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## Digenetic trematodes and crustacean parasitising some fishes from the Tigris River, Al-Zaafaraniya region, Baghdad city

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### Abstract

A total of 304 of freshwater fishes belongs to 12 fish species (*Acanthobram amarnid*, *Alburnus caeruleus*, *Arabibarbus grypus*, *Carasobarbus luteus*, *Carassius auratus*, *Chondrostoma regium*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Leuciscus vorax*, *Luciobarbus xanthopterus*, *Mystus pelusius* and *Planiliza abu*) were collected from Tigris River at Al-Zaafaraniya Region, south of Baghdad City during the period from December 2016 to May 2017. Three hundred and three (303) fish were infecting by seven ectoparasite species including four trematodes and three crustacean infecting gills, skin and eyes. The study revealed the existence of six new fish hosts were reported for three species of these parasites, including two Trematode namely *Clinostomum complanatum* in *Alburnus caeruleus*, *Arabibarbus grypus*, *Chondrostoma regium* and *Luciobarbus xanthopterus*; and *Diplostomum phoxini* in *Carassius auratus*, in addition to Crustacean parasite (*Ergasilus peregrinus*) that infected *Chondrostoma regium*. The percentage incidence of infection, intensity of infection of parasite and site of infection were varied depending on species of parasite and host.

**Keywords:** Trematoda, Crustacea, ectoparasites, Tigris River, Iraq

### Introduction

Ectoparasites constitute 45.4% of the total number of parasite species of freshwater fish parasites in Iraq [1]. It is well documented that many parasite species have received significant scientific attention due to the damage to fishery resources cause reduce fish growth, reproduction and other activities in their natural environments, The adult stage of the parasite is mostly dangerous to the health of the fish based on the weight and size of host and the mode of infestation, this situation is more pronounced in case of infection with the external parasites (ectoparasites) as such parasites have direct life cycles in which the parasites can complete their life cycles with no need for any intermediate host, the direct contact between fishes of the same species or even of different species make the task of life cycle completion so easy for ectoparasites in comparison with that of the endoparasites [2]. The trematodes, which are commonly referred to as flukes, comprise two subclasses: Aspidogastrea and Digenea. Trematoda is one of the three classes of the phylum Platyhelminthes. Some trematodes live as larvae in fish eyes [3], gills and skin and responsible for important fish diseases such as worm cataract [4]. Some trematodes are known to be transmissible to humans through the consumption of fishes, crustaceans or mollusks [5]. There are three main groups of parasitic crustaceans affecting commercially important fish species: Branchiura, Copepoda and Isopoda [6]. Some crustaceans cause significant economic losses to fishes [7]. Some crustaceans play significant role in fish secondary infections, fish lice have been shown to be mechanical vectors for fish viruses [8]. Among parasitological investigations achieved on trematodes of fishes from Tigris River within the Iraqi area many researches have been published [9, 10, 11, 12]. The present study aimed to investigate the trematodes and crustacean that causes health problem in fish from the Tigris River at Baghdad City

### Materials and Methods

Weekly fish samples were collected from Tigris River at Al-Zaafaraniya Region, Baghdad City during the period from December 2016 to May 2017, they were caught with aid of a gill nets of 2, 3 and 4cm mesh size in different dimensions and were directly transported to the laboratory. Fish are classified according to [13]. Fishes were freshly examined for ectoparasites [5]. Parasites were identified according to [14].

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Skin smears were taken by slide scraping, then examined directly under low and high microscope. The gills of the fish were dissected out, placed in Petri dishes containing tap water and examined for ectoparasites under dissecting microscope, and the smears were prepared by slight scraping and examined. Whole eyes were removed and the lens were dissected from each eye then teased under dissecting microscope. The percentage incidence of infection and intensity of infection of parasite were calculated according to [15] as follow:

Prevalence of Infection =  $\frac{\text{Number of infected host} \times 100}{\text{Total number host examined}}$

Mean Intensity of Infection =  $\frac{\text{Number of parasite}}{\text{Number of infected host}}$

## Results

A total of 304 of freshwater fishes belongs to 12 fish species and three families were inspected for parasites. 303 fish were infected by parasites.

