



Monogeneans and Trematodes of some Fishes from Lake Hamrin in Diyala Province, Iraq

Jawdat M. Al-Jawda* & Maan H. Ali

Animal and Fish Research Centre, Agriculture Research Directorate, Ministry of Science and Techn
765, Al-Jadiriya, Baghdad, Iraq

*Corresponding author: jaljawda@gmail.com

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Abstract: Between January and December 2019, a total of 368 fish specimens were collected from Lake Hamrin in Diyala province, Iraq. Eight species of these fishes belonged to the family Cyprinidae, five to the family Leuciscidae as well as one species each to Bagridae, Heteropneustidae, Siluridae, Mugilidae and Mastacembelidae. After the laboratory examination these fishes were found to be infected with 30 monogeneans and two trematode species. The monogeneans included one species each of *Mastacembelocleidus*, *Paradiplozoon*, *Solostamenides*, and *Thaparocleidus*, two species of *Dogielius*, four species of *Gyrodactylus* and 20 species of *Dactylogyrus*, while the trematodes included one species each of *Ascocotyle* which infects eight fish species and *Clinostomum* which infect nine fish species. *Clinostomum complanatum* infected nine host species, also, the results of the present study revealed that 15 parasite species infect only one host species each. *Carassius auratus* was infected with 18 parasite species and *Cyprinus carpio* with nine species. Eight fish species are reported here as new host records in Iraq for 13 parasite species.

Keywords: Monogenea, Trematoda, Freshwater fishes, Diyala province, Lake Hamrin, Iraq.

Introduction

The study of fish parasites is necessary to increase the productivity of pond fish farms, to improve the stocks of valuable commercial fisheries in the natural waters and to the possibility of fish acclimatization in new sites or localities (Shulman, 1961). Monogenea is one of the largest classes within the phylum Platyhelminthes. Monogeneans usually possess anterior and posterior attachment apparatus that are used for settlement, feeding, locomotion and transfer from host to host (Bychowsky, 1957; Yamaguti, 1968; Kearns, 1998). The class Monogenea, used to be known as monogenetic trematodes,

includes skin and gill flat worms with direct life cycles (Amlacher, 1970). Monogeneans are common in carp culture practices (Bauer *et al.*, 1969). According to their attachment organs, monogeneans are provided either with hooks and hooklets and hence they are known as monopisthocotyleans or with clamps and hence they are known as polyopisthocotyleans (Gussev, 1985). It is interesting to state here that the name Monogenoidea, instead of Monogenea, is applied for this class with two subclasses: Polyonchoinea and Heteronchoinea instead of Monopisthocotylidea and Polyopisthocotylidea, respectively (Boeger & Kritsky, 2001).

The trematodes live parasitically on fishes either as larval forms (metacercaria) in tissues of fish skin, gills and eyes or as adults in their digestive system (Hoffman, 1999). Most trematodes include endoparasitic flat worms with non-segmented body, closed digestive system, oral and ventral suckers and indirect life cycles. As adults, they live inside various vertebrates and spend their larval stages in intermediate hosts, mainly snails but also in some fishes (Olsen, 1974).

Lake Hamrin is located in Diyala province at about 10 km away from Al-Muqdadya city and at about 120 km east north of Baghdad city. This Lake was found after the compilation of Lake Hamrin on Diyala river in 1981. The present report on the monogenean and trematode infections in fishes of this lake was done because only one survey was achieved on infection of fishes of this lake by Balasem *et al.* (2000) in which two ciliophorans, seven myxozoans, nine monogeneans, two trematodes, one cestode, two nematodes and one crustacean were reported from 14 inspected fish species.

Materials & Methods

Fish samples were collected from the south part of Lake Hamrin in Diyala province, during the period from January to December 2019. These fishes were captured alive by using gill nets of different mesh sizes as well as cast nets. Fishes were brought to the laboratory in plastic containers filled with ice. These fishes were identified according to Coad (2010). Total length and weight was recorded for each fish. Smears from the skin, gills, buccal cavity and eye ball were taken and examined under a compound microscope.

