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Studies on Helminth Parasites of the Amphibian, Amietophrynus maculatus hallowell,1854in Wilberforce Island, Nigeria

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ABSTRACT

This study evaluated the helminth parasites of Amietophrynusmaculatus in Wilberforce Island, Bayelsa state, Nigeria. A total of 29 specimens of Amietophrynusmaculatus were sampled in Wilberforce Island, Bayelsa state, Nigeria between October and December 2016. The specimens were dissected and examined following standard protocol. Results revealed the presence of 3 Classes of helminthes distributed into 2 cestodes, 4 nematodes and 1 trematode. The prevalence for each parasite wasCepaloclamyssp (10.3%), Pentastimidsp (6.89%) (cestodes), Oxyuridsp (6.89%), Applectanamakintoshi(3.44%), (31.0%), Cosmocera ornate (10.3%) (nematodes), and Mesocolium monas (17.2%) (trematoda). The mean intensity of infection were <1 except for Amplicaecumafricanum(7.14) a nematode, and Mesocolium monas (13.86) a trematode. Hence, there is the need for a close study of these parasites to ascertain their level of public health importance with regard to potential transmission to humans that feed on the definite predators of the amphibians.

Keywords:*Amphibians, Bufonidae, Helminthes parasite, Protozoan;*

INTRODUCTION

Amietophrynusmaculatus is one of the species of amphibians found in several African countries including Nigeria.*Amietophrynusmaculatus,* which belongs to the Bufonidae family, ismainly referred to Hallowell's toad, the flat-backed toad, and the striped toad, and inhabit tropical moist lowland, montane forests, dry and moist savanna, dry shrubland, lowland grassland, freshwater rivers, stream, creeks, creeklets, ponds, swamps, canals and ditches (Wikipedia, 2018).

Several studies have been carried out on amphibians in some area in Southern Nigeria including Southern Eastern region (Akani *et al*., 2003), Guinea savanna at New Bussa (Aisien *et al*., 2004a), Gelegele Forest Reserve, in South Western Nigeria (Aisien *et al*., 2009). For instance, Aisien *et al*. (2009) reported the presence of *Amietophrynus maculatus, Hoplobatrachus occipitalis, Aubria subsigillata, Ptychadena longirostris, Ptychadena oxyrynchus, Ptychadena bibroni, Ptychadena pumilio, Chiromantis rufescens, Leptopelis hyloides, Hyperolius fusciventris* and a *Phrynobatrachus* species from the Gelegele Forest Reserve in South Western Nigeria. Some species of amphibian could be potential means through which helminth parasites could be transmitted among wildlife. According to Imasuen *et al*. (2012), amphibians are preyed upon by some species of wildlife such as birds, snakes, turtles, and reptiles and predatory anurans (viz *Hoplobatrachusoccipitalis*). Since this wildlife is a potential source of food to humans, there is the need to assess the parasites of amphibians

Amphibians are host to several heminthic parasites. According to Imasuen *et al*. (2012), anurans are typically definitive hosts to helminth parasites belonging to the classes Cestoda, Monogenea, Trematoda, Nematoda, and Acanthocephala. Furthermore, the helminthparasites of amphibians have also been reported from several locations in Nigeria (Aisien *et al*., 2003, 2004b; 2009; Aisien *et al*., 2015; Imasuen *et al*., 2012) and Sudan (Sulieman *et al*., 2015). Due to the economic importance of amphibians there is the need to ascertain the parasites associated with them. Hence this study focused onparasites of

*Amietophrynus maculatus*in the Wilberforce Island, Nigeria.

MATERIALS AND METHODS

Study Area

Amassoma is situated in the Southern Ijaw Local Government Area of Bayelsa state. Like other regions of the state, it lies in the sedimentary basin and fishing is major occupation to the indigenous people of the area (Kigigha *et al*., 2018; Seiyaboh*et al*., 2017). The town is the host community of the Niger Delta University. Probably due to these, business and civil service jobs are the major sources of livelihood of the people of the area. A major tributary of River Nun passes through the community which receives several wastes streams resulting from human activities in the area (Ogamba *et al*., 2015; Seiyaboh *et al*., 2017). Two predominant seasons are observed in the area including wet season (April to October) and dry season (November to March of the following year). The atmospheric temperature and relative humidity of the area are also similar to the values previously reported in some locations within the Niger Delta region (Izah *et al*., 2017a-c, 2018).

