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Protistology

Myxobolus dhanachandi sp. n. (Myxozoa, Myxosporea, Bivalvulida) from an Indian freshwater fish *Channa orientalis* (Bloch-Schneider)

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Summary

Investigations on the incidence of myxozoans in fishes have assumed immense importance because of severe pathogenicity of these parasites and host mortality associated with them. The present communication describes a new myxosporean species, *Myxobolus dhanachandi* sp. n., from a freshwater fish *Channa orientalis* (Bloch -Schneider) from the state of Manipur, India.

Key words: Myxozoa, *Myxobolus dhanachandi* sp. n., parasite, fish, India

Introduction

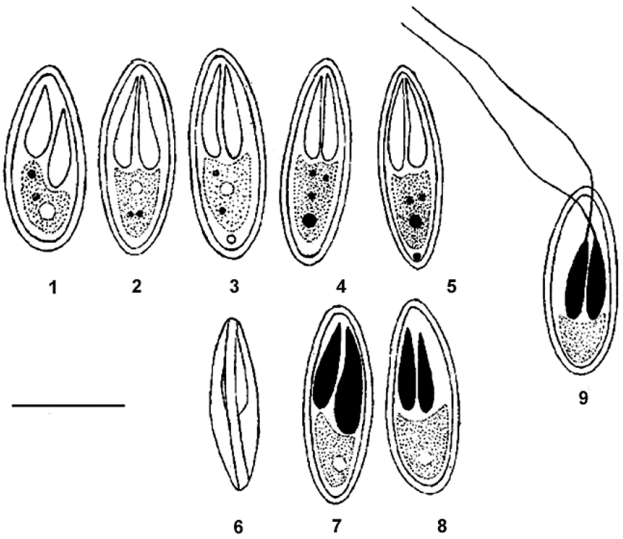
The genus *Myxobolus* was established by O. Bütschli (1882). Since that time, approximately 500 species of *Myxobolus* have been reported from freshwater and marine fishes (Landsberg and Lom, 1991). A biotic survey of protozoan parasites in fishes from ponds of Kangla Fort (Manipur, Imphal, India) revealed a new *Myxobolus* species. The present communication deals with the description of the new species in accordance with the guidelines of Lom and Arthur (1989) and Lom and Dykova (1992).

Material and Methods

Host fishes were collected alive from the pond of Kangla Fort, brought to the laboratory and examined immediately. Sporogonic plasmodia, when found, were carefully removed with sterile forceps, smeared on clean grease-free slides with drops of 0.5% NaCl solution, covered with cover slips and sealed with bee wax for examination under the oil immersion lens of Olympus CH-2 phase contrast microscope. Some of the fresh smears were treated with various concentrations (2-10%) of KOH solution for the extrusion of polar

filaments. The Indian ink method of Lom and Vavrá (1963) was employed for observing the mucous envelope of spores. For permanent preparations, air-dried smears were stained with Giemsa after fixation in acetone-free absolute methanol. Measurements (based on twenty fresh spores treated with Lugol's iodine) were done with the aid of a calibrated ocular micrometer. All measurements are presented in μm as mean ± SD followed in parentheses by the range. Drawings were made on fresh or stained material with the aid of a mirror type camera lucida and the Corel Draw 10.0 computer programme.

The abbreviations used in the paper are as follows: LS - length of the spore; WS - width of spore; LLPC - length of large polar capsule; WLPC - width of large polar capsule; LSPC - length of small polar capsule; WSPC - width of small polar capsule; LPC - length of polar capsule; WPC - width of polar capsule; LPF - length of polar filament; DIV - diameter of iodinophilous vacuole.



Figs 1-9. Camera lucida drawing of the spore of *M. dhanachandi* sp. n. **1** - Immature spore; **2, 3** - spore in fresh condition; **4, 5** - spore stain with Lugol's Iodine; **6** - spore in sutural view; **7** - immature spore stained with Geimsa; **8** - spore stained with Geimsa (unextruded polar filament); **9** - spore with extruded polar filament (Geimsa). Scale bar: 10 μm.

Results and Discussion

MYXOBOLUS DHANACHANDI SP. N. (FIGS 1-10).

Plasmodia. Pinkish-white spherical plasmodia, 0.27 mm in diameter, are found attached to the dorsal, ventral and caudal fins. They contain mostly matured spores, some late stage spores were also present.

Spores. The spores are small, elongated, dumb-bell shaped, broader at the middle and tapering at both ends. In sutural view, the spore is lenticular, with a slightly curved broad sutural line. The two shell valves are narrow, smooth and symmetrical. In immature forms the spores have broader middle part, and the polar capsules are shorter and thicker.

Mature spores measure 17.0-19.5 (18.4 ± 1.01) μm in length and 5.1-6.8 (6.05 ± 0.62) μm in breadth. In fresh condition there is variation in spore structure in respect to the position of the polar capsules.

There are two polar capsules of equal size. Both are elongated and tear-shaped with a sharply pointed anterior end and a slightly rounded posterior end. Polar capsules are situated almost parallel to each other. They measure 7.7-8.5 (8.26 ± 0.36) μm in length and 0.8-1.7 (1.43 ± 0.41) μm in breadth. The polar capsules occupy almost half of the total spore body. In Giemsa-stained slides, the polar capsules are somewhat posterior in position. The two polar filaments are extruded from two separate openings. They measure 27.2-34.0 (29.49 ± 3.64) μm in length.

The extracapsular space is occupied by granular homogenous mass of sporoplasm. A iodinophilus vacuole, 0.8-1.7 (0.97 ± 0.42) μm in diameter, and two or three very small sporoplasmic nuclei are present in the sporoplasm. In some of the spores, there is a rounded structure adjacent to the inner wall.

