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Parasites of Fishes of Kurdistan Region, Iraq: Checklists

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Abstract: Literature review of all references concerning the parasitic fauna of fishes in Kurdistan region, northern Iraq till the end of 2016 showed that a total of 188 valid parasite species are so far known from 33 valid freshwater fish species (27 cyprinid and six non cyprind species) in different aquatic habitats of Kurdistan region. The parasitic fauna included one euglenozoan, one microsporidian, 21 ciliophorans, 19 myxozoans, 11 trematodes, 82 monogeneans, 19 cestodes, 16 nematodes, five acanthocephalans, two annelids, one molluscan and 10 arthropods. Among these parasites, the nematode larvae of the genus *Contracaecum* was the most common parasite as it infected 21 host species, followed by the trematode metacercaria *Diplostomum spathaceum* (16 host species) and the ciliophoran *Ichthyophthirius multifiliis* (15 host species) while 103 parasite species infected only a single fish host species each. Among the hosts, number of parasite species fluctuated from a maximum of 57 species in *Cyprinus carpio*, followed by *Cyprinion macrostomum* (35 parasite species) and *Silurus triosteguus* (29 parasite species) to a minimum of one species in *Barbus rajanorum*, *Ctenopharyngodon idella*, *Glyptothorax cavia* and *Luciobarbus subquincunciatus*. The article includes a host-parasite list for each fish species.

Keywords: Checklists, Parasites, Fishes, Kurdistan region, Iraq.

INTRODUCTION

Kurdistan region is located in the north of Iraq. Its capital is Erbil. The new Constitution of Iraq defines the Kurdistan region as a federal entity of Iraq and establishes Kurdish and Arabic as Iraq's joint official languages. The four governorates of Duhok, Hawler (also known as Erbil), Silemani (also spelled as Sulaimaniya) and the newly established Halabja comprise around 41,710 km^2 and according to 2015 estimates, they have a population of 5.5 million (Wikipedia, 2017). Kurdistan region is largely mountainous. There are many rivers running through the region, which is distinguished by its fertile lands, plentiful water, and

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picturesque nature. The Greater Zab (also known as Great Zab and Upper Zab) and the Little Zab (also known as Lesser Zab and Lower Zab) flow from the east to the west in the region. The Tigris river enters Kurdistan region from Turkey. The largest lake in the region is Dukan lake (also spelled as Dokan). There are also several smaller lakes, such as Darbandikhan lake and Duhok lake. The western and southern parts of the Kurdistan region are not as mountainous as the east. Instead, it is rolling hills and sometimes plains that make up these areas (Wikipedia, 2017).

SOURCES AND METHODS

Ninty-seven references (77 research papers, 16 unpublished M. Sc. theses, two unpublished Ph. D. theses, one unpublished report and one abstract) dealing with the parasites of fishes of Kurdistan region were used to prepare the present checklists. Data from these references were gathered to provide parasite-fish list and fish-parasite list based on some electronic sites concerned with parasite classification (EOL, 2017; Global Cestode Database, 2017; ITIS, 2017; MonoDb, 2017; PESI, 2017; WoRMS, 2017) as well as some relevant taxonomic references (Gibson et al., 1996; Eiras et al., 2005; Anderson et al., 2009; Pugachev et al., 2009; Gibbons, 2010; Amin, 2013). The layout and names of the major taxonomic groups (phyla, classes, orders and families) of the concerned parasites followed checklist of FAO Fisheries Technical Papers (Kirjušina & Vismanis, 2007). For fishes, the scientific names were reported as they appeared in their original references but their valid names and authorities were corrected according to Eschmeyer (2017) and Froese & Pauly (2017). The index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2017) was used to show number of host fish species so far recorded for any particular parasite species in Iraq (Table 1).

Parasitological Investigations Achieved on Fishes of Kurdistan Region

Although Hamad (1985) was the first to investigate the trematodes of some vertebrates from some parts of northern Iraq, she failed to detect any trematodes from five fish species which were included in her investigation. However, since 1988 up to the end of 2016, a total of 96 articles were available on different aspects of fish parasitology in Kurdistan region covering different localities. These are chronologically arranged within each of the following categories:

Greater Zab river (also known as Great Zab and Upper Zab): Rasheed & Hussain (1988), Ali (1989), Rasheed et al. (1989), Nawab Al-Deen (1994), Rahemo & Nawab Al-Din (1995), Abdullah (1997b, 2002), Abdullah & Mhaisen (2003), Amin et al. (2003a, b), Abdullah & Ismail (2,004), Abdullah & Mhaisen (2004), Kritsky et al. (2004), Abdullah & Mhaisen (2005a, b, 2006b), Abdullah (2007), Abdullah & Mhaisen (2007b), Abdullah (2008), Bashê (2008), Abdullah (2009a), Abdullah & Mhaisen (2009a, b), Shwani (2009), Abdullah & Mhaisen (2010), Abdullah & Shwani (2010), Bashê & Abdullah (2010a, b), Shwani & Abdullah (2010), Shwani et al. (2010), Abdullah & Mhaisen (2011a, b, c), Bilal & Abdullah (2012a), Moravec et al. (2012), Bilal (2013), Bilal & Abdullah (2013), Muhammad et al. (2013), Hashim (2014), Abubakr (2015), Bilal & Abdullah (2015), Hashim et al. (2015), Al-Marjan (2016), E.F Bilal (2016), Bilal (2016a, b).

Lesser Zab river (also known as Little Zab and Lower Zab): Abdullah (1997b), Rahemo & Nawab Al-Din (1999), Abdullah (2002), Amin et al. (2003a, b), Abdullah & Mhaisen (2004, 2005a, 2006a, b, 2007a, 2009b, 2010, 2011a, c), Abdullah & Mama (2012), Mama (2012), Mama & Abdullah (2012b), Moravec et al. (2012), Bilal (2013), Bilal & Abdullah (2013), Mama & Abdullah (2013a), Nasraddin (2013), Abdullah & Nasraddin (2015), Bilal & Abdullah (2015). It is reliable to state here that some of the above mentioned articles (from Lesser Zab and Greater Zab rivers) included collection from both rivers at the same time.

Bahdinan river, southeast of Greater Zab river: Bilal (2006), Saraiva et al. (2007), Bilal & Abdullah (2008, 2009a, b), Moravec et al. (2009).

Darbandikhan lake: Abdullah (1997b, 2005, 2009b), Abdullah (2013), Abdullah & Abdullah (2013a, b, 2015a, b).

Dokan lake: Abdullah (1990, 1997a, b), Abdullah & Ali (1999), Abdullah & Ismail (2004), Abdullah & Rasheed (2004a, b), Abdullah (2009a), Abdullah & Abdullah (2016a).

Other inland waters: These included Kuboor river (Abdullah & Ismail, 2004), Ruwandos river (Abdullah & Ismail, 2004), Kasnazan lake (Abdullah, 2004), Sirwan river, southeast of Sulaimani governorate (Abdullah & Abdullah, 2014), Mortuka stream, southeast Erbil province (Abdullah, 2004), Serchinar stream, Sulymania governorate (Rahemo et al., 2005), Surdash stream, Sulaimania governorate (Abdullah, 1997b) and Watersheds of Sharbazher area in the northeast of Sulaimani city (Abdullah & Abdullah, 2016b).

Ainkawa fish hatchery, northwest of Erbil city: Al-Marjan (2007), Al-Marjan & Abdullah (2007, 2008, 2009), Mama (2012), Mama & Abdullah

(2012a, b, c), Abdullah & Mama (2013), Mama & Abdullah (2013b), Al-Marjan & Abdullah (2015).

Fish farms and ponds: Some fish farms and ponds in provinces of Duhok (Ali, 2002), Suliemanyia (Ali, 2002; Abid, 2016) and Erbil (Ali, 2002; Abdullah, 2004; Al-Marjan & Abdullah, 2010; Bilal & Abdullah, 2012b; Mustafa, 2016) in addition to an aquarium shop in Erbil city (Al-Marjan & Abdullah, 2016). Mhaisen & Abdullah (2016) gave a detailed account on parasites of farm fishes of Kurdistan region, Iraq.

Fish market in Erbil: Abdullah (2000), Al-Marjan (2010).

RESULTS AND DISCUSSION

Surveying literature concerning the parasites which are so far recorded from fishes of Kurdistan region showed the presence of 188 parasite species. These parasites included one euglenozoan, one myxosporidian, 21 ciliophorans, 19 myxozoans, 11 trematodes, 82 monogeneans, 19 cestodes, 16 nematodes, five acanthocephalans, two annelids, one mollusc glochidium and 10 arthropods.

Names of fish hosts are quoted as they appeared in the reviewed literature but the valid names were updated according to Eschmeyer (2017) and Froese & Pauly (2017). The full authority of each valid fish host is shown in Table (1). The following is a brief account on the major groups of the parasitic fauna of fishes of Kurdistan region.

Parasite-Host List

Species of the parasitic fauna of fishes of Kurdistan region are grouped here into 12 major groups (phyla for some species or classes for others) according to Kirjušina & Vismanis (2007). For each major group, a list of species will be given according to their systematic account. This will be followed by an alphabetical listing of each parasite species in each major group. Parasite listing will include alphabetically arranged fish hosts involved for each parasite. Finally, for each parasite species, its first record in Iraq will be indicated and the total number of its hosts so far recorded from fishes of Iraq will be declared depending on the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2017) without mentioning this reference each time to economise space.

Phylum Euglenozoa

The phylum Euglenozoa, which belongs to the kingdom Protista, is represented in fishes of Kurdistan region with unidentified species of the genus *Trypanosoma* as indicated below.

Phylum Euglenozoa
Class Kinetoplastea
Order Trypanostomatida
Family Trypanosomatidae
Trypanosoma spp.

Trypanosoma species were reported from blood of four fish species namely, *Luciobarbus kersin* (reported as *Barbus kersin*) from Bahdinan River (Bilal, 2006; Bilal & Abdullah, 2008), *Mastacembelus mastacembelus* from Greater Zab river (Abdullah, 2002; Bashê, 2008; Bashê & Abdullah, 2010a), *Silurus glanis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b) and *S. triostegus* from Greater Zab river (E.F. Bilal, 2016). Thirteen fish species are so far reported as hosts for unidentified *Trypanosoma* species in addition to nine identified *Trypanosoma* species in fishes of Iraq.

Phylum Microsporidia

The phylum Microsporidia, which belongs to the kingdom Fungi, is represented in fishes of Kurdistan region with one species of the genus *Pleistophora* as indicated below.

Phylum Microsporidia
Class Microsporea
Order Glugeida
Family Glugeidae
Pleistophora longifilis Schuberg, 1910

Pleistophora longifilis Schuberg, 1910 was reported from ovaries of *Capoeta damascina* (misspelled as *C. damascinus*) from Bahdin River (Bilal, 2006; Bilal & Abdullah, 2008). No more records on *P. longifilis* from fishes of Iraq are so far known.

Phylum Ciliophora

The phylum Ciliophora is represented in fishes of Kurdistan region with one species each of the genera *Balantidium*, *Chilodonella*, *Ichthyophthirius*, *Riboscyphidia* and *Tetrahymena*, two species of the genus *Apiosoma* and 11 species of *Trichodina*, in addition to unidentified species of the genera *Apiosoma, Tetrahymena* and *Trichodina* as indicated below.

Phylum Ciliophora
Class Litostomatea
Order Vestibuliferida

Family Balantidiidae
Balantidium polyvacuolum Li, 1963
Class Phyllopharyngea
Order Chlamydodontida
Family Chilodonellidae
Chilodonella cyprini (Moroff, 1902) Strand, 1928
Class Oligohymenophorea
Order Hymenostomatida
Family Ichthyophthiriidae
Ichthyophthirius multifiliis Fouquet, 1876
Order Sessilida
Family Epistylididae
Apiosoma amoebae (Grenfell, 1887) Lom, 1966
Apiosoma robusta Zhukov, 1962
Apiosoma sp.
Family Scyphidiidae
Riboscyphidia arctica (Zhukov, 1964) Jankovski, 1985
Order Mobilida
Family Trichodinidae
Trichodina acuta Lom, 1961
Trichodina anguilli Wu, 1961
Trichodina domerguei (Wallengren, 1897) Haider, 1964
Trichodina erbilensis Shwani, Abdullah & Asmat, 2010
Trichodina heterodentata Duncun, 1977
Trichodina kurdistani Shwani, Abdullah & Asmat, 2010
Trichodina mutabilis Kazubski & Migala, 1968
Trichodina nobilis Chen, 1963
Trichodina pediculus Ehrenberg, 1838
Trichodina ranae da Cunha, 1950
Trichodina reticulata Hirschmann & Partsch, 1955
Trichodina sp.
Order Tetrahymenida
Family Tetrahymenidae
Tetrahymena pyriformis (Ehrenberg, 1830) Furgason, 1940
Tetrahymena sp.

Apiosoma amoebae (Grenfell, 1887) Lom, 1966 was reported from the skin of *Cyprinus carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009; Mama, 2012; Mama & Abdullah, 2012b, 2013b). *A. amoebae* was recorded for the first time in Iraq from skin, buccal cavity and gills of *Ctenopharyngodon idella* and buccal cavity of *Hypophthalmichthys molitrix* both from Babylon (now Al-Furat) fish farm,

Babylon province (Ali et al., 1989a). So far, six fish host species are known for *A. amoebae* in Iraq.

Apiosoma robusta Zhukov, 1962 was reported from the skin of *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010). No more records are so far known for *T. robusta* in Iraq.

Apiosoma species was reported from *Chondrostoma regium* from Greater Zab river (Al-Marjan, 2016). The site of infection was not stated by Al-Marjan (2016), but according to personal communication with him, he declared that the sites were skin, fins and gills. Two fish species are so far reported as hosts for unidentified *Apiosoma* species in addition to nine identified *Apiosoma* species in fishes of Iraq.

