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MONOGENEANS AND TREMATODES OF SOME FISHES FROM TIGRIS RIVER AT NORTH, MID AND SOUTH OF BAGHDAD PROVINCE, IRAQ

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ABSTRACT

Between January and December 2009, a total of 154 fish specimens were collected from Tigris River from three stations at north, mid and south of Baghdad province (Al-Taji, Al-Shawaka and Al-Zaafaraniya, respectively). These fishes belong to ten species: *Alburnus caeruleus*, *Aspius vorax*, *Carasobarbus luteus*, *Carassius auratus*, *C. carassius*, *Cyprinus carpio*, *Cyprinion macrostomum*, *Liza abu*, *Mystus pelusius* and *Silurus triostegus.* The result of inspection showed that eight species of these fishes were infected with 16 species of the class Monogenea and three species of the class Trematoda. The monogeneans included one species each of *Dogielius*, *Ligophorus* and *Thaparocleidus*, three species of *Gyrodactylus* and ten species of *Dactylogyrus*. The trematodes included one species of *Ascocotyle* and two species of *Diplostomum*. Among all these parasites, *A. coleostoma* infected the highest number of hosts (five host species) while 12 parasite species infected one host each. Among these fishes, *C. luteus* was infected with the highest number of parasite species (nine species), followed by *C. carpio* (eight species) while no infection was detected from both *A. caeruleus* and *A. vorax*. Furthermore, *C. luteus* is also reported as a new host record in Iraq for both *Dactylogyrus kulwieci* and *Diplostomum commutatum* and *C. macrostomum* as a new host for both *Dactylogyrus anchoratus* and *D. skrjabini*.

INTRODUCTION

Parasites live in a normal condition with their fish hosts in their natural healthy environments. However, if some harmful changes occur in the environment, the equilibrium between fish hosts and their parasites may be disturbed, and outbreaks of species of parasites may occur. Regulating mechanisms in the environment soon involved, and a new equilibrium will be established, but in the intervening period, there may be a serious loss of fishes (28).

Monogeneans are known to cause harmful damages to fish gills and skin (50). They have direct life cycles, which enable them to transmit easily from one host to another, especially under conditions of intensive fish culture (27).

Trematodes live as larval forms (metacercaria) in tissues of fish skin and gills or as adults in their digestive system (34). Detailed information on the parasitic fauna has a special importance for purposes of increasing the productivity of fish ponds or to improve the stocks of valuable commercial fisheries in natural waters (55).

In Iraq, surveys of parasitic flukes were done on fishes captured from natural water bodies (rivers, tributaries, dams, lakes and marshes). Among such surveys, notable records of some monogeneans and trematodes were achieved from fishes of Tigris River (30, 48, 12, 1, 49, 33, 42, 15, 6, 13, 14, 21, 45, 18). According to Mhaisen (38), a total of 172 monogeneans and trematodes are so far

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known to infect freshwater fishes of Iraq. However, this number is vulnerable to increase as new surveys are achieved. The aim of the present work is to survey some fishes from Tigris River at Baghdad province for monogenean and trematode infections.

MATERIALS AND METHODS

The sampled fishes were collected from three stations at Tigris River at Baghdad province. These are Al-Taji, Al-Shawaka and Al-Zaafaraniya, during the period from January to December 2009. These fishes were captured by gill nets of different mesh sizes and cast nets. Fishes were brought to laboratory with containers filled with ice. These fishes (Table 1) were identified according to Coad (29) and their scientific names followed Froese and Pauly (31).

Total length and weight was recorded for each fish. Smears from the skin, gills, buccal cavity and eye ball were examined under a compound microscope. Parasite identification was done according to some text books (28, 56, 32, 34). The index-catalogue of parasites and disease agents of fishes of Iraq (38) was followed to indicate number of previous host records for each parasite species in order to minimize list of references for each parasite species.

RESULTS AND DISCUSSION

During the present study, a total of 154 fish specimens were captured (Table 1). The parasitological investigation of these fishes revealed the occurrence of 65 species of ectoparasites and endoparasites. The present information deals only with 19 species of these parasites, which are 16 monogeneans and three trematodes. The following is brief account on the occurrence of these parasites which are alphabetically arranged under their classes.