Specimen Collection

Amietophrynusmaculatus) specimens were collected within the premises of the Niger Delta University and Amassoma town using torchlight between October and December 2016. The captured *Amietophrynusmaculatus* were taken to the laboratory for examination.

Examination of *Amietophrynusmaculatus*parasites

The *Amietophrynus maculatus*specimens were euthanized with soft tissue paper soaked in chloroform in a dessicator. The *Amietophrynus maculatus*samples were dissected and the oesophagus, stomach, liver, lungs, peritoneal cavity, small and large intestine and urinarybladder were examined. The method previously described by Aisien *et al*. (2009) was adopted for this study. The nematodes, were fixed in 70% hot ethanol, while the cestodes and trematodes were flattened under a glass cover slip and fixed with 10% formol saline. Thereafter, the worms were stained with acatocarmine, dehydrated, cleared in xylene and then mounted in Canada balsam. While the nematodes were cleared in lactosephenol prior to examination.

Prevalence Rate and Mean Intensity of Infection

The mean intensity and prevalence rate previously provided by Anderson (1993) and applied by Aisien*et al*. (2009) were adopted in this study. The mean intensity of infection was calculated for the total host population including the uninfected individuals.

$$\text{Mean intensity of infection} = \frac{Total\ number\ of\ parasites}{Number\ of\ host\ parasitized}$$

$$\%\ \text{Prevalence} = \frac{Number\ of\ host\ parasitized\ \ by\ specific\ \ parasite}{Number\ of\ host\ examined}\ x\ 100$$

RESULTS AND DISCUSSION

In this study, three Classes of helminth parasites wereidentified in *Amietophrynusmaculatus* (Table1). The parasites of *Amietophrynusmaculatus* included*Pentastomid*sp found in the Lungs and *Cepaloclamys*sp found in the stomach (cestoda), *Amplicaecumafricanum*found in large intestine, *Applectanamakintoshi*and *Cosmocera ornate* found in the small intestine, *Oxyurid*sp found in urinary bladder, small and large intestine (nematoda) and *Mesocoliummonas*found in urinary bladder, small and large intestine (trematoda). The findings in this study are different from previous works. Aisien*et al*. (2009) reported 2cestode, 3 monogenean, 6 trematode and 8 nematodeparasites of amphibians in Gelegele Forest Reserve. The authors further reported the presence of *Mesocoeliummonas* in the small intestine, *Rhabdiasbufonis* in the lungs, *Applectana*sp in the stomach and *Ascaridoid* larvae in the peritoneal cavity of *Amietophrynusmaculatus*. Aisien*et al*. (2009) reported the presence of *Mesocolium monas* in *Ptychadena bibroni, Ptychadena longirostris, Aubria subsigillata, Amietophrynus maculatus*; *Cosmocera ornate* in rectum of *Ptychadena pumilio, Ptychadena longirostris, Phrynobatrachus* sp., *Aubria subsigillata,* and *Applectana* sp in stomach of *Amietophrynus maculatus* and *Hyperolius fusciventris*. This variation suggests changes in geographical distribution. Table 2 presents the prevalence and means intensity of parasite infection in *Amietophrynusmaculatus* in Wilberforce Island, Nigeria. *Cepaloclamys*sp (10.3%), *Pentastomid*sp (6.89%) (cestodes), *Oxyurid*sp (6.89%),

Applectanamakintoshi(3.44%), *Amplicaecumafricanum*(31.0%), *Cosmocera ornate* (10.3%) (nematodes) and *Mesocolium monas* (17.2%) (cedotodes).

The mean intensity of infection were <1 except for *Amplicaecumafricanum* (7.14) a nematode, and *Mesocoliummonas* (13.86) a trematode.

