THE HELMINTH PARASITOFAUNA OF *BUFO REGULARIS* (REUSS) IN ILE-IFE, NIGERIA

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Abstract

One hundred and sixty two specimens of *Bufo regularis* were collected between June 1998 and May 1999 in Ile-Ife and examined for helminth parasites. Ninety nine percent (99%) of the specimens were infected by seven parasitic helminths made up of one trematode, one cestode and five nematodes. All the helminths exhibited site preferences except one nematode, *Amplicaecum africanum,* recovered from both stomach and intestine.

Parasite abundance was variable from one toad size class to another. It appeared that there was a general tendency for the prevalences to increase with increase in size of the host except for *Aplectana* sp. which appeared not to be affected. Mean intensities and variance/mean ratios are reported. *Mesocoelum monodi* and *Ochoterenella digiticauda* showed aggregated distribution.

Keywords: *Bufo,* size, helminths, prevalence and intensity.

1. Introduction

Comparatively little effort has been made to investigate the parasitofauna of amphibians in Nigeria. Most of the reports on the infection of amphibians by helminth parasites deal with their occurrence in frogs, especially *Rana* spp. It is no surprise therefore that relatively meager information is available on helminth fauna of *Bufo regularis*. However, several records of helminths have been reported in *Rana* spp. in several countries (Yamaguti, 1963; Reichenback-Klinke and Elkan, 1965; Frandsen, 1974; Smyth and Smyth, 1980; Grabda-Kazubsku and Combes, 1981; Schell, 1985).

One of the reasons that may be adduced for the paucity of information on the helminth parasites of *Bufo regularis* is that toad does not serve as food or pet for humans. However, toad is a common and valuable laboratory animal and a scientific tool of importance. Noble (1954) regarded toads as indiscriminate feeders on insects and hence play a role in the control of insect pests of agriculture and in Japan toads skin is a good source of leather.

The present work was undertaken to provide information on the helminth fauna of *Bufo regularis* as well as their prevalences.

2. Materials and Methods

One hundred and sixty two specimens of *Bufo regularis* caught between June 1998 and May 1999 from various parts of Ile-Ife were examined in this study. As soon as the toads were brought into the laboratory, they were assigned identification numbers after which the length from snout to cloaca and sex were determined. They were anaesthetized and the skin covering the entire body surface including any abnormal formations such as ulcers, scars and tumours were examined. Scrapings of slime from the skin were smeared on slides and subjected to microscopic examination. The buccal cavity of each toad was thoroughly examined for helminth parasites.

The toads were dissected and the body cavity, different parts of the gut and other organs were examined for helminth parasites. Each section of the gut was carefully opened up in a petri dish containing 0.9 saline solution. The inner surface of the gut was scrapped into the petri dish, left for 10 minutes and then examined under low power binocular. The number and habitat of each parasitic specimen were noted. The parasites were fixed in formol-acetic-alcohol and preserved in 70% alcohol. The parasites were subsequently prepared for specific identification

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at least up to generic level (Yamaguti, 1958, 1959, 1961; Anderson *et al.*, 1974 and Baker, 1987). Where it was impossible to dissect all the toads brought into the laboratory on the same day, the rest were kept in a collection box placed in a trough containing a little quantity of water in a humid place overnight. No toad kept in captivity for more than two days was examined as they tend to lose some of their parasites through defaecation if kept for too long.

3. Results

Of the 162 specimens of *Bufo regularis* examined 99% were infected by seven species of helminth parasites made up of one trematode, one cestode and five nematodes. Concurrent infections of all the parasites were common except Oswaldocruzia sp. All the parasites exhibited site preferences in the toad (Table 1) except *Amplicaecum africanum* that was recovered from the stomach and intestine.

