



Description of new and known Myxozoans infecting wild Indian fishes in Uttar Pradesh, India

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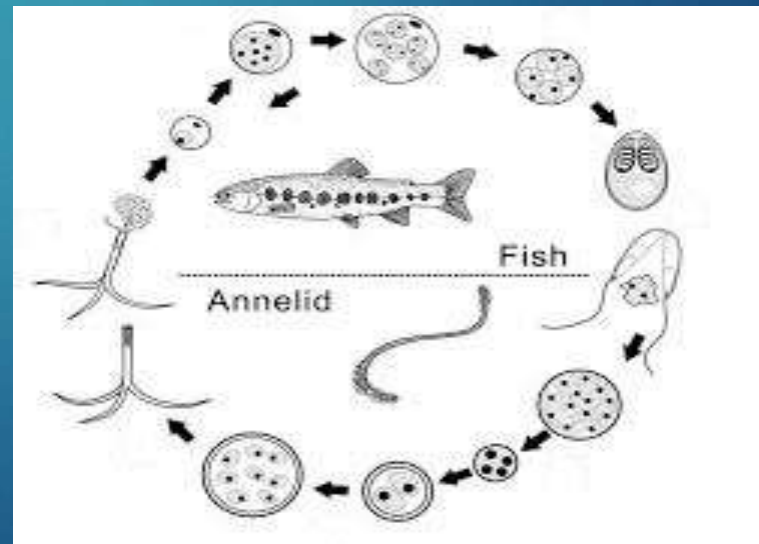
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Introduction



- ▶ Myxozoa is a class of aquatic obligatory parasitic cnidarian animal.
- ▶ 1300 species have been described.
- ▶ Most of have two-host lifecycle involving a fish and annelid worms.



Methods I (conventional)

Collection of fishes for the examination of myxospores infection from river Ganga tributaries near the Meerut, Uttar Pradesh, India.