Balantidium polyvacuolum Li, 1963) was reported from the intestine of *C. carpio* from three fish farms in Grdda Rasha village, south of Erbil city (Al-Marjan & Abdullah, 2010). The first record of *B. polyvacuolum* in Iraq was that of Al-Marjan & Abdullah (2010). So far, seven fish host species are known for *B. polyvacuolum* in Iraq.

Chilodonella cyprini (Moroff, 1902) Strand, 1928 was reported from gills of *Capoeta trutta* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), gills of *Carassius auratus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), skin of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009; Mama, 2012; Mama & Abdullah, 2012b, 2013b) and from fish ponds in Chwarta, Sulaimani province (Abid, 2016) and skin of *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010). The first record of *C. cyprini* in Iraq was from gills of *Mystus pelusius* from Tigris river at Baghdad (Ali et al., 1987b). So far, 11 fish host species are known for this parasite in Iraq.

Ichthyophthirius multifiliis Fouquet, 1876 was reported from skin and gills of *Acanthobrama marmid* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b) and gills of the same fish from Darbandikhan lake (Abdullah, 2005), skin and gills of *Arabibarbus grypus* (reported as *Barbus grypus*) from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), skin and gills of *C. trutta* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), skin and gills of *Capoeta umbla* (reported as *Varicorhinus umbla*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b), skin, fins and gills of *Carasobarbus luteus* (reported as *Barbus luteus*) from Erbil's fish market (Abdullah, 2000) and from skin and gills of *C. luteus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), *C. auratus* by Al-Marjan & Abdullah (2016), skin, fins, buccal cavity and gills of *C. regium* from Greater Zab river (Abdullah,

2002; Abdullah & Mhaisen, 2006b; Al-Marjan, 2016), skin and gills of the same fish from Darbandikhan lake (Abdullah, 2005; Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), skin, fins and gills of *Cyprinion macrostomum* from Erbil's fish market (Abdullah, 2000) and from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b), skin, fins and gills of *C. carpio* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b), from Darbandikhan lake (Abdullah, 2005), from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009; Mama, 2012; Mama & Abdullah, 2012b, 2013a, b) and from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016), gills of *Hypophthalmichthys molitrix* from Darbandikhan lake (Abdullah, 2005), skin and gills of *Luciobarbus barbulus* (reported as *Barbus barbulus*) from Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2006b), skin and gills of *Luciobarbus esocinus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), skin and gills of *M. mastacembelus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), skin, fins and gills of *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010) and from skin and gills of *Squalius lepidus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a). *I. multifiliis* was recorded for the first time in Iraq from skin and gills of *Planiliza subviridis* (reported as *Mugil dussumieri*) from Tigris river at Baghdad by Herzog (1969). So far, 35 fish host species are known for *I. multifiliis* in Iraq.

Riboscyphidia arctica (Zhukov, 1964) Jankovski, 1985 was reported as *Scyphidia arctica* Zhukov, 1962 from skin of *C. trutta* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a) and from skin of *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010). This parasite was recorded for the first time in Iraq (as *S. arctica*) from skin of both *C. luteus* (reported as *B. luteus*) and *P. abu* (reported as *L. abu*) from a man-made lake at Baghdad (Al-Nasiri, 2000). So far, only four fish host species are known for *R. arctica* (all were reported as *S. arctica*) in Iraq.

Tetrahymena pyriformis (Ehrenberg, 1830) Furgason, 1940 was reported from skin of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009) and from skin of *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010) and skin of the same fish from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a). The first record of this parasite in Iraq was from skin and gills of *C. carpio* from a fish farm at Al-Zaafaraniya, Baghdad (Sadek, 1999). So far, 14 fish host species are known for *T. pyriformis* in Iraq.

Tetrahymena species was reported from skin, fins and gills of *C. regium* from Greater Zab river (Al-Marjan, 2016). So far, no more records of any unidentified *Tetrahymena* sp. in fishes of Iraq.

Trichodina acuta Lom, 1961 was reported from skin of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2007; Mama, 2012; Mama & Abdullah, 2012b, 2013b). The first record of this parasite in Iraq was that of Al-Marjan (2007). Two hosts are so far known for *T. acuta* from fishes of Iraq.

Trichodina anguilli Wu, 1961 was reported from skin, fins, gills and buccal cavity of *C. carpio* from fish markets in Erbil city (Al-Marjan, 2010). This is the only record of *T. anguilli* from fishes of Iraq.

Trichodina domerguei (Wallengren, 1897) Haider, 1964 was reported from skin and gills of *A. marmid* from Darbandikhan lake (Abdullah, 2005), skin and gills of *C. luteus* (reported as *B. luteus*) from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2006b) and skin and gills of the same fish from Darbandikhan lake (Abdullah, 2005), skin and gills of *C. regium* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b) and skin and gills of the same fish from Darbandikhan lake (Abdullah, 2005), gills of *C. macrostomum* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b), skin, fins and gills of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2007), skin and gills of *H. molitrix* from Darbandikhan lake (Abdullah, 2005), gills of *S. glanis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b), skin and gills of *Squalius cephalus* (reported as *L. cephalus*) from Darbandikhan lake (Abdullah, 2005) and gills of *Squalius spurius* (reported as *Leuciscus spurius*) from Darbandikhan lake (Abdullah, 2005). It is appropriate to mention here that neither *S. spurius* nor *L. spurius* are found in list of freshwater fishes of Iraq (Coad, 2010). This parasite was recorded for the first time in Iraq from skin of eight fish species from Tigris river, Al-Tharthar lake and fish markets in Baghdad city (see Shamsuddin et al., 1971). *T. domerguei* is the most distributed *Trichodina* species among fishes of Iraq as it has so far 39 fish host species.

Trichodina erbilensis Shwani, Abdullah & Asmat, 2010 was detected as a new species from skin, fins and gills of *S. triostegus* from Greater Zab river (Shwani, 2009) and published later by Shwani et al. (2010). The first record of this parasite in Iraq was that of Shwani (2009). *S. triostegus* is so far, the only known host for *T. erbilensis* in Iraq.

Trichodina heterodentata Duncun, 1977 was reported from skin, fins and gills of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2007). The first record of this parasite in Iraq was

that of Al-Marjan (2007). *C. carpio* is so far, the only known host for *T. heterodentata* in Iraq.

Trichodina kurdistani Shwani, Abdullah & Asmat, 2010 was detected as a new species from skin, fins and gills of *S. triostegus* from Greater Zab river (Shwani, 2009) and published later by Shwani et al. (2010). No more hosts are so far known for *T. kurdistani* from fishes of Iraq.

Trichodina mutabilis Kazubski & Migala, 1968 was reported from gills of *C. carpio* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b) and from gills of the same fish from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2007) as well as from gills of *S. triostegus* from Greater Zab river (Muhammad et al., 2013). The first record of this parasite in Iraq was that of Abdullah (2002). No more hosts are so far known for *T. mutabilis* from fishes of Iraq.

Trichodina nobilis Chen, 1963 was reported from skin and fins of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2007; Mama, 2012; Mama & Abdullah, 2012b, 2013b) and from skin of the same fish from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016). The first record of this parasite in Iraq was that of Al-Marjan (2007). *C. carpio* is so far, the only known host for *T. nobilis* in Iraq.

Trichodina pediculus Ehrenberg, 1838 was reported from skin of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a) and from gills of *S. triostegus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a). The first record of this parasite in Iraq was that of Bashê (2008). No more hosts are so far known for *T. pediculus* from fishes of Iraq.

Trichodina ranae da Cunha, 1950 was reported from skin and fins of *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010). The first record of this parasite in Iraq was that of Shwani (2009). *S. triostegus* is so far, the only known host for *T. ranae* in Iraq.

Trichodina reticulata Hirschmann & Partsch, 1955 was reported from skin and fins of *C. carpio* from both Ainkawa fish hatchery and Lesser Zab river (Mama, 2012; Mama & Abdullah, 2012b), from skin and fins of the same fish from Lesser Zab river (Mama & Abdullah, 2013a) and Ainkawa fish hatchery (Mama & Abdullah, 2013b). The first record of this parasite in Iraq was from skin, gills and blood? of *Silurus triostegus* from Al-Hammar marsh, Basrah (Jori, 2006). So far, five fish host species are known for *T. reticulata* in Iraq.

Trichodina species was reported from skin, fins and gills of *C. regium* from Greater Zab river (Al-Marjan, 2016) and from skin of *C. carpio* from a fish farm at Duhok region (Ali, 2002) as well as from the same fish from

Ainkawa fish hatchery (Al-Marjan & Abdullah, 2015). In addition of the 32 identified *Trichodina* species so far recorded from fishes of Iraq, unidentified *Trichodina* species were so far reported from seven fish host species in Iraq.

Phylum Cnidaria- Class Myxosporea

The Myxozoa is represented in fishes of Kurdistan region with 18 species of the genus *Myxobolus* as well as unidentified species of *Myxobolus* as indicated below. WoRMS (2017) is followed to arrange taxonomy of the myxozoans. Names of *Myxobolus* species and their authorities were checked with Eiras et al. (2005).

Phylum Cnidaria
Class Myxozoa
Order Bivalvulida
Family Myxobolidae
Myxobolus amurensis Akhmerov, 1960
Myxobolus bulbocordis Masoumian, Baska & Molnár, 1996
Myxobolus cyprinicola Reuss, 1906
Myxobolus iranicus Molnár, Masoumian & Abbasi, 1996
Myxobolus karuni Masoumian, Baska & Molnár, 1994
Myxobolus macrocapsularis Reuss, 1906
Myxobolus mesopotamiae Molnár, Masoumian & Abbasi, 1996
Myxobolus molnari Baska & Masoumian, 1996
Myxobolus oviformis Thélohan, 1892
Myxobolus parvus Shul'man, 1962
Myxobolus persicus Masoumian, Baska & Molnár, 1994
Myxobolus pfeifferi Thélohan, 1895
Myxobolus poljanski Shul'man, 1962
Myxobolus rotundus Nemeczek, 1911
Myxobolus sandrae Reuss, 1906
Myxobolus shadgani Molnár, Masoumian & Abbasi, 1996
Myxobolus sharpeyi Molnár, Masoumian & Abbasi, 1996
Myxobolus sphaericus (Fujita, 1924) Landsberg & Lom, 1991
Myxobolus spp.

Myxobolus amurensis Akhmerov, 1960 was reported from skin, caudal fin and gills of *S. lepidus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a). The first record of this parasite in Iraq was that of Abdullah (2013). So far, three fish host species are known for *M. amurensis* in Iraq.

Myxobolus bulbocordis Masoumian, Baska & Molnár, 1996 was reported from gills of *C. regium* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a) and gills of *Mesopotamichthys sharpeyi* (reported as *Barbus sharpeyi*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was that of Abdullah (2002). No more hosts are so far known for *M. bulbocordis* from fishes of Iraq.

Myxobolus cyprinicola Reuss, 1906 was reported from fins and gills of *C. carpio* from Dokan lake (Abdullah, 1997a) and from skin, fins and gills of the same fish from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was that of Abdullah (1997a). So far, ten fish host species are known for *M. cyprinicola* in Iraq.

Myxobolus iranicus Molnár, Masoumian & Abbasi, 1996 was reported from gills of *Barbus lacerta* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a) and gills of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was from spleen of *S. glanis* from Tigris river at Mosul (Al-Niaeemi, 1997). So far, three fish host species are known for *M. iranicus* in Iraq.

Myxobolus karuni Masoumian, Baska & Molnár, 1994 was reported from gills and intestine of *A. grypus* (reported as *B. grypus*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was that of Abdullah (2002). Five fish host species are so far known for *M. karuni* in Iraq.

Myxobolus macrocapsularis Reuss, 1906 was recorded from gills of *L. barbulus* (reported as *B. barbulus*) from Dokan lake (Abdullah, 1997a) which was its first record in Iraq. So far, four fish host species are known for *M. macrocapsularis* in Iraq.

Myxobolus mesopotamiae Molnár, Masoumian & Abbasi, 1996 was reported from gills and liver of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was that of Abdullah (2002). So far, three fish host species are known for *M. mesopotamiae* in Iraq.

Myxobolus molnari Baska & Masoumian, 1996 was reported from skin, gills and ovaries of *L. esocinus* (reported as *B. esocinus*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). *L. esocinus* is so far, the only known host for *M. molnari* in Iraq.

Myxobolus oviformis Thélohan, 1892 was reported from intestine and air bladder of *Leuciscus vorax* (reported as *Aspius vorax*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The year of authority

of *M. oviformis* was given as 1882 instead of 1892 by both above references. This parasite was recorded for the first time in Iraq from different internal organs of *A. grypus* (reported as *B. grypus*), *L. vorax* (reported as *A. vorax*), *L. esocinus* (reported as *B. esocinus*) and *M. sharpeyi* (reported as *B. sharpeyi*) by Herzog (1969). Twenty fish host species are so far known for *M. oviformis* in Iraq.

Myxobolus parvus Shul'man, 1962 was reported from of gills of *C. carpio* from Dokan lake (Abdullah, 1997a) and from gills of the same fish from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was that of Abdullah (1997a). So far, seven fish host species are known for *M. parvus* in Iraq.

Myxobolus persicus Masoumian, Baska & Molnár, 1994 was reported from skin and gills of *A. grypus* (reported as *B. grypus*) from Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2005a) and from skin, gills and kidneys of *C. macrostomum* from Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was that of Abdullah (2002). Three fish host species are so far known for *M. persicus* in Iraq.