Parasite identification was done according to some text books (Bykhovskaya-Pavlovskaya *et al.*, 1962; Yamaguti, 1968;

Gussev, 1985; Hoffman, 1999; Pugachev *et al.*, 2009). The prevalence of infection was calculated according to Margolis *et al.* (1982). The index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2020) was followed to indicate number of previous host records for each parasite species in order to minimize list of references for each parasite species. The valid scientific names of these fish species, are based on Fricke *et al.* (2020), as shown in the following systematic account.

Class Actinopterygii

Order Cypriniformes

Family Cyprinidae

Arabibarbus grypus (Heckel, 1843)

Carasobarbus luteus (Heckel, 1843)

Carassius auratus (Linnaeus, 1758)

Cyprinion kais Heckel, 1843

Cyprinion macrostomum Heckel, 1843

Cyprinus carpio Linnaeus, 1758

Garra rufa (Heckel, 1843)

Luciobarbus xanthopterus Heckel, 1843

Family Leuciscidae

Acanthobrama marmid Heckel, 1843

Alburnus caeruleus Heckel, 1843

Alburnus sellal Heckel, 1843

Chondrostoma regium (Heckel, 1843)

Leuciscus vorax (Heckel, 1843)

Order Siluriformes

Family Bagridae

Mystus pelusius (Solander, 1794)

Family Heteropneustidae

Heteropneustes fossilis (Bloch, 1794)

Family Siluridae

Silurus triostegus Heckel, 1843

Order Mugiliformes

Family Mugilidae

Planiliza abu (Heckel, 1843)

Order Synbranchiformes

Family Mastacembelidae

Mastacembelus mastacembelus (Banks & Solander, 1794)

Results & Discussion

A total of 368 fish specimens were captured. The parasitological investigation of these fishes revealed the presence of 30 monogenean species and two trematode species. The following is a brief account on the occurrence of these parasites which are alphabetically arranged under their classes. The first record of each parasite species in Iraq will be given. The total number of host species in Iraq and any new host record will be declared depending on Mhaisen (2020) without mentioning this reference each time.

Class Monogenea

The recorded monogeneans included one species each of *Mastacembelocleidus*, *Paradiplozoon*, *Solostamenides* and *Thaparocleidus*, two species of *Dogielus*, four species of *Gyrodactylus* and 20 species of *Dactylogyrus*. These are alphabetically arranged in the following account.

Dactylogyrus achmerowi Gusev, 1955 was recorded from gills of *C. carpio* and *G. rufa*. Mhaisen *et al.* (1988) recorded this parasite for the first time in Iraq from *C. carpio*. A total of 16 other host species from different inland waters and fish farms in Iraq which did not include *G. rufa*, and hence *G. rufa* represents a new host for this parasite in Iraq.

Dactylogyrus anchoratus (Dujardin, 1845) Wagener, 1857 was reported from gills of *C. auratus*. Mhaisen *et al.* (1997) in a conference abstract reported this parasite for the first time in Iraq from *C. carpio*, but the full paper was published later by Mhaisen *et al.* (2003). Later on, it was reported from 12 other fish species which included *C. auratus*.

Dactylogyrus barbioides Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993 was recorded from gills of *A. grypus*. Gussev *et al.* (1993) described this parasite from Iraq as a

new species from *A. grypus* (reported as *Barbus grypus*). After that, it was recorded in Iraq from six other host species.

Dactylogyrus barbuli Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993 was reported from gills of *L. xanthopterus*. Abdullah (1990) reported this parasite in Iraq from *Luciobarbus barbulus* (as *Barbus barbulus*) as *D. dokani* in an unpublished M. Sc. Thesis and then, it was nominated as *D. barbli* by Gussev *et al.* (1993). After that, it was reported from seven other host species which included *L. xanthopterus*.