The mean intensities by infection are shown in Table 2 with *Mesocoelium monodi* having the highest level (44.3±7.7). The prevalencies of infection showed that *M. monodi*, *Amplicaecum africanum*, *Aplectana* sp. and *Rhabdias bufonis* were common than *Nematotaenia* sp., *Oswaldocruzia* sp. and *Ochoterenella digiticauda*. *M. monodi* and *Ochoterenella digiticauda* exhibited aggregated distribution (S^2 to the mean $\overline{X}$ >1; P<0.05). The prevalences of infection by sex of the host (78 males and 84 females) were not statistically significant (P>0.05). In Fig. 1, it appeared that there was a general tendency for the prevalencies to increase with increase in the size of the host. However the level of parasitization by *Aplectana* sp. appeared not to be affected by the size of the toad. The level of parasitization in *Rhabdias bufonis*, which is a tissue parasite, increased gradually with size up to a certain size of the toad (7.1-8.0 cm) where it reached the maximum. After this point it dropped sharply as shown in Fig. 1.

Table 1: Distribution of helminth parasites in *Bufo regularis* (n = 162) collected in Ile-Ife.

Class	Parasite Species	Total number of parasites	Location
Trematoda	*Mesocoelium monodi*	3984	Intestine
Cestoda	*Nematotaenia* sp.	12	Intestine
Nematoda	*Amplicaecum africanum*	2946	Stomach, Intestine
Nematoda	*Aplectana* sp.	3201	Rectum
Nematoda	*Oswaldocruzia* sp.	6	Stomach
Nematoda	*Rhabdias bufonis*	417	Lung
Nematoda	*Ochoterenella digiticauda*	360	Coelomic cavity

Table 2: Overall prevalence, mean intensity and variance/mean ratios of helminth parasites recovered from 162 specimens of *Bufo regularis* in Ile-Ife

Parasite Species	**Prevalence (%)**	**Mean intensity ($\overline{x}$ ±SD)**	**Variance/Mean ($S^2/\overline{x}$) ratios**
Mesocoelium monodi	55.6	44.3±7.7	1.1
Nematotaenia sp.	1.9	4.0±0.00	0.0
Amplicaecum africanum	96.3	18.9±2.2	0.3
Aplectana sp.	92.6	21.3±3.1	0.5
Oswaldocruzia sp.	1.9	2.0±0.00	0.0
Rhabdias bufonis	46.3	5.6±0.8	0.1
Ochoterenella digiticauda	14.8	15.0±8.2	4.5

*$S^2/\overline{x}$>1; P<0.05.

4. Discussions

The results of this study showed that seven of species of helminth parasites were relatively prevalent though disproportionately so in one hundred and sixty two toads examined. One of these seven species was a trematode, another a cestode while the remaining five were nematodes.

Although *Amplicaecum africanum* had the highest prevalence rate with *Aplectana* sp. ranking second, the mean number of parasites per host was higher for *Aplectana* sp. All these pointed to fact that, although greater number of *Aplectana* sp. was recovered it parasitized smaller number of toads than *Amplicacum*

