Vol 5 Issue 7 Aug 2015

ISSN No : 2230-7850

International Multidisciplinary Research Journal

Indian Streams Research Journal

Executive Editor
Ashok Yakkaldevi

Editor-in-Chief
H.N.Jagtap

Welcome to ISRJ

RNI MAHMUL/2011/38595 **ISSN No.2230-7850**

Indian Streams Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial board.Readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

International Advisory Board

Editorial Board

Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.isrj.org

Indian Streams Research Journal
ISSN 2230-7850

Impact Factor : 3.1560(UIF)
Volume - 5 | Issue - 7 | Aug - 2015

RECORD OF MYXOZOAN PARASITES OF THE GENUS MYXOBOLUS FROM FRESHWATER FISHES

Somatkar J. R.
Post Graduate and Research Department of Zoology, R. A. Arts,
Shri M. K. Commerce and Shri S. R. Rathi Science Mahavidhyalaya, Washim.

Co - Author Details :
D. S. Dabhade
Post Graduate and Research Department of Zoology, R. A. Arts, Shri M. K. Commerce and
Shri S. R. Rathi Science Mahavidhyalaya, Washim.

ABSTRACT

The present study is undertaken to study the Myxozoan parasites found in locally available freshwater fishes. Myxozoan parasites were isolated from freshwater fishes mainly the Indian major carps collected from various water resources in the Washim region of Maharashtra, India. The Myxozoan parasites reported and morphologically described are *Myxobolus mrigalhitae, Myxobolus basui* and *Myxobolus lalbaghensis*. These Myxozoan parasites are recorded with heavy infection on gill tissue forming plasmodia and the kidney of freshwater fishes.

KEYWORDS :*parasites, Myxobolus, Washim, freshwater fishes.*

INTRODUCTION

Myxozoa are parasites that are widely dispersed in pond reared fish. Myxozoans are one of the economically important groups of microscopic metazoan parasites as they infect fish harvested for food. New myxosporean pathogens are continually emerging and threatening the development of pisciculture allover the world. The genus *Myxobolus Butschli* (1882) is one of the most intensively studied largest genus in the phylum *Myxozoa*. These parasites can be found in every organ of fish and have been known to cause serious diseases in both cultured and wild fishes. During the last decade extensive work was carried out by many workers on the Myxosporea reporting many species belonging to genera *Myxobolus, Thelohanellus, Henneguya* and *Myxidium* from Indian fishes. Report of *Myxobolus* Butschli (1882) from India includes those of Basu and Haldar (2002a, 2002b, 2003), Basu *et.al.*,(2009), Gupta and Khera (1988, 1989a, 1989b, 1991), Hemananda *et.al*., (2006, 2009), Kaur and Singh (2009, 2010, 2011), Mandal (1975), Narasimhamurti and Kalavati (1986), Kalavati and Nandi (2007), Pagarkar (1993), Sarkar (1986, 1993), Seenappa and Manohar (1980a, 1980b, 1981).

The present research work reported three species of *Myxobolus viz. Myxobolus mrigalhitae, Myxobolus basui* and *Myxobolus lalbaghensis* from freshwater fishes. The Myxozoan parasitic species have not been reported earlier from Vidarbha region of Maharashtra and the present study is the first record of Genus Myxobolus from Washim in Maharashtra state of India.

