



New record of six species of Myxozoan parasites *Myxobolus* in *Carasobarbus luteus* from Tigris River at Baghdad city, Iraq

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ABSTRACT

During the period from March till the end of October 2018, a total of 60 specimens of *Carasobarbus luteus* (Cyprinidae) were collected from Tigris River passing through Baghdad city and examined for seeking and identify the *Myxobolus* infection. The results of examination revealed that these fishes were infected with six species of genus *Myxobolus* including *M. feisti* (1.66%) from tissue of gills, *M. gigi* (1.66%) from spleen, *M. impressus* (3.33%) from kidney, *M. musajevi* (1.66%) from kidney, *M. phylloides* (1.66%) from kidney and *M. suturalis* (1.66%) from kidney. These six species were recorded in the present study for the first time in Iraq. The description and measurements of these papasites are presented.

Introduction

Fish are considered as a basis of protein, fat, phosphate, iron, calcium, amino acids and some vitamins. The fish is a source of income and food for millions of people all over the world [1; 2].

All freshwater and marine fishes are infecting by external and internal parasites like ciliophora, myxozoa, monogenea, trematoda, cestoda, nematoda, acanthocephala, and crustaceans [3].

Members of the Myxozoa, include important fish pathogens such as members of Myxobolidae from the genus *Myxobolus* [4].

Myxozoan are one of the important groups of metazoan parasites as pathogens for fish and cause disease in a large variety of commercially important fish. Also, they cause losses in production of fish and some fish may be discarded because they are unsightly and not considered to be suitable for human feeding [5].

The parasites from the genus *Myxobolus* consist of a great diversity of species described worldwide [6; 7]. In Iraq, several research papers have been done on fish parasites from different Iraqi freshwater waters, more species of Myxobolidae were detected and are characterized mainly by morphological and morphometrical data of the Myxobolidae spores.

The cyprinid fish *Carasobarbus luteus*, which is called himri in Iraq, is endemic and widely distributed in Tigris river and Euphrates and adjacent drainage basins [8]. *C. luteus* is considered as one of the important fish for fisheries and consumer in Iraq. The importance of fish parasites is connected to the importance of fishes themselves. So, more study on fish parasites are needed to identify more species and increasing the data on the parasitic fauna of freshwater fishes as *C. luteus* which are scattered of Iraq. Therefore, present study have done to seeking the myxosporeans species which infect Cyprinidae fish *C. luteus* from Tigris River at Baghdad city.

Materials and Methods

During the present study, a total of 60 fish samples of *C. luteus* were collected from Tigris River at Baghdad city, during the period from March to the end of October 2018. The fishes were identified according to Coad [8] and their scientific names were determined using Froese and Pauly [9].

Fishes were examined as soon as possible after killing them by pithing method. Fish samples were dissected and examined externally and interinally with magnifying lens or with dissecting microscope to seeking for plasmodia of *Myxobolus* species. Scrapping the skin was done by spatula and the

smears of skin materials were examined under compound microscope. Gills were removed from branchial cavity and placed in Petri dishes with normal saline (0.9%) and examined by dissecting microscope. Pieces from kidney, spleen, liver, gonads and contents of gall bladder were examined microscopically after compressed it between two slides. The intestine is examined under a dissecting microscope as a whole view, and pieces of it was cut, opened longitudinally and compressed between two glass plates.

The spores of *Myxobolus* (which were presence in isolated and opened cysts) studied in a wet mount, and some of the spores were mounted with glycerine-jelly onto a slide under a cover slip. The specimens of *Myxobolus* species are diagnosed using the morphometric features of spores [10; 11]. All measurements are given in microns (μm) as Mean (range; no. of specimens). The parasites were photographed by compound microscope with digital camera. The prevalence of infection (%) of infected fish with *Myxobolus* species was calculated as demonstrated by Margolis *et al.* [12].

