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Recording of the Lissorchid Trematode *Asymphylodora imitans* (Mühling, 1898) in Iraq from Intestine of the Common Carp *Cyprinus carpio*

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Abstract: The lissorchid trematode *Asymphylodora imitans* (Mühling, 1898) is recorded in the present study for the first time in Iraq from intestine of the common carp *Cyprinus carpio* which was collected from Al-Ataifiya location on the Tigris river at Baghdad city during the period from July until November 2018. The description and measurements of this internal parasite as well as its illustrations are given. With this record, number of *Asymphylodora* species in fishes of Iraq reaches five species with two of them infecting *C. carpio*. Hence, the family Lissorchiidae from fishes of Iraq now includes two genera: *Asymphylodora* (with five species in addition to some unidentified species of this genus) and *Asymphylotrema* with one species.

Keywords: *Asymphylodora imitans*, Trematoda, *Cyprinus carpio*, Iraq.

Introduction

According to Bray (2008) and GBIF (2018), the genus *Asymphylodora* belongs to the family Lissorchiidae, superfamily Monorchioidea, order Plagiorchiida, class Trematoda, phylum Platyhelminthes.

The trematodes are heteroxenous (require more than one host to complete their life cycles), and their adult stages are parasitic in different vertebrate hosts. Apart from being hosts for adult trematodes, fishes may also be infected by the metacercarial larval stage (Paperna & Dzikowsk, 2006), with gastropods and other mollusc groups as first intermediate hosts (Olson et al., 2003). There are about 46 families of digeneans (the overwhelmingly biggest trematode group), that are primarily parasites of fishes (Cribb et al., 2002).

In Iraq, the first work on fish parasites was done by Herzog (1969) who studied different species of fishes collected from different locations in Iraq. He described the occurrence of one digenean parasite namely *Neodiplostomum* sp. So far, the family Lissorchiidae is represented with four species of the genus *Asymphylodora* (Al-Alusi, 1989; Al-Moussawi, 1997; Al-Ali, 1998; Abdul-Rahman, 1999; Al-Salim & Al-Ali, 2000; Al-Sa'adi, 2007; Mhaisen et al., 2015; Atwan, 2016; Hendi, 2017), some unidentified species of *Asymphylodora* (Al-Daraji, 1986; Al-Ali, 1998; Jori, 2006) and one species of the genus *Asymphylotrema* (Bashê, 2008; Bashê & Abdullah, 2010; Mhaisen et al., 2015; Hammood, 2017). The present paper documents the first record in Iraq of *Asymphylodora imitans* from intestine of *C. carpio* from Al-Ataifiya location on the Tigris river at Baghdad city.

Materials and Methods

A total of 20 specimens of the *Cyprinus carpio* were collected weekly from Tigris river at Baghdad city near Al-Ataifiya location during the period from July until the end of November 2018. Sampling was made weekly, fishes were transported alive to the laboratory and freshly

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examined for parasites. Trematodes were isolated from the intestine of the infected fishes under the dissecting microscope. Care was taken to isolate and flatten the specimens, which were then stained with aqueous neutral red and permanent slides were prepared with glycerol. The systematic descriptions used in the present study were based on the observations of living as well as stained specimens. Drawing was done based on permanent specimen's slides by using a camera Lucida. All measurements used in the description are in the following order; minimum-maximum (mean) values. Parasite identification was performed according to Bykhovskaya-Pavlovskaya et al. (1962). The information on the previous account records of parasites was checked by using the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2018).

Results and Discussion

Asymphylodora imitans was found in the intestine of two out of 20 specimens of *C. carpio*. The following is a brief description and measurements (in mm, based on five specimens) of this parasite as shown in Fig. (1).