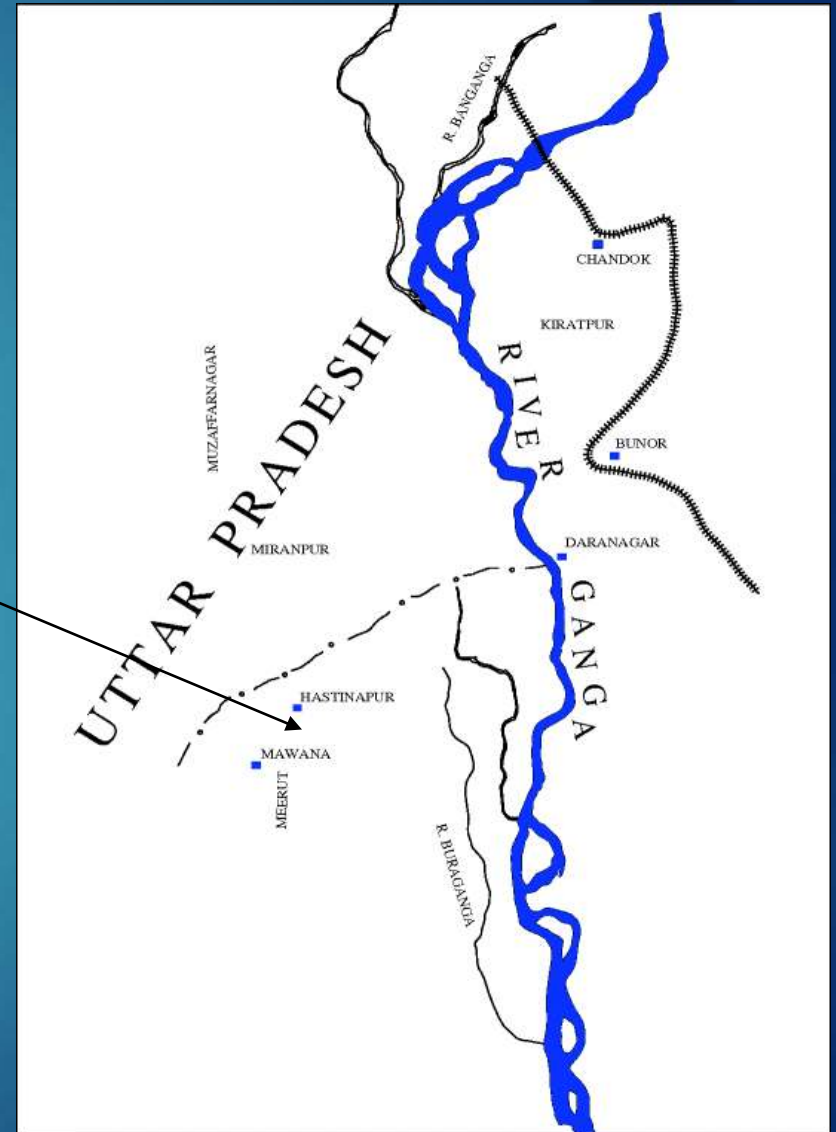
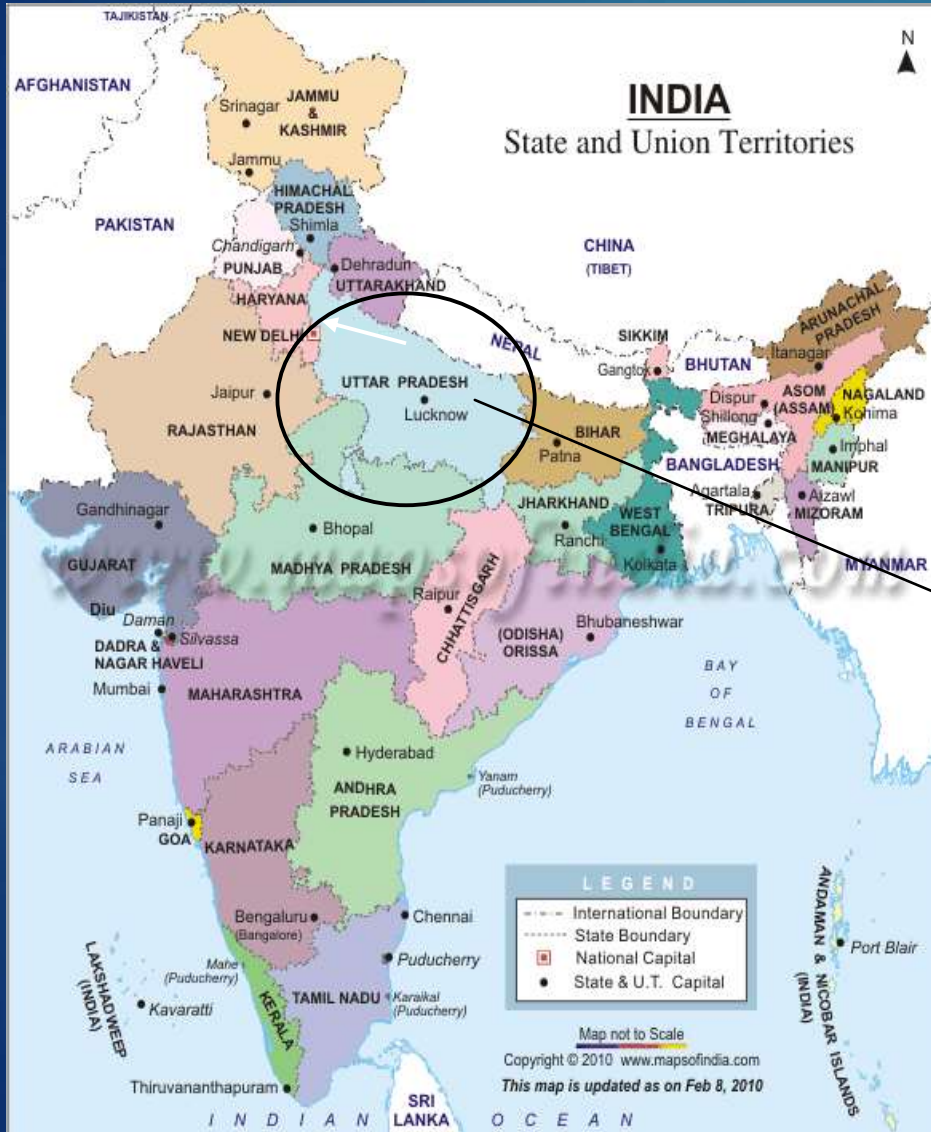
Fishes were transported to the laboratory and shifted in aerated aquarium.

After the dissection, infected organs were preserved for further examination as for morphology in formalin and in 95% ethanol for molecular studies.

For morphological studies, photographs were taken by Olympus BH-2 microscope equipped with a DP-20 digital camera.



Location



Methods II. (molecular)



- DNA extraction
- Nested PCR
- Agarose Gel electrophoresis
- Sanger sequencing
- Assembly of sequence fragments using MEGA 7
- NCBI search (for related myxozoan sequences)
- Maximum likelihood analysis and PW-distance calculation by MEGA 7