Tab.1 illustrate the scientific names of these species as well as their families, through the external examination of these fishes revealed the occurrence of seven ectoparasites as demonstrated in Tab.1.

**Table 1:** The scientific names of fish and parasite with their families

Family	Species
<b>Fish</b>	
Cyprinidae	<i>Acanthobrama marmid</i> Heckel, 1843
	<i>Alburnus caeruleus</i> Heckel, 1843
	<i>Arabibarbus grypus</i> (Heckel, 1843)
	<i>Carasobarbus luteus</i> (Heckel, 1843)
	<i>Carassius auratus</i> (Linnaeus, 1758)
	<i>Chondrostoma regium</i> (Heckel, 1843)
	<i>Cyprinion macrostomum</i> Heckel, 1843
	<i>Cyprinus carpio</i> Linnaeus, 1758
	<i>Leuciscus vorax</i> (Heckel, 1843)
	<i>Luciobarbus xanthopterus</i> Heckel, 1843
Bagridae	<i>Mystus pelusius</i> (Solander, 1794)
Mugilidae	<i>Planiliza abu</i> (Heckel, 1843)
<b>Parasite</b>	
Heterophyidae	<i>Ascocotyle coleostoma</i> (Looss, 1896) Looss, 1899
Clinostomidae	<i>Clinostomum complanatum</i> (Rud., 1819) Braun, 1899
Diplostomidae	<i>Diplostomum phoxini</i> Faust, 1918 <i>Diplostomum spathaceum</i> (Rud., 1819) Olsson, 1876
Argulidae	<i>Argulus foliaceus</i> (Linnaeus, 1758) Jurine, 1806
Ergasilidae	<i>Ergasilus peregrinus</i> Heller, 1865 <i>Ergasilus sieboldi</i> von Nordmann, 1832

## Trematodes

Metacercaria of four trematode species, below is a list of those species:

### *Ascocotyle coleostoma*

The parasite appeared in all studied species with different proportions. The presence of the parasite was in the skin and gills in five species of fish, while confined in the presence only in gills in another six species of fish, and found only in the skin of *A. grypus* (Tab.2). The incidence of parasitic infection ranged from 6.7% in *C. auratus* to 100% in *M. pelusius* and *C. macrostomum*, while the mean intensity ranged between 1 in *P. abu* to 3 in *L. vorax* (Tab.2).

### *Clinostomum complanatum*

The parasite appeared in eight fish species particularly in skin of two species namely *A. caeruleus* and *L. xanthopterus*, and in gills of *C. luteus*, *L. vorax* and *P. abu*, while it found in both skin and gills of *A. grypus*, *C. auratus* and *C. regium*.

The highest mean incidence appeared in *P. abu* reached 50% followed by both *C. regium* and *A. grypus* (33.3%), and the lowest incidence of parasite infection was found in *L. xanthopterus* reached 5% (Tab.2), while the previous species was characterized by the highest mean intensity of infection with this parasite reached 7.5%, the lowest mean intensity of infection recorded in *C. auratus* (Tab.2).

### *Diplostomum phoxini*

It appeared in eyes of only one species namely *C. auratus* with incidence reached 0.7% and mean intensity reached 1% (Tab.2).

### *Diplostomum spathaceum*

This parasite was recorded from the eyes of four species namely, *A. caeruleus*, *C. auratus*, *C. regium* and *C. carpio* with an incidence of 2.5, 2.2, 12.5 and 2.5% respectively, while mean intensity reached 2, 1, 1 and 1 in these species respectively (Table.2).