Dactylogyrus baueri Gusev, 1955 was recorded from gills of *C. auratus* and *C. regium*. Al-Aubaidi *et al.* (1999) gave the first record of this parasite in Iraq from *C. carpio*. Later on, it was reported from eight other fish species inclusive of *C. auratus* but excluded *C. regium*, and hence *C. regium* represents a new host in Iraq for this monogenean.

Dactylogyrus carasobarbi Gusev, Jalali & Molnár, 1993 was reported from gills of *C. luteus*, *C. auratus*, *C. regium*, *C. carpio* and *L. xanthopterus*. Al-Ali (1998) gave the first record of this parasite in Iraq from *C. luteus* (as *Barbus luteus*). Nine other fish species, inclusive of *C. luteus*, *C. regium* and *L. xanthopterus* but exclusive of *C. auratus* and *C. carpio* were reported from Iraq and hence both *C. auratus* and *C. carpio* represent new hosts in Iraq for this parasite.

Dactylogyrus deziensioides Gusev, Jalali & Molnár, 1993 was recorded from gills of *C. regium* and *L. xanthopterus*. Abdullah (2002) documented the first record of this parasite in Iraq from both *L. barbulus* (reported as *Barbus barbulus*) and *L. xanthopterus* (as *B. xanthopterus*). After that, it was reported from 13 other hosts which included *C. regium*.

Dactylogyrus dulkeiti Bychowsky, 1936 was reported from gills of *C. auratus*. Mohammad-Ali *et al.* (1999) represented its first record in Iraq from *C. carpio*. Later on, it was reported from nine other fish species which included *C. auratus*.

Dactylogyrus ergensi Molnár, 1964 was reported from gills of *A. caeruleus*, *C. auratus* and *C. regium*. Al-Zubaidy (1998) gave the first report on this monogenean in Iraq from *C. carpio*. Later on, it was reported from *C. regium* by Hameed (2019). So, *A. caeruleus* and *C. auratus* now represent new hosts in Iraq for this parasite.

Dactylogyrus extensus Mueller & Van Cleave, 1932 was recorded from gills of *C. auratus* and *C. carpio*. Salih *et al.* (1988) documented its first record in Iraq from *C. carpio*. After that, it was reported from 22 other host species inclusive of *C. auratus*. This parasite was also reported as *D. solidus* Akhmerov, 1948 which is a synonym of *D. extensus* as stated by Pugachev *et al.* (2009).

Dactylogyrus fallax Wagener, 1857 was reported from gills of *L. vorax*. Abdullah (2008) documented its first report in Iraq from *Alburnus sellal* (reported as *Chalcalburnus mossulensis*). Later on, it was reported from two other fish species which included *L. vorax*.

Dactylogyrus formosus Kulwiec, 1927 was recorded from gills of *C. auratus* and *C. carpio*. Asmar *et al.* (2004) published its first report in Iraq from *C. auratus*. After that, it was recorded from six other fish species, inclusive of *C. carpio*.

Dactylogyrus inexpectatus Izjumova, in Gusev, 1955 was reported from gills of *C. auratus*. Salih *et al.* (1988) gave its first record in Iraq from *Ctenopharyngodon idella*.

Later on, it was reported from six other fish species which included *C. auratus*.

Dactylogyrus kersini Gusev, Jalali & Molnár, 1993 was recorded from gills of *L. xanthopterus*. Abdullah (2002) demonstrated its first record in Iraq from *L. kersin* (reported as *Barbus kersin*). Later on, it was reported from four other fish species, inclusive of *L. xanthopterus*.

Dactylogyrus macrostomi Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993 was reported from gills of *C. auratus* and *C. macrostomum*. Abdullah (1990) reported this monogenean for the first time in Iraq from *C. macrostomum* as *D. erbilensis* in an unpublished M. Sc. Thesis, then, it was nominated as a new species (*Dactylogyrus macrostomi*) by Gussev *et al.* (1993). After that, it was reported from one more fish species (*C. carpio*). So, *C. auratus* now represents a new host species in Iraq for this parasite.