Results

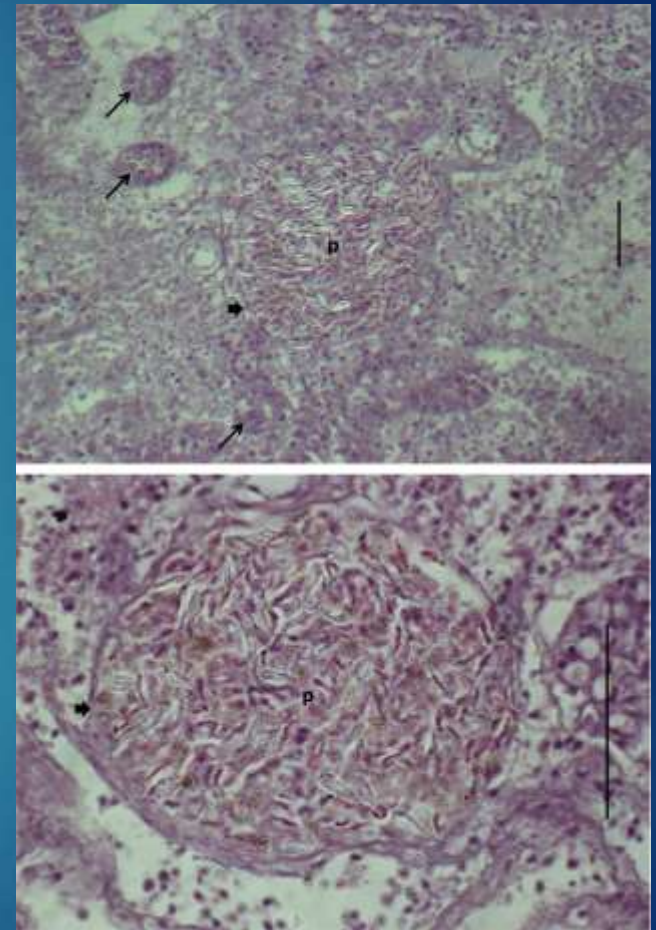
Parasite	Host	Location	Body length of Spore (μm)	Body width of Spore (μm)	Capsule length (μm)	Capsule width (μm)
<i>Myobolus ompok n. sp.</i>	<i>Ompok pabda</i>	Sotiganj, Uttar Pradesh, India	13.6-14.4	5.6-4	8.0-8.5	1.5-2.4
<i>Henneguya mystasi</i>	<i>Mystus vittaus</i>	Meerut, U.P. India	12-14	3.8-4	5.6-6.4	1.1-1.3
<i>Myxobolus cylindricus</i>	<i>Channa gachua</i>	Meerut, U.P. India	12.8-14.9	5.6-6.4	3.6-4.8	0.7-1.21
<i>Henneguya ganapatiae</i>	<i>Notopterus notopterus</i>	Hastinapur, U.P. India	9.3-9.9	4.0-4.7	3.2-2.5	1.4-1.7
<i>Myxidium sp.</i>	<i>Monopterus cuchia</i>	Bijnor, India	19.0-22.3	5.1-6.8	3.7-5.6	2.6-3.6
<i>Myxobilatus sp.</i>	<i>Anabas testiduneus</i>	Bijnor, India	7.0-8.5	1.3-1.5	1.5-2.3	0.6-0.9
<i>Myxidium sp.</i>	<i>Macrogathus aculaetus</i>	Bijnor, India	18-19.5	3.4-4.9	3.0-2.1	1.2-1.5

Results I(morphology, histology)

