Myxobolus mississippiensis n. sp. (Myxosporea) from Gills of Lepomis macrochirus in Mississippi

David K. Cone
St. Mary's University, david.cone@smu.ca

Robin M. Overstreet
Gulf Coast Research Laboratory, robin.overstreet@usm.edu

Follow this and additional works at: https://digitalcommons.unl.edu/parasitologyfacpubs

Part of the Parasitology Commons

Cone, David K. and Overstreet, Robin M., "Myxobolus mississippiensis n. sp. (Myxosporea) from Gills of Lepomis macrochirus in Mississippi" (1997). Faculty Publications from the Harold W. Manter Laboratory of Parasitology. 445.
https://digitalcommons.unl.edu/parasitologyfacpubs/445

This Article is brought to you for free and open access by the Parasitology, Harold W. Manter Laboratory of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Faculty Publications from the Harold W. Manter Laboratory of Parasitology by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.
**MYXOBOLUS MISSISSIPPIENSIS N. SP. (MYXOSPOREA) FROM GILLS OF LEPOMIS MACROCHIRUS IN MISSISSIPPI**

David K. Cone and Robin Overstreet*

Department of Biology, Saint Mary's University, Halifax, Nova Scotia, Canada B3H 3C3

**ABSTRACT:** *Myxobolus mississippiensis* n. sp. is described from gill lamellae of the bluegill (*Lepomis macrochirus*) inhabiting the Pascagoula River System, Mississippi. Fresh spores measure 16.4–18.7 µm long, 3.9–6.2 µm wide, and 4.7–6.2 µm thick. Spore width to length ratio is 1:3.2. Polar capsules are 5.5–7.8 µm long and 1.5–2.3 µm wide, with 9–10 filament coils that when extruded measure 42.1 ± 4.2 µm. This parasite is unique among known species of *Myxobolus* in having spores that are lenticular in frontal view.

During examination of centrarchid fishes of Mississippi for myxosporean parasites, we found a previously undescribed species of *Myxobolus* Bütschli, 1882 (*Myxospora*) parasitizing gills of the bluegill. This report describes that material and discusses its possible relation to species in *Henneguya* Thélohan, 1892.

**MATERIALS AND METHODS**

Five adult specimens of the bluegill (*Lepomis macrochirus*) were collected in September 1994 by seining in the Pascagoula River and joining bayous, near Vancleave, Mississippi. Fish were fixed whole in 10% buffered formalin and rinsed overnight in tap water prior to necropsy, which included microscopic examination of all organs. Sample tissues were dehydrated in a graded ethanol series, cleared in xylene, and embedded in Paraplast. Histological sections (7 µm thick) were stained with hematoxylin and eosin. Fresh spores were obtained from the Pascagoula River, Jackson County, Mississippi. Those spores from 3 pseudocysts were mixed together in a wet mount and then measured and photographed. Air-dried smears of fresh spores were stained with Giemsa. Other fresh spores were mounted in India ink or stained with Lugol's iodine solution. Spore measurements are presented in micrometers as a mean ± SD followed in parentheses by the range.

**DESCRIPTION**

*Myxobolus mississippiensis* n. sp. (Figs. 1–12)

Plasmodia occurring as subspherical pseudocysts, up to 300 µm long; ectoplasm thin; endoplasm poorly defined, containing randomly arranged fully developed spores. Spores lenticular in frontal view; anterior end usually more blunt than posterior end (see figures); posterior extremity tapered, rounded, or pointed; posterior tip frequently bending slightly away from sutural plane; absent spore specimens (0.5% of spores in a pseudocyst) often with pair of thin posterior extensions of spore valves; extensions 1–16 long (Fig. 12). Fresh spores (n = 15) 17.7 ± 0.6 (16.4–18.7) long, 5.2 ± 0.7 (3.9–6.2) wide, 5.4 ± 0.8 (4.7–6.2) thick, without mucous envelope; fixed spores (n = 15) from different specimen 16.8 ± 0.8 (16–18) long, 5.2 ± 0.3 (5.0–5.3) wide, 5.3 ± 0.5 (4.7–6.2) thick. Spore width to length ratio in fresh spores 1:3.3 ± 0.5 (1:2.8–4.4), in fixed spores 1:3.2 ± 0.2 (1:2.9–3.5). Spore valves smooth, devoid of sutural ridge folds. Polar capsules narrowly pyriform, converging anteriorly but not crossing, 7.2 ± 0.59 (5.5–7.8) long (6.3 ± 0.6 [5.5–7.0] long in fixed specimens), with ratio of length to spore length 1:2.4 ± 0.2 (1:2.2–2.8), 1.6 ± 0.2 (1.5–2.3) wide (1.5 ± 0.2 [1.0–2.0] wide in fixed specimens), typically equal in length but frequently with 1 capsule 1–2 shorter than other, with intercapsular appendix absent. Polar filament exhibiting 9–10 coils arranged perpendicular to long axis of capsule, 42.1 ± 4.2 (35–46) long when extruded. Sporoplasm single, occupying almost 2/3 of spore length, sometimes containing prominent (2 µm wide) roundish-shaped vacuole. Iodinophilous vacuole absent.