Dactylogyrus minutus Kulwiec, 1927 was recorded from gills of *C. auratus*, *C. macrostomum* and *C. carpio*. Mhaisen *et al.* (1997) declared its first record in Iraq from *C. carpio* by in a conference abstract and the full paper published was by Mhaisen *et al.* (2003). So far, it was reported from 14 other fish species inclusive of *C. auratus* and *C. macrostomum*.

Dactylogyrus pavlovskyi Bychowsky, 1949 was recorded from gills of *A. grypus* and *L. vorax*. Abdullah (1990) firstly described it in Iraq from *A. grypus* as *D. tigræ* in an unpublished M. Sc. Thesis, but then, it was nominated as a new species (*D. pavlovskyi*) by Gussev *et al.* (1993). After that, it was reported from 11 other fish species which did not include *L. vorax* and hence *L. vorax* represents a new host record in Iraq for this parasite.

Dactylogyrus persis Bychowsky, 1949 was reported from gills of *C. luteus* and *C. auratus*. Abdullah (2013) gave its first record in Iraq from *C. luteus*. Later on, it was reported from six other fish species exclusive of *C. auratus*. So, this fish now represents a new host record in Iraq for this parasite in Iraq.

Dactylogyrus polyepidis Alvarez-Pellitero, Simon Vicente & Gonzales Lanza, 1981 was recorded from gills of *C. regium*. Abdullah (2002) showed its first record in Iraq from *C. regium*. So, *C. regium* is so far considered as the only fish host species in Iraq for this parasite.

Dactylogyrus wegneri Kulwiec, 1927 was recorded from gills of *C. auratus* and *G. rufa*. Abdul-Ameer (2006) published its first record in Iraq from *C. carpio*. Later on, it was recorded from three other fish species inclusive of *C. auratus* but exclusive of *G. rufa* and hence *G. rufa* represents a new host in Iraq for this parasite.

Dogielius molnari Jalali, 1992 was recorded from gills of *C. auratus*. Abdullah (2002) firstly recorded it in Iraq from *C. macrostomum*. After that, it was reported from two other fish species exclusive of *C. auratus*, so, *C. auratus* is considered as a new host in Iraq for this parasite.

Dogielius persicus Jalali & Molnár, 1990 was recorded from gills of *C. luteus*, *C. auratus* and *C. kais*. Abdullah (2002) showed its first report in Iraq from *C. luteus*. Later on, it was recorded from six other fish species exclusive of *C. auratus*. So, this fish is considered as a new host in Iraq for this parasite in Iraq.

Gyrodactylus baicalensis Bogolepova, 1950 was recorded from gills of *P. abu*. Salih *et al.* (1988) demonstrated its first report from

Iraq from *C. carpio*. Later on, it was reported from 11 other fish species inclusive of *P. abu*.

Gyrodactylus cyprini Diarova, 1964 was reported from gills of *C. carpio*. Mama (2012) gave its first report in Iraq from *C. carpio*. No more hosts for this parasite in Iraq are available.

Gyrodactylus elegans Nordmann, 1832 was reported from gills of *A. grypus*, *C. auratus*, *C. regium*, *C. carpio* and *G. rufa*. Ali & Shaaban (1984) documented its first report in Iraq from *C. carpio* and *P. abu* (as *Liza abu*). Later on, it was reported from 22 other fish species inclusive of *A. grypus*, *C. auratus*, *C. regium*, *C. carpio* and *G. rufa*.

Gyrodactylus sprostonae Ling, 1962 was recorded from gills of *C. auratus*, *C. carpio*, *H. fossilis* and *P. abu*. Al-Zubaidy (1998) indicated its first record in Iraq from *C. carpio*. Later on, it was recorded from 12 other fish species inclusive of *C. auratus* and *P. abu* but exclusive of *H. fossilis*. So, this fish is considered as a new host in Iraq for this parasite.