Results and Discussion

A total of 60 samples of *C. luteus* were collected from Tigris River at different regions at Baghdad city. The results of examination the fishes demonstrated that seven specimens (out of 60 examined fishes) were infected with *Myxobolus* spp. and six species of *Myxobolus* (*M. feisti*, *M. gigi*, *M. impressus*, *M. musajevi*, *M. phylloides* and *M. suturalis*) were identified in/ on infected fish sample. The *Myxobolus* spp. varies in their site and prevalence of infection (Table 1).

The following is a brief description of the *Myxobolus* species which recorded in present study from *C. luteus* species. The description is according to morphological features of spores.

Genus *Myxobolus* Bütschli, 1882

Spore spherical, ovoid, ellipsoid or pyriform in the front view, two polar capsules in anterior part. They have a polar filament coiled in spiral shape into each polar capsule. Sporoplasm contains the iodophile vacuole.

Myxobolus feisti Molnár, Gech, Székely, 2008

This parasite was detected from gill filaments of *C. luteus* with prevalence of infection 1.66% (Table 1). This parasite was not previously reported from Iraqi fish. Spore ellipsoidal shape, with two equal polar capsules that are pearl shape, they occupy in first half of spore length, intercapsular process clear and triangle shape (Figure 1). Length of spore was 11.2 (10.8-11.8; 4), width 7.2 (6.8-7.8; 4), length of polar capsules 5.5 (5.0-6.0; 4), and their width 2.3 (1.8-2.8). This parasite was recorded in the present study from gills of *C. luteus* which represents as new host for *M. feisti* in Iraq. The description was agreement with those reported in Molnár *et al.* [13] whereas the measurements of the present specimens were smaller than those recorded by Molnár *et al.* [13]. These

differences may be due the small no. of specimens which measured in present study or may be reflect differences in environmental conditions and host.

Myxobolus gigi (Fujita, 1927)

This spore was isolated from spleen of *C. luteus* with a prevalence of infection 1.66% (Table 1). *M. gigi* was not previously reported from Iraqi fish, the following is a brief description and measurement of this parasite. Spores lamonian shape with tapering anterior pole. Polar capsules pyriform occupy first half of spore length (Figure 2). Spore length 10.3 (9.0-11.7; 5), width 7.3 (6.5-8.6; 5), length of polar capsules 4.6m (3.9-5.2; 5) and their width 1.8 (1.4 - 2.0; 5). In the present study, this parasite represents the first record of *M. gigi* from Iraqi fish. *C. luteus* consider as first host for *M. gigi* in Iraq. The description and measurements of the present specimens were similar to those reported by Shul'man [11].

Myxobolus impressus Miroshnichenko, 1980

This parasite was recorded from kidneys of *C. luteus* with a prevalence of infection 3.33% (Table 1). Spore is spherical in shape (Figure 3), the morphological characteristics of this spores widening at level of the polar capsules, length of spores 11.6 (11.5-11.8; 7), width 9.5 (9.4-9.6; 7), length of polar capsules 4.2 (4.0 -4.6; 7), and their width 2.4 (2.2- 2.8; 7). The present record represents the first record for *M. impressus* in Iraq. The description and measurements of the present specimens were at the agreement with those reported by Miroshnichenko [14].

Myxobolus musajevi Kandilov, 1963

Spore was isolated from kidney of *C. luteus* with a prevalence of infection 1.66% (Table 1). The following is a brief description and measurement of this parasite. Spores ovate, narrow anterior pole. Polar capsules pyriform, occupy half spore length (Figure 4). Length of spores was 13.4 (11.9-15.6; 6), width 8.5 (7.8-9.7; 6), length of polar capsules 6.5 (6.4-6.8; 6) and their width 2.9 (2.6-3.2; 6). In the present study, *M. musajevi* represents a parasite recorded for the first in Iraqi fish and *C. luteus* consider as new host for it in Iraq. The descriptions of the spore were similar to those previously reported in Shul'man [11] with slight differences on the measurements between each specimens.