Table 1: Number of fishes examined from three stations at Tigris River

Fish scientific name	Number of fishes examined from:			
	Al-Taji	Al-Shawaka	Al-Zaafaraniya	Total
Alburnus caeruleus Heckel, 1843	1	-	-	1
Aspius vorax Heckel, 1843	2	-	-	2
Carasobarbus luteus (Heckel, 1843)	21	3	9	33
Carassius auratus (Linnaeus, 1758)	-	-	1	1
Carassius carassius (Linnaeus, 1758)	6	2	11	19
Cyprinus carpio Linnaeus, 1758	8	4	3	15
Cyprinion macrostomum Heckel, 1843	7	1	3	11
Liza abu (Heckel, 1843)	11	26	28	65
Mystus pelusius (Solander, 1794)	-	1	-	1
Silurus triostegus Heckel, 1843	-	6	-	6
Total	56	43	55	154

Class Monogenea

The monogeneans of the present study included one species each of *Dogielius, Ligophorus* and *Thaparocleidus,* three species of *Gyrodactylus* and ten species of *Dactylogyrus*. These are alphabetically arranged in the following account.

Dactylogyrus anchoratus (Dujardin, 1845) Wagener, 1857

This parasite was recorded from gills of *Carassius carassius*, *Cyprinus carpio* and *Cyprinion macrostomum*. The first report on this parasite in Iraq was

documented in a conference abstract (44) and published later (45) from *C. carpio* from Tigris River at Al- Zaafaraniya, south of Baghdad during 1993. Later on, it was reported from five fish species, inclusive of *C. carpio* and *C. carassius* (38) but not from *C. macrostomum*, which now represents the sixth host for *D. anchoratus* in Iraq. According to Mhaisen (38), this is a common parasite in *C. carpio* as there are 21 reports on this fish in different parts of Iraq. Three reports were published on *D. anchoratus* from *C. carassius*: from Al-Habbaniya Lake (41) and Al- Zaafaraniya fish farm (46, 53).

Dactylogyrus dulkeiti Bychowsky, 1936

This parasite was recorded from gills of *C. carassius*. The first report on this parasite in Iraq was from *C. carpio* from Al- Zaafaraniya fish farm, south Baghdad (46). Later on, it was reported from four fish species which included *C. carpio* (51, 52) and *C. carassius* from three fish farms, south of Baghdad (22) and from Euphrates River at Al-Musaib city (19).

Dactylogyrus extensus Mueller and Van Cleave, 1932

This parasite was reported from gills of *C. carpio*. The first report in Iraq of *D. extensus* and its synonym *D. solidus* was from *C. carpio* from Suwairah and Latifiyah fish farms (54). According to Mhaisen (38), this is a common parasite in *C. carpio* as there are 45 reports on it from this fish in different parts of Iraq. In addition to *C. carpio*, *D. extensus* has so far 16 fish hosts in Iraq (38).

Dactylogyrus inexpectatus Izjumova, in Gusev, 1955

This parasite was recorded from gills of *C. carassius*. Its first report from Iraq was from *Ctenopharyngodon idella* from fish ponds at Suwairah and Latifiyah (54). Later on, it was reported from four fish hosts which included *C. carassius* from Al- Zaafaraniya fish farm (46, 53) and from Euphrates River at Al-Musaib city (19).

Dactylogyrus kulwieci Bychowsky, 1933

This parasite was reported from gills of *Carasobarbus luteus*. The first report on this parasite in Iraq was from *B. xanthopterus* (= *Luciobarbus xanthopterus*) and *B. esocinus* (= *Luciobarbus esocinus*) from Tigris River at Salah Al-Deen province, Iraq (1). Later on, it was reported from three other hosts in Iraq which did not include *C. luteus* (38). So, *C. luteus* in the present study represents the sixth new host record for this parasite in Iraq.