Mastacembelocleidus heteranchorus (Kulkami, 1969) Kritsky, Pandey, Agrawal & Abdullah, 2004 was reported from gills of *M. mastacembelus*. Kritsky *et al.* (2004) described it as a new species from *M. mastacembelus*. No more reports for this parasite in Iraq are so far available. This species appears to be specific for *M. mastacembelus* in Asia (Kritsky *et al.*, 2004).

Paradiplozoon iraqensis Al-Nasiri & Balbuena, 2016 was recorded from gills of *P. abu*. Al-Nasiri & Balbuena (2016) described it as a new species from *C. macrostomum*. One more host species in Iraq was reported, exclusive of *P. abu*, and hence *P. abu* is considered as a new host in Iraq for this parasite.

Solostamenides paucitesticulatus Kritsky & Öktener, 2015 was reported from gills of *P. abu*. Al-Nasiri & Balbuena (2018) indicated its first report in Iraq, as *S. iraqensis*, from *P. abu*. As stated by Al-Helli *et al.* (2019), *S. iraqensis* is a synonym of *S. paucitesticulatus*. No more hosts are so far known in Iraq.

Thaparocleidus vistulensis (Sivak, 1932) Lim, 1996 was reported from gills of *S. triostegus*. Abdul-Ameer (1989) stated its first report from Iraq, as *Ancylo-discoides vistulensis*, from *S. triostegus*. According to Lim *et al.* (2001), *A. vistulensis* is a synonym of *T. vistulensis*. Later on, this parasite (as *A. vistulensis*) was reported from eight other host species from Iraq.

Class Trematoda

The trematodes of the present study included one species of *Ascocotyle* and one species of *Clinostomum*. 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 *A. sellal*, *C. luteus*, *C. regium* and *L. vorax*, as well as from gills of *C. auratus*, *H. fossilis*, *M. pelusius* and *P. abu*. Its first report from Iraq

was by Ali *et al.* (1986) from *H. fossilis* and *P. abu* (as *Liza abu*). This is the commonest trematode infecting freshwater fishes of Iraq as it has infects 34 host species which included the eight above-named hosts of the study. Adults of this trematode infect the grey heron *Ardea cinerea* in Babylon fish farm, Babylon province (Mhaisen & Abul-Eis, 1992).

Clinostomum complanatum (Rudolphi, 1814) metacercariae of this parasite was recorded from gills of *A. sellal*, *C. luteus*, *C. auratus*, *C. regium*, *C. kais*, *C. carpio*, *G. rufa*, *H. fossilis* and *P. abu*. Its first record from Iraq was by Khamees (1983) from *C. luteus* and *L. vorax* (reported as *Aspius vorax*). Later on, it was reported from 24 other fish host species exclusive of *G. rufa*. So, this fish represents a new host in Iraq for this trematode. Adults of these metacercariae live in mouth and pharynx of some fish-eating birds (Duijn, 1973).

The list of monogeneans and trematodes of fishes of Lake Hamrin is demonstrated in table (1). These monogenean and trematode species are alphabetically arranged. The valid fish host species are also alphabetically arranged for each parasite species.

Table (1): Monogenean and trematode species with their site of infection and percentage incidence.