Host- *Ompok pabda*

Infection site- Kidney

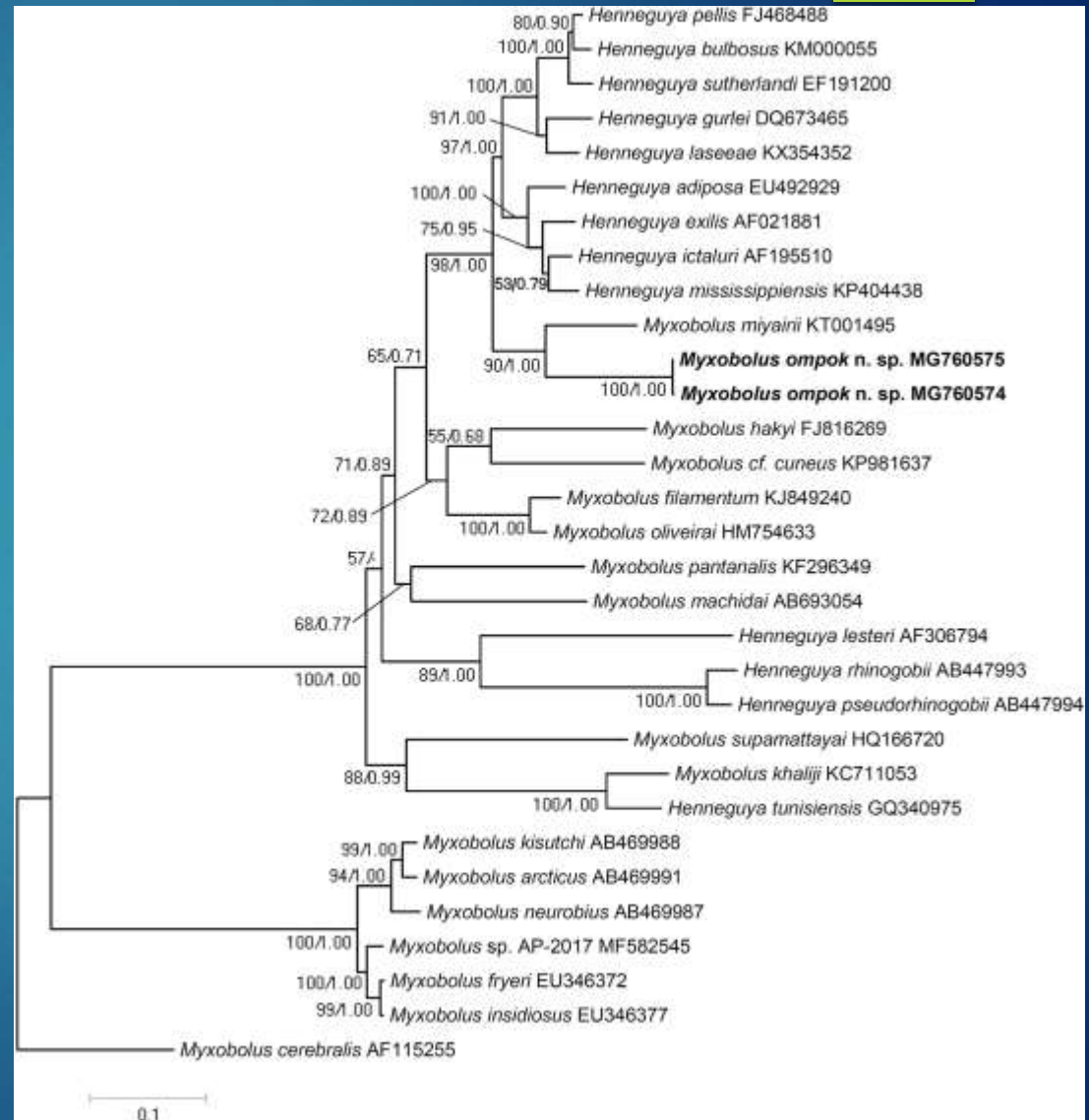
Parasite- *Myxobolus ompok n. Sp.*



Plasmodium (p) filled by matured spores and bordered by thin connective tissue (arrow head) in the interstitial tissue of the kidney.

Molecular result I

Phylogenetic tree generated through maximum likelihood analysis of the 18S rDNA sequences of *Myxobolus ompok* n. sp. and selected species.



Results II (morphology)

Host- *Mystus vittatus*

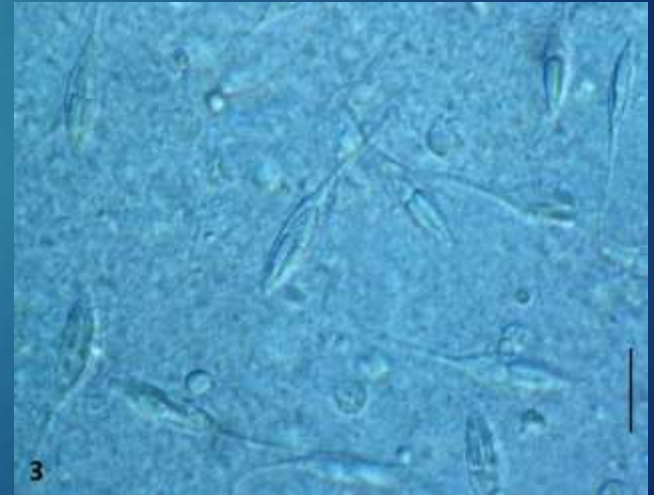
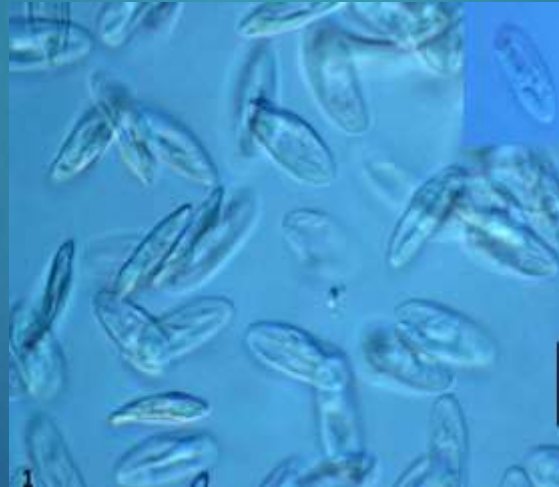
Infection site- Gill lamellae