Dactylogyrus minutus Kulwiec, 1927

This parasite was reported from gills of *C. luteus* and *C. carpio*. Its first report from Iraq was documented in a conference abstract (44) and published later (45) from *C. carpio* from Tigris River at Al- Zaafaraniya and from Euphrates River at Al-Qadisiya Dam Lake during 1993. Now, *D. minutus* has 12 hosts in Iraq which included both *C. luteus* and *C. carpio*. According to Mhaisen (38), this is a common parasite in *C. carpio* as there are 37 reports on this fish in different parts of Iraq. *C. luteus* was reported as host for this parasite only from a drainage river at Al-Mahmoodiya (25) and from Euphrates River at Al-Musaib city (19).

Dactylogyrus pavlovskyi Bychowsky, 1949

This species was detected in the present study from gills of *L. abu*. Its first report in Iraq was from *B. grypus* and *B. sharpeyi* (= *Mesopotamichthys sharpeyi*) from Tigris River (33). Later on, it was reported from five fish hosts inclusive of *L. abu* from Euphrates River at Al-Musaib city (19), Hilla river (35) and from Tigris River passing through Baghdad city at Al-Adhamiyah region (18).

Dactylogyrus skrjabini Achmerov, 1954

This parasite was reported from gills of *C. luteus* and *C. macrostomum*. The first report in Iraq was from *Hypophthalmichthys molitrix* (54). Later on, it was reported from four other hosts which included *C. luteus* from Al-Zaafaraniya fish farm (53). So, *C. macrostomum* in the present study represents the sixth new host record for this parasite in Iraq (38).

Dactylogyrus varicorhini Bychowsky, 1957

This parasite was recorded from gills and skin of *C. luteus*. The first report in Iraq was from *B. luteus* (=*C. luteus*) and *Varicorhinus trutta* (= *Capoeta trutta*) from Tigris River at Salah Al-Deen province, Iraq (1). According to Mhaisen (38), it was then reported from *C. luteus* in different locations in Iraq (2, 46, 26, 23, 17, 24, 21, 22) as well as from *Barbus xanthopterus* (= *Luciobarbus xanthopterus*).

Dactylogyrus vastator Nybelin, 1924

This parasite was recorded from gills of *C. luteus*. Its first report from Iraq was from *C. macrostomum* from Tigris River, Baghdad (12). *D. vastator* is the commonest monogenean in Iraq as it has so far 33 fish hosts (38).

Dogielius persicus Molnár and Jalali, 1990

This parasite was recorded from gills of *C. luteus*. The first report from Iraq was from *B. luteus* (= *C. luteus*) from Greater Zab River (3). Later on, it was reported from *C. luteus* from Euphrates River at Al-Musaib city (19) and from Lesser Zab River (47) in addition to four other hosts (38).

Gyrodactylus baicalensis Bogolepova, 1950

This parasite was recorded from gills of *C. macrostomum*. Its first report from Iraq was from *C. carpio* from Suwairah and Latifiyah fish farms (54). Later on, it was reported from seven fish species (38) inclusive of *C. macrostomum* from man-made lakes, north of Baghdad (10, 5).

Gyrodactylus elegans Nordmann, 1832

This parasite was recorded from gills of *C. carpio*. The first report on this parasite in Iraq was from *C. carpio* and *L. abu* from some fish farm (9). Later on, 45 reports were done on the occurrence of *G. elegans* from *C. carpio* from different water bodies and fish farms of Iraq (38). *G. elegans* is the commonest gyrodactylid species in fishes of Iraq as it was reported from 22 host species (39).

Gyrodactylus medius Kathariner, 1895

This parasite was recorded from gills of *C. carpio*. The first report in Iraq was from *C. carpio* from Al-Furat fish farm near Hilla city (20). Later on, it was reported from *C. carpio* from Lesser Zab River, north of Iraq (3, 4) and from *C. luteus* from Euphrates River at Al-Musaib city (19). No more hosts were reported for this parasite in Iraq (38).

Ligophorus vanbenedenii (Parona and Perugia, 1890) Euzet & Suriano, 1977

This parasite was recorded from gills of *Liza abu*. Its first report from Iraq was documented in a conference abstract (44) and published later (45) from the same fish from Tigris River at Al- Zaafaraniya, south of Baghdad during 1993 as *Ancyrocephalus vanbenedenii*. Later on, *A. vanbenedenii* was reported only from *L. abu* in Iraq from Tigris River at Al-Zaafaraniya (6), a man- made lake at Baghdad city (16) and from Euphrates River at Al-Musaib city (19).