Parasite species	Host species	Site of infection*	% Incidence
Class Monogenea			
<i>Dactylogyrus achmerowi</i>	<i>C. carpio</i>	G	5.7
	<i>G. rufa</i> **	G	5
<i>D. anchoratus</i>	<i>C. auratus</i>	G	4.2
<i>D. barbioides</i>	<i>A. grypus</i>	G	20
<i>D. barbuli</i>	<i>L. xanthopterus</i>	G	18.7
<i>D. baueri</i>	<i>C. auratus</i>	G	17
	<i>C. regium</i> **	G	8.6
<i>D. carasobarbi</i>	<i>C. luteus</i>	G	73.5
	<i>C. auratus</i> **	G	4.2
	<i>C. regium</i>	G	8.6
	<i>C. carpio</i> **	G	1.9
	<i>L. xanthopterus</i>	G	6.2

<i>D. deziensioides</i>	<i>C. regium</i>	G	4.3
	<i>L. xanthopterus</i>	G	50
<i>D. dulkeiti</i>	<i>C. auratus</i>	G	6.3
<i>D. ergensi</i>	<i>A. caeruleus**</i>	G	33.3
	<i>C. auratus**</i>	G	2.1
	<i>C. regium</i>	G	4.3
<i>D. extensus</i>	<i>C. auratus</i>	G	4.2
	<i>C. carpio</i>	G	3.8
<i>D. fallax</i>	<i>L. vorax</i>	G	8.3
<i>D. formosus</i>	<i>C. auratus</i>	G	29.7
	<i>C. carpio</i>	G	1.9
<i>D. inexpectatus</i>	<i>C. auratus</i>	G	6.3
<i>D. kersini</i>	<i>L. xanthopterus</i>	G	6.2
<i>D. macrostomi</i>	<i>C. auratus**</i>	G	8.5
	<i>C. macrostomum</i>	G	25
<i>D. minutus</i>	<i>C. auratus</i>	G	10.6
	<i>C. macrostomum</i>	G	25
	<i>C. carpio</i>	G	67.3
<i>D. pavlovskyi</i>	<i>A. grypus</i>	G	100
	<i>L. vorax**</i>	G	8.3
<i>D. persis</i>	<i>C. luteus</i>	G	58.8
	<i>C. auratus**</i>	G	2.1
<i>D. polylepidis</i>	<i>C. regium</i>	G	4.3
<i>D. wegneri</i>	<i>C. auratus</i>	G	4.2
	<i>G. rufa**</i>	G	10
<i>Dogielius molnari</i>	<i>C. auratus**</i>	G	2.1
<i>D. persicus</i>	<i>C. luteus</i>	G	14.7
	<i>C. auratus**</i>	G	2.1
	<i>C. kais</i>	G	25
<i>Gyrodactylus baicalensis</i>	<i>P. abu</i>	G	1
<i>G. cyprini</i>	<i>C. carpio</i>	G	3.8
<i>G. elegans</i>	<i>A. grypus</i>	G	40
	<i>C. auratus</i>	G	2.1
	<i>C. regium</i>	G	8.6
	<i>C. carpio</i>	G	3.8
	<i>G. rufa</i>	G	5
<i>G. sprostonae</i>	<i>C. auratus</i>	G	2.1
	<i>C. carpio</i>	G	1.9
	<i>H. fossilis**</i>	G	28.5
	<i>P. abu</i>	G	2
<i>Mastacembelocleidus heteranchorus</i>	<i>M. mastacembelus</i>	G	100
<i>Paradiplozoon iraqensis</i>	<i>P. abu**</i>	G	1
<i>Solostamenides paucitesticulatus</i>	<i>P. abu</i>	G	10.3
<i>Thaparocleidus vistulensis</i>	<i>S. triostegus</i>	G	100
Class Trematoda			
<i>Ascocotyle coleostoma</i>	<i>A. sellal</i>	G, S	100
	<i>C. luteus</i>	G, S	17.6
	<i>C. auratus</i>	G	14.8
	<i>C. regium</i>	G, S	39.1
	<i>L. vorax</i>	G, S	50
	<i>M. pelusius</i>	G	5.5