Myxobolus phylloides Shul'man, 1962

Spore was isolated from kidney of *C. luteus* with a prevalence of infection 1.66% (Table 1). Previously, there are no report for *M. phylloides* in Iraqi fish, therefore it consider as new item added to the parasitic fauna of Iraqi fish, and *C. luteus* consider as first host for *M. phylloides* in Iraq. Spores pyriform, narrow-tapered anterior end. Pyriform polar capsules equal in size, occupy more than half spore body (Figure 5). Length of spore was 8.4 (7.3 -9.8; 4), width 7.4 (7.2 -7.5; 4), length of polar capsules 4.1 (3.4-4.6; 4) and their width 2.2 (1.8-2.5; 4). The description were agreement with those reported by Shul'man [11] whereas the measurements of the

present specimens were slightly smaller than the measurements of spore described in Shul'man [11].

***Myxobolus suturalis* Shul'man, 1962**

The spore of *M. suturalis* was reported from kidneys of *C. luteus* with a prevalence of infection 1.66% (Table 1). This parasite was not previously reported from Iraqi fish, it was reported herein as new organism for the parasitic fauna of Iraqi fishes. Spores ellipsoid elongated with rounded toward anterior and posterior end; pyriform polar capsules reside in first half of spore body (Figure 6). Length of spore 14.6 (14.2-14.9; 4) width 12.6 (12.4-12.8; 4), length of polar capsules 7.6 (7.5-7.8; 4) and their width 5.3 (5.0-5.8; 4). The description of the present specimens was agreement with those reported by Shul'man [11] whereas the spores isolated in present study were larger compared with the measurements of the spores which recorded by Shul'man [11].

Table (1): *Myxobolus* species recorded during the present study from 60 specimens of *C. luteus*, their site and prevalence of infection.

<i>Myxobolus</i> species	Site of infection	No. of infected fish	Prevalence of Infection (%)
<i>Myxobolus feisti</i>	Gills	1	1.66
<i>Myxobolus gigi</i>	Spleen	1	1.66
<i>Myxobolus impressus</i>	Kidney	2	3.33
<i>Myxobolus musajevi</i>	Kidney	1	1.66
<i>Myxobolus phylloides</i>	Kidney	1	1.66
<i>Myxobolus suturalis</i>	Kidney	1	1.66

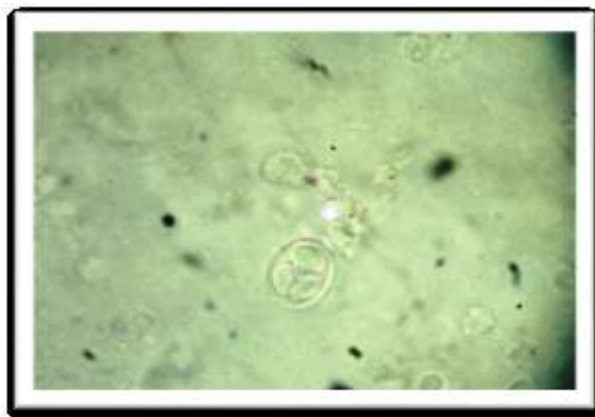


Fig. 1: Spore of *M. feisti* from gills of *C. luteus* (1000 X).

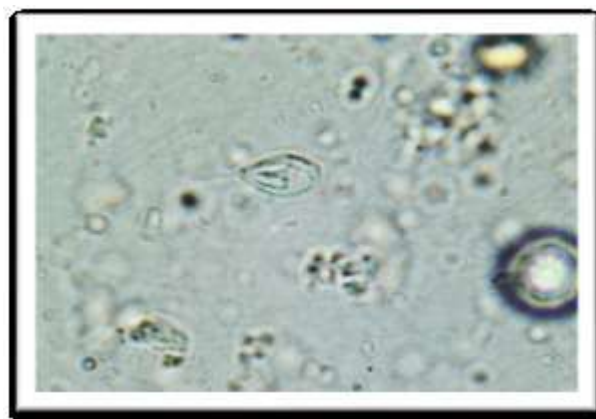


Fig. 2: Spore of *M. gigi* from spleen of *C. luteus* (1000 X).