Thaparocleidus siluri (Zandt, 1924) Lim, 1996

This parasite was recorded from gills of *S. triostegus*. Balasem *et al.* (26) reported *Ancylodiscoides siluri* for the first time in Iraq from the same host from Hemrin Dam Lake at Diyala province. According to Lim *et al.* (36), *A. siluri* is a synonym of *T. siluri*. No more reports were published on the occurrence of *T. siluri* and its synonym *A. siluri* in Iraq (38).

Class Trematoda

The trematodes of the present study included one species of *Ascocotyle* and two species of *Diplostomum*. These are alphabetically arranged in the following account.

Ascocotyle coleostoma (Looss, 1896) Looss, 1899

Metacercariae of this trematode were recorded from gills and skin of *C. luteus, C. carassius, C. macrostomum, C. carpio* and *L. abu*. It was reported for the first time in Iraq from both *Heteropneustes fossilis* and *L. abu* from Diyala River (11). This is the commonest trematode infecting freshwater fishes of Iraq as it has so far 34 host species (38) which included the five above-named hosts of the present study. Adults of *A. coleostoma* infect some piscivorous birds such as the grey heron *Ardea cinerea* in Babylon (now Al-Furat) fish farm, mid Iraq (40).

Diplostomum commutatum (Diesing, 1850) Dubois, 1937

Metacercariae of this parasite was recorded from eye ball of *C. luteus* and *C. carpio*. The first report in Iraq was from *A. vorax* (15). Later on, it was reported from both *C. carpio* and *H. molitrix* from three fish farms, south of Baghdad (22). So, *C. luteus* of the present study represents the fourth new host record for this parasite in Iraq (38).

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Metacercariae of this trematode were recorded from eye ball of *C. luteus, C. macrostomum* and *C. carpio*. It was reported for the first time in Iraq from the same above-named hosts from Dokan Dam Lake (2). These metacercariae are common in freshwater fishes of Iraq as so far 31 fish hosts are known (38). They are responsible for the worm cataract which causes fish blindness (37). The adult worm lives in the intestine of fish-eating birds such as some gulls like *Larus ridibundus* from Al-Baghdadi town, mid Iraq (7), *L. canus* and *L. ichthyaetus* from Shatt Al-Arab River (43) and *L. ridibundus* from Basrah (8).

To sum up on the monogenean and trematode infections of fishes of the present study, *A. coleostoma* was the prevalent parasite among these fishes as it was recorded from five fish hosts, followed by both *D. anchoratus* and *D. spathaceum* which were recorded from three fish species each, while 12 monogeneans were monoxenous, i. e. each was recorded from one host (Table 2). This is explained on the basis of host specificity which is known for most monogeneans (32). In connection with host infections, *C. luteus* was infected with nine different species followed by *C. carpio* which was infected with eight species while no infection was recorded from both *A. caeruleus* and *A. vorax*. In connection with differences in the infection among fishes from the three sampling areas, table (2) indicates that fishes of Al-Taji were infected with 15 species, those of Al-Zaafaraniya with 10 species while those of Al-Shawaka were infected with five species. These numbers are, to some extent, in accordance with number of fishes sampled (Table 1). In general, more fishes examined usually reveal more parasitic infections. Hence, to get reliable results, many fish specimens should be examined. Finally, *C. luteus* is reported here as a new host

record in Iraq for both *D. kulwieci* and *D. commutatum* and *C. macrostomum* for both *D. anchoratus* and *D. skrjabini*.

Table 2: Infection of fishes from Tigris River at Al-Taji (T), Al-Shawaka (S) and Al-Zaafaraniya (Z) with some monogenean and trematode parasites with their site of infection and percentage incidence.