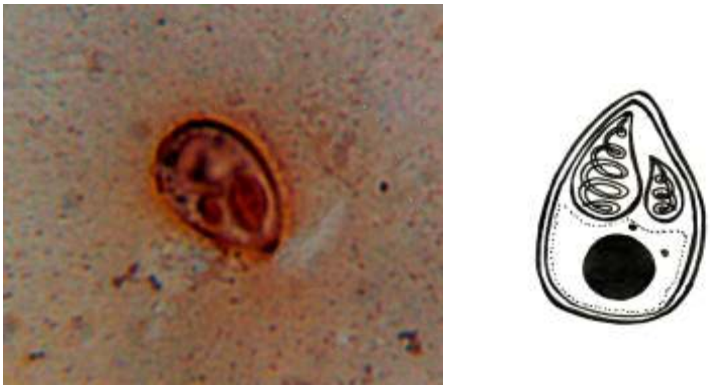
MATERIALS AND METHODS

The host fishes for the present study were collected alive from various dams and local fish market from 2010 to 2013. The collected fishes were brought to laboratory for necropsy procedure for examination of Myxozoan parasites. For temporary mounting of parasites Lugol's solution is used and for permanent preparation, a smear using fresh spores is prepared and allowed to air dry. Then the spores are fixed in 10% buffered formalin and stained in Giemsa's stain (Cone and Anderson, 1977) and mounted in DPX. Examinations of preparations were made under Olympus phase-contrast microscope at 100x magnification and the photographs of the slide will be taken with the camera set on phase contrast microscope and drawing will be made with Camera Lucida.

RESULT AND DISCUSSION

The various Myxozoan parasites of the genus Myxobolus reported during the present study are described as below:

1.*Myxobolus mrigalhitae* (Basu and Haldar, 2003)



Photoplate 3: Showing microp hotographs of Myxozoan parasite, *Myxobolus mrigalhitae* along with drawing.

Taxonomic Summary

Type host	:	*Cirrhinus mrigala*
Parasite	:	*Myxobolus mrigalhitae*
Type locality	:	Ekburgi dam, Washim, Maharashtra
Site of infection	:	Gills
Holotype	:	In slide no. M18b/2013, deposited in P.G. and Research department of Zoology, R.A. College, Washim Dist. Washim Maharashtra.
Morphometrix		
Length of spore	:	10.7µm
Width of spore	:	7.6µm
Length of Polar capsule	:	large: 4.6µm Small: 2.9µm
Width of polar capsule	:	large: 2.8µm Small: 1.8µm

Plasmodia

Fully developed plasmodia are round in shape and seen attached with the gill filaments of infested host fishes.

Spores:

1.Spores are round to spherical in shape.
2.Two polar capsules occupy most part of the spore cavity.
3.Fully developed or mature spores are pyriform in front view.
4.The posterior end is broad and rounded whereas the anterior end is narrow and blunt.
5.The spore valves are thick at the posterior end, but thin at the anterior one.
6. The sutural ridge is broad with straight median sutural line.
7. In the posterior extremity of the spore there lie 2-5 parietal folds.
8.Two polar capsules are unequal.
9.The larger one is pyriform with broader posterior and bluntly pointed anterior ends.
10.The smaller polar capsule is tear-shaped and with slightly curved anterior end.
11.The polar filament makes 5-6 and 3-4 spiral coils inside larger and smaller polar capsules respectively.
12. Polar filament from the larger polar capsule extrudes through the anterior end of the spore but that from the smaller one extrudes through the antero lateral end, i.e., there lie two separate openings for the extrusion of two polar filaments.
13.The sporoplasm is granular, homogenous and fills the extracapsular space.

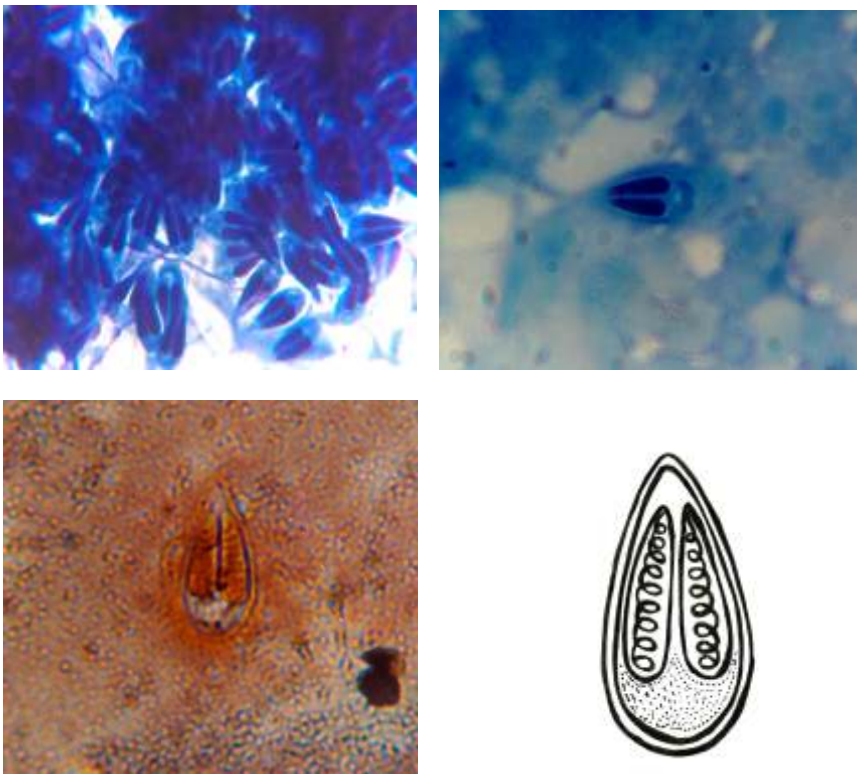
Table 1: Morphometric comparison of *M. mrigalhitae* obtained in the present study with those of Basu and Haldar (2003).