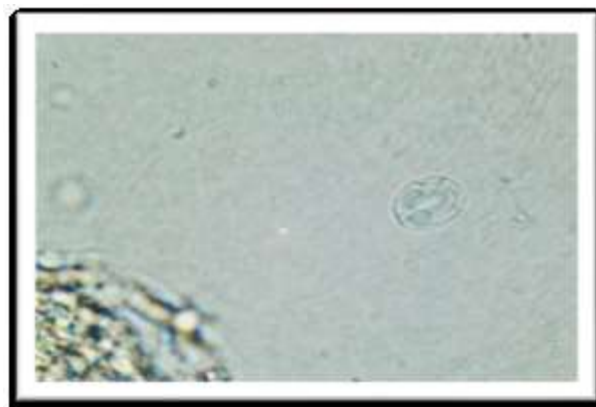


Fig. 3: Spore of *M. impressus* from kidney of *C. luteus* (1000 X).



Fig. 4: Spores of *M. musajevi* from kidney of *C. luteus* (1000X).

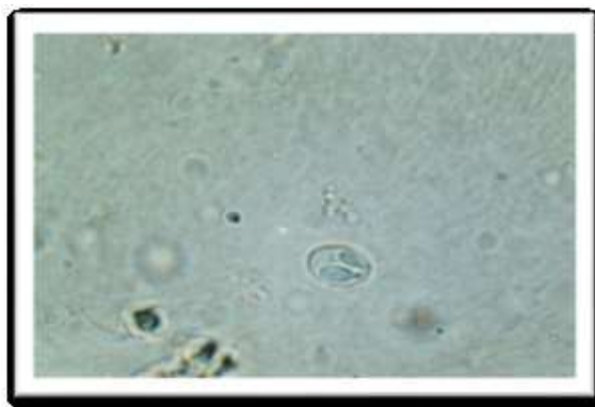


Fig. 5: Spore of *M. phylloides* from kidney of the *C. luteus* (1000X).

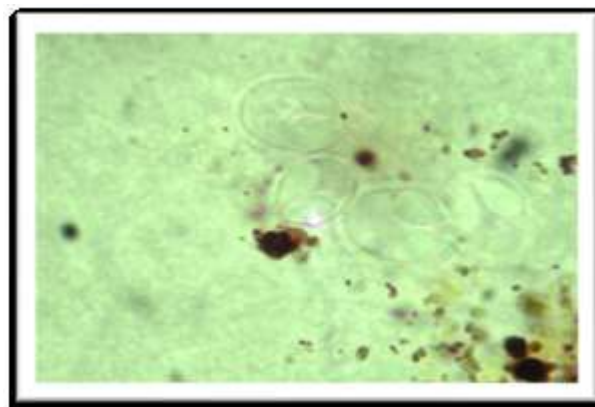


Figure (6): Spore of *M. suturalis* from the kidney of *C. luteus* (1000 X).

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تسجيل جديد لستة انواع من البوغيات الحيوانية *Myxobolus* المتطفلة في اسماك الحمري من نهر دجلة عند مدينة بغداد، العراق

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الملخص

تم خلال الدراسة الحالية الممتدة من شهر اذار الى نهاية شهر تشرين الأول 2018، تشخيص البوغيات الحيوانية العائدة الى الجنس *Myxobolus* المتطفلة على سمكة الحمري (العائلة الشبوطية). حيث جمعت 60 سمكة حمري من نهر دجلة عند مدينة بغداد، وفحصت الاسماك بحثاً عن الاصابة بطفيليات الجنس *Myxobolus*. وبينت نتائج الفحص اصابة هذه الاسماك بستة انواع من الطفيليات العائدة الى الجنس *Myxobolus* تضمنت مايلي: *M. feisti* (1.66%) المتطفل في نسيج الغلاصم، *M. gigi* (1.66%) المتطفل في نسيج الطحال، *M. impressus* (3.33%) المتطفل في نسيج الكلية، *M. musajevi* (1.66%) المتطفل في نسيج الكلية، *M. phylloides* (1.66%) المتطفل في نسيج الكلية، *M. suturalis* (1.66%) المتطفل في نسيج الكلية.