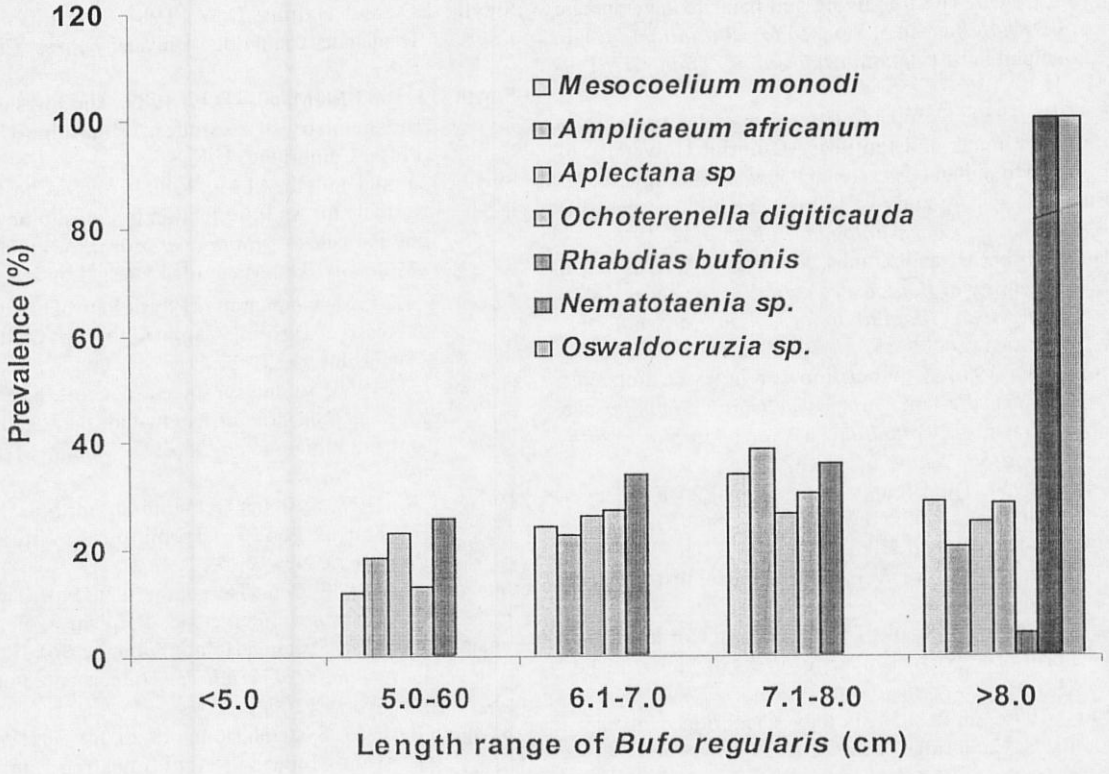

Fig. 1: Size-related distribution of helminth parasites of Bufo regularis in Ile-Ife.

africanum Mesocoelium monodi, Rhabdias bufonis and *Ochoterenella digiticauda* ranked third, fourth and fifth respectively in prevalence. This observation was in conformity with the conclusions reached by various workers on *Rana* spp. (Thomas, 1956; Reichenbach-Klinke and Elkan, 1965; Baker, 1979; Hausfater *et al.*,1990 and Smyth, 1996). Both *Nematotaenia* sp. and *Oswaldocruzia* sp. were found in only one host each and few numbers of the specimens were recovered from their respective hosts.

It is, however evident, that in general, this population of toads was more heavily parasitized by nematodes than by either trematodes or cestodes. Lees (1962) made a similar remark about the incidence of helminth parasites in a population of frogs adducing the reason that nematodes have evolved a much more highly effective distribution mechanism. Even though most of the parasites were recovered from the gut, most of them still showed habitat specificity. *Mesocoelium monodi*, *Nematotaenia* sp. and *Aplectana* sp. were found exclusively in the upper, lower part of the intestine and rectum respectively while *Amplicaecum africanum* was largely found in the upper intestine but often times in the stomach. The fact that these regions of the gut contained already digested food materials which can be utilized for nourishment by the parasites and partly because the pH of the various parts made the lumen of the gut more habitable for the parasites (Mettrick, 1973; Smyth and Halton, 1983; Stevens, 1988; and Smyth and McManus, 1989). *Rhabdias bufonis*, a tissue parasite, resided exclusively in the lungs while *Ochoterenella digiticauda* was found only in the body cavity and among subcutaneous connective tissues. Intraspecific reaction was demonstrable only between *M. monodi* and *Amplicaecum africanum* both of which were found in great numbers so that in any particular gut in which one was abundant the other seemed to be scarce and vice-versa. This mutual avoidance may be attributable to the metabolic products of one being toxic to the other.

While all the size ranges except those less than 5.0 cm were infected, length size of range 7.1-8.0 cm had the highest prevalence. This is explained by high susceptibility coupled with high exposure to infection. The aggregated distribution of *M. monodi* and *O. digiticauda* in this study is striking and various factors can cause such dispersion patterns.

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