Myxobolus pfeifferi Thélohan, 1895 was reported from gills of *A. marmid* from Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2005a, 2009b), gills of *A. grypus* (reported as *B. grypus*) from Little Zab river (Rasheed et al., 1989) and gills of the same fish (reported as *Tor grypus*) from Greater Zab river (Ali, 1989), gills, intestine and liver of *C. umbla* (reported as *V. umbla*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a) and gills of the same fish from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), gills of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Ali, 1989), gills, liver and external surface of intestine of the same fish from Dokan lake (Abdullah, 1990), gills of the same fish from Erbil's fish market (Abdullah, 2000), gills of the same fish from Darebandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), gills of *C. macrostomum* (erroneously reported as *C. macrostomus*) from Greater Zab river (Ali, 1989), gill of the same fish (erroneously reported as *C. macrostomus*) from Little Zab river (Rasheed et al., 1989), gills of the same fish (erroneously reported as *C. macrostomus*) from Dokan lake (Abdullah, 1990) and gills of the same fish from Darebandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013a, 2015a), fins and gills of *C. carpio* from Dokan lake (Abdullah, 1990) and gills of the same fish from from Erbil's fish market (Abdullah, 2000), gills of *L. barbulus* (reported as *B. barbulus*) from Greater Zab river (Ali, 1989) and gills of the same fish from Dokan lake (Abdullah (1990), gills and body cavity of *L. esocinus*

(reported as *B. esocinus*) from Greater Zab river (Rasheed & Hussain, 1988), gills of the same fish from Little Zab river (Rasheed et al., 1989), skin and gills of the same fish from Greater Zab river (Ali, 1989) and skin and fins of the same fish from Erbil's fish market (Abdullah, 2000), gills of *Luciobarbus xanthopterus* (reported as *Barbus xanthopterus*) from Dokan lake (Abdullah, 1990), gills of *M. sharpeyi* (reported as *B. sharpeyi* from Greater Zab river (Rasheed & Hussain, 1988), gills of *S. cephalus* (reported as *L. cephalus*) from Greater Zab river (Ali, 1989) and gills of *S. spurius* (reported as *L. spurius*) from Greater Zab river (Ali, 1989). This parasite was reported for the first time in Iraq from gills of *A. marmid* from Tigris river at Mosul city (Fattohy, 1975). *M. pfeifferi* is the most distributed *Myxobolus* species among fishes of Iraq as it has so far 35 fish host species.

Myxobolus poljanski Shul'man, 1962 was reported from gills of *A. grypus* (reported as *B. grypus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a) and from gills of the same fish from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a) as well as from skin of *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010). The first record of this parasite in Iraq was that of Abdullah (1990). Five fish host species are so far known for *M. poljanski* in Iraq.

Myxobolus rotundus Nemeczek, 1911 was reported from gills of *S. lepidus* (reported as *L. lepidus*) from Dokan lake (Abdullah, 1997a) and from gills of the same fish from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was that of Abdullah (1997a). So far, three fish host species are known for *M. rotundus* in Iraq.

Myxobolus sandrae Reuss, 1906 was reported from skin, gill and intestinal wall of *Planiliza abu* (reported as *L. abu*) from Dokan lake (Abdullah, 1997a) which represents its first record in Iraq. Only two fish host species are so far known for *M. sandrae* in Iraq.

Myxobolus shadgani Molnár, Masoumian & Abbasi, 1996 was reported from gills of *Barbus rajanorum*? from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a) and from gills of *L. barbulus* (reported as *B. barbulus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a) and from gills of the same fish from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008). According to Coad (2010), *B. rajanorum*, which was described from Syria, is a hybrid of *Barbus pectoralis* and *C. damascina* and hence some authors considered *B. rajanorum* as a synonym of *B. barbulus* and others considered it as a synonym of *B. pectoralis*. The first record of this parasite in Iraq was that of Abdullah

(2002). No more hosts are so far known for *M. shadgani* from fishes of Iraq.

Myxobolus sharpeyi Molnár, Masoumian & Abbasi, 1996 was reported from gills of *C. regium* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a) and from gills of *M. sharpeyi* (reported as *B. sharpeyi*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2005a). The first record of this parasite in Iraq was that of Abdullah (2002). No more hosts are so far known for *M. sharpeyi* from fishes of Iraq.

Myxobolus sphaericus (Fujita, 1924) Landsberg & Lom, 1991, reported as *M. sphaerica* was reported from skin, fins and gills of *L. esocinus* (reported as *B. esocinus*) from Dokan lake (Abdullah, 1990) and from external surface of intestine and ovaries of *P. abu* (reported as *L. abu*) from Dokan lake (Abdullah, 1990). The first record of this parasite in Iraq was from gills of *C. regium* (misspelled as *C. regius*) from Tigris river at Baiji city (Abdul-Ameer, 1989). So far, ten fish host species are known for *M. sphaericus* in Iraq.

Myxobolus species were reported from fins of *A. grypus* (reported as *B. grypus*) from a fish farm south of Erbil province (Abdullah, 2004), skin of *C. macrostomum* from Kasnazan lake (Abdullah, 2004), gills of *C. carpio* from two fish farms south of Erbil province (Abdullah, 2004) and from skin of *P. abu* (reported as *L. abu*) from Mortuka stream and a fish farm south of Erbil province (Abdullah, 2004). In addition to the 59 identified *Myxobolus* species so far recorded from fishes of Iraq, unidentified *Myxobolus* species were so far reported from seven fish host species in Iraq.

Phylum Platyhelminthes- Class Trematoda

The class Trematoda of the phylum Platyhelminthes is represented in fishes of Kurdistan region with one species each of the genera *Allocreadium*, *Asymphylotrema*, *Azygia*, *Clinostomum*, *Megamonostomella*, *Orientocreadium*, *Paracoenogonimus* and *Pseudochetosoma*, two species of the genus *Diplostomum* as well as unidentified species of the genus *Diplostomum* as indicated below. Keys to the Trematoda (Gibson et al., 2002; Jones et al., 2005; Bray et al., 2008) were followed to arrange the major taxonomic groups of these trematodes. However, recent updates in WoRMS (2017) were taken in consideration.

Phylum Platyhelminthes
Class Trematoda
Superfamily Azygioidea
Family Azygiidae
Azygia robusta Odhner, 1911

Superfamily Schistosomatoidea
Family Clinostomidae
Clinostomum complanatum (Rudolphi, 1819) Braun, 1899
Superfamily Diplostomoidea
Family Diplostomidae
Diplostomum flexicaudum (Cort & Brooks, 1928)
Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876
Diplostomum spp.
Family Cyathocotylidae
Paracoenogonimus ovatus Katsurada, 1914
Superfamily Allocreadioidea
Family Allocreadiidae
Allocreadium transversale (Rudolphi, 1802)
Superfamily Microphalloidea
Family Zoogonoidae
Pseudochetosoma salmonicola Dollfus, 1951
Superfamily Opisthorchioidea
Family Cryptogonimidae
Megamonostomella rashediansis Rahemo & Al-Naemi, 1998
Superfamily Monorchioidea
Family Monorchidae
Asymphylotrema macracetabulum (Belous, 1953)
Superfamily Plagiorchiioidea
Family Orientocreadiidae
Orientocreadium siluri (Bychowski & Dubinina, 1954) Yamaguti, 1958

Allocreadium transversale (Rudolphi, 1802) was reported from the intestine of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a). The first record of this parasite in Iraq was that of Bashê (2008). So far, two fish host species are known for *A. transversale* in Iraq.

Asymphylotrema macracetabulum (Belous, 1953) Dvorjadkin & Besprozvanykh, 1985 was reported as *Asymphylodora macracetabulum* from the intestine of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a). According to Dvorjadkin and Besprozvanykh (1985), *Asymphylodora macracetabulum* is considered as a synonym of *Asymphylotrema macracetabulum*. The first record of this parasite in Iraq (as *Asymphylodora macracetabulum*) was from four cyprinid fish species, viz. *A. grypus* (reported as *B. grypus*), *C. luteus* (reported as *B. luteus*), *Cyprinion kais* and *C. carpio* from Euphrates river

at Al-Musaib town (Al-Sa'adi, 2007). Five fish host species are so far known for *Asymphylotrema macracetabulum* in Iraq. Apart from one report (Mhaisen et al., 2015), all the remaining reports referred to it with its synonym (*Asymphylodora macracetabulum*).

Azygia robusta Odhner, 1911 was reported from the intestine of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010). The first record of this trematode in Iraq was that of Shwani (2009). So far, two fish host species are known for *A. robusta* in Iraq.

Clinostomum complanatum (Rudolphi, 1819) Braun, 1899 as metacercaria was reported from gill cavity of *C. umbla* (also reported as *V. umbla*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010, 2011b) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b), gills and gill cavity of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Ali, 1989; Abdullah, 2002; Abdullah & Mhaisen, 2010, 2011b) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b), gill cavity of *C. macrostomum* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010, 2011b) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b), gills of *L. esocinus* (reported as *B. esocinus*) from Greater Zab river (Ali, 1989), gill cavity of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a) and gill cavity of *S. lepidus* (reported as *L. lepidus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a) and from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010, 2011b). The first record of this trematode metacercaria in Iraq was from gills of *C. luteus* from Mehaijeran creek (Khamees, 1983). *C. complanatum* has so far 22 fish host species in Iraq.

Diplostomum flexicaudum (Cort & Brooks, 1928) was reported as metacercaria from eye lenses of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a) and eye lenses of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010). Shwani (2009) and Shwani & Abdullah (2010) erroneously reported the authority of this parasite as Rud., 1819 inside parentheses. The first record of this parasite in Iraq was that of Bashê (2008). No more hosts are so far known for *D. flexicaudum* from fishes of Iraq.

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876 was reported as metacercaria from eye lenses of 16 fish species. These were *A. marmid* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010), *A. grypus* (reported as *B. grypus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010) and from Mortuka stream (Abdullah, 2004), *C. damascina* (reported as *B. belayewi*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010), *C. umbla* (also reported as *V. umbla*)

from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010), *C. luteus* (also reported as *B. luteus*) from Dokan lake (Abdullah, 1990), Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2007b, 2009a, 2010) and from Greater Zab river (Muhammad et al., 2013), *C. regium* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010), from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b), *C. macrostomum* from Dokan lake (Abdullah, 1990), Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2007b, 2009a, 2010) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b), *C. carpio* from Dokan lake (Abdullah, 1990) and from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012b, 2013a), *Garra rufa* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010), *Heteropneustes fossilis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010), *L. barbulus* (reported as *B. barbulus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010), *M. mastacembelus* from Greater Zab river (Abdullah, 2002; Bashê, 2008; Abdullah & Mhaisen, 2010; Bashê & Abdullah, 2010a) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b), *P. abu* (reported as *L. abu*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2007b, 2010), *S. glanis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010), *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010) and *S. lepidus* (reported as *L. barbulus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010). The first record of this parasite in Iraq was that of Abdullah (1990). Thirty-four fish host species are known for *D. spathaceum* in Iraq.

Diplostomum species as metacercaria was reported from eye lenses of *C. regium* (misspelled as *C. regius*) from Greater Zab river (Rasheed & Hussain, 1988) as well as from eye lenses of five other species from the same river (Ali, 1989). These were: *C. umbla* (reported as *V. umbla*), *C. macrostomum* (misspelled as *C. macrostomus*), *L. barbulus* (reported as *B. barbulus*), *L. esocinus* (reported as *B. esocinus*) and *S. spurius* (reported as *L. spurius*). In addition of the eight identified *Diplostomum* species so far recorded from fishes of Iraq, unidentified *Diplostomum* species were so far reported from 27 fish host species in Iraq.

Megamonostomella rashediansis Rahemo & Al-Naemi, 1998 was reported from the intestine of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010). This trematode was reported for the first time in Iraq from intestine of *S. glanis* from Tigris river at Mosul (Al-Niaeemi, 1997). It has so far only two fish host species in Iraq.

Miller and Cribb (2008) considered *Megamonostomella* Rahemo & Al-Naemi, 1998 as a genus inquirenda as no species were ascribed to it. The same applies to Megamonostomatinae Rahemo & Al-Naemi, 1998 during overviewing the taxonomic status of all genera of Cryptogonimidae.

Orientocreadium siluri (Bychowski & Dubinina, 1954) Yamaguti, 1958 was reported from the stomach and intestine of *S. glanis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010, 2011b) and from the intestine of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010). The authority of this trematode was not inserted inside parantheses by Abdullah (2002) and Abdullah & Mhaisen (2011b), and the name Bychowski was spelled as Bykhowskii by Abdullah (2002) and as Bykhowski by Abdullah & Mhaisen (2011b). This parasite was reported for the first time in Iraq from intestine of *S. glanis* from Tigris river at Mosul (Al-Niaeemi, 1997). So far, it has three fish host species in Iraq.

Paracoenogonimus ovatus Katsurada, 1914 was reported as metacercaria from the gill cavity of *C. macrostomum* (misspelled as *C. macrostomus*) from Erbil's fish market (Abdullah, 2000). This was its first record in Iraq. No more hosts are so far known for *P. ovatus* from fishes of Iraq.

Pseudochetosoma salmonicola Dollfus, 1951 was reported from the gall bladder of four fish species: *A. mossulensis* (reported as *C. mossulensis*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010, 2011b), *L. barbulus* (reported as *B. barbulus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010, 2011b), *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a) and *S. cephalus* (reported as *L. cephalus*) from both Kasnazan lake and Mortuka stream (Abdullah, 2004). This trematode was reported for the first time in Iraq from the gall bladder of *Acanthobrama marmid* from Tigris river at Mosul (Fattohy, 1975). So far, 12 fish host species are known for *P. salmonicola* in Iraq.

