Myxidium lesminteri n. sp. (Myxosporea: Myxidiidae) from the gall-bladder of three southern African Anura

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Abstract

During 1988 and 1989 409 specimens, representing 50 species in 9 families of southern African Anura from 26 localities throughout the Republic of South Africa and from Swaziland, were examined for gall-bladder myxozoans. Myxidium lesminteri n. sp. was the only myxozoan found and was observed in one Tomopterna krugerensis (Ranidae), one Bufo garmani (Bufonidae) and one Heleophryne natalensis (Heleophrynidae), all from Transvaal. The spore of Myxidium lesminteri (9.5–15.0 x 5.0–8.0 μm) is characterised by a smooth shell devoid of striations but has one longitudinal ridge.

Introduction

The genus Myxidium is commonly found in fish but has been only exceptionally reported in amphibians (Jayasri & Hoffman, 1982). However, three species have been described from the gall-bladders of amphibians (Delvinquier, 1986). During a survey of southern African Anura, we discovered a fourth species from amphibians. The species is described herein and an updated list of the Myxidium species recovered in amphibians is presented in Table I.

Materials and methods

Details on numbers of frogs collected, localities and dates of collection have been reported previously (Delvinquier et al., 1991). A total of seven adult Tomopterna krugerensis, 20 adult Bufo garmani and two juveniles and seven tadpoles of Heleophryne natalensis were collected.

The methods of fixation and SEM techniques follow those of Delvinquier (1986).

Myxidium lesminteri n. sp. (Figs 1–8)

Type-material: Holotype, Queensland Museum: GL 13041 (Tomopterna krugerensis); Paratypes, GL 13042 (Bufo garmani), GL 13043 (Heleophryne natalensis).

Etymology: This species is named after Mr Les Minter for his dedicated help in collecting frogs.

Occurrence and localities: In 1/5 Tomopterna krugerensis (type-host) from Transvaal, Naboomspruit district, Mosdene Nature Reserve (24°36′00″ S, 28°46′00″ E, map 2428DB) (type-locality), February 1989; in 1/9 Bufo garmani from Transvaal, Pietersburg district, a small pond in Mr Oosthuizen’s garden (Geluk) (23°53′45″ S, 29°32′45″ E, map 2329DC), December 1988; 1/2 Heleophryne natalensis (juveniles) from Transvaal, Tzaneen district, De Hoek Forestry Reserve Cascade (23°49′15″ S, 30°00′15″ E, map 2330CC),
December 1988. It was not observed in tadpoles of *H. natalensis*.

**Description**

*Trophozoite.* Circular to ovoid, flattened, floating freely in the bile; in *T. krugerensis*, 0.5–1.0 mm in diameter (n = 20), in *B. garmani*, 0.5–1.5 mm in diameter (n = 30), in *H. natalensis*, 0.2–0.5 mm in diameter (n = 40) with very few spores but very large fat globules.

*Spore.* Ovoid, shell devoid of striations and divided in 2 by sutural line and with parallel longitudinal ridge. Circular polar capsules at each pole. Number of polar filament turns within the capsule not seen; in *T. krugerensis*, 12.5 (9.5–15.0) × 6.5 (5.7–8.0) μm (n = 7), in *B. garmani*, 12.6 (11.0–13.5) × 5.7 (5.0–7.0) μm (n = 13), in *H. natalensis*, 13.9 (12.5–15.0) × 6.5 (6.0–7.0) μm (n = 12).

**Comments**

This is the first *Myxidium* sp. reported from African Anura. It differs from all other species in amphibians by having a smooth shell. *Myxidium immersum* and *M. serotinum* both have shells with transverse striations (Lutz, 1889; Cordero, 1919; Kudo & Sprague, 1940; Clark & Shoemaker, 1973; Delvinquier, 1986), whereas *M. haldari* has a shell with longitudinal striations (Sarkar, 1982). Other species of *Myxidium* in southern Africa have been described from salt-water fishes (Fantham, 1930; Dubina & Isakov, 1976). Among the *Myxidium* spp. described from freshwater environments in Africa as a whole, Fomena & Bouix (1986) described five species of *Myxidium* located in the gall-bladders of five different species of fishes. All have shells with longitudinal striations. Okaeme *et al.* (1988) found a *Myxidium* sp. in the gill-raker of a fish, from the Lake Kainji area, Nigeria, but there is no description of it.

**Discussion**

*Myxidium lesminteri* is the first species of *Myxidium* found in amphibians of the Afrotropical Region. In South Africa, Fantham (1930) described three species of *Myxidium* in the gall-bladder of fish but reported no myxosporidians in anurans.

The rare occurrence of *M. lesminteri* in southern African anurans is unusual. From Table I it is clear that *M. serotinum* has often been reported in various North American amphibians. Clark & Shoemaker (1973) concluded that the salamander, *Eurycea bimaculata*, from Cabell and Wayne Counties, West Virginia, with a prevalence of 87.9%, was the “preferred host” for *M. serotinum* and that anurans were to be regarded as “incidental hosts”. This conclusion was disputed by McAllister & Upton (1987), who found 48.1% *Ambystoma texanum* from Dallas County, Texas, were infected, and stated that “there is little host specificity in amphibians for the myxosporean”. Similarly, Delvinquier (1986) found *M. immersum* in 19 native species of Australian anurans and the introduced *Bufo marinus*. There was no indication of a preferred host.

A high prevalence of *M. serotinum* has been found in hosts from various localities (Lutz, 1889; Kudo, 1943; Clark & Shoemaker, 1982; McAllister, 1987; McAllister & Upton, 1987; McAllister *et al.*, 1989). However, Kudo & Sprague (1940) did not find *M. serotinum* in 227 specimens of 10 species of anurans from various states. Kudo (1943) did not observe it in eight *Scaphiopus holbrookii* (Pelobatidae) and two *Bufo terrestris* from Ocala, Florida. Carini (1932) did not find *M. immersum* in *Limnomedusa macroglossa* (Leptodactylidae) nor in the gymnophionan *Chthonerpeton indistinctum* (Typhlonectidae) from Brazil, whereas Cordero (1928) stated that *M. immersum* was frequently seen in *Limnomedusa macroglossa* from Uruguay. Sarkar (1982) found only one *Hyla arborea* infected with *Myxidium haldari* in Bengal. Among 330 anurans dissected from Queensland, north of a line running between Townsville and Westmoreland, only one *Litoria nyakalensis* was infected with *M. immersum*, whereas south of that line 41 out of 171 anurans were infected (Delvin-