**Taxonomic summary**

*Type host:* *Lepomis macrochirus* Rafinesque, 1819, bluegill (Centrarchidae).

*Site of infection:* Capillary bed of secondary gill lamellae. Other organs not infected.

*Type locality:* Bluff Creek; also in nearby Swift Bayou and associated Pascagoula River, Jackson County, Mississippi.

*Type specimens:* Syntypes on Giemsa-stained, air-dried smear in U.S. National Parasite Collection no. 86817, Beltsville, Maryland.

*Prevalence of infection:* Five of 11 (45%).

*Etymology:* The species is named for the type locality.

**DISCUSSION**

Four-hundred sixty-six nominal species of *Myxobolus* have been described from aquatic vertebrates, the majority of which are from fishes (Cone et al., 1990; Maeno et al., 1990; Landsberg and Lom, 1991; Segovia Salinas et al., 1991; Fomena et al., 1993; Lom and Dyková, 1994; Masoumian et al., 1994). Of these, 110 species are known from freshwater fishes of North America (Cone and Raesly, 1995; Cone et al., 1996). *Myxobolus mississippiensis* n. sp. is unique in its lenticular frontal view. Spores of all other known species of *Myxobolus* are either circular, ellipsoidal, pyriform, or narrowly pyriform in frontal view (Shulman, 1966; Lom and Dyková, 1992).

Three species of *Myxobolus* in addition to *M. mississippiensis* have been reported from *Lepomis macrochirus: Myxobolus osburni* Herrick, 1936, *Myxobolus cartilaginis* Hoffman, Putz, and Dunbar, 1965, and *Myxobolus corneus* Cone, Horner, and Hoffman, 1990 (see Herrick, 1936; Otto and Jahn, 1943; Hoffman et al., 1965; Cone et al., 1990). Spores of these species can be easily distinguished from those of *M. mississippiensis* by their circular or suboval frontal aspect.

**FIGURES 1–10.** *Myxobolus mississippiensis* n. sp. parasitizing *Lepomis macrochirus* from the Pascagoula River system, Mississippi. 1. Small oval plasmodium from fresh tissue smear, unstained. Scale bar 30 µm. 2. Histological section (H&E stained) through a plasmodium revealing its location within secondary lamellae. Scale bar 20 µm. 3–5. Photomicrographs of series of developed spores in frontal view. 6. Side view. Scale bar 10 µm. 7–10. Series of spores with atypical development of posterior extremity.
is not unique for *M. mississippiensis*. Some spores of at least one other species, *Myxobolus muelleri* Mitchell, 1989 from freshwater fishes in Montana, also exhibited abnormal posterior filaments (Mitchell, 1989).

**ACKNOWLEDGMENTS**

The authors thank Bill Font for arranging the initial collection of fishes that led us to find the parasite. The work was supported in part by an NSERC operating grant awarded to D.K.C., U.S. Department of Commerce, National Marine Fisheries Service Award no. NA26F 10085-01 and International Paper.

**LITERATURE CITED**


**FIGURES 11, 12.** Line drawings of *Myxobolus mississippiensis* n. sp. in frontal view. **11.** Typical spore. **12.** Abnormal spore with posterior extension of the valve. Scale bar 5 μm.