Phylum Platyhelminthes- Class Monogenea

The class Monogenea of the phylum Platyhelminthes is represented in fishes of Kurdistan region with one species each of the genera *Mastacembelocleidus*, *Mazocraes*, *Microcotyle* and *Thaparocleidus*, four species of *Dogielius*, 10 species of *Paradiplozoon*, 15 species of *Gyrodactylus*, 47 species of *Dactylogyrus*, in addition to unidentified species of the genera *Dactylogyrus* and *Diplozoon*. Names of *Gyrodactylus* species and their authorities were checked with Harris et al. (2004),

Pugachev et al. (2009) and MonoDb (2017) while those of *Dactylogyrus* species were according to Gibson et al. (1996). Some authors (such as Pugachev et al., 2009) apply the term Monogenoidea for this class instead of Monogenea.

Phylum Platyhelminthes
Class Monogenea
Order Dactylogyridea
Family Ancylodiscoididae
Thaparocleidus vistulensis (Siwak, 1932) Lim, 1996
Family Dactylogyridae
Dactylogyrus achmerowi Gusev, 1955
Dactylogyrus acinacus Gusev, Jalali & Molnár, 1993
Dactylogyrus affinis Bychowsky, 1933
Dactylogyrus alatus Linstow, 1878
Dactylogyrus anchoratus (Dujardin, 1845) Wagener, 1857
Dactylogyrus arcuatus Yamaguti, 1942
Dactylogyrus barbioides Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993
Dactylogyrus barbuli Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993
Dactylogyrus baueri Gusev, 1955
Dactylogyrus carassobarbi Gusev, Jalali & Molnár, 1993
Dactylogyrus carpathicus Zakhvatkin, 1951
Dactylogyrus charbinensis Gusev, 1955
Dactylogyrus cornu Linstow, 1878
Dactylogyrus cyprinioni Gusev, Jalali & Molnár, 1993
Dactylogyrus deziensioides Gusev, Jalali & Molnár, 1993
Dactylogyrus deziensis Gusev, Jalali & Molnár, 1993
Dactylogyrus dulkeiti Bychowsky, 1936
Dactylogyrus dyki Ergens & Lucky, 1959
Dactylogyrus elegantis Gusev, 1966
Dactylogyrus extensus Mueller & Van Cleave, 1932
Dactylogyrus fallax Wagener, 1857
Dactylogyrus formosus Kulwiec, 1927
Dactylogyrus hypophthalmichthys Akhmerov, 1952
Dactylogyrus inexpectatus Izjumova, in Gusev, 1955
Dactylogyrus inutilis Bychowsky, 1949
Dactylogyrus kersini Gusev, Jalali & Molnár, 1993
Dactylogyrus kulwieci Bychowsky, 1933
Dactylogyrus lenkorani Mikailov, 1967
Dactylogyrus macracanthus Wegener, 1910

Dactylogyrus macrostomi Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993
Dactylogyrus mascomai El-Gharbi, Renaud & Lambert, 1993
Dactylogyrus microcirrus Gusev, Jalali & Molnár, 1993
Dactylogyrus minutus Kulwiec, 1927
Dactylogyrus molnari Ergens & Dulmaa, 1969
Dactylogyrus orbus Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993
Dactylogyrus pavlovskyi Bychowsky, 1949
Dactylogyrus persis Bychowsky, 1949
Dactylogyrus polylepidis Alvarez-Pellitero, Cimon Vicente & Gonzales Lanza, 1981
Dactylogyrus pulcher Bychowsky, 1957
Dactylogyrus rectotrabus Gusev, Jalali & Molnár, 1993
Dactylogyrus sahuensis Ling in Chen et al., 1973
Dactylogyrus skrjabinensis Osmanov, 1958
Dactylogyrus skrjabini Akhmerov, 1954
Dactylogyrus suchengtaii Gusev in Bykhovskaya-Pavlovskaya et al., 1962
Dactylogyrus varicorhini Bychovsky, 1957
Dactylogyrus vastator Nybelin, 1924
Dactylogyrus vistulae Prost, 1957
Dactylogyrus spp.
Dogielius mokhayeri Jalali & Molnár, 1990
Dogielius molnari Jalali, 1992
Dogielius persicus Molnár & Jalali, 1992
Dogielius planus Bychowsky, 1958
Mastacembelocleidus heteranchorus (Kulkarni, 1969) Kritsky, Pandey, Agrawal & Abdullah, 2004

Order Gyrodactylidea
Family Gyrodactylidae
Gyrodactylus baicalensis Bogolepova, 1950
Gyrodactylus barbi Ergens, 1976
Gyrodactylus cyprini Diarova, 1964
Gyrodactylus elegans von Nordmann, 1832
Gyrodactylus gobioninum Gusev, 1955
Gyrodactylus gussevi Ling, 1962
Gyrodactylus katharineri Malmberg, 1964
Gyrodactylus kherulensis Ergens, 1974
Gyrodactylus longoacuminatus Zitnan, 1964
Gyrodactylus macracanthus Hukuda, 1940
Gyrodactylus medius Kathariner, 1895

Gyrodactylus molnari Ergens, 1978
Gyrodactylus shulmani Ling, 1962
Gyrodactylus sprostonae Ling, 1962
Gyrodactylus vicinus Bychowsky, 1957
Order Mazocraeidea
Family Diplozoidae
Diplozoon spp.
Paradiplozoon amurense (Akhmerov, 1974)
Paradiplozoon barbi (Reichenbach-Klinke, 1951)
Paradiplozoon bingolensis Civáňová, Koyun & Koubková, 2013
Paradiplozoon cyprini Khotenovsky, 1982
Paradiplozoon homoion (Bychowsky & Nagibina, 1959)
Paradiplozoon kasimii (Rahemo, 1980)
Paradiplozoon leucisci Khotenovsky, 1982
Paradiplozoon pavlovskii (Bychowsky & Nagibina, 1959)
Paradiplozoon tadjikistanicum (Gavrilova & Djalilov, 1965)
Paradiplozoon vojteki (Peječoch, 1968)
Family Mazocraeidae
Mazocraes alosae (Hermann, 1782)
Family Microcotylidae
Microcotyle donavini van Beneden & Hesse, 1863

Dactylogyrus achmerowi Gusev, 1955 was reported from gills of *C. carpio* from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012b, c), Lesser Zab river (Mama, 2012; Abdullah & Mama, 2012; Mama & Abdullah, 2012b; Nasraddin, 2013) and from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016). *D. achmerowi* was reported for the first time in Iraq from gills of *C. carpio* from both Al-Wahda fish hatchery at Al-Suwaira and Babylon (Al-Furat) fish farm (Mhaisen et al., 1988). So far, 13 fish host species are known for *D. achmerowi* in Iraq.

Dactylogyrus acinacus Gusev, Jalali & Molnár, 1993 was reported from gills of *G. rufa* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004) and from Mortuka stream (Abdullah, 2004). The first record of this parasite in Iraq was that of Abdullah (2002). *D. acinacus* has so far only two fish host species in Iraq.

Dactylogyrus affinis Bychowsky, 1933 was reported from gills of both *L. esocinus* (reported as *B. esocinus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a) and from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004) and *L. xanthopterus* (reported as *B. xanthopterus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed,

2004a) and from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004). The authority of this monogenean was given as Bykhovskii by Abdullah (1990), Abdullah & Rasheed (2004a), Abdullah (2002) and Abdullah & Mhaisen (2004). The first record of this parasite in Iraq was that of Abdullah (1990). So far, nine fish host species are known for *D. affinis* in Iraq.

Dactylogyrus alatus Linstow, 1878 was reported from gills of *A. mossulensis* (reported as *C. mossulensis*) from Darbandikhan lake (Abdullah, 2009b). This was the first and the last report so far known on *D. alatus* from fishes of Iraq.

Dactylogyrus anchoratus (Dujardin, 1845) Wagener, 1857 was reported from gills of *C. auratus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a), gills of *C. carpio* from Ainkawa fish hatchery (Abdullah & Mama, 2012; Mama, 2012; Mama & Abdullah, 2012c), Greater Zab river (Abdullah & Mama, 2012; Mama, 2012) and Lesser Zab river (Nasraddin, 2013) and gills of *L. esocinus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). *D. anchoratus* was reported for the first time in Iraq (in a conference abstract) from gills of *C. carpio* from Tigris river at Al-Zaafaranuiya, south of Baghdad (Mhaisen et al., 1997), but the full paper was published later on (Mhaisen et al., 2003). Eleven fish host species are so far known for *D. anchoratus* in Iraq.

Dactylogyrus arcuatus Yamaguti, 1942 was reported from skin and gills of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009). *D. arcuatus* was reported for the first time in Iraq from skin, buccal cavity and gills of *C. carpio* from fish ponds at Al-Suwairah and Al-Latifiyah (Salih et al., 1988). Nine fish host species are so far known for *D. arcuatus* in Iraq.

Dactylogyrus barbioides Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993 was reported as a new species from gills of *A. grypus* (reported as *B. grypus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). *D. barbioides* was reported for the first time in Iraq from gills of *A. grypus* (reported as *B. grypus*) from Tigris river at Baiji city (Gussev et al., 1993). So far, six fish host species are known for *D. barbioides* in Iraq.

Dactylogyrus barbuli Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993 (assigned as *D. dokani* by Abdullah, 1990) was reported as a new species from *L. barbulus* (reported as *B. barbulus*) from Dokan lake (Abdullah, 1990), Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004), Darbandikhan lake (Abdullah, 2005) and Bahdinan river

(Bilal, 2006; Bilal & Abdullah, 2009a), gills of *L. kersin* (reported as *B. kersin*) from Greater Zab river (Muhammad et al., 2013) and Lesser zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015) and from *L. xanthopterus* (reported as *B. xanthopterus*) from Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004). *D. barbuli* was reported for the first time in Iraq from gills of *L. barbulus* (reported as *B. barbulus*) from Tigris river at Baiji city (Gussev et al., 1993). Six fish host species are so far known for *D. barbuli* in Iraq.

Dactylogyrus baueri Gusev, 1955 was reported from gills of *C. trutta* from Lesser zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015), gills of *C. auratus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and from gills of *C. carpio* from Lesser Zab river (Abdullah & Mama, 2012; Mama, 2012; Mama & Abdullah, 2012b; Nasraddin, 2013; Abdullah & Nasraddin, 2015). *D. baueri* was reported for the first time in Iraq from gills of *C. carpio* from Al-Zaafaraniya fish farm (Al-Aubaidi, 1999). So far, seven fish host species are known for *D. baueri* in Iraq.

Dactylogyrus carassobarbi Gusev, Jalali & Molnár, 1993 was reported from gills of *C. trutta* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b), gills of *C. umbla* (reported as *V. umbla*) from both Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004) and gills of *C. luteus* (also reported as *B. luteus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004), from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b) and from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004; Nasraddin, 2013). *D. carassobarbi* was reported for the first time in Iraq from gills of *C. luteus* (reported as *B. luteus*) from Garmat Ali river, Basrah (Al-Ali, 1998). Seven fish host species are so far known for *D. carassobarbi* in Iraq.

Dactylogyrus carpathicus Zakhvatkin, 1951 was reported from gills of *C. umbla* (reported as *V. umbla*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004), gills of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004), gills of *L. kersin* (reported as *B. kersin*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a) and gills of *L. xanthopterus* (reported as *B. xanthopterus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a). According to Gibson et al. (1996), the specific name of this monogenean is also spelled as *carpaticus*. The first record of this parasite in Iraq was that of Abdullah (1990). So far, five fish host species are known for *D. carpathicus* in Iraq.

Dactylogyrus charbinensis Gusev, 1955 was reported from gills of *C. carpio* from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a)

and from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004). The first record of this parasite in Iraq was that of Abdullah (1990). No more hosts are so far known for *D. charbinensis* from fishes of Iraq.

Dactylogyrus cornu Linstow, 1878 was reported from gills of *L. xanthopterus* (reported as *B. xanthopterus*) from Greater Zab river (Rasheed & Hussain, 1988). *D. cornu* was reported for the first time in Iraq from gills of five fish species from Diyala river, Baghdad (Ali et al., 1986). So far, 13 fish host species are known for *D. cornu* in Iraq.

Dactylogyrus cyprinioni Gusev, Jalali & Molnár, 1993 was reported from gills of *C. macrostomum* from Darbandikhan lake (Abdullah, 2009b). This was the first and the last report so far known on *D. cyprinioni* from fishes of Iraq.

Dactylogyrus deziensioides Gusev, Jalali & Molnár, 1993 was reported from gills of *C. carpio* from Lesser Zab river (Abdullah & Mama, 2012; Mama, 2012; Mama & Abdullah, 2012b), gills of *L. barbulus* (reported as *B. barbulus*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004), from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009a) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b 2015a), gills of *L. kersin* (reported as *B. kersin*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009a) and from gills of *L. xanthopterus* (reported as *B. xanthopterus*) from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004). The first record of this parasite in Iraq was that of Abdullah (2002). Eight fish host species are so far known for *D. deziensioides* in Iraq.

Dactylogyrus deziensis Gusev, Jalali & Molnár, 1993 was reported from gills of *L. barbulus* (reported as *B. barbulus*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009a) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a), gills of *L. esocinus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and gills of *L. kersin* (reported as *B. kersin*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009a). The first record of this parasite in Iraq was that of Bilal (2006). So far, eight fish host species are known for *D. deziensis* in Iraq.

Dactylogyrus dulkeiti Bychowsky, 1936 was reported from gills of *C. auratus* from Dukan lake (Abdullah & Abdullah, 2016a). *D. dulkeiti* was reported for the first time in Iraq from gills of *C. carpio* from Al-Zaafaraniya fish farm (Mohammad-Ali et al., 1999). Nine fish host species are so far known for *D. dulkeiti* in Iraq.