Character	*M. mrigalhitae*	*M. mrigalhitae*
Length of Spore (µm)	10.2-11.3	10.4-11.2
Width of Spore (µm)	7.6-8.1	7.7 -8.3
Length of polar capsule Larger polar capsule (µm) Smaller polar capsule (µm)	 4.3-5.2 2.9-3.2	 4.5 – 5.6 3.0 – 3.3
Width of polar capsule Larger polar capsule (µm) Smaller polar capsule (µm)	 2.7-3.2 2.0 -3.2	 2.8 -3.4 1.9 – 2.5
No. of polar filament coils Larger polar capsule Smaller polar capsule	 5-6 coils 3-4 coils	 5-6 coils 3-4 coils
	Basu and Haldar (2003).	Present study

Remarks

Morphometric observation on *M. mrigalhitae* in the present study are in conformity with the original describtion of *M. mrigalhitae* (Basu and Haldar, 2003) with few variation in size of spore and polar capsule. This parasite was reported earlier from hybrid between *Cirrhinus mrigala* and *Labeo rohita*. The present study is the first record of the parasite from the gills of *Cirrhinus mrigala* collected from Ekburgi dam in Washim (M.S.)

2.*Myxobolus basui* (Kaur et al., 2013)



Photoplate 1: Showing microp hotographs of Myxozoan parasite, *Myxobolus basui* along with drawing.

Taxonomic Summary

Type host	: *Cirrhinus mrigala, Labeo rohita*
Parasite	: *Myxobolus basui*
Type locality	: Ekburgi dam, Supkhela dam, Washim, Maharashtra
Site of infection	: Gills
Holotype	: In slide no. M1a/2013, deposited in P.G. and Research department of Zoology, R.A. College, Washim Dist. Washim Maharashtra.
Morphometrix:	
Length of spore	: 14.2µm
Width of spore	: 6.0 µm
Length of Polar capsule	: 6.9 µm

Width of polar capsule : 2.2 µm
Plasmodia

Minute, attached on the mucous membrane around gill lamellae with spores 15-20 per plasmodium.

Spore

1.The spores are histozoic and pyriform with sharply pointed, spear-shaped anterior end and rounded posterior end.
2.Shell valves smooth, symmetrical and thin walled.
3.Parietal folds absent.
4.Polar capsules two, equal, elongated pyriform and positioned posteriorly from the tip of the spore and lie parallel to each other inside the spore body cavity.
5.Polar filaments form 9-12 coils and are arranged perpendicular to the polar capsule axis in each polar capsule.
6.An intercapsular process (ICP) absent.
7.Sporoplasm agranular, homogeneous, hemispherical occupying rest of the spore body cavity.
8.Sporoplasmic nuclei two.
9.An iodinophilous vacuole is absent.