The present species resembles *M. angustus* Kudo, 1934 reported from gill filaments of *Cliola vigilax* (Kudo, 1934); *M. calbasui* Chakravarty, 1939 reported from the gall bladder of *Labeo rohita* (Hamilton) and *Cirrhinus mrigala* (Hamilton) (Chakravarty, 1939); *M. punctatus* Roychaudhuri and Chakravarty 1970 from spleen and pharyngeal epithelium of *Ophicephalus punctatus* (Bloch) (Roychaudhuri and Chakravarty, 1970); *M. vedavantiensis* Seenapa and Manohar, 1981 from gills and muscles of *Cirrhinus mrigala* (Hamilton) (Seenapa and Manohar, 1981); *M. bhadhuria* (Sarkar, 1985) Gupta and Khera, 1988 from gills and fins of *Puntius sarana* (Hamilton) (Gupta and Khera, 1988) and *M. iranicus* Molnar, Masoumain et Abasi, 1996 from the spleen of *Barbus luteus* (Heckel) (Molnar et al., 1996); *M. catlae* Chakravarty, 1943 from fins and gills of *Cirrhinus mrigala* (Hamilton) (Chakravarty, 1943) and *M. koi* Kudo, 1919 from gill filaments of *Cyprinus carpio haematopterus* (Kudo, 1919).

However, *M. angustus* (LS: 14-15; WS: 7-8), *M. calbasui* (LS: 12.4-15; WS: 8.2-10; LLPC: 6.1; WLPC: 4.1; LSPC: 4.1; WSPC: 3.0), *M. vedavatienses* (LS: 13-15; WS: 8-10 ; LLPC: 6.9-7.5; WLPC: 3-4; LSPC: 3-

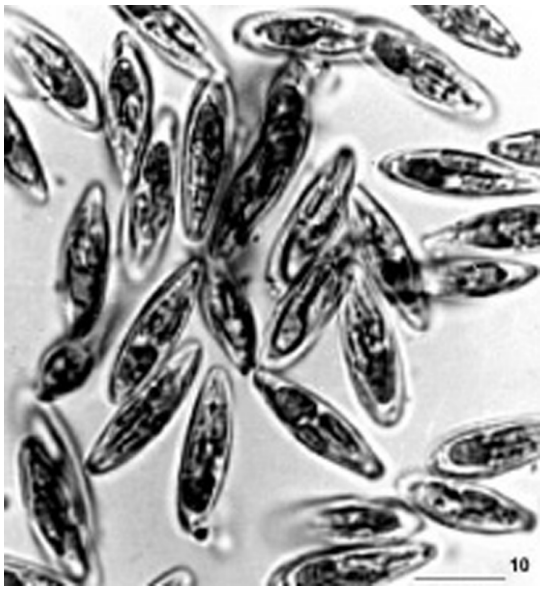


Fig. 10. Photomicrograph of spores of *Myxobolus dhanachandi* sp.n. stained with Giemsa. Scale bar: 12 μm.

5; WSPC: 2-3), *M. iranicus* (LS: 13.2-14; WS: 7.5-9.2; LLPC: 6.9-7.5; WLPC: 2.9-3.5; LSPC: 6.6-7.2) differ from the present species (Table 1) in morphometric characteristics.

M. punctatus (LS: 12.2-15; WS: 85.7-7.8; LPC: 8.5-10; WPC: 2.1-2.8), *M. bhaduria* (LS: 10-14; WS: 5-8; LPC: 5-7; WPC: 2-4), *M. catlae* (LS: 14-15; WS: 5; LPC: 10; WPC: 2-2.5; LPF: 30-41) have polar capsules similar in size to the present species but differ from it in other morphometric characteristics and spore shape.

Finally, *M. koi* (LS: 14.0-16.0; WS: 7.0-9.0; LPC: 7.0-9.0.p; WPC: 2.7) is morphometrically similar to our species. However, the former has elongated, tear-shaped spores, and the latter, the dump-bell shaped spores.

In view of these differences, the myxozoan under study should be considered as a new species. Hereby, we name it *Myxobolus dhanachandi* sp. n.

Table 1. Statistical analysis of measurements and ratios of *Myxobolus dhanachandi* sp. n.

Measurement	Range	X	SD	SE	CV%
LS	17.0 – 19.5	18.4	1.01	0.22	5.48
BS	5.1 – 6.8	6.1	0.62	0.13	10.24
LPC	7.7 – 8.5	8.3	0.36	0.08	4.35
BPC	0.8 – 1.7	1.4	0.41	0.09	28.67
DIV	0.8 – 1.7	0.9	0.42	0.09	43.29
LPF	27.2 - 34	29.5	3.64	0.81	12.34

LS : WS = 1 : 0.3288
LPC : WPC = 1 : 0.1731
LS : LPC = 1 : 0.4489
WS : WPC = 1 : 0.2363

Abbreviations: see Materials and Methods

Taxonomic summary

Type host: *Channa orientalis* (Bloch-Schneider).

Type locality: Kangla, Manipur.

Type specimens: One holotype, slide CO/04/2003, and paratypes, slides CO/01/2003, CO/06/2003, CO/08/2003, Collection of the Life Science Department, Manipur University, India.

Prevalence and Intensity of Infection: 08/10 (80%).

Etymology: The specific epithet *dhanachandi* has been given after the name of late Prof. Ch. Dhanachand of Life Sciences Department, Manipur University, for his outstanding contribution to parasitology.

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