Table1.*Site of parasite infection in Amietophrynus maculatusin Wilberforce Island, Nigeria*

Parasites class	Parasites	Site of infection
Cestode	*Pentostimid*sp	Lungs
	*Cepaloclamys*sp	Stomach
Nematodes	*Amplicaecumafricanum*	Large intestine
	Applectanamakintoshi	Small intestine
	Cosmocera ornate	Small intestine
	*Oxyurid*sp	Urinary bladder, small and large intestine
Trematodes	*Mesocolium monas*	Urinary bladder, small and large intestine

Table2.*Prevalence and mean intensity of parasite infection in Amietophrynus maculatusin Wilberforce Island, Nigeria*

Parasites	Total *Amietophrynusmaculatus* examined	Number that host the parasite	Prevalence (%)	Mean intensity of infection
*Cepaloclamys*sp	29	3	10.3	0.21
*Pentastimid*sp	29	2	6.89	0.10
*Oxyurid*sp	29	2	6.89	0.38
Applectanamakintoshi	29	1	3.44	0.10
Amplicaecumafricanum	29	9	31.0	7.14
Cosmocera ornate	29	3	10.3	0.21
Mesocolium monas	29	5	17.2	13.86

Among the nematodes, the prevalence of *Cosmocera ornata* in this study is lower than the value of 13.79 % (*Ptychadena oxyrynchus*), 21.43% (*Ptychadena pumilio*) and 2.63% in *Ptychadena longirostris.* Furthermore, the mean intensity was higher than the values reported in *Ptychadena oxyrynchus* and *Ptychadena longirostris,* and *Ptychadena pumilio* by Aisien *et al*. (2009). The prevalence and mean intensity of *Mesocolium monas* in *Amietophrynus maculatus* from the study area were far lower than the values reported in *Ptychadena oxyrynchus* and *Ptychadena longirostris,* and far higher than the values reported in *Ptychadena bibroni* by Aisien *et al*. (2009).

In a study,Aisien*et al*. (2015) reported that the encysted acanthocephalan had higher prevalence in *Phrynobatrachuslatifrons* captured in an agricultural area, while specimens obtained from buffer region had a higher intensity of infection. The authors further reported that infection with trematodes is predominant in hosts from agricultural area, which was attributed to variation in landscape, uses of pesticides and fertilizers. These suggest effect of prevailing environmental conditions on the distribution of helminthes parasites in amphibians. Furthermore, Akani*et al*. (2003) reported that environmental degradation impacts adversely on the species composition of amphibians. Aisien*et al*. (2009) opined that changes in environmental condition could affect the tendency of some parasites to complete their life cycles and maintain infection within their hosts.

CONCLUSION

Wilberforce Island is within the Nun River reserve, which is under intense pressure due to agricultural activities, deforestation, excessive hunting, industrialization and urbanization. The region is among the protected areas for biodiversity. This study assessed the helminth parasites of *Amietophrynus maculatus* in Wilberforce Island, Nigeria. The study found *Cepaloclamys* sp and *Pentastimid* sp (cestoda), *Oxyurid* sp, Applectana makintoshi, Amplicaecum africanum, *Cosmocera ornate* (nematoda) and *Mesocolium monas* (trematoda). The mean intensity of infection was below 1 apart for *Amplicaecum africanum* – a nematode, and *Mesocolium monas* - a trematode. The study also found higher diversity of nematode parasite in the specimen.

REFERENCES

[1] Aisien, M.S.O., Ogoannah, S.O. andLmasuen, A.A.2009. Helminth Parasites of Amphibians

from a Rainforest Reserve in Southwestern Nigeria. African Zoology, 44(1), 1- 7

[2] Aisien, M.S.O., Nago, S.G.A. andRödel, M.O.2015.Parasitic infections of amphibians in the Pendjari Biosphere Reserve, Benin.African Zoology,46(2),340-349

[3] Aisien, M.S.O., Ajakaiye, E.B. andBraimoh, K. 2003. Helminth parasites of anurans from the savannahmosaic zone of south-western Nigeria. ActaParasitologica 48(1), 47–54.