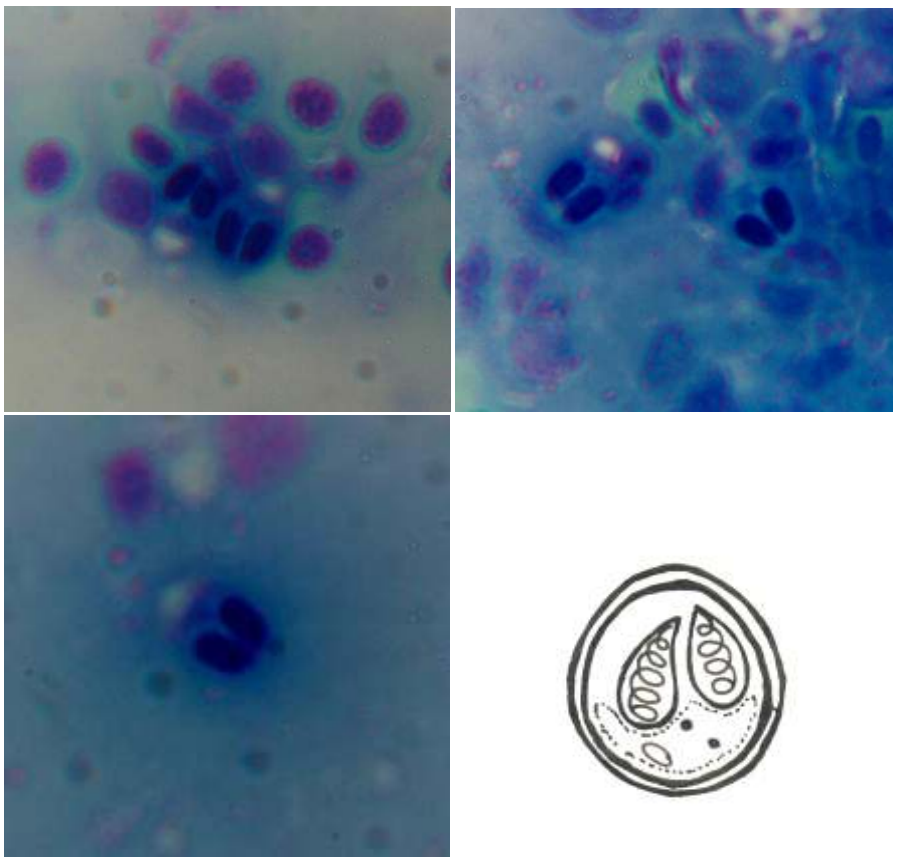
Table 2: Morphometric comparison of Myxobolus basui obtained in the present study with those of Kaur *et al*. (2013)

Character	*Myxobolus basui*	*Myxobolus basui*
Length of Spore (µm)	12.10-14.60	13.2 -14.7µm
Width of Spore (µm)	4.68-7.40	6.0 µm
Length of polar capsule (µm)	6.14-7.02	6.9 µm
Width of polar capsule (µm)	1-2.3	2.2 µm
No. of polar filament coils	9-12 coils	11-14 coils
	Kaur *et al*. (2013)	Present study

Remarks

Morphometric observation on *M. basui* in the present study are in conformity with the original describtion of *Myxobolus basui* (Kaur *et al*., 2013) with few variation in size of spore and polar capsule. This parasite was reported earlier from *Cirrhinus mrigala*. The present study is the first record of the parasite from the gills of *Cirrhinus mrigala* and *Labeo rohita* in Washim (M.S.)

1.*Myxobolus lalbaghensis* (Banergee et al., 2011)



Photoplate 2: Showing microp hotographs of Myxozoan parasite, *Myxobolus lalbaghensis* along with drawing.

Taxonomic Summary

Type host	: *Labeo rohita, Labeo bata*
Parasite	: *Myxobolus lalbaghensis*
Type locality	: Supkhela dam, Washim, Maharashtra
Site of infection	: Gills
Holotype	: In slide no. M16b/2013, deposited in P.G. and Research department of Zoology, R.A. College, Washim Dist. Washim Maharashtra.

Morphometrix:

Length of spore	: 7.2µm
Width of spore	: 5.3µm
Length of Polar capsule	: 4.1µm
Width of polar capsule	: 2.2µm

Plasmodia:

These were isolated from the gills of the infected fishes with creamy white colour and round

shape.