**Table 2:** Trematodes parasites with their hosts and its mean incidence and intensity

Parasite	Host fish (n infected)	Percentage incidence (%)	Mean intensity	Infection Site
<i>A. oleostoma</i>	<i>A. marmid</i> (5)	60	2	Skin and gills
	<i>C. luteus</i> (40)	15	1.5	Skin and gills
	<i>C. auratus</i> (134)	6.7	2.6	Skin and gills
	<i>C. regium</i> (24)	50	2.5	Skin and gills
	<i>C. carpio</i> (39)	7.6	2.3	Skin and gills
	<i>A. grypus</i> (9)	11.1	2	Skin
	<i>A. caeruleus</i> (4)	75	1.6	Gills
	<i>C. macrostomum</i> (1)	100	2	Gills
	<i>L. vorax</i> (4)	50	3	Gills
	<i>L. xanthopterus</i> (40)	15	2.5	Gills

	<i>M. pelusius</i> (1)	100	2	Gills
	<i>P. abu</i> (2)	50	1	Gills
<i>C. complanatum</i>	<i>A. grypus</i> ** (9)	33.3	1.6	Skin and gills
	<i>C. regium</i> ** (24)	33.3	2.5	Skin and gills
	<i>C. auratus</i> (134)	5.2	1.7	Skin and gills
	<i>A. caeruleus</i> ** (4)	25	2	Skin
	<i>L. xanthopterus</i> ** (40)	5	7.5	Skin
	<i>C. luteus</i> (40)	10	4	Skin
	<i>P. abu</i> (2)	50	5	Gills
	<i>L. vorax</i> (4)	25	2	Gills
<i>D. phoxini</i>	<i>C. auratus</i> ** (134)	0.7	1	Eyes
<i>D. spathaceum</i>	<i>A. caeruleus</i> (4)	25	2	Eyes
	<i>C. auratus</i> (134)	2.2	1	Eyes
	<i>C. regium</i> (24)	12.5	1	Eyes
	<i>C. carpio</i> (39)	2.5	1	Eyes

\*\*New host record in Iraq.

### Crustacea

Three crustacean species were recorded from gills and skin of four fish hosts in the present study, below is a list of these species:

#### *A. foliaceus*

The parasite appeared in gills of *C. auratus* with percentage incidence attend 1.4% and mean intensity reached 1 (Tab.3).

#### *E. peregrinus*

This parasite recorded from gill of *A. grypus* and from skin and gills of *C. regium*, with percentage incidence attend 11.1 and 4.1% respectively, mean intensity reached 1 in both species (Tab.3).

#### *E. sieboldi*

This parasite was recorded from gills of *L. xanthopterus*, percentage incidence attend 2.5% and mean intensity attend 1 (Tab.3).

**Table 3:** Crustacean parasites with their hosts and mean incidence and intensity

Parasite	Host fish (n examined)	Percentage incidence (%)	Mean intensity	Infection Site
<i>A. foliaceus</i>	<i>C. auratus</i> (134)	1.4	1	Gills
<i>E. peregrinus</i>	<i>A. grypus</i> (9)	11.1	1	Gills
	<i>C. regium</i> ** (24)	4.1	1	Skin and gills
<i>E. sieboldi</i>	<i>L. xanthopterus</i> (40)	2.5	1	Gills

\*\*New host record in Iraq.

### Discussion

Discussion of the emergence of the parasites is according to the registrations of Iraqi fish parasites as follow:

#### Trematoda

In the current study, the significant variations of water temperature were noticed, high temperature recorded in April and May reached 20.1 and 25 °C respectively, while lowest temperature recorded in December attained 10.8°C. Metacercaria of four trematodes species are listing below:

#### *A. coleostoma*

In Iraq, the first report of this parasite infection was in from gills of *Planiliza abu* (reported as *Liza abu*) from Diyala River [16], Later on, it was reported from 32 other hosts of Iraqi fish [17] which included 12 hosts recorded in the present study.