	<i>H. fossilis</i>	G	28.5
	<i>P. abu</i>	G	3
<i>Clinostomum complanatum</i>	<i>A. sellal</i>	G	20
	<i>C. luteus</i>	G	14.7
	<i>C. auratus</i>	G	2.1
	<i>C. regium</i>	G	17.3
	<i>C. kais</i>	G	25
	<i>C. carpio</i>	G	1.9
	<i>G. rufa**</i>	G	5
	<i>H. fossilis</i>	G	14.2
	<i>P. abu</i>	G	2

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

Conclusions

To sum up on the monogenean and trematode infections of fishes of the present study, *C. complanatum* was the prevalent parasite among these fishes due to its record from nine fish host species. *A. coleostoma* came in the second rank in this respect as it was recorded from eight fish species, while 15 monogeneans were monoxenous, i. e. was recorded from one host species each (Table 1). This is explained on the basis of host specificity which is known for most monogeneans (Gussef, 1985). Recently, Mhaisen & Abdul-Ameer (2019) in their checklists of *Dactylogyrus* species infecting fishes of Iraq demonstrated that 29 out of 82 *Dactylogyrus* species infected only one host species each. In connection with host infections, *C. auratus* was infected with 18 different parasite species, followed by *C. carpio* which was infected with nine species. Finally, many fishes are reported here as a new host record in Iraq for each parasite species: *A. caeruleus* for *D. ergensi*, *C. regium* for *D. baueri*, *C. carpio* for *D. carasobarbi*, *H. fossilis* for *G. sprostonae*, *L. vorax* for *D. pavlovskiyi*, and *P. abu* for *P. iraqensis*. *G. rufa* was recorded as a new host for three for *D. achmerowi*, *D. wegeneri* and *C. complanatum*, while *C. auratus* was reported as a new host for *D. carasobarbi*, *D.*

ergensi, *D. macrostomi*, *D. persis*, *Dogielius molnari* and *D. persicus*.

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Conflicts of interest

The authors declare that they have no conflict of interests.

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مونوجينيا ومخرّمات بعض الأسماك من بحيرة حميرين عند محافظة ديالى، العراق

جودت مجيد الجودة ومعن حسن علي

مركز بحوث الثروة الحيوانية والسّمكية، دائرة البحوث الزراعية، وزارة العلوم والتكنولوجيا، ص. ب. 765 الجادرية، بغداد

المستخلص: ما بين شهر كانون الثاني وكانون الأول 2019، تم جمع 368 نموذجاً سمكياً من بحيرة حميرين في محافظة ديالى، العراق. ثمانية أنواع من هذه الأسماك تعود إلى العائلة الشبوطية، خمسة أنواع تعود إلى عائلة الشلق ونوع واحد فقط يعود لكل من عوائل الصقنقور، الجرّي اللاسع، الجرّي، البياح والمرمريج. هذه الأسماك كانت مصابة بثلاثين نوعاً من المونوجينيا ونوعين من المخرّمات. إشتملت مجموعة المونوجينيا على نوع واحد من كل من الجنس *Mastacembelocleidus* والجنس *Paradiplozoon* والجنس *Solostamenides* والجنس *Thaparocleidus* ونوعين من الجنس *Dogielius* وأربعة أنواع من الجنس *Gyrodactylus* وعشرين نوعاً من الجنس *Dactylogyryrus*، في حين إشتملت المخرّمات على نوع واحد من كل من الجنس *Ascocotyle* والجنس *Clinostomum complanatum*. أصاب المخرّم *Clinostomum complanatum* تسعة أنواع من المضيّفات، في حين أصاب 15 نوعاً من الطفيليات مضيّفاً واحداً لكل منها. كانت السمكة الذهبية مصابة بـ 18 نوعاً وسمكة الكارب الإعتيادي بتسعة أنواع. تم هنا إعتبار ثمانية أنواع من الأسماك بمثابة تسجيل مضيّفات جديدة في العراق لثلاثة عشر نوعاً من الطفيليات.

الكلمات المفتاحية: مونوجينيا، مخرّمات، أسماك المياه العذبة، محافظة ديالى، بحيرة حميرين، العراق.