

# First Occurrence of Five Species of Myxosporean (Myxozoa: Myxosprea) Parasites for the First Time in Iraq from Fishes of Diyala River Fishes, Iraq

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**Abstract:** The examination of gills of *Carasobarbusluteus* from Diyala River at Diyala Province revealed the presence of five species of Myxosporean Parasites for the first time in Iraq viz *Chloromyxumleiosporum*, *Myxidiumventricosum*, *Myxoboluslobatus*, *M. permagnus* and *M. sprostoni*. The description, measurements and illustrations of these parasites were given.

**Keywords:** Myxozoa, *Chloromyxumleiosporum*, *Myxidiumventricosum*, *Myxoboluslobatus*, *Myxoboluspermagnus*, *Myxobolussprostoni*, Diyalariver, Iraq

## 1. Introduction

Among the external parasites infect freshwater fishes, ciliophorans, myxozoans, monogeneans in addition to crustaceans are the major significant agents affecting fish existence [1]. Myxosporidean life cycles are very complex, which included alternation of generations or stages of growth and reproduction [2]. All myxozoans are very ordinary in freshwater and marine fishes and can infect each organ [3]. Most infections in fish make minimal problems, but heavy infections can develop into serious, especially in young fishes, Myxozoans are parasites affecting a wide range of tissues [4]. Myxozoans infect fins, skin, operculum, buccal cavity, nasal hall, eye ball, gall bladder in addition to wall of the alimentary canal [5]. Parasites in wild fishes are usually only remarked upon when they are so obvious as to lead to rejection of fish by fishermen or consumers [6]. These parasites are significant fish pathogens, particularly for carp fingerlings beneath extensive fish culture practice and their direct life cycles and fish crowd are good circumstances for their easy increase among fishes [7]. Developmental stages were too establish in waterfowl, in nervous system of mammals and were still detect in human faeces [8] but no myxozoan has be known to be dangerous to human health. Most myxozoans cause small harm, a few have become documented as serious pathogens, particularly in aquaculture situations [9].

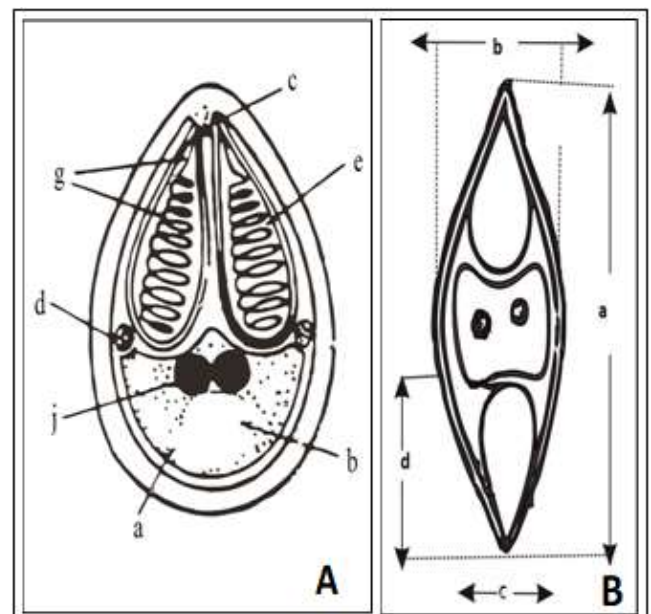
## 2. Materials and Methods

A total of 108 specimens of the fishes *C. luteus*, were collected from Diyala River, Diyala province. Sampling was complete weekly twice during the period from July 2016 to February 2017.

Fishes were transported living, placed in container contain local river water and immediately transferred to the laboratory of Parasitology, College of Education for pure science (Ibn-Al-Haitham). The fishes were identified according to [10].

In the laboratory, the fishes were examined externally for Myxozoa of skin, fins and buccal cavity. The gill arches

from both sides were separated, placed in Petri dish containing tap water and examine for ectoparasites. Pieces of gill filaments were tiered by needle .Smears from the skin, gills and buccal cavity were examined under a compound microscope. Upon fish dissection, muscles and all internal organs were examined according to [1]. Parasite identification was done according to [11].



**Figure 1:** Measurements used in the description according to Bykhovskaya-Pavlovskaya *et al.* (1962)

### A-Genus *Myxobolus* spp

a-amoeboid embryo; b-iodinophilous vacuole; c-intercapsular process; d-capsulogenic nuclei; e-polar capsules; g-polar filament; j-nuclei of amoeboid embryo

### B-Genus *Myxidium* spp

a-length of spore; b-width of spore; c-diameter of polar capsule; d-length of polar capsule

### 3. Results and Discussion

The present investigation showed the existence of five species of Myxozoabelonging to the genus *Chloromyxum*, *Myxidium* and *Myxobolus*. The following is an account of their measurements (in  $\mu\text{m}$ ) which were based on five specimens of each species.

#### 3.1. *Chloromyxumleiosporum* Shul'man, 1962 (Fig. 2)

This species was detected from gills of *C. luteus* of the present study with prevalence of infection of 6.5% and the mean intensity was 3. As this parasite was not reported earlier in Iraq [12] (Mhaisen, 2017). Its brief description and measurement ( $\mu\text{m}$ ) of this parasite.

Spores spherical oval. polarcapsules pyriform. Length of spores 6.1-6.3 (6.2), width 5.9-6.3 (6.1), length of polar capsules 1.7-2.3 (2.0), diameter of spore 1.4-1.6 (1.5). The description and measurements of the present specimen are similar to those reported by [11].