#### *C. complanatum*

Also in Iraq, the first report on this parasite infection was from gills of *C. luteus* and *L. vorax* from Mahajaran River, south of Basrah [18], Later on, it was reported from 22 other hosts of Iraqi fish which included *C. luteus*, *C. auratus*, *Leuciscus vorax* (reported as *Aspius vorax*) and *Planiliza abu* (reported as *Liza abu*) which recorded in the current study but did not include *A. caeruleus*, *A. grypus*, *C. regium* and *L. xanthopterus* [19]. So, *A. caeruleus*, *A. grypus*, *C. regium* and *L. xanthopterus* of the present study represent a new host record for this parasite in Iraq, this makes the number of hosts of this parasite in Iraq to 27 species of fish. This metacercariae was found in gills of *C. macrostomum*, *C.*

*luteus*, *L. vorax* and *P. abu* from Tigris River with a prevalence of 2.59, 10, 25 and 50% respectively [20], the previous study also recorded in skin of *A. caeruleus* and *L. xanthopterus* with prevalence reached 25 and 5% respectively, the same parasite found in skin of *A. grypus* and *C. auratus* with prevalence reached 33.3 and 5.2% respectively, while the current study reported from skin of *A. caeruleus* with percentage incidence 25% and gills of *C. auratus* 5.2% and in gills and skin of *A. grypus* (33.3%) from the Tigris River passing through Tikrit City.

#### *D. phoxini*

The first report on this parasite in Iraq was from the eyes of *M. pelusius* from Tigris River, Baghdad City [21], Later on, it was reported from only one other host of Iraqi fish but not included *C. auratus* [19], So *C. auratus* of the present study represents a new host record for this parasite in Iraq, this makes the number of hosts of this parasite in Iraq to three species of fish.

#### *D. spathaceum*

The first report on this parasite in Iraq was from eyes of *C. macrostomum*, *C. luteus* and *C. carpio* from Dokan dam lake [22], Later on, it was reported from 35 other hosts of Iraqi fish [19], which included *A. caeruleus*, *C. auratus*, *C. regium* and *C. Carpio* that recorded in the current study. This parasite was found in the eye lens of *C. carpio* from Ainkawa fish hatchery with a prevalence of 1.33% [23], while in our study this parasite was recorded from the eyes of four species namely ; *A. caeruleus*, *C. auratus*, *C. regium* and *C. carpio* with an incidence 2.5, 2.2, 12.5 and 2.5% respectively.

## Crustacea

Three crustacean species were recorded from gills and skin of four fish hosts in the present study, below are a list of those species:

### *A. foliaceus*

The first report on this parasite in Iraq was detected in gills of *C. luteus* from in Habbaniyah Lake [19], Later on, it was reported from 15 other hosts of Iraqi fish including *C. auratus* which recorded in the current study [17]. This crustacean parasite was found on skin of *C. carpio* in Ainkawa fish hatchery with a prevalence of 4.5% [24], the parasite in the current study appeared in gills of *C. auratus*, the incidence attained 1.4%.

### *E. peregrinus*

The first report on this parasite in Iraq was from gill of *P. Abu* from Tigris River at Baiji City, Salah Al-Deen province[25], Later on, it was reported from seven others host of Iraqi fish including *A. grypus* which recorded in the current study, but not included *C. regium* [17], So, the later species is representing a new host in Iraq, increasing the number nine species parasite in Iraq, this makes the number of hosts of this parasite in Iraq nine species of fish. This crustacean was recorded from gills of *C. auratus* and *P. abu* from the Euphrates River at Al-Musaib City with incidence of 1.3 and 8.3% respectively [26], the same parasite recorded in the present study from gills of *A. grypus* and from the skin and gills of *C. regium* with an incidence of 11.1 and 4.1% respectively.

### *E. sieboldi*

The first report on this parasite in Iraq was from gills of *L.vorax* from Habbaniyah Lake [19], Later on, it was reported from 25 other hosts of Iraqi fish including *L.xanthopterus* which recorded in the current study [17]. This crustacean was recorded from gills of *P. abu* from the Euphrates River at Al-Musaib City with an incidence of 12.5% [26], the same parasite recorded in the present study from the gills of *L. xanthopterus* with an incidence of 2.5%.

## Conclusion

In Iraq, Six new species of fish were infected with parasite, an incidence and mean intensity of infection was varied according to the parasite and host.

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