Dactylogyrus dyki Ergens & Lucky, 1959 was reported from gills of *S. lepidus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). The first record of this parasite in Iraq was that of

Abdullah (2013). Two fish host species are so far known for *D. dyki* in Iraq.

Dactylogyrus elegantis Gusev, 1966 was reported from gills of *C. trutta* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015), gills of *C. regium* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and from gills of *S. lepidus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). The first record of this parasite in Iraq was that of Abdullah (2002). Seven fish host species are so far known for *D. elegantis* in Iraq.

Dactylogyrus extensus Mueller & Van Cleave, 1932 was reported from gills of *C. carpio* from Dokan lake (Abdullah, 1990), Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004), two fish farms south of Erbil province (Abdullah, 2004), Darbandikhan lake (Abdullah, 2005), Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009; Mama, 2012; Mama & Abdullah, 2012b, c), Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015) and from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016). *D. extensus* was reported for the first time in Iraq from buccal cavity and gills of *C. carpio* from fish ponds at Al-Suwairah and Al-Latifiyah (Salih et al., 1988). So far, 19 fish host species are known for *D. extensus* in Iraq.

Dactylogyrus fallax Wagener, 1857 was reported from gills of *A. mossulensis* (reported as *C. mossulensis*) from Greater Zab river (Abdullah, 2008). The first record of this parasite in Iraq was that of Abdullah (2008). Two fish host species are so far known for *D. fallax* in Iraq.

Dactylogyrus formosus Kulwiec, 1927 was reported from gills of *C. auratus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and gills of *C. carpio* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015). *D. formosus* was reported for the first time in Iraq from gills of *C. auratus* from a fish farm at Al-Medaen, south of Baghdad (Asmar et al., 2004). Five fish host species are so far known for *D. formosus* in Iraq.

Dactylogyrus hypophthalmichthys Akhmerov, 1952 was reported from gills of *H. molitrix* from Darbandikhan lake (Abdullah, 2005). *D. hypophthalmichthys* was reported for the first time in Iraq from buccal cavity and gills of *H. molitrix* from fish ponds at Al-Suwairah and Al-Latifiyah (Salih et al., 1988). No more hosts are so far known for *D. hypophthalmichthys* from fishes of Iraq.

Dactylogyrus inexpectatus Izjumova, in Gusev, 1955 was reported from gills of *C. carpio* from Lesser Zab river (Abdullah & Mama, 2012; Mama,

2012; Mama & Abdullah, 2012b). *D. inexpectatus* was reported for the first time in Iraq from skin and gills of *C. idella* from fish ponds at Al-Suwairah and Al-Latifiyah (Salih et al., 1988). Seven fish host species are so far known for *D inexpectatus* in Iraq.

Dactylogyrus inutilis Bychowsky, 1949 was reported from gills of *L. barbulus* (reported as *B. barbulus*) from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004) and from gills of *L. esocinus* (reported as *B. esocinus*) from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). *D. inutilis* was reported for the first time in Iraq from gills of *L. xanthopterus* (reported as *B. xanthopterus*) from Tigris river at Baiji city (Gussev et al., 1993). Four fish host species are so far known for *D. inutilis* in Iraq.

Dactylogyrus kersini Gusev, Jalali & Molnár, 1993 was reported from gills of *L. kersin* (reported as *B. kersin*) from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004). The first record of this parasite in Iraq was that of Abdullah (2002). So far, only two fish host species are known for *D. kersini* in Iraq.

Dactylogyrus kulwieci Bychowsky, 1933 was reported from gills of *C. regium* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004) and gills of *L. esocinus* (reported as *B. esocinus*) from Dokan lake (Abdullah, 1990). *D. kulwieci* was reported for the first time in Iraq from gills of both *L. esocinus* (reported as *B. esocinus*) and *L. xanthopterus* (reported as *B. xanthopterus*) from Tigris river at Baiji city (Abdul-Ameer, 1989). Six fish host species are so far known for *D. kulwieci* in Iraq.

Dactylogyrus lenkorani Mikailov, 1967 was reported from gills of *C. trutta* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and gills of *C. umbla* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) *D. lenkorani* was reported for the first time in Iraq from gills of *M. sharpeyi* (reported as *B. sharpeyi*) from Diyala river (Abdul-Ameer, 2010). Six fish host species are so far known for *D. lenkorani* in Iraq.

Dactylogyrus macracanthus Wegener, 1910 was reported from gills of *S. lepidus* (reported as *L. lepidus*) from Darbandikhan lake (Abdullah, 2009b). The year of authority was given as 1909 instead of 1910 by Abdullah (2009b). This was the first and the last report so far known on *D. macracanthus* from fishes of Iraq.

Dactylogyrus macrostomi Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993 (assigned as *D. erbilensis* by Abdullah, 1999) was reported from

gills of *C. macrostomum* from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004), from Mortuka stream (Abdullah, 2004), a fish farm south of Erbil province (Abdullah, 2004), Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009a), Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and from Lesser Zab river (Nasraddin, 2013). *D. macrostomi* was reported for the first time in Iraq from gills of *C. macrostomum* from Tigris river at Baiji city (Gussev et al., 1993). Two fish host species are so far known for *D. macrostomi* in Iraq.

Dactylogyrus mascomai El-Gharbi, Renaud & Lambert, 1993 was reported from gills of *C. macrostomum* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). The first record of this parasite in Iraq was that of Abdullah (2013). The year of authority was given as 1992 instead of 1993 by Abdullah (2013) and Abdullah & Abdullah (2013b). No more host species are so far known for *D. mascomai* from fishes of Iraq.

Dactylogyrus microcirrus Gusev, Jalali & Molnár, 1993 was reported from gills of *C. trutta* from Darbandikhan lake (Abdullah, 2009b; Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and from Lesser Zab river (Nasraddin, 2013). The first record of this parasite in Iraq was that of Abdullah (2009b). No more hosts are so far known for *D. microcirrus* from fishes of Iraq.

Dactylogyrus minutus Kulwiec, 1927 was reported from gills of *C. carpio* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004, 2006a; Abdullah & Mama, 2012; Mama, 2012; Mama & Abdullah, 2012b; Nasraddin, 2013), two fish farms south of Erbil province (Abdullah, 2004), Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009; Mama, 2012; Mama & Abdullah, 2012b, c) and from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016). *D. minutus* was reported for the first time in Iraq (in a conference abstract) from gills of *C. carpio* from Tigris river at Al-Zaafaranuiya, south of Baghdad as well as from the Euphrates river at Al-Qadisia Dam lake (Mhaisen et al., 1997), but the full paper was published later on (Mhaisen et al., 2003). Twelve fish host species are so far known for *D. minutus* in Iraq.

Dactylogyrus molnari Ergens & Dulmaa, 1969 was reported from gills of *C. carpio* from Ainkawa fish hatchery (Abdullah & Mama, 2012; Mama, 2012; Mama & Abdullah, 2012b, c) and from Lesser Zab river (Abdullah & Mama, 2012; Mama, 2012; Mama & Abdullah, 2012b). The first record of this parasite in Iraq was that of Mama (2012). No more hosts are so far known for *D. molnari* from fishes of Iraq.

Dactylogyrus orbus Gusev, Ali, Abdul-Ameer, Amin & Molnár, 1993 was reported from gills of *B. lacerta* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004). *D. orbus* was reported for the first time in Iraq from gills of *B. lacerta* from Tigris river at Baiji city (Gussev et al., 1993). No more hosts are so far known for *D. orbus* from fishes of Iraq.

Dactylogyrus pavlovskyi Bychowsky, 1949 (assigned as *D. tigrae* by Abdullah, 1990) was reported from gills of *A. grypus* (reported as *B. grypus*) from Dokan lake (Abdullah, 1990), from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004), Mortuka stream (Abdullah, 2004), a fish farm south of Erbil province (Abdullah, 2004), Darbandikhan lake (Abdullah, 2005; Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a), Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009a). *D. pavlovskyi* was reported for the first time in Iraq from gills of both *A. grypus* (reported as *B. grypus*) and *M. sharpeyi* (reported as *B. sharpeyi*) from Tigris river at Baiji city (Gussev et al., 1993). Eleven fish host species are so far known for *D. pavlovskyi* in Iraq.

Dactylogyrus persis Bychowsky, 1949 was reported from gills of *C. luteus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b) and from Lesser Zab river (Nasraddin, 2013). The first record of this parasite in Iraq was that of Abdullah (2013). Two fish host species are so far known for *D. persis* in Iraq.

Dactylogyrus polylepidis Alvarez-Pellitero, Cimon Vicente & Gonzales Lanza, 1981 was reported from gills of *C. regium* from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004). The authority of this parasite was erroneously reported as Alvarez-Pellitero, 1981 instead of Alvarez-Pellitero, Cimon Vicente & Gonzales Lanza, 1981. The first record of this parasite in Iraq was that of Abdullah (2002). No more hosts are so far known for *D. polylepidis* from fishes of Iraq.

Dactylogyrus pulcher Bychowsky, 1957 was reported from gills of *C. trutta* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a), from Lesser Zab river (Nasraddin, 2013), from gills of *C. umbla* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a), gills of *C. regium* (misspelled as *C. regius*) from Dokan lake (Abdullah, 1990) and gills of *C. microstomum* (misspelled as *C. macrostomus*) from Dokan lake (Abdullah, 1990) and from Lesser Zab river (Nasraddin, 2013). The authority of this parasite, Bychowsky, was spelled as Bykhovskii by Abdullah (1990), Abdullah (2013) and Nasraddin (2013) and as Bykhovsky by Abdullah & Abdullah (2013b). *D. pulcher* was reported for the first time in Iraq from gills of both *Capoeta*

trutta (reported as *Varicorhinus trutta*) and *C. macrostomum* (misspelled as *C. macrostomus*) from Tigris river at Baiji city (Abdul-Ameer, 1989). Five fish host species are so far known for *D. pulcher* in Iraq.

Dactylogyrus rectotrabus Gusev, Jalali & Molnár, 1993 was reported from gills of *G. rufa* from Greater Zab river (Abdullah, 2007) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). The first record of this parasite in Iraq was that of Abdullah (2007). Two fish host species are so far known for *D. rectotrabus* in Iraq.

Dactylogyrus sahuensis Ling in Chen et al., 1973 was reported from gills of *C. carpio* from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012b, c). *D. sahuensis* was reported for the first time in Iraq from gills of *C. carpio* from Al-Furat fish farm, Babylon province (Al-Zubaidy, 1998). According to Gibson et al. (1996), *D. sahuensis* was first mentioned in 1965 by Ling in unpublished M. Sc. thesis. No more host species are so far known for *D. sahuensis* from fishes of Iraq.

Dactylogyrus skrjabinensis Osmanov, 1958 was reported from gills of *C. trutta* from Sirwan river (Abdullah & Abdullah, 2014). The specific name of this parasite was spelled as *scrjabinensis* by Abdullah & Abdullah (2014). According to Gibson et al. (1996), *D. skrjabinensis* is sometimes spelled as *D. scrjabinensis*. This was the first and the last report so far known on *D. skrjabinensis* from fishes of Iraq.

Dactylogyrus skrjabini Akhmerov, 1954 was reported from gills of *H. molitrix* from fish ponds in Ainkawa city (Bilal & Abdullah, 2012b). The specific name of this monogenean was spelled as *scrjabini* by Bilal & Abdullah (2012b). According to Gibson et al. (1996), *D. skrjabini* is sometimes spelled as *D. scrjabini*. This parasite was reported for the first time in Iraq from buccal cavity and gills of *H. molitrix* from fish ponds at Al-Suwairah and Al-Latifiyah (Salih et al., 1988). Seven fish host species are so far known for *D. skrjabini* in Iraq.

Dactylogyrus suchengtaii Gusev in Bykhovskaya-Pavlovskaya et al., 1962 was reported from gills of *H. molitrix* fom Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). The authority of this monogenean was reported as Gussev, 1962 by Abdullah (2013) and Abdullah & Abdullah (2013b). The first record of this parasite in Iraq was that of Abdullah (2013). No more hosts are so far known for *D. suchengtaii* from fishes of Iraq.

Dactylogyrus varicorhini Bychovsky, 1957 was reported from gills of *C. luteus* (reported as *B. luteus*) from Dokan lake (Abdullah, 1990). *D. varicorhini* was reported for the first time in Iraq from gills of both *C. trutta* (reported as *V. trutta*) and *C. luteus* (reported as *B. luteus*) from

Tigris river at Baiji city (Abdul-Ameer, 1989). Six fish host species are so far known for *D. varicorhini* in Iraq.

Dactylogyrus vastator Nybelin, 1924 was reported from gills of *A. grypus* (reported as *Tor grypus*) from Greater Zab river (Ali, 1989), gills of *B. lacerta* from Greater Zab river (Ali, 1989), gills of *C. umbla* (reported as *V. umbla*) from Greater Zab river (Ali, 1989), gills of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Ali, 1989), gills of *C. macrostomum* (misspelled as *C. macrostomus*) from Greater Zab river (Ali, 1989), gills of *C. carpio* from Darbandikhan lake (Abdullah, 2005) and from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012b, c), gills of *L. barbulus* (reported as *B. barbulus*) from Greater Zab river (Ali, 1989), gills of *L. esocinus* (reported as *B. esocinus*) from Greater Zab river (Ali, 1989), gills of *S. cephalus* (reported as *L. cephalus*) from Greater Zab river (Ali, 1989), gills of *S. lepidus* (reported as *L. lepidus*) from Greater Zab river (Ali, 1989) and gills of *S. spurius* (reported as *L. spurius*) from Greater Zab river (Ali, 1989). *D. vastator* was reported for the first time in Iraq from gills of *C. macrostomum* (misspelled as *C. macrostomus*) from Tigris river at Baghdad (Ali et al., 1987c). This monogenean is the most distributed *Dactylogyrus* species in fishes of Iraq as it has so far 33 fish host species.