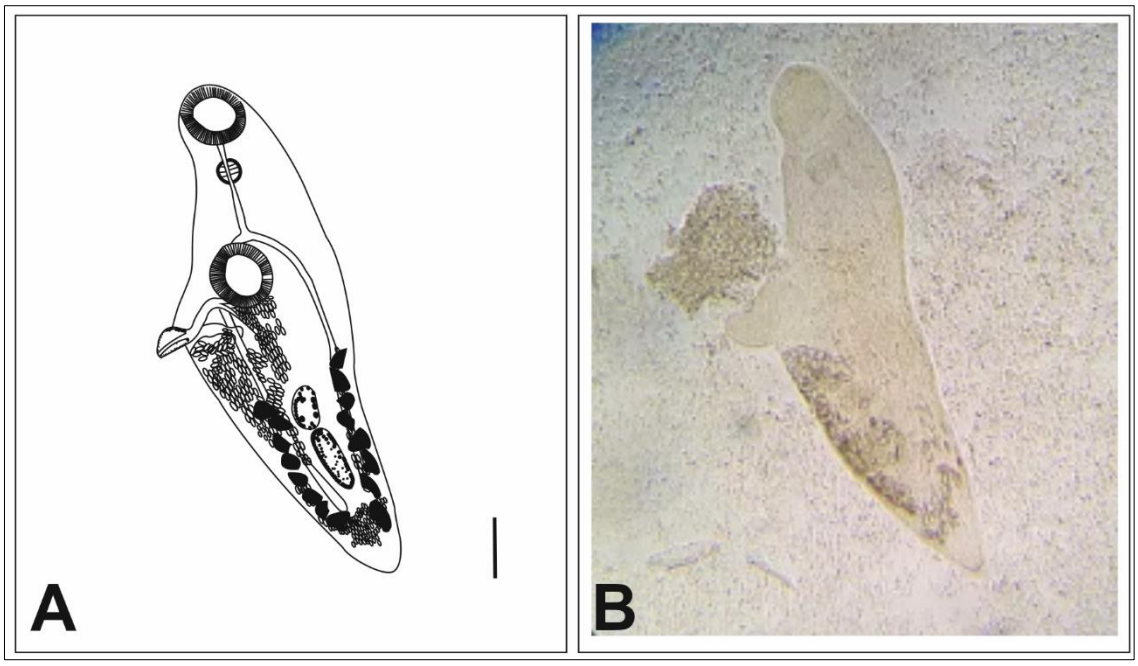

Figure 1: *Asymphylodora imitans* from *Cyprinus carpio*. A: Camera Lucida drawing (Scale bar 0.2 mm). B: Photomicrograph (40x).

Body size 1.3-1.7 (1.5) × 0.3-0.9 (0.6), tapering markedly posteriorly. Oral sucker 0.18, ventral sucker 0.2-0.24 (0.22). Prepharynx 0.06-0.08 (0.07). Oesophagus long and bifurcates directly before ventral sucker. Intestinal branches reach beyond posterior margin of testis. Testis in posterior position of the last third of body, while ovary is situated in the anterior of last third of body and round in shape. Vitellaria extend somewhat from the anterior of the ovary till beyond testis, consisting of single row of eight follicles. Uterus fills entire space in rear of body beyond the ventral sucker, with its upper loops occasionally reaching intestinal bifurcation. Eggs 0.06-0.07 (0.065) × 0.018-0.022 (0.02). Cirrus sac is well developed in posterolateral position to the ventral sucker.

Discussion

Lissorchiidae has worms with small to medium bodies, elongated-oval to fusiform body. It has two subfamilies: Asymphylodorinae with single testis and Lissorchiinae with two testes (Bray, 2008). Hence, the characters of the present worms fall in Asymphylodorinae due to having a single testis and within the genus *Asymphlodora* due to vitellaria which show separate lateral forms. The descriptions and measurements of the present *Asymphylodora imitans* are in agreement with those reported by Bykhovskaya-Pavlovskaya et al. (1962) from intestine of bream, white-eye bream, silver bream and keeled bream from waters of Leningrad and Kalinin regions, basins of Danube, Dniester and Bug and Dnieper rivers. *A. imitans* is easily distinguished from the other four *Asymphylodora* species from fishes of Iraq (*A. demeli*, *A. kubanicum*, *A. markewitschi* and *A. tincae*) by its large eggs which reach 0.06 mm compared with about 0.02 mm in the other four *Asymphylodora* species, and its uterus which fills the entire space in the rear body with its upper loops occasionally reaching the intestinal bifurcation.

The present report of this trematode represents its first record in Iraq according to the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2018).

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