THREE NEW SPECIES OF MYXOSPOREAN PARASITES OF MARINE FISHES FROM SENEGAL

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SUMMARY: Three myxosporidian (Myxozoa, Myxosporea) parasites, Myxobolus diagrammae n. sp. from the Kidney of Parapristipoma (Diagramma) octolineatum and Plectorhynchus (Diagramma) mediterraneus, Thelohannus arii n. sp. from the gall Bladder of Arius heudeloti and Myxidium chilomycteri n. sp. from the gall bladder of Chilomycterus spinosus mauretanicus are described. The host fishes were collected from the coast of Senegal, West Africa. The spores of M. diagrammae measured 11.23±0.85 µm x 6.73±0.78 µm and their polar capsules were 4.10±0.65 x 2.6±0.70 µm. The dimensions of spores of T. arii were 12.57±0.5 µm x 6.64±0.7 µm; polar capsules 6.9±0.12 x 2.57±0.17 µm. Spores of M. chilomycteri measured 11.53±0.68 µm x 7.27±0.58 µm and their polar capsules were 4.10±0.54 µm x 3.17±0.37 µm.

Key Words: Myxosporea, parasites, myxobolus, myxidium, thelohanellus.

INTRODUCTION

Numerous myxosporean species belonging to the genera Myxobolus Bütschli, 1882, Thelohanellus Kudo, 1933 and Myxidium Bütschli, 1882 are parasites of fishes (3-5,7-12). Some of these myxosporidia are histozoic and are serious pathogens of commercially important fishes. For example: the common carps, in Eurasia, is affected by Thelohanellus nikolskii which causes, under certain conditions, serious losses in the fish stock (8); Myxobolus cerebralis causes heavy losses in salmonid cultures in Europa (8). Myxidium giardi causes lesions to the kidney and gills of Anguilla anguilla (1).

In Africa these parasites are poorly known. The present paper is the description of three new species belonging to the genera Myxobolus, Thelohanellus and Myxidium found in marine fishes from Senegal.

MATERIALS AND METHODS

1922 fish specimens from the coast of Senegal (West Africa) belonging to 37 families, 51 genera and 63 species were examined. Light microscopy examination of fresh smears from various organs (liver, gall bladder, gonads, pyloric caeca, swim bladder, intestine and kidney) from each fish were conducted to look for myxosporean parasites. Fresh spores were measured according to the method described by Lom and Arthur (1989) for taxonomic purposes. Permanent smears were fixed with methanol, stained with Giemsa solution, dehydrated with acetone and mounted in Canada balsam.

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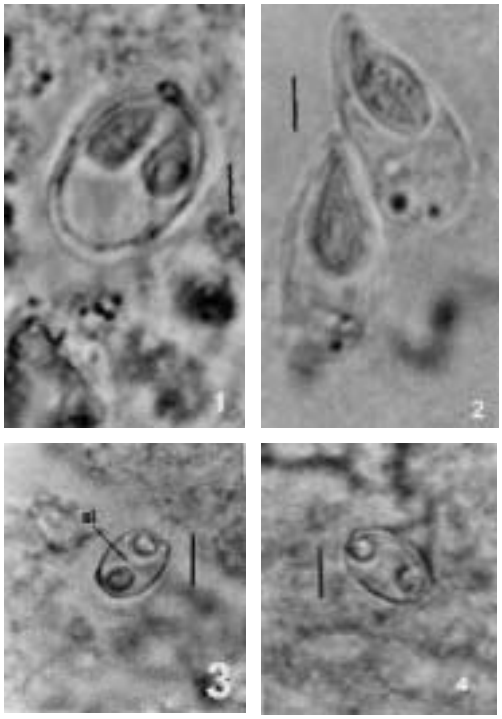

Figure 1: Fresh spores of Myxobolus diagrammae (Scale=2.5 μm)
Figure 2: Fresh spores of Thelohanellus arii (Scale=2.5 μm
Figure 3: Fresh spores of Myxidium chilomycteri in sutural view. Si=sutural line (Scale=6 μm).
Figure 4: Fresh spores of Myxidium chilomycteri in side view. Si=sutural line (Scale=6 μm)

RESULTS

a) Myxobolus diagram n. sp.

- Hosts: Parapristipoma (Diagramma) octolineatum (Valenciennes 1933) (Haemulidae) Plectorhynchus (Diagramma) mediterraneus Guichemet, 1850 (Haemulidae)

-Site of infection: Kidney

-Prevalences: 27.9% (12/43) in P. octolineatum; 10.2% (4/39) in P. mediterraneus.