Dactylogyrus vistulae Prost, 1957 was reported from gills of *C. trutta* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015), gills of *M. mastacembelus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and gills of *S. lepidus* (also reported as *L. lepidus*) from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004), Mortuka stream (Abdullah, 2004), Darbandikhan lake (Abdullah, 2005; Abdullah, 2013; Abdullah & Abdullah, 2013b; 2015a) and Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009a). The first record of this parasite in Iraq was that of Abdullah (2002). *D. vistulae* has so far four fish host species in Iraq.

Dactylogyrus species was reported from gills of *C. regium* from Greater Zab river (Al-Marjan, 2016) and gills of *C. carpio* from two fish farms in Duhok and Suliemanyia regions (Ali, 2002). In addition of the 85 identified *Dactylogyrus* species so far recorded from fishes of Iraq, unidentified *Dactylogyrus* species were so far reported from nine fish host species in Iraq.

Diplozoon species was reported from gills of *C. macrostomum* from Kasnazan lake (Abdullah, 2004), *C. carpio* from FAP Hatchery Fish Project in Suliemanyia (Ali, 2002) and gills of *S. lepidus* (reported as *L. cephalus*) from Kasnazan lake (Abdullah, 2004). No site of infection was given for *Diplozoon* sp. from *C. carpio* by Ali (2002). In addition of

Diplozoon paradoxum which was firstly recorded in Iraq from gills of *C. luteus* (reported as *B. luteus*) from Al-Husainia creek (Al-Saadi, 2007), unidentified *Diplozoon* species were so far reported from ten fish host species in Iraq.

Dogielius mokhayeri Jalali & Molnár, 1990 was reported from gills of *C. trutta* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015), gills of *C. luteus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a), gills of *C. macrostomum* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015) and from gills of *L. vorax* (reported as *A. vorax*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004, 2005b). The first report of this monogenean in Iraq was that of Abdullah (2002). *D. mokhayeri* has so far these above-named four fish host species in Iraq.

Dogielius molnari Jalali, 1992 was reported from gills of *C. macrostomum* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004, 2005b), from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and from Lesser Zab river (Nasraddin, 2013). The first report of this monogenean in Iraq was that of Abdullah (2002). No more hosts are so far known for *D. molnari* from fishes of Iraq.

Dogielius persicus Molnár & Jalali, 1992 was reported from gills of *A. grypus* (reported *as B. grypus*) from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a), gills of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004, 2005b) and from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015) and gills of *C. macrostomum* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015). The first report of this monogenean in Iraq was that of Abdullah (2002). *D. persicus* has so far six fish host species in Iraq.

Dogielius planus Bychowsky, 1958 was reported from gills of *C. luteus* (reported as *B. luteus*) from Darbandikhan lake (Abdullah, 2005). That was the first record of this monogenean in Iraq. So far, three fish host species are known for *D. planus* in Iraq.

Gyrodactylus baicalensis Bogolepova, 1950 was reported from skin of *C. carpio* from Lesser Zab river (Mama, 2012; Mama & Abdullah, 2012b, 2013a) and from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016). The specific name *baicalensis* was misspelled as *baikalensis* by Mama (2012), Mama & Abdullah (2012b, 2013a) and Mustafa (2016). *G. baicalensis* was reported for the first time in Iraq from skin, buccal cavity and gills of *C. carpio* from fish ponds at Al-Suwairah

and Al-Latifiyah (Salih et al., 1988). *G. baicalensis* has so far ten fish host species in Iraq.

Gyrodactylus barbi Ergens, 1976 was reported from skin of *C. carpio* from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012b; Abdullah & Mama, 2013). The first report of this monogenean in Iraq was that of Mama (2012). Five fish host species are so far known for *D. barbi* in Iraq.

Gyrodactylus cyprini Diarova, 1964 was reported from skin of *C. carpio* from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012b; Abdullah & Mama, 2013). The first report of this monogenean in Iraq was that of Mama (2012). No more hosts are so far known for *G. cyprini* from fishes of Iraq.

Gyrodactylus elegans von Nordmann, 1832 was reported from skin and gills of *C. trutta* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015), skin and gills of *C. carpio* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004; Mama, 2012; Mama & Abdullah, 2012b, 2013a), gills of *C. carpio* from fish ponds in Erbil, Duhok and Suliemanyia regions (Ali, 2002), skin of the same fish from two fish farms south of Erbil province (Abdullah, 2004), gills of *C. carpio* from Darbandikhan lake (Abdullah, 2005), skin and gills of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009) and skin and gills of *C. carpio* from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016). This monogenean was reported for the first time in Iraq from both *C. carpio* and *P. abu* (reported as *L. abu*) from Al-Zaafaraniya and Al-Latifiya fish fatms (Ali & Shaaban, 1984). *G. elegans* has so far 23 fish host species in Iraq.

Gyrodactylus gobioninum Gusev, 1955 was reported from skin of *C. carpio* from Lesser Zab river (Mama, 2012; Mama & Abdullah, 2012b, 2013a). No more records are so far known for *G. gobioninum* from fishes of Iraq.

Gyrodactylus gussevi Ling, 1962 was reported from skin of *H. fossilis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004). The first report of this monogenean in Iraq was that of Abdullah (2002). *H. fossilis* is the only host so far known for *G. gussevi* in Iraq.

Gyrodactylus katharineri Malmberg, 1964 was reported from gills of *C. carpio* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015). The first report of this monogenean in Iraq was that of Nasraddin (2013). So far, two fish host species are known for *G. katharineri* in Iraq.

Gyrodactylus kherulensis Ergens, 1974 was reported from skin of *C. carpio* from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012b; Abdullah & Mama, 2013) and skin of *S. triostegus* from Greater

Zab river (Muhammad et al., 2013). *G. kherulensis* was reported for the first time in Iraq from gills of *C. carpio* from Babylon (Now Al-Furat) fish farm (Ali et al., 1988b). Four fish host species are so far known for *G. kherulensis* in Iraq.

Gyrodactylus longoacuminatus Zitnan, 1964 was reported from skin of *C. carpio* from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012b, Abdullah & Mama, 2013). The first report of this monogenean in Iraq was that of Mama (2012). No more hosts are so far known for *G. longoacuminatus* from fishes of Iraq.

Gyrodactylus macracanthus Hukuda, 1940 (as *G. paralatus* by Abdullah, 2005) was reported from skin of *C. carpio* from Darbandikhan lake (Abdullah, 2005) and skin of *H. molitrix* from Darbandikhan lake (Abdullah, 2005). *G. macracanthus* was reported for the first time in Iraq from skin and gills of *C. carpio* and skin, fins and buccal cavity of *H. molitrix* from Al-Furat fish farm, Babylon province (Al-Zubaidy, 1998) as *G. paralatus*. According to Pugachev et al. (2009), *G. paralatus* is a synonym of *G. macracanthus*. So far, two fish host species are known for *G. macracanthus* and its synonym *G. paralatus* in Iraq.

Gyrodactylus medius Kathariner, 1895 was reported from skin of *C. carpio* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004). The year of authority was reported as 1893 instead of 1895 by Abdullah (2002) and Abdullah & Mhaisen (2004). *G. medius* was reported for the first time in Iraq from skin and fins of *C. carpio* from Al-Furat fish farm (Al-Zubaidy, 1998). Four fish host species are so far known for *G. medius* in Iraq.

Gyrodactylus molnari Ergens, 1978 was reported from gills of *C. carpio* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a). The first report of this monogenean in Iraq was that of Abdullah (2013). No more hosts are so far known for *G. molnari* from fishes of Iraq.

Gyrodactylus shulmani Ling, 1962 was reported from gills of *C. carpio* from Lesser Zab river (Nasraddin, 2013) and from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016). The specific name *shulmani* was erroneously reported as *schulmani* by both Nasraddin (2013) and Mustafa (2016). The first report of this monogenean in Iraq was that of Nasraddin (2013). No more hosts are so far known for *G. shulmani* from fishes of Iraq.

Gyrodactylus sprostonae Ling, 1962 was reported from gills of *C. trutta* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015), gills of *C. auratus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and gills of *C. carpio* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013 b, 2015a). *G. sprostonae* was

reported for the first time in Iraq from skin and fins of *C. carpio* from Al-Furat fish farm (Al-Zubaidy, 1998). So far, 13 fish host species are known for *G. sprostonae* in Iraq.

Gyrodactylus vicinus Bychowsky, 1957 was reported from skin of *C. carpio* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004) and from skin and gills of *C. carpio* from Lesser Zab river (Mama, 2012; Mama & Abdullah, 2012b, 2013a). The authority of this parasite was reported as Bykhowskii by Abdullah, (2002), Abdullah & Mhaisen (2004), Mama (2012) and Mama & Abdullah (2013a). *G. vicinus* was reported for the first time in Iraq from skin, fins and gills of *C. carpio* from Al-Furat fish farm (Al-Zubaidy, 1998). Three fish host species are so far known for *G. vicinus* in Iraq.

Mastacembelocleidus heteranchorus (Kulkarni, 1969) Kritsky, Pandey, Agrawal & Abdullah, 2004 was reported from gills of *M. mastacembelus* from Greater Zab river (Kritsky et al., 2004; Bashê, 2008; Bashê & Abdullah, 2010a, b) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b). The first report of this monogenean in Iraq was that of Kritsky et al. (2004). *M. mastacembelus* is the only host so far known for *M. heteranchorus* in Iraq.

Mazocraes alosae (Hermann, 1782) was reported from gills of *C. carpio* from Erbil's fish market (Abdullah, 2000). This was the first and last record of *M. alosae* from fishes of Iraq.

Microcotyle donavini van Beneden & Hesse, 1863 was reported from gills of *P. abu* (reported as *L. abu*) from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015). *M. donavini* was recorded for the first time in Iraq from gills of *P. abu* (reported as *L. abu*) from Babylon fish farm (Ali et al., 1989b). Ten host species are so far known for this monogenean from fishes of Iraq.

Paradiplozoon amurense (Akhmerov, 1974) was reported from gill filaments of *S. lepidus* from watersheds of Sharbazher area, northeast of Sulaimani city (Abdullah & Abdullah, 2016b). *P. amurense* was recorded for the first time in Iraq from gills of *C. macrostomum* from Tigris river passing through Tikreet city by Al-Nasiri (2010) who misspelled its specific name as *amurensis* and did not inserted the authority inside parentheses. Three host species are so far known for *P. amurense* from fishes of Iraq.

Paradiplozoon barbi (Reichenbach-Klinke, 1951) was reported as *Diplozoon barbi* Reichenbach-Klinke, 1951 by Ali (1989), Abdullah (2002) and Abdullah & Mhaisen (2004). It was reported from gills of *A. marmid* from Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004), gills of *C. regium* from Lesser Zab river (Abdullah, 2002; Abdullah

& Mhaisen, 2004), gills of *C. macrostomum* (misspeled as *C. macrostomus*) from Greater Zab river (Ali, 1989; Bilal, 2016b) and from gills of *S. spurius* (reported as *L. spurius*) from Greater Zab river (Ali, 1989). The first record of this parasite (as *D. barbi*) in Iraq was from gills of *Chondrostoma nasus*, *C. regium* (misspelled as *C. regius*) and *C. carpio* from Tigris river at Baghdad city (Rasheed, 1989). So far, eight fish host species are known for *P. barbi* and its synonym *D. barbi* in Iraq.

Paradiplozoon bingolensis Civáňová, Koyun & Koubková, 2013 was reported from gill filaments of *G. rufa* from watersheds of Sharbazher area, northeast of Sulaimani city (Abdullah & Abdullah, 2016b). The first report of this monogenean in Iraq was that of Abdullah & Abdullah (2016b). Five host species are so far known for *P. bingolensis* from fishes of Iraq.

Paradiplozoon cyprini Khotenovsky, 1982 was reported from gills of *C. macrostomum* from Greater Zab river (Muhammad et al., 2013) and from gills of *C. carpio* from Ainkawa fish hatchery (Mama, 2012; Mama & Abdullah, 2012a, b) and from Lesser Zab river (Nasraddin, 2013). *P. cyprini* was recorded for the first time in Iraq from gills of *A. grypus* (reported as *B. grypus*) from Tigris river passing through Abu-Ajeel village at Tikreet city (Al-Nasiri & Mhaisen, 2009). Seven host species are so far known for *P. cyprini* from fishes of Iraq.

Paradiplozoon homoion (Bychowsky & Nagibina, 1959) was reported from gills of *C. macrostomum* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015). The first record of this parasite in Iraq was from gills of *L. xanthopterus* (reported as *B. xanthopterus*) from Al-Husainia creek (Al-Saadi, 2007). Four host species are so far known for *P. homoion* from fishes of Iraq.

Paradiplozoon kasimii (Rahemo, 1980) was reported as *Diplozoon kasimii* by Abdullah (2002) and Abdullah & Mhaisen (2004). It was reported from gills of *C. macrostomum* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004). This parasite was recorded for the first time in Iraq as *D. kasimii* from gills of *C. macrostomum* (misspelled as *C. macrostomus*) from Tigris river in Mosul city (Fattohy, 1975) but its description was published later by Rahemo (1980). Khotenovsky (1985) transferred *D. kasimii* to the genus *Paradiplozoon* and considered it as a species inquirenda. So far, 13 fish host species are known for *P. kasimii* and its synonym *D. kasimii* in Iraq.

Paradiplozoon leucisci Khotenovsky, 1982 was reported from gills of *Hemiculter leucisculus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b, 2015a) and gills of *S. lepidus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2013b,

2015a). The first report of this monogenean in Iraq was that of Abdullah (2013). Three host species are so far known for *P. leucisci* from fishes of Iraq.