#### 3.2. *Myxidiumventricosum* Shul'man, 1962 (Fig. 3)

The parasite was recorded on gills of nine specimens of *C. luteus*, with prevalence of infection 8.3% and the mean intensity was 8. This parasite was not record earlier in Iraq [12] (Mhaisen, 2017). Its brief description and measurement ( $\mu\text{m}$ ) of this parasite.

Spores fusiform. Length of spores 10.6-12.2 (11.4), width 6.7-6.9 (6.8), length of polar capsules 5.4-5.8 (5.6), diameter of spore 3.4-3.8 (3.6).The description and measurements of the present specimen are similar to those reported by [11].

#### 3.3. *Myxoboluslobatus* (Nemeczek, 1911) Landsberg & Lom, 1991 (Fig. 4)

This species was reported on gills of *C. luteus* of the present study with prevalence of infection 4.6% and the mean intensity was 9. As this parasite not previously recorded from Iraq [12] (Mhaisen, 2017), the following is a brief description and measurements of this parasite.

Spores broadly oval. Length of spores 8.6-9.2 (8.9), width 6.1-6.3 (6.2), length of polar capsules 4.2-5.4 (4.8).The description and measurements of the present specimen are similar to those reported by [11].

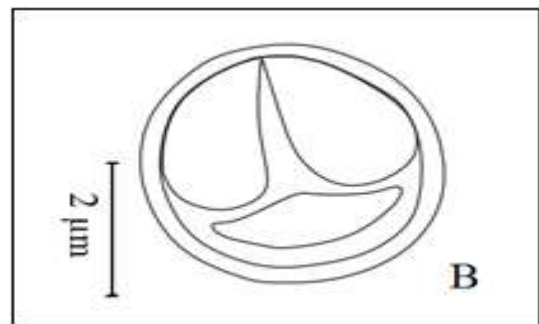
#### 3.4. *Myxoboluspermagnus* Wegener, 1910 (Fig. 5)

The speciement of *M.permagnus* were collected from gills of *C. luteus* recording an overall prevalence 8.3% and the mean intensity was 8. As this parasite not previously recorded from Iraq [12] (Mhaisen, 2017), the following is a brief description and measurements of this parasite (in  $\mu\text{m}$ ). Spores roundly pyriform. polar capsules pyriform. Length of spores 18.2-19.8 (19.0), width 10.4-11.2 (10.8), length of polar capsules 7.6-10.4 (9.0), diameter of spore 4.1-4.5 (4.3).The description and measurements of the present specimen are similar to those reported by [11].

#### 3.5. *Myxobolusprostoni* Shul'man, 1962 (Fig. 6)

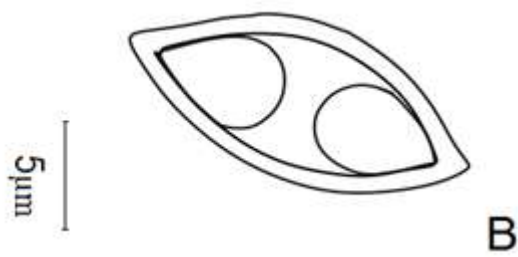
The gills of 108 fishes from *C. luteus* (out of six) was infected with this parasite with 5.6% prevalence of infection and the mean intensity was 13. As this parasite was not recorded, According to the parasite of the present study represent their first record in Iraq [12] (Mhaisen, 2017). As no previous record was given for this parasite on fishes from Iraq.

Spores spherical, pyriform polar capsules. Length of spores 11.6-12.4 (12.0), width 10.5-11.3 (10.9), length of polar capsules 5.8-7.2 (6.5), diameter of spore 3.7-3.9 (3.8).The description and measurements of the present specimen are similar to those reported by [11].

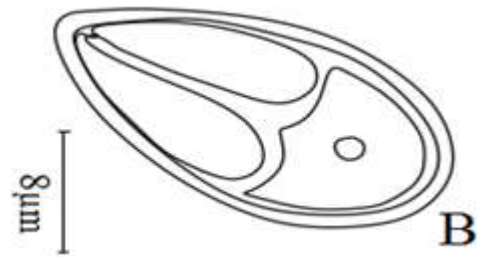


**Figure 2:** *Chloromyxumleiosporum*  
A-Photomicrograph (1000X) and B-Camera Lucida drawing

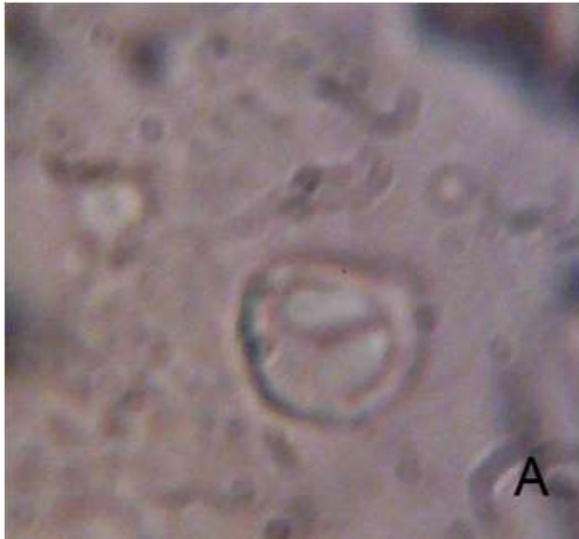




**Figure 3:** *Myxidium ventricosum*  
A-Photomicrograph (1000X)  
B-Camera Lucida drawing



**Figure 5:** *Myxobolus permagnus*  
A-Photomicrograph (1000X)  
B-Camera Lucida drawing



**Figure 4:** *Myxobolus lobatus*  
A-Photomicrograph (1000X)  
B-Camera Lucida drawing



**Figure 6:** *Myxobolus prostoni*  
A-Photomicrograph (1000X) and B-Camera Lucida drawing



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