-Description: This species did not induce formation of cysts. The spores (Figure 1 and 5) were ellipsoidal without sutural marking around the sutural edge. There is no intercapsular appendix. Spore length was 11.25±0.85 (9-12) μm, with 6.73±0.78 (5.5-7) μm, thickness 4.93±0.35 (4.5-5.5) μm. The polar capsules, of equal size pyriform and measured 4.10±0.65 (3-5.5) μm in length and 2.67±0.70 (21-4.2) μm in width; their posterior ends reach the midpoint of the spore length. No mucous envelope or distinct iodinophilous vacuole was detected;

b) Thelohanellus arii n. sp.

- Host: Arius heudeloti Valenciennes, 1840 (Ariidae)
Synonyme: Arius mercatoris

-Site of infection: Gall bladder

-Prevalence: 14.2% (1/7)

Description: The spores (Figure 2 and 6) were pyriform in shape. The anterior end was tapered, often slightly curved while the posterior end was broader and rounded. These spores were 12.57±0.5 (12-13.5) μm

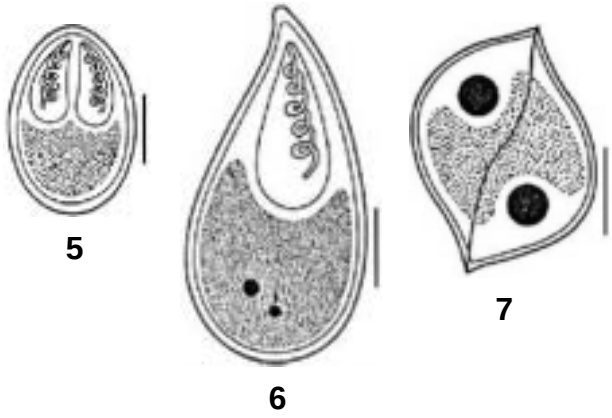

Figure 5: Line diagram of mature spore of Myxobolus diagrammae in frontal view. (Scale=2.5 μm)
Figure 6: Line diagram of mature spore of Thelohanellus arii in frontal view. (Scale=5 μm)
Figure 7: Line diagram of mature spore of Myxidium chilomycteri in sutural view. (Scale=4 μm)

long and 6.64±0.7 (6-8) μm wide; their thickness equaled that of the width. The valves of the spores are symmetrical and uniformly thick. The sutural edge of the spore did not bear markings. The polar capsule was elongated, pyriform, anteriorly pointed and measured 6.9±0.12 (6.75-7.5) μm x 2.57±0.17 (2.5-3) μm. The polar filament was distinctly observed inside the polar capsule. The sporoplasm was cups-shaped occupied the posterior region of the spore.

c) Myxidium chilomycteri n. sp.

- Host: Chilomycterus spinosus mauretanicus (Le Danois, 1959) (Diodontidae)

Table 1: Comparative study of Myxobolus diagrammae n. sp. with its related Myxobolus spp.

Species	Spores	Hosts	Countries	Authors
M. spatulatus Dogiel, 1957	Short appendix at The posterior end, 9-12x6-7 μm. Polar capsules: equal size, 5-6 μm.	-Paracottus kneri	USSR	Schulman, 1966
M. disparoides Schulman, 1962	Anterior end tapered, 9-12x6-7.5 μm Polar capsules of equal size, 4.5-6 μm.	-Schizothorax intemedius	USSR	Schulman, 1966
M. problematicus Schulman, 1962	Ellipsoidal, 9.5-11.5x5.5-6 μm Polar capsules: unequal size, 6x3 μm and 4.2x3 μm	-Acheilognathus chankaensis -Paracheilognathus imberbis	USSR	Schulman, 1966
M. rhodei Lom and Dykova, 1994	Ellipsoidal, 11 (9.8-11.8) x 8.9 (8.4-9.1) μm. Polar capsules: equal size, 4.3 (3.7-5)x2.8 (2.5-3.1) μm.	-Mugil cephalus	Australia	Lom and Dykova, 1994
M. purkynjei Lom and Dykova, 1994	Ellipsoidal 10.5 (10.2-11)x 8.7 (7.8-9.4) μm. Polar capsules: equal size, 5.5 (4.6-6.5)x3.1 (2.3-5.4) μm.	-Girella tricuspidata	Australia	Lom and Dykova, 1994
M. diagrammae n.sp.	Ellipsoidal, 11.25 (9-12) μm x 6.73 (5.5-7) μm polar capsules: equal size, 4.10 (3-5.5)x2.67 (2.1-4.2) μm.	-Parapristipoma octolineatum -Plectorhynchus mediterraneus	Senegal	Present paper

-Site of infection: Gall bladder

-Prevalence: 8.33% (4/48)

-Description: In sutural view, the spores were oval, slightly curved and the both ends pointed in diagonally opposite directions; the sutural line was slightly S-shaped (Figure 3 and 7). The shell walves were symmetrical with longitudinal striations. In side view, the spores were elliptical in shape with rounded extremities (Figure 4). The spore dimensions were 11.53±0.68 (10-13) μm in length and 7.27±0.58 (6-8) μm in width. The

Table 2 : Comparative study of Thelohanellus arii n. sp. with its related Thelohanellus spp.