Paradiplozoon pavlovskii (Bychowsky & Nagibina, 1959) was reported as *Diplozoon pavlovskii* by Abdullah (1990), Abdullah (2002), Abdullah & Mhaisen (2004) and Abdullah & Rasheed (2004a). It was reported from gills of *C. regium* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b), gills of *C. macrostomum* (misspelled as *C. macrostomus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a), gills of *L. barbulus* (reported as *B. barbulus*) from Dokan lake (Abdullah, 1990) and from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004) and from gills of *L. xanthopterus* (reported as *B. xanthopterus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2004). This monogenean was recorded for the first time in Iraq from gills of *L. vorax* (reported as *A. vorax*) from Mehaijeran creek, a side branch of Shatt Al-Arab river (Khamees, 1983) under the name *D. pavlovskii*. Twelve fish host species are so far known for *P. pavlovskii* and its synonym *D. pavlovskii* in Iraq.

Paradiplozoon tadjikistanicum (Gavrilova & Djalilov, 1965) was reported from gills of *C. trutta* from Lesser Zab river (Nasraddin, 2013; Abdullah & Nasraddin, 2015). The specific name *tadjikistanicum* was misspelled as *tadzhikistanicum* by Abdullah & Nasraddin (2015) and also Djalilov (part of the authority) was misspelled as Dzhalilov. Nasraddin (2013) did not insert this parasite authority inside parentheses. The first report of this monogenean in Iraq was that of Nasraddin (2013). No more records are so far known for *P. tadjikistanicum* in Iraq.

Paradiplozoon vojteki (Pejěoch, 1968) was reported from gill filaments of *C. regium* from watersheds of Sharbazher area, northeast of Sulaimani city (Abdullah & Abdullah, 2016b). The first record of this parasite in Iraq was from gills of *L. xanthopterus* (reported as *B. xanthopterus*) from Al-Husainia creek (Al-Saadi, 2007). Four fish host species are so far known for *P. vojteki* in Iraq.

Thaparocleidus vistulensis (Siwak, 1932) Lim, 1996 was reported as *Ancylodiscoides vistulensis* by Abdullah (2002), Abdullah & Mhaisen (2004), Shwani (2009) and Abdullah & Shwani (2010). It was reported from gills of *S. glanis* from Lesser and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2004) and from gills of *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010; E.F. Bilal, 2016) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b). *T. vistulensis* was reported for the first time in Iraq by its synonym *Ancylodiscoides vistulensis* from gills of *S. triostegus* from Tigris river

at Baiji city (Abdul-Ameer, 1989). Nine fish host species are known for *T. vistulensis* and its synonym *A. vistulensis* in Iraq.

Phylum Platyhelminthes- Class Cestoda

The class Cestoda of the phylum Platyhelminthes is represented in fishes of Kurdistan region with one species each of the genera *Caryophyllaeides*, *Diphyllobothrium*, *Glanitaenia*, *Ligula*, *Monobothrium*, *Neogryporhynchus*, *Polyonchobothrium*, *Postgangesia*, *Proteocephalus* and *Schyzocotyle*, two species of *Khawia*, three species of *Caryophyllaeus*, in addition to unidentified species of the genera *Proteocephalus*, *Senga* and *Tetracampo*s as well as an unidentified caryophyllid species as indicated below. Names of all cestodes followed Global Cestode Database (2017).

Phylum Platyhelminthes
Class Cestoda
Order Bothriocephalidea
Family Bothriocephalidae
Polyonchobothrium magnum (Zmeev, 1936) Yamaguti, 1959
Schyzocotyle acheilognathi (Yamaguti, 1934) Brabec, Waeschenbach, Scholz, Littlewood & Kuchta, 2015
Senga sp.
Tetracampos ciliotheca Wedl, 1861
Order Caryophyllidea
Family Caryophyllaeidae
Caryophyllaeides fennicus (Schneider, 1902) Nybelin, 1922
Caryophyllaeus fimbriceps Annenkova-Chlopina, 1919
Caryophyllaeus gotoi Motomura, 1927
Caryophyllaeus laticeps (Pallas, 1781) Mueller, 1787
Monobothrium wageneri Nybelin, 1922
Caryophyllid sp.
Family Lytocestidae
Khawia armeniaca (Cholodkovski, 1915) Shulman, 1958
Khawia sinensis Hsü, 1953
Order Diphyllobothriidea
Family Diphyllobothriidae
Diphyllobothrium latum (L., 1758) Cobbold, 1858
Ligula intestinalis (Linnaeus, 1758) Bloch, 1782
Order Cyclophyllidea
Family Dilepididae
Neogryporhynchus cheilancristrotus (Wedl, 1855) Baer & Bona, 1960
Order Proteocephalidea
Family Monticellidae

Postgangesia inarmata de Chambrier, Al-Kallak & Mariaux, 2003

Family Proteocephalidae

Glanitaenia osculata (Goeze, 1782) de Chambrier, Zehnder, Vaucher & Mariaux, 2004

Proteocephalus coregoni Wardle, 1932

Proteocephalus sp.

Caryophyllides fennica (Schneider, 1902) was reported as *Caryophyllaeides fennicus* Nybelin, 1922. It was reported as prematures and adults from the intestine of *L. xanthopterus* (reported as *B. xanthopterus*) from Greater Zab river (Rasheed & Hussain, 1988). This was its first report from Iraq. So far, only two fish host species are known for *C. fennica* and its synonym *C. fennicus* in Iraq.

Caryophyllaeus fimbriceps Annenkova-Chlopina, 1919 was reported from the intestine of *L. barbulus* (reported as *B. barbulus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b) and from intestine of *L. kersin* (reported as *B. kersin*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b). The authority of this cestode was erroneously given as Chlopina, 1924 by Bilal (2006) and Bilal & Abdullah (2009b). Its first record in Iraq was that of Abdullah (1990). No more records are so far known for this cestode from fishes of Iraq.

Caryophyllaeus gotoi Motomura, 1927 was reported as *Paracaryophyllaeus gotoi* by Abdullah (2005). It was reported from intestine of *C. luteus* (reported as *B. luteus*) from Darbandikhan lake (Abdullah, 2005). This was its first record in Iraq. So far, no more fish host species are known for *C. gotoi* and its synonym *P. gotoi* in Iraq.

Caryophyllaeus laticeps (Pallas, 1781) Mueller, 1787 was reported as juveniles and adults from intestine of *L. xanthopterus* (reported as *B. xanthopterus*) from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2011b). Its first record in Iraq was from the intestine and body cavity of both *Alburnus caeruleus* and *L. xanthopterus* (reported as *B. xanthopterus*) from Al-Tharthar lake (Al-Saadi, 1986). Six fish host species are so far known for this cestode in Iraq.

Caryophyllid species was reported from the intestine of *C. carpio* from FAO hatchery fish project in Suliemanyia region (Ali, 2002). Mhaisen & Abdullah (2016) in their checklist had erroneously applied *Caryophyllaeus* sp. instead of caryophyllid sp. for this cestode from *C. carpio* which was reported by Ali (2002). So far, five identified *Caryophyllaeus* species as well as some unspecified *Caryophyllaeus* species from two fish host species and four other caryophyllid species are known from fishes of Iraq.

Diphyllobothrium latum (L., 1758) Cobbold, 1858 larva was reported as plerocercoid from muscles of *A. grypus* (reported as *B. grypus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b). *D. latum* was recorded for the first time in Iraq from the body cavity attached to the outer surface of the intestine of *Acanthobrama centisquama* from Tigris river at Baghdad (Ali et al., 1987d). So far, four fish species are known as hosts for this cestode larva in Iraq.

Glanitaenia osculata (Goeze, 1782) de Chambrier, Zehnder, Vaucher & Mariaux, 2004 was reported as *Proteocephalus osculatus* by Abdullah (2002), Shwani (2009), Shwani & Abdullah (2010), Abdullah & Mhaisen (2011b) and Muhammad et al. (2013). It was reported from intestine of *S. glanis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2011b; Muhammad et al., 2013) and Lesser Zab rivers (Abdullah, 2002), and intestine of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010). The first record of this cestode in Iraq (as *P. osculatus*) was from the alimentary canal of *L. vorax* (reported as *A. vorax*) from Al-Tharthar lake (Al-Saadi, 1986). So far, eight fish host species are known for *G. osculata* and its synonym *P. osculatus* in Iraq.

Khawia armeniaca (Cholodkovski, 1915) Shulman, 1958 was reported from intestine of *A. grypus* (reported as *B. grypus*) from Greater Zab and Lesser Zab rivers (Bilal, 2013; Bilal & Abdullah, 2015), intestine of *C. luteus* from Greater Zab and Lesser Zab rivers (Bilal, 2013; Bilal & Abdullah, 2015), intestine of *L. esocinus* from Greater Zab river (Bilal, 2013; Hashim, 2014; Bilal & Abdullah, 2015; Hashim et al., 2015), Lesser Zab river (Bilal, 2013; Bilal & Abdullah, 2015), intestine of *L. kersin* from Greater Zab and Lesser Zab rivers (Bilal, 2013; Bilal & Abdullah, 2015) and intestine of *M. mastacembelus* from Greater Zab and Lesser Zab rivers (Bilal, 2013; Bilal & Abdullah, 2015). The first record of *K. armeniaca* in Iraq was from the intestine of both *M. sharpeyi* and *S. triostegus* (reported as *Parasilurus triostegus*) from Al-Hammar marsh (Al-Daraji, 1986). So far, seven fish host species are known for *K. armeniaca* and its synonyms *K. barbi*, *K. grypi* and *K. lutei* (according to Scholz et al., 2011) in Iraq.

Khawia sinensis Hsü, 1953 was reported from the intestine of *A. grypus* (reported as *B. grypus*) from Darbandikhan lake (Abdullah, 2005). This was its first record in Iraq. So far, three host species are known for this cestode in Iraq.

Ligula intestinalis (Linnaeus, 1758) Bloch, 1782 larva was reported as plerocercoid from body cavity and intestine of *A. marmid* from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b), body cavity and intestine of *A. grypus* (reported as *B. grypus*) from Dokan lake (Abdullah,

1990; Abdullah & Rasheed, 2004b) and from Lesser Zab river (Abdullah, 2002) and from intestine of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a). The first record of *L. intestinalis* in Iraq was from the body cavity of *L. vorax* (reported as *A. vorax*) from Shatt Al-Arab river (Al-Hasani, 1985). So far, 14 fish host species are known for this cestode in Iraq.

Monobothrium wageneri Nybelin, 1922 was reported from intestine of *L. barbulus* (reported as *B. barbulus*) from Greater Zab river (Ali, 1989; Abdullah, 2002; Abdullah & Mhaisen, 2011b). Its first record in Iraq was that of Ali (1989). So far, three fish host species are known for this cestode in Iraq.

Neogryporhynchus cheilancristrotus (Wedl, 1855) Baer & Bona, 1960 was reported as larval form from the intestine of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010). This cestode larva was recorded for the first time in Iraq from the the intestine of *P. abu* (reported as *L. abu*) from Diyala river (Ali et al., 1987a). So far, four fish species are known as hosts for this cestode in Iraq.

Polyonchobothrium magnum (Zmeev, 1936) Yamaguti, 1959 was reported from intestine of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a). *P. magnum* was recorded for the first time in Iraq from the the intestine of *C. macrostomum* from a man-made lake (Ali et al., 1988a). So far, four fish species are known as hosts for this cestode in Iraq.

Postgangesia inarmata de Chambrier, Al-Kallak & Mariaux, 2003 was reported from intestine of *S. glanis* from Greater Zab and Little Zab rivers (Bilal, 2013; Bilal & Abdullah, 2013) and intestine of *S. triostegus* from Greater Zab river (Hashim, 2014; Hashim et al., 2015; E.F. Bilal, 2016). *P. inarmata* was recorded for the first time in Iraq from the the intestine of *S. glanis* from Tigris river at Mosul (de Chambrier et al., 2003). So far, three fish species are known as hosts for this cestode in Iraq.

Proteocephalus coregoni Wardle, 1932 was reported from the intestine of *L. esocinus* (reported as *B. esocinus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b). No more records are so far known for this cestode in Iraq.

Proteocephalus species larva was reported as cysticercoid from the intestinal wall of *A. marmid* from Greater Zab river (Abdullah, 2002). So far, two identified *Proteocephalus* species as well as some unspecified *Proteocephalus* species from four fish host species are known from fishes of Iraq.

Schyzocotyle acheilognathi (Yamaguti, 1934) Brabec, Waeschenbach, Scholz, Littlewood & Kuchta, 2015 was reported as *Bothriocephalus*

acheilognathi (Abdullah, 2002, 2004; Abdullah & Rasheed, 2004b; Abdullah, 2005, Abdullah & Mhaisen, 2006a; Bilal, 2006; Bilal & Abdullah, 2009b; Abdullah & Mhaisen, 2011b; Mama, 2012; Mama & Abdullah, 2012b, 2013a; Muhammad et al., 2013; Hashim, 2014; Hashim et al., 2015), *B. gowkongensis* (Ali, 2002) and *B. opsariichthydis* (Abdullah, 1990). It was reported from intestine of *A. grypus* (reported as *B. grypus*) from Mortuka stream (Abdullah, 2004), intestine of *C. carpio* from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b), Darbandikhan lake (Abdullah, 2005), Greater Zab river (Muhammad et al., 2013; Hashim, 2014; Hashim et al., 2015), Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006a; Mama, 2012; Mama & Abdullah, 2012b, 2013a), three fish farms at Erbil province (Ali, 2002; Abdullah, 2004) and from the intestine of *S. lepidus* (reported as *L. lepidus*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2011b) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b). Brabec et al. (2015), based on molecular study, considered the genus *Bothriocephalus* as a synonym of *Schyzocotyle*. The first record of *S. acheilognathi* (as *B. achelognathi* and *B. gowkongensis*) in Iraq was from the the intestine of *C. carpio* from some fish ponds (Khalifa, 1982). So far, 21 fish species are known as hosts for *S. acheilognathi* and its synonyms *B. acheilognathi, B. gowkongensis* and *B. opsaiichthydis* in Iraq.