Spore –

1.Immature spores are round to ovoid in shape.
2.Two polar capsules are pear shaped.
3.Sporoplasm has two nuclei.
4.Mature spores are ovoidal to rounded in shape in front view.
5.Both the anterior and posterior ends are blunt.
6.The two polar capsules are equal in shape .
7.The capsules are pear shaped with anterior tip and blunt posterior end.
8.The polar filament makes 4 – 5 coils which can be prominently observed by staining with Lugol's Iodine.
9.The polar filaments are thin and extrude out through a single opening at the blunt anterior end of the spore.
10.The granular sporoplasm fills the extracapsular region. It contains two sporoplasmic nuclei and one glycogen filled iodinophilus vacuole.

Table 3: Morphometric comparison of Myxobolus lalbaghensis obtained in the present study with those of Banerjee *et. al*. (2011).

Character	***Myxobolus lalbaghensis***	***Myxobolus lalbaghensis***
Length of Spore	7.65-11.9	7.2 – 11.5
Width of Spore	5.1-8.5	4.9 – 8.3
Length of polar capsule	4.25-6.8	4.1 – 6.6
Width of polar capsule	1.7-2.55	1.6 – 2.4
Polar filament coils	4-5 coils	4-5 coils
	Banerjee *et. al.* (2011)	Present study

Remarks

Morphometric observation on *Myxobolus lalbaghensis* in the present study are in conformity with the original describtion of *Myxobolus lalbaghensis* with few variation in size of spore and polar capsule. This parasite was reported earlier from *Labeo bata* by Banerjee *et. al.* (2011) from West Bengal. The present study is the first record of the parasite from the gills of *Labeo rohita* and *Labeo bata in Washim (M.S.)*

ACKNOWLEDGEMENT

We express our deep sense of gratitude towards Dr. M. M. Sancheti, Principal, R. A. Mahavidyalaya, Washim for providing highly equipped laboratory facility for the present research

work.

BIBLIOGRAPHY

1.Basu S. and D. P. Haldar (2002a): Myxobolous opthalmusculata, a new species of histozoic myxozoan (Myxozoa: Bivalvulida) from Cirrhinus mrigala (Hamilton). Proceedings of the Zoological Society of Calcutta, 55: 43–48.
2.Basu S. and D. P. Haldar (2002b): Observations on three new species of Myxobolus Butschli (1882) from hybrid carps of West Bengal, India. Indian Journal of Environment and Ecoplanning, 6: 629–640.
3.Basu S. and D. P. Haldar (2003): Three new species of Myxobolus Butschli (1882) from different food fishes of West Bengal, India. Acta Protozoologica, 42: 245–251.
4.Basu, S., Modak, B. K., and D. P. Haldar (2009): Two new species of Myxobolus Butschli, 1882 (Myxozoa: Mysporea: Bivalvulida) from food fishes of West Bengal, India - a light and scanning electron microscopy study. Acta Protozoologica, 48, 83–89.
5.Gupta, S. and S. Khera (1988): Review of the genus Myxobolus Butschli, 1882. Research Bulletin (Science) of the Punjab University, 39, 45–48.
6.Gupta, S. and S. Khera (1989a): Observations on Myxobolus haldari sp. nov. (Myxozoa: Myxosporea) from freshwater fishes of North India. Research Bulletin (Science) of the Panjab University, 40: 281–291.
7.Gupta, S. and S. Khera (1989b): Observations on Myxobolus punjabensis sp. nov. (Myxozoa: Myxobolidae), parasitic on gills and fins of Labeo dyocheilus. Rivista di Parassitologia, 50 :131–138.
8.Gupta, S. and S. Khera (1991): On some species of the genus Myxobolus (Myxozoa: Myxosporea) from freshwater fishes of India. Indian Journal of Parasitology, 15, 35–47.
9.Hemananda, T., Mohilal, N., Bandyopadhyay, P. K., and A. K. Mitra (2009): Two new myxosporidia (Myxozoa: Myxosporea) of the genus Myxobolus Butschli (1882) from cornea of Clarias batrachus (Linnaeus, 1758) caught from a fish farm in India. North-Western Journal of Zoology, 5: 165–169.
10.Hemananda, T., Mohilal, N. and W. Vishwanath (2006): Myxobolus haldi sp. nov, a new species of Myxobolus Butschli (1882) (Myxozoa: Bivalvulida) from the gill filament of Cirrhinus mrigala from fresh water of Manipur. Journal of Parasitology and. Applied Animal Biology, 15: 35–42.
11.Kaur, H. and R. Singh (2009): A new myxosporean species, Myxobolus eirasi sp. nov., a known species M. venkateshi Seenappa, Manohar, 1981 from the Indian major carp fish Cirrhina mrigala (Ham). Protistology, 6:126–130.
12.Kaur, H. and R. Singh (2010): A new myxosporean species, Myxobolus sclerii sp. nov., one known species M. stomum Ali et al., 2003 from two Indian major carp fishes. Journal of Parasitic Diseases, 34, 33–39.
13.Kaur, H. and R. Singh (2011a): Two new species of Myxobolus (Myxozoa: Myxosporea: Bivalvulida) infecting an Indian major carp in Ropar and Kanjali wetlands (Punjab). Myxobolus Butschli (1882) Myxobolus Butschli (1882) Journal of Parasitic Diseases, 35, 23–32.
14.Mandal, A. K., and K. N. Nair (1975): Myxobolus eeli sp. n. (Myxobolidae) a new myxosporidium from Indian spiny eel Mastacembelus armatus (Lace´pe`de). Acta Protozoologica,14, 175–178.
15.Narasimhamurti, C. C., and C. Kalavati (1986): A new myxosporidian Myxobolus bivacuolatus n. sp. parasitic in the intestinal wall of the fresh water fish Clarius batrachus. Archiv fu¨r Protistenkunde, 131:153–157.
16.Kalavati, C. and N. C. Nandi (2007): Handbook of myxosporidean parasites of Indian fishes. Kolkata: Zoological Survey of India, 293 pp.
17.Pagarkar, A. U. and M. Das (1993): Two new species of myxozoa, Thelohanellus caudatus n. sp. and