[4] Aisien, S.O., Ayeni, F. andIlechie, I. 2004a. Helminth fauna of anurans from the Guinea savanna at New Bussa, Nigeria. African Zoology 39(1), 133–136.

[5] Aisien, S.O., Salami, L.A., Obaro, F.E. andErakpoweri, S.O. 2004b. The influence of climate on the distribution of monogeneans of anurans in Nigeria. Journal of Helminthology78, 101–104.

[6] Aisien, S.O., Ugbo, A.D., Ilavbare, A. andOgunbor, O. 2001. Endoparasites of amphibians from South-Western Nigeria. ActaParasitologica46(4), 299–305.

[7] Akani, G.C., Politano, E. andLuiselli, L. 2003. Amphibians recorded in forest swamp areas of the Niger Delta (southeastern Nigeria) and the effects of habitat alteration from oil industry development on species richness and diversity. *Applied Herpetology* 2: 1–22.

[8] Anderson, R.M. 1993. Epidemiology. In: Modern Parasitology, A Textbook of Parasitology, (ed.) F.E.G. Cox, pp. 75–116. Blackwell Scientific, London.

[9] Imasuen, A.A., Ozemoka, H.J. and Aisien, M.S.O. 2012. Anurans as Intermediate and Paratenic Hosts of Helminth Infections in the Rainforest and Derived Savanna Biotopes of Southern Nigeria. International Journal of Zoology, http://dx.doi.org/10.1155/2012/823970.

[10] Izah, S.C., Bassey, S.E. andOhimain, E.I. 2017a. Assessment of heavy metal in cassava mill effluent contaminated soil in a rural community in the Niger Delta region of Nigeria. EC Pharmacology and Toxicology, 4(5), 186-201.

[11] Izah, S.C., Bassey, S.E. andOhimain, E.I. 2017b.Assessment of pollution load indices of heavy metals in cassava mill effluents contaminated soil: a case study of small-scale cassava processing mills in a rural community of the Niger Delta region of Nigeria. Bioscience Methods, 8(1), 1-17. doi: 10.5376/bm.2017.08.0001.

[12] Izah, S.C., Bassey, S.E. andOhimain, E.I. 2017c.Geo-accumulation index, enrichment factor and quantification of contamination of heavy metals in soil receiving cassava mill effluents in a rural community in the Niger Delta region of Nigeria. Molecular Soil Biology, 8(2), 7-20. doi: 10.5376/msb.2017.08.0002.

[13] Izah, S.C., Bassey, S.E. andOhimain, E.I. 2018.Ecological risk assessment of heavy metals in cassava mill effluents contaminated soil in a rural community in the Niger Delta Region of Nigeria. Molecular Soil Biology, 9(1), 1-11 (doi: 10.5376/msb.2018.09.0001)

[14] Kigigha, L.T., Seiyaboh, E.I., Obua, V.J. andIzah, S.C. 2018. Contamination of River Nun at Amassoma, Bayelsa State, Nigeria Due to Microbial Diversity in Sediments. Environmental Toxicology Studies Journal, 2 (1), 2

[15] Ogamba, E.N., Izah, S.C. and Oribu, T. 2015. Water quality and proximate analysis of *Eichhorniacrassipes* from River Nun, Amassoma Axis, Nigeria. Research Journal of Phytomedicine. 1(1), 43 – 48.

[16] Seiyaboh, E.I., Izah, S.C. andBokolo, J.E.2017. Bacteriological quality of water from river nun at AmassomaAxises, Niger Delta, Nigeria. ASIO Journal of Microbiology, Food Science & Biotechnological Innovations, 3(1), 22 – 26.

[17] Sulieman, Y., Afifi, A., Awad, H.M. and Pengsakul, T. 2015. Helminth parasites of the subdesert toad, *Amietophrynus* (*Bufo*) Xeros (Anura: Bufonidae). International Journal of Research – Granthaalayah, 3(10), 75-83.

[18] Wikipedia 2018. *Amietophrynusmaculatus*. https://en.wikipedia.org/wiki/Amietophrynus_maculatus.