Parasite- *Henneguya mystasi*

Host- *Channa gachua*

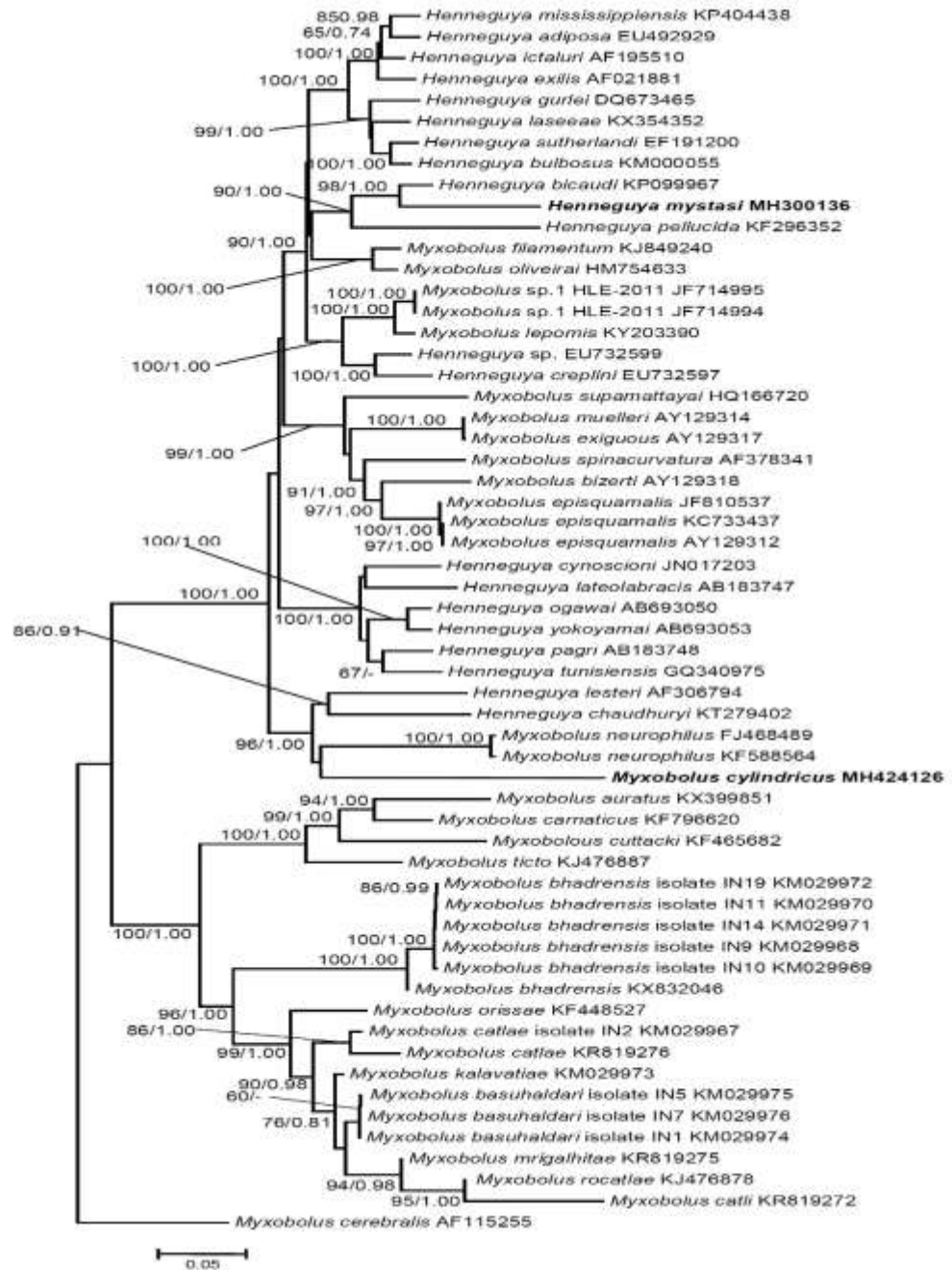
Infection site- Gill lamellae

Parasite- *Myxobolus cylindricus*



Molecular result II

Phylogenetic tree generated through maximum likelihood analysis of the 18S rDNA sequences of *Myxobolus cylindricus*, *Henneguya mystasi* and selected species.



Results III (morphology)

Host- *Monopterus albus*

Infection site- Kidney

Parasite- *Myxidium* sp.