Species	Spores	Hosts	Countries	Authors
T. misgumi Kudo, 1919	Elongated, Pyriforme, 14-15x6-7 μm 13-18.5x6.0-0.7.5 μm. Polar capsules: 6.3x2-3 μm 6.3-7.5x7 μm	-Misgurnus anguillicaudatus	Japan USSR	Kudo, 1919 Schulman, 1966
T. Occulileucisci Trojan, 1909	Tear-shaped, 9-10x4.5-5.5 μm 12.5x6(13.2-14.4x6.3-7.1 Polar capsules: 6.5x2.8 μm 5-7x2.5-3 μm 5x2 μm	-Rutilus rutilus -Leuciscus leuciscus -L. idius -Blicca bjoerkna Abramis brama -Acanthorhodeus asmussi -Carassius carassius -C. auratus -Cyprinus carpio -Gobio gobio	Russia Czehoslovakia	Kudo, 1919 Schulman, 1966 Lom et al. 1987 Lom and Dykova, 1992
T. arii	Pyriform, 12.57x6.64 (12-13.5x6.8) μm Polar capsules; 6.9x2.57 μm (6.75-7.5)	-Arius heudeloti (Gall bladder)	Senegal	Present paper

polar capsules, of equal size, were oval, 4.10±0.54 (3-5) μm in length and 3.17±0.37 (3-4) μm in width.

Vegetative forms were not observed.

DISCUSSION

No myxosporidian parasite of the genus Myxobolus was previously known in fishes of the genera Parapristipoma and Plectorhynchus. Comparing the species described in the present paper with the other species of the genus Myxobolus described previously, only spores of M. problematicus Schulman, 1962, M. disparoides Schulman, 1962; M. spatulatus Dogiel, 1957; M. rohdei Lom and Dykova 1994; M. purkyngei Lom and Dykova, 1994 resemble those of this species by their dimensions (Table 1). However, this species differs by the width of its spores, and by the dimensions of its polar capsules, not to mention the different hosts and region. Therefore, we propose to establish this species as new for science, Myxobolus diagrammae n. sp., the name being derived from the old generic name of its hosts.

The present species of Thelohanellus found in Arius heudeloti closely resembles Thelohanellus misgurni (5) reported from Misgurnus anguillicaudatus and Thelohanellus occulilencisci Trojan, 1909 reported from many species of fish (Table 2) (5,8,10,12). However the present Thelohanellus differs from T. misgurni by the shorter length of its spore and by its widely different, region and host. It is also distinct from T. occulilencisci

Table 3: Comparative study of Myxidium chilomycteri n. sp. with related Myxidium spp.

Species	Spores	Hosts	Countries	Authors
M. glutinosum Davis, 1917	Cylindrical, 10-11x6 μm Polar capsules: 3 μm in length	-Cynoscion regalis	France	Kudo, 1919
M. Phyllium Davis, 1917	Fusiform, each end truncated, 11x8 μm Polar capsules: 3 μ in diameter	-Gambusia affinis	France	Kudo, 1919
M. pseudoma crocapsulare Gwosdov, 1950	-Curved in S-shape in sutural view, elliptical with roundede ends in side view, 11-12x6-8 μm Polar capsules: 3.5-4 μm long	-Gobio gobio markakulensis	USSR	Schulman, 1966
M. truttae Leger, 1930	Ellipsoid, pointed at both ends, slightly S-shape, 11.5x8 μm 10.5-12x5.5-7.3 μm Polar capsules: 4.3x2.5 μm 3.5-4x2.6-3 μm	-Salmo trutta m. fario -Coregonus usuriensis -Brachimystax lenik	USSR	Schulman, 1966 Lom and Dykova, 1992
M. chilomycteri n.sp.	Oval, slightly S-shape, pointed at both ends, 11.53(10-13)x7.27 (6.8 μm) Polar capsules 4.10(3-5)x3.17(3-4) μm	-Chilomyctercus spinosus mauretanicus	Senegal	Present paper

by the lack of markings around the sutural edge of the posterior half of the spore and by its widely different host and region. The myxosporidian is, therefore, considered as a new species, to which the name Thelohanellus arii n. sp. is given after name of its host.

The Myxidium found in C. spinosus mauretanicus resembles four species previously described in having closely related length and shape of its spores. The spores of the present species is wider than that of M. glutinosum. M. truttae and M. phyllium are parasites of European fresh water fishes. M. pseudomacrocapsulare differs from the species described here by the

shorter and longer length of its spore. The Myxidium in study is, therefore, considered to be a new species and the name Myxidium chilomycteri n. sp. is given after its host. The recovery of Myxidium from the gall bladder of Chilomycterus spinosus mauretanicus is the first record of infestation of this fish (Table 3).

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