Parasite species	Host species	Site of infection*	% Incidence	Sampling area		
				T	S	Z
Class Monogenea						
Dactylogyrus anchoratus	*C. carassius* *C. macrostomum* + *C. carpio*	G G G	10.5 10.5 6.6	√ √ √		
D. dulkeiti	*C. carassius*	G	5.2	√		
D. extensus	*C. carpio*	G	13.3	√		
D. inexpectatus	*C. carassius*	G	5.2	√		√
D. kulwieci	*C. luteus* +	G	3			√
D. minutus	*C. luteus* *C. carpio*	G G	3 6.6	√		√
D. pavloviski	*L. abu*	G	1.5		√	
D. skrjabini	*C. luteus* *C. macrostomum* +	G G	30.3 9	√ √		√
D. varicorhini	*C. luteus* *C. macrostomum*	G, S G	69.6 9	√ √	√	√
D. vastator	*C. luteus*	G	3	√		√
Dogielius persicus	*C. luteus*	G	6	√		
Gyrodactylus baicalensis	*C. macrostomum*	G	9	√		
G. elegans	*C. carpio*	G	6.6			
G. medius	*C. carpio*	G	26.6	√		
Ligophorus vanbenedenii	*L. abu*	G	13.8	√	√	√
Thaparocleidus siluri	*S. triostegus*	G	83.3		√	
Class Trematoda						
Ascocotyle coleostoma	*C. luteus* *C. carassius* *C. macrostomum* *C. carpio* *L. abu*	S S G, S S G	3 5.2 9 6.6 6.1	√ √ 	 √ √	√ √
Diplostomum commutatum	*C. luteus* + *C. carpio*	Eb Eb	3 6.6	 √		√
D. spathaceum	*C. luteus* *C. macrostomum* *C. carpio*	Eb Eb Eb	3 9 6.6	 √		√ √

***Site of infection: Eb= Eye ball, G= Gills, S= Skin.**
+ New host record in Iraq.

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الديدان أحادية المنشأ والمخرّمات المتطفلة على بعض أسماك نهر دجلة شمال ووسط وجنوب محافظة بغداد

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الملخص

تم جمع وفحص **154** أنمودجاً من أسماك نهر دجلة من ثلاث محطات هي شمال ووسط وجنوب محافظة بغداد (التاجي، الشواكة والزعفرانية) أثناء شهري كانون ثاني وكانون أول من عام **2009**. تعود تلك الأسماك إلى عشرة أنواع هي اللصاف، الشلك، الحمري، السمكة الذهبية، الكرسين، الكارب الإعتيادي، البنيني الكبير الفم، الخشني، أبو الزمير والجري الآسيوي. تبين أثناء الفحص المختبري أن ثمانية أنواع من هذه الأسماك كانت مصابة بواقع **16** نوعا من طفيليات صنف المونوجينيا وثلاثة أنواع من صنف المخرّمات. شملت طفيليات المونوجينيا نوعاُ واحداً من كل من الجنس ***Dogielius*** والجنس ***Ligophorus*** والجنس ***Thaparocleidus*** وثلاثة أنواع من الجنس ***Gyrodactylus*** وعشرة أنواع من الجنس ***Dactylogyrus***. أما المخرّمات فتعود إلى نوع واحد من الجنس ***Ascocotyle*** ونوعين من الجنس ***Diplostomum***. من بين هذه الأنواع المتطفلة، أصاب النوع ***Ascocotyle coleostoma*** أكبر عدداً من المضيفات (خمسة أنواع من المضيفات)، بينما سجلت إصابة **12** نوعاً من تلك الطفيليات لمضيف واحد فقط لكل منها. ومن بين تلك الأسماك، كانت سمكة الحمري مصابة بأعلى عدداً من أنواع الطفيليات (تسعة أنواع) تلتها سمكة الكارب الإعتيادي المصابة بثمانية أنواع، في حين لم تسجل أية إصابة لكل من سمكتي اللصاف والشلك. وبالإضافة الى ذلك عدّت سمكة الحمري مضيفاً جديداً في العراق لكل من ***Dactylogyrus kulwieci*** و ***Diplostomum commutatum*** وعدّت سمكة البنيني كبير الفم مضيفاً جديداً لكل من ***Dactylogyrus anchoratus*** و ***D. skrjabini***.

وزارة العلوم والتكنولوجيا– بغداد، العراق.