Histopathology results

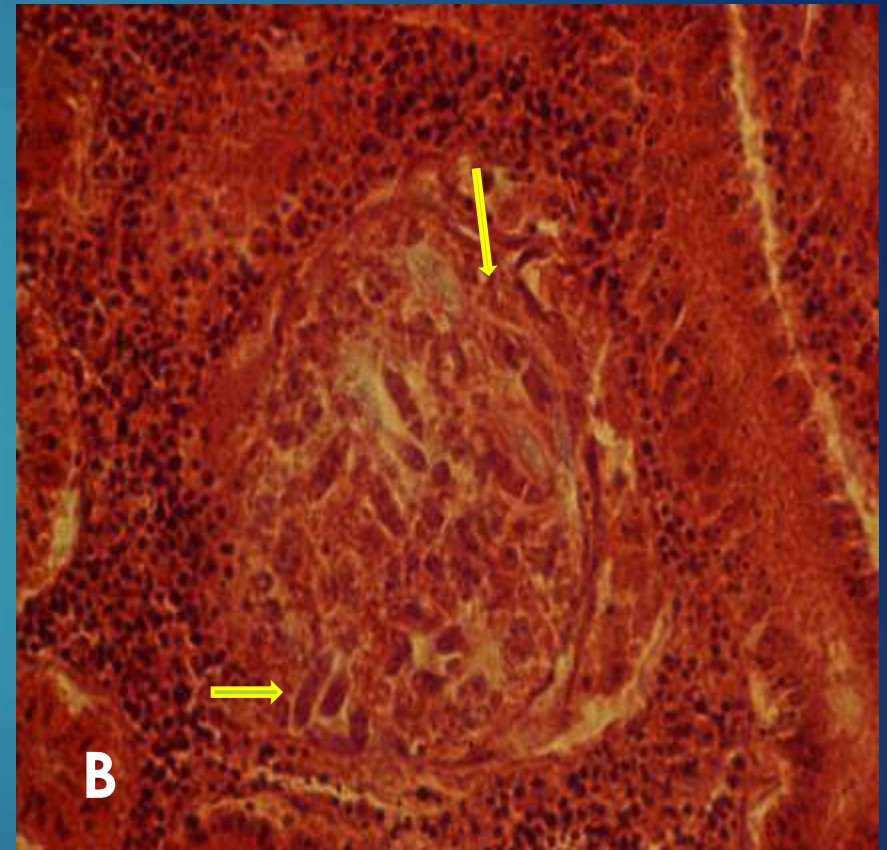
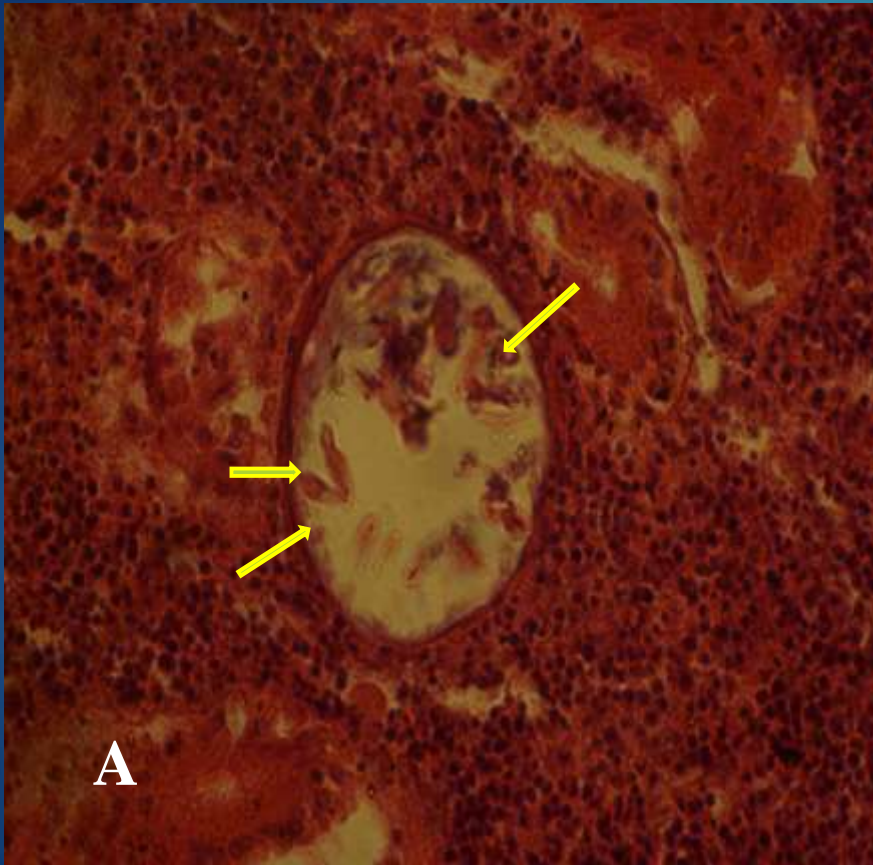


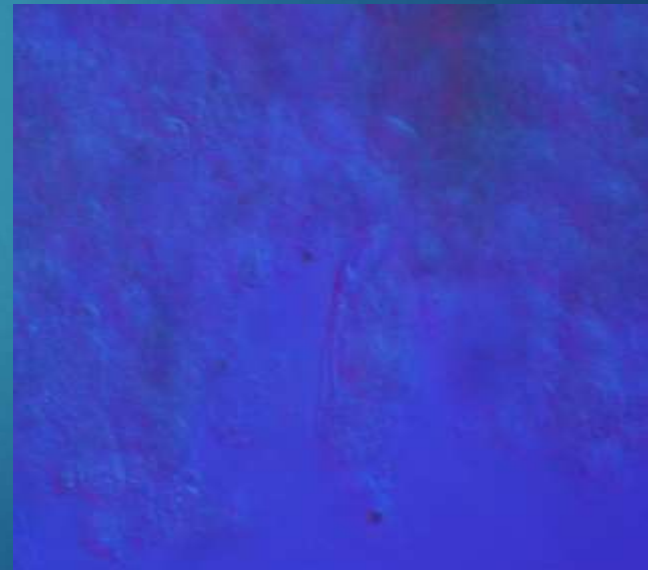
Fig. A-B are showing the plasmodia filled with sopres in kidney tissue

Results IV(morphology)

Host- *Anabas testudineus*

Infection site- Kidney

Parasite- *Myxobilatus* sp.

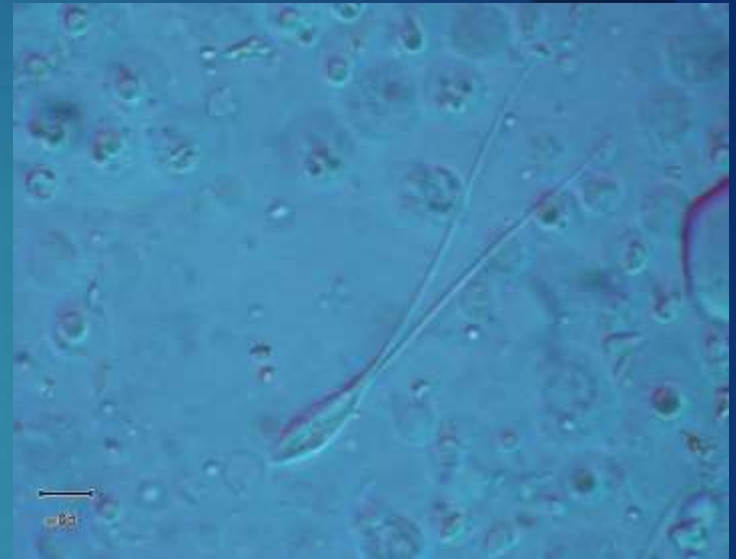


Results V (morphology)