Myxobolus serrata n. sp. from cultural carps. Journal of the Inland
18.Fisheries Society of India, 25:30–35.
19.Sarkar, N. K. (1986): On two new species of Myxobolus Butschli (1882) (Myxozoa: Myxosporea) from the fresh water fishes of West Bengal, India. Acta Protozoologica, 25, 235–239.
20.Sarkar, N. K. (1993): On two new species of Myxobolus Butschli (1882) (Myxozoa: Myxosporea) from some freshwater fish of West Bengal, India. Proceedings of the Zoological Society of Calcutta, 46: 61–66.
21.Seenappa, D. and L. Manohar (1980a): Two new species of Myxobolus (Myxosporidia: Protozoa) parasitic on Cirrhina mrigala (Hamilton) and Puntius curmuca (Hamilton). Current Science, 49: 204–206.
22.Seenappa, D. and L. Manohar (1980b): Myxobolus vanivilasae n. sp. parasitic in Cirrhina mrigala (Ham.). Proceedings of the Indian Academy of Science, (Animal Science), 89: 485–491.
23.Seenappa, D. and L. Manohar (1981): Five new species of Myxobolus (Myxosporea: Protozoa), parasitic in Cirrhina mrigala (Hamilton) and Labeo rohita (Hamilton), with a note on a new host record for M. curmucae Seenappa and Manohar, 1980. Journal of Protozoology, 28: 358–360.

Publish Research Article
International Level Multidisciplinary Research Journal
For All Subjects

Dear Sir/Mam,

We invite unpublished Research Paper,Summary of Research Project,Theses,Books and Book Review for publication,you will be pleased to know that our journals are

Associated and Indexed,India

- International Scientific Journal Consortium
- OPEN J-GATE

Associated and Indexed,USA

- Google Scholar
- EBSCO
- DOAJ
- Index Copernicus
- Publication Index
- Academic Journal Database
- Contemporary Research Index
- Academic Paper Databse
- Digital Journals Database
- Current Index to Scholarly Journals
- Elite Scientific Journal Archive
- Directory Of Academic Resources
- Scholar Journal Index
- Recent Science Index
- Scientific Resources Database
- Directory Of Research Journal Indexing

Indian Streams Research Journal
258/34 Raviwar Peth Solapur-413005,Maharashtra
Contact-9595359435
E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com
Website : www.isrj.org