a prevalence rate of 7.29%. Figure 1 shows the pattern of occurrence of single infections in the hosts examined while Figures 2 and 3 show the pattern of the multiple infections.

## DISCUSSION

The small intestine and lungs were parasitized by two parasite species each while the body cavity and large intestine/rectum had one parasite each. Though the difference is not much, this is in line with the findings of Amuzie et al. (2016) who reported that the small intestine was significantly more parasitized than the other organs examined. This is connected with the availability of nutrients in the small intestine due to its physiological role in digestion.

The parasites recovered consisted mainly of nematodes. Other reports on *Sclerophrys* spp. also observed a higher occurrence of nematode than other helminth parasites (Aho, 1990; Ibrahim, 2008; Haman and Gonzalez, 2015; Amuzie et al., 2016). The prevalent rates of the nematodes

**Table 2:** Total prevalence of helminth parasites of *S. maculata* , Fouchee Community, Degema, Rivers State, Nigeria.

| Parasite | No. of infected hosts | Prevalence (%) | Mean intensity ± SEM |
|---|---|---|---|
| Pentastomidea | | | |
| *Raillietiella* sp. | 3 | 3.13 | 4.00±2.08 |
| Trematoda | | | |
| *M. monodi* | 17 | 17.71 | 8.65±3.90 |
| Nematoda | | | |
| *A. africanum* | 57 | 59.38 | 3.53±0.41 |
| Ascaridida larva | 2 | 2.08 | 1.5±0.5 |
| *C. ornata* | 33 | 34.38 | 4.09±0.84 |
| *Rhabdias africanus* | 11 | 11.46 | 2.00±0.49 |

**Key: SEM:** Standard error of the mean.

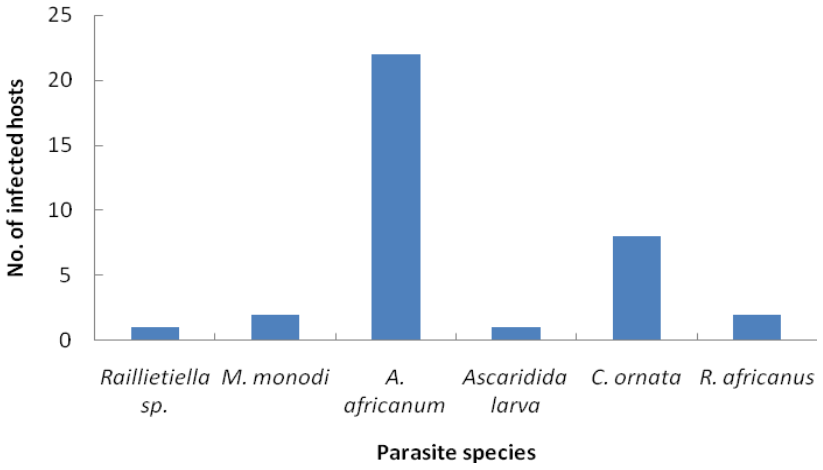


**Figure 1:** Pattern of single infection in *S. maculata* specimens, Fouchee Community, Degema, Rivers State.

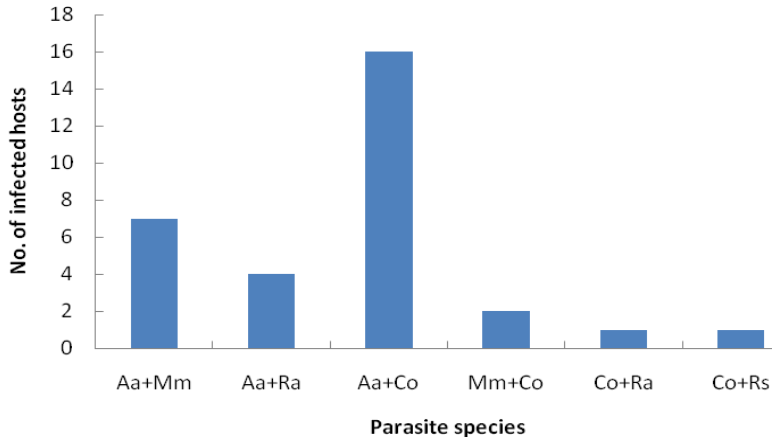


**Figure 2:** Pattern of double infection in *S. maculata* specimens, Fouchee Community, Degema, Rivers State. **Key: Aa:** *A. africanum*; **Mm:** *M. monodi*; **Ra:** *R. africanus*; **Co:** *C. ornata*; **Rs:** *Raillietiella* sp.

were also generally higher than those of the other helminth groups present. This could also be related to the feeding habit and habitat preference of the species. They feed indiscriminately (Aho, 1990; Rodel, 2000) and could pick up nematode eggs in the process. They are more terrestrial than some other anurans, thereby, limiting their contact with parasites whose transmission is facilitated in water bodies. The diversity of helminth parasites from Fouchee community is similar to that reported by Aisien et al. (2017b) for *Sclerophrys* (syn. *Amietophrynus* sp.) from Degema, who recovered *Raillietiella* sp., *A. africanum, R. africanus* and *Aplectana mackintoschi*).

It was observed that single infection was more prevalent than multiple infections. Sulieman et al. (2015) also found that single infection was more prevalent than multiple infections with two to four parasite species. The prevalence rate reduced with increase in the number of multiple infections, as also observed in this research. This same phenomenon was reported by Iyaji et al. (2015).

## Conclusion

Helminth parasites of *S. maculata* of Fouchee Community, Degema LGA, Rivers State, Nigeria, has been reported to include one pentastomid, four nematodes and one trematode. It was found that single and multiple infections were common with single infections being more prevalent. This research has contributed to the knowledge of the distribution of helminth parasites in amphibians within the State and Niger Delta region.

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