Host- *Notopterus notopterus*

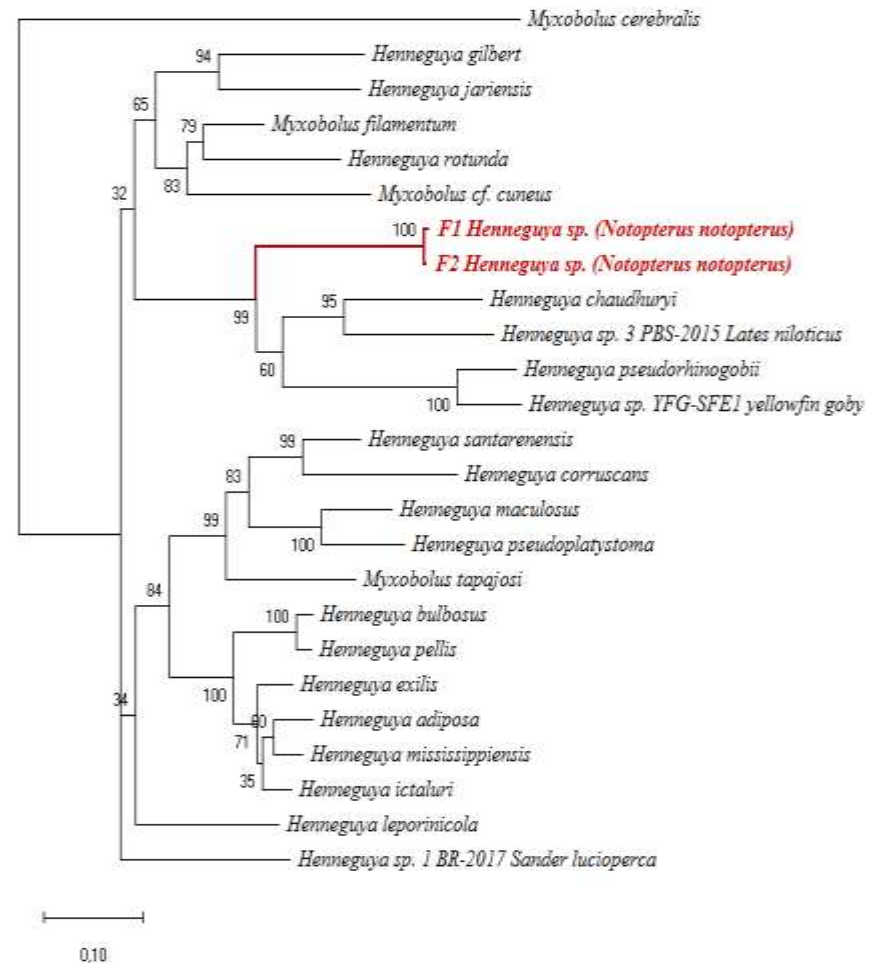
Site of infection- Gill lamellae

Parasite- *Henneguya* sp.



Molecular result V

Phylogenetic tree generated through maximum likelihood analysis of the 18S rDNA sequences of *Henneguya* sp.



Results VI (morphology)

Host- *Macragnathus aculeatus*

Infection site- Kidney

Parasite- *Myxidium sp.*



Histopathology results

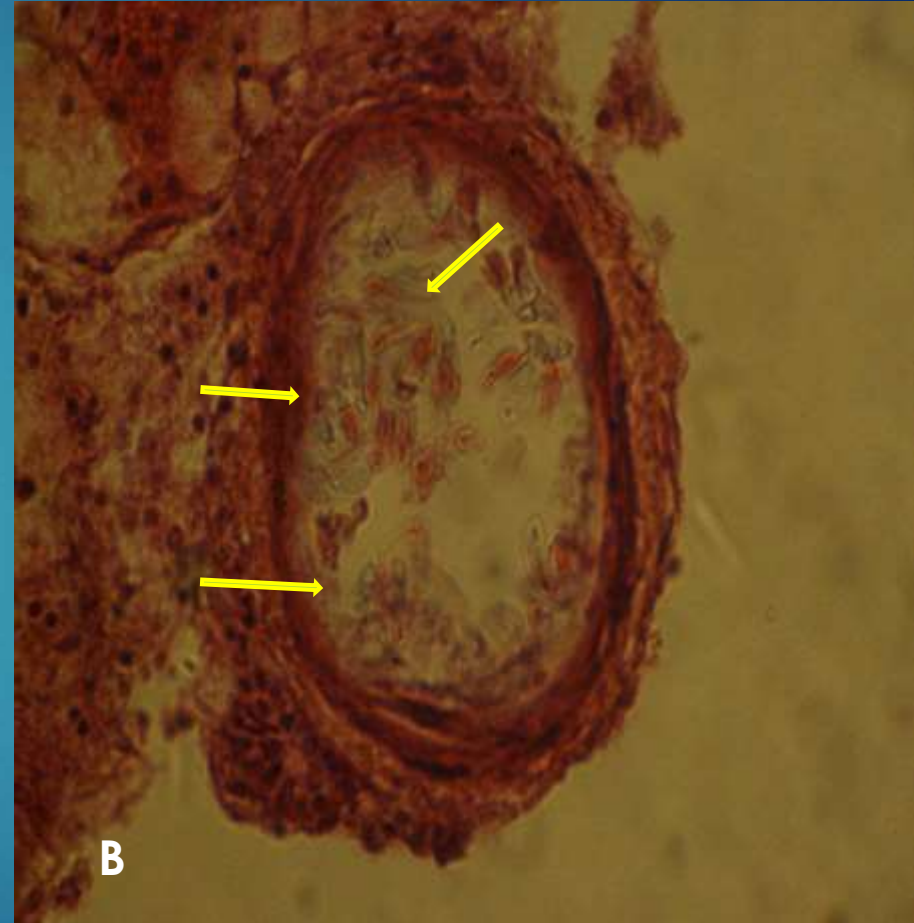
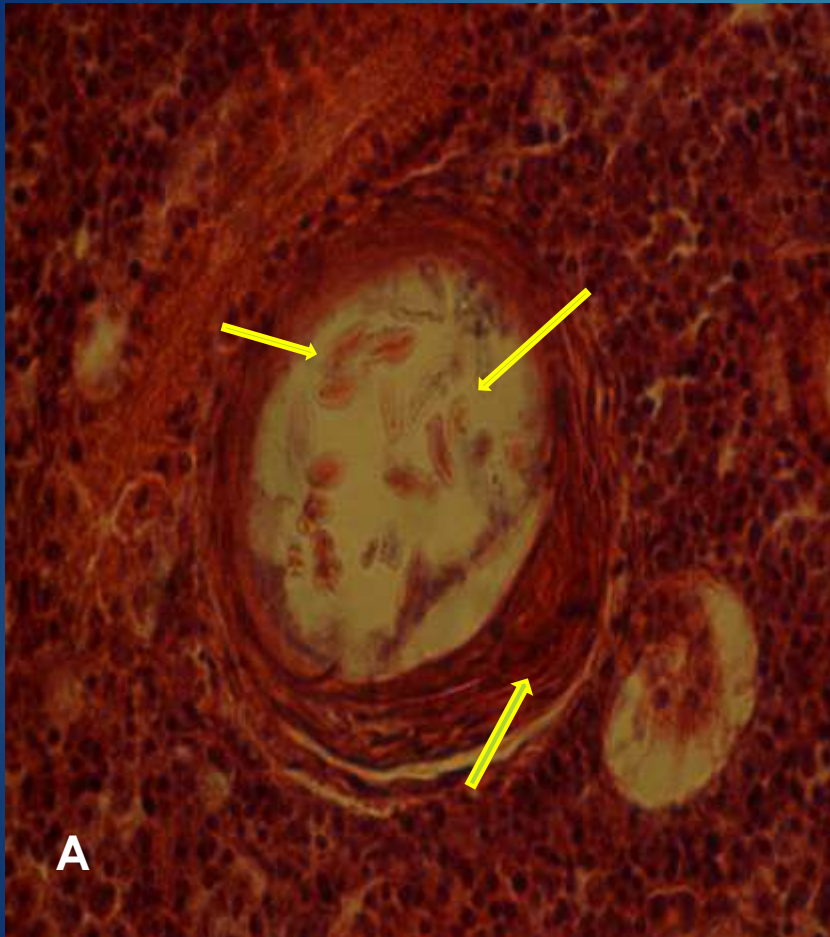


Fig. A-B are showing plasmodia filled with spores in Bowman's capsule of kidney tissue

Published articles

- ▶ Chaudhary,A; **Goswami,U**; Gupta,A ;Cech,G; Molnar,K; Singh,H.S.; Sezekly,C; Sharma,B; Morphological, histological, and molecular description of *Myxobolus ompok* n. sp. (Myxosporea: Myxobolidae), a kidney myxozoan from Pabdah catfish *Ompok pabda* (Hamilton, 1822) (Siluriformes: Siluridae) in India. *Parasitology Research* (2018) 117(6) DOI: 10.1007/s00436-018-5882-y
- ▶ Chaudhary,A; Gupta,A; **Goswami,U**; Cech,G; Molnar,K; Singh,H.S.; Sezekly,C; Molecular Genetic Studies on *Myxobolus cylindricus* and *Henneguya mystasi* (Myxosporea: Myxobolidae) Infecting Two Indian Fish Species, *Channa gachua* and *Mystus vittatus*, Respectively. *Acta Parasitologica* (2019) DOI: 10.2478/s11686-018-00014-8

Future aspects

- ▶ Investigations on actinospores in alternate Annelid hosts in India.
- ▶ Collection of new fish, and samples. Description of future Myxozoan spp.
- ▶ Investigation of the life cycle of these parasites.

Thank you for your attention!



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