Senga species was reported from intestine of *M. mastacembelus* from Greater Zab river (Bilal, 2013, Hashim, 2014; Hashim et al., 2015) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a). So far, one identified *Senga* species as well as some unspecified *Senga* species from two fish host species are known from fishes of Iraq.

Tetracampos ciliotheca Wedl, 1861 (as *Polyonchobothrium clarias* Woodland, 1925) was reported as larvae from the intestine of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010). According to Kuchta & Scholz (2007), Kuchta et al. (2008) and Kuchta et al. (2012), *P. clarias* is considered as a new synonym of *T. ciliotheca*. The first record of *T. ciliotheca* (as *P. clarias*) was from the intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). No more hosts are so far known for this cestode in Iraq.

Phylum Nematoda

The phylum Nematoda is represented in fishes of Kurdistan region with two species of the genus *Procamallanus*, six species of the genus *Rhabdochona* in addition to unidentified species of the genera *Agamospirura, Anisakis*, *Contracaecum*, *Cucullanus*, *Philometra*, *Rhabdochona* (*Globochona), Rhabdochona* (*Rhabdochona*) and *Spiroxys* as

indicated below. Names and authorities of these nematodes were checked in accordance with Anderson et al. (2009) and Gibbons (2010).

Phylum Nematoda
Class Secernentea
Order Ascaridida
Superfamily Ascaridoidea
Family Anisakidae
Anisakis spp.
Contracaecum spp.
Superfamily Seuratoidea
Family Cucullanidae
Cucullanus sp.
Order Spirurida
Superfamily Camallanoidea
Family Camallanidae
Procamallanus siluri Osmanov, 1964
Procamallanus viviparus Ali, 1956
Superfamily Dracunculoidea
Family Philometridae
Philometra sp.
Superfamily Gnathostomatoidea
Family Gnathostomatidae
Spiroxys spp.
Superfamily Thelazioidea
Family Rhabdochonidae
Rhabdochona (*Globochona*) *chodukini* Osmanov, 1957
Rhabdochona (*Globochona*) *kurdistanensis* Moravec, Bilal & Abdullah, 2012
Rhabdochona (*Globochona*) sp.
Rhabdochona (*Rhabdochona*) *denudata* (Dujardin, 1845) Railliet & Henry, 1915
Rhabdochona (Rhabdochona) gnedini Skrjabin, 1948
Rhabdochona (*Rhabdochona*) *similis* Moravec, Ali & Abul-Eis, 1991
Rhabdochona (*Rhabdochona*) *tigridis* Rahemo, 1978 (emend.)
Rhabdochona (*Rhabdochona*) spp.
Superfamily Acuaroidea
Family Acuariidae
Agamospirura sp.

Agamospirura species was reported as larva from the intestinal wall of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê &

Abdullah, 2010a). Unidentified *Agamospirura* was recorded for the first time in Iraq from coelom and liver of *H. fossilis* and *M. mastacembelus* from Tigris river at Baghdad (Ali et al., 1987e). Four host species are so far known for unidentified *Agamospirura* sp. in fishes of Iraq.

Anisakis species was reported as larva from body cavity of *C. macrostomum* (misspelled as *C. macrostomus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b) and from muscular layer of *M. mastacembelus* from Lesser Zab river (Abdullah, 2002). Abdullah, (1990) was the first to record unidentified *Anisakis* species in Iraq from *C. macrostomum*. Five host species are so far known for unidentified *Anisakis* sp. in fishes of Iraq.

Contracaecum species larvae were reported from body cavity of *A. marmid* from Lesser Zab and Greater Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2011a) and from Darbandikhan lake (Abdullah, 2005), stomach, liver, intestine and external wall of intestine of *A. grypus* (reported as *B. grypus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b) and from Erbil's fish market (Abdullah, 2000), intestine and intestinal wall of *C. damascina* (reported as *B. belayewi*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2011a), intestine of *C. trutta* from Greater Zab river (Abubakr, 2015), liver, body cavity, intestine and intestinal wall of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Ali, 1989), Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b), Erbil's fish market (Abdullah, 2000) and from Greater and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2011a), body cavity, liver and intestine of *C. regium* (misspelled as *C. regius*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b), Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2011a) and from Darbandikhan lake (Abdullah, 2005), liver and intestine of *C. macrostomum* (misspelled as *C. macrostomus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b) and from Greater Zab river (Abubakr, 2015), stomach, liver, intestine and external wall of intestine of *C. carpio* from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b), Erbil's fish market (Abdullah, 2000), Lesser Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006a, 2011a), intestine and intestinal wall of *G. rufa* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2011a), intestine and intestinal wall of *H. fossilis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2011a) and from Darbandikhan lake (Abdullah, 2005), mesentries of *L. vorax* (reported as *A. vorax*) from Upper Zab river (Nawab Al-Deen, 1994), liver, gonads and intestine of *L. barbulus* (reported as *B. barbulus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b) and from Greater Zab river (Abdullah, 2002;

Abdullah & Mhaisen, 2011a), stomach, intestine and external wall of intestine of *L. esocinus* (reported as *B. esocinus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b), Erbil's fish market (Abdullah, 2000) and from Darbandikhan lake (Abdullah, 2005), body cavity of *L. kersin* (reported as *B. kersin*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b), body cavity of *Luciobarbus subquincunciatus* (reported as *B. subquincunciatus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b), gonads, intestinal wall and body cavity of *L. xanthopterus* (reported as *B. xanthopterus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b) and from Erbil's fish market (Abdullah, 2000), muscles of *M. mastacembelus* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2011a) and from Darbandikhan lake (Abdullah, 2005), intestine of *P. abu* (reported as *L. abu*) from Mortuka stream and a fish farm south of Erbil province (Abdullah, 2004), liver and ovaries of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010), intestine and liver of *S. cephalus* (reported as *L. cephalus*) from Darbandikhan lake (Abdullah, 2005) and from Serchinar stream, Sulymania governorate (Rahemo et al. 2005) and body cavity, gonads and liver of *S. lepidus* (reported as *L. lepidus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004b) and from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2011a). *Contracaecum* spp. larvae were recorded for the first time in Iraq from ten fish species from different inland waters of Iraq (Herzog, 1969). So far, a total of 40 fish host species are known for *Contracaecum* spp. larvae in Iraq.

Cucullanus species was reported from the intestine of *C. luteus* (reported as *B. luteus*) from Erbil's fish market (Abdullah, 2000). The first *Cucullanus* species reported from fishes of Iraq was *C. cyprini* from intestine of both *A. caerulus* and *L. xanthopterus* (reported as *B. xanthopterus*) from Al-Tharthar lake (Al-Saadi, 1986). So far, five identified *Cucullanus* species as well as some unspecified *Cucullanus* species from five fish host species are known from fishes of Iraq.

Philometra species, as a larva, was reported from the intestine of *C. macrostomum* from Greater Zab river (Abubakr, 2015). The first *Philometra* species reported from fishes of Iraq was *P. abdominalis* from body cavity of *A. grypus* (reported as *B. grypus*) from Diyala river (Ali et al., 1987a). So far, ten identified *Philometra* species as well as some unspecified *Philometra* species from ten fish host species are known from fishes of Iraq.

Procamallanus siluri Osmanov, 1964 was reported from the intestine of *S. glanis* from Greater Zab river (Bilal & Abdullah, 2012a; Bilal, 2013).

The first record of *P. siluri* from Iraq was that of Bilal & Abdullah (2012a) and so far no more hosts are known for *P. siluri* in fishes of Iraq.

Procamallanus viviparus Ali, 1956 was reported from intestine of *C. trutta* from Greater Zab river (Abubakr, 2015), intestine of *C. macrostomum* from Greater Zab river (Abubakr, 2015), from the stomach and intestine of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a; Hashim, 2014; Hashim et al., 2015), Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b) and stomach and intestine of *S. triostegus* from Greater Zab river (Shwani, 2009; Shwani & Abdullah, 2010; Hashim, 2014; Hashim et al., 2015). It is reliable to state here that the specific name *viviparus* was misspelled as *viviparous* by Shwani (2009), Shwani & Abdullah (2010), Hashim (2014) and Hashim et al. (2015). The first record of *P. viviparus* from Iraq was from stomach of *Mystus pelusius* (reported as *M. halepensis*) from Tigris river at Baghdad (Ali et al., 1987e). So far, seven fish host species are known for this nematode in Iraq.

Rhabdochona (*Globochona*) *chodukini* Osmanov, 1957 was reported from intestine of *L. barbulus* (reported as *B. barbulus*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b) and intestine of *L. kersin* (reported as *B. kersin*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b). Bilal (2006) was the first one to record *R.* (*G.*) *chodukini* from fshes of Iraq. No more hosts are so far known for this nematode in Iraq.

Rhabdochona (*Globochona*) *kurdistanensis* Moravec, Bilal & Abdullah, 2012 was described as a new species from the intestine of *L. kersin* from Greater Zab and Lesser Zab rivers (Moravec et al., 2012). It was then reported from the same fish and locality (Bilal, 2013; S.J. Bilal, 2016a). No more hosts are so far known for this nematode in Iraq.

Rhabdochona (*Globochona*) species, as fourth-stage larvae, were reported from intestine of *L. barbulus* (reported as *B. barbulus*) from Bahdinan river (Moravec et al., 2009) and intestine of *L. kersin* (reported as *B. kersin*) from Bahdinan river (Moravec et al., 2009). Moravec et al. (2012) stated that there is no doubt that these larvae as well as those from *C. macrostomum* by Moravec et al. (2009) were conspecific with *R.* (*G.*) *kurdistanensis*. Three host species are so far known for this nematode in Iraq.

Rhabdochona (*Rhabdochona*) *denudata* (Dujardin, 1845) Railliet & Henry, 1915 was reported from intestine of both *C. trutta* and *C. macrostomum* from Greater Zab river (Abubakr, 2015). This nematode was recorded for the first time in Iraq from the intestine of both *C. luteus* (reported as *B. luteus*) and *C. macrostomum* from surroundings of Baghdad (Moravec et al., 1991). This nematode together with its

synonym *R. mesopotamica* by Rahemo & Kasim (1979) has so far nine fish host species in Iraq.

Rhabdochona (*R.*) *gnedini* Skrjabin, 1948 was reported from intestine of *C. damascina* (misspelled as *C. damascinus*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b) and intestine of *C. umbla* (reported as *V. umbla*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b). The year of authority was erroneously stated as 1946 instead of 1948. The first record of this nematode from Iraq was that of Bilal (2006). No more hosts are so far known for this nematode in Iraq.

Rhabdochona (*R.*) *similis* Moravec, Ali & Abul-Eis, 1991 was reported from the intestine of *C. macrostomum* from Greater Zab river (Abubakr, 2015). This nematode was recorded for the first time in Iraq from the intestine of both *C. luteus* (reported as *B. luteus*) and *Glyptothorax* sp. from surroundings of Baghdad (Moravec et al., 1991). So far, three host species are known for this nematode in Iraq.

Rhabdochona (*R.*) *tigridis* Rahemo, 1978 (emend) was reported as *R. tigrae* Rahemo, 1978 by Bilal (2006) and as *R. fortunatowi* by Saraiva et al. (2007). It was reported from intestine of *C. damascina* (misspelled as *C. damascinus*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b), intestine of *C. trutta* from Greater Zab river (Abubakr, 2015) and intestine of *C. macrostomum* from Bahdinan river (Saraiva et al., 2007) and from Greater Zab river (Abubakr, 2015). Rahemo (1978) described *R. tigrae* as a new species from the intestine of *C. trutta* (reported as *V. trutta*) from Tigris river passing through Mosul city. According to Moravec et al. (2009), *R. tigrae*, *R. grandipapillata* Rahemo & Kasim, 1979 and *Rhabdochona fortunatowi* Dinnik, 1933 reported by Saraiva et al. (2007) are considered as syonyms of *R.* (*R.*) *tigridis*. Four host species in Iraq are so far known for *R.* (*R.*) *tigridis* and its three above-named synonyms.

Rhabdochona (*R.*) species was reported from intestine of *L. vorax* (reported as *A. vorax*) from Upper Zab river (Nawab Al-Deen, 1994; Rahemo & Nawab Al-Din, 1999) and intestine of *L. kersin* (reported as *B. kersin*) from Greater Zab river (Moravec et al., 2012; Bilal, 2013). Seven host species are so far known for *Rhabdochona* (*R.*) species from Iraq in addition to three host species for *Rhabdochona* (*G.*) species in Iraq as explained above.

Spiroxys species was reported as larva from intestinal wall of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Abdullah, 2002), intestinal wall of *H. fossilis* from Greater Zab river (Abdullah, 2002), mesentries and external surface of intestine of *L. vorax* (reported as *A. vorax*) from Upper Zab river (Nawab Al-Deen, 1994; Rahemo & Nawab Al-Din, 1995,

1999), intestinal wall of *M. mastacembelus* from Greater Zab river (Abdullah, 2002) and intestinal wall of *S. glanis* from Greater Zab river (Abdullah, 2002). The first record of *Spiroxys* species in Iraq was that of Nawab Al-Deen (1994). Six host species are so far known for this nematode in Iraq.

Phylum Acanthocephala

The phylum Acanthocephala is represented in fishes of Kurdistan region with three species of the genus *Neoechinorhynchus* and two species of the genus *Pomphorhynchus* as indicated below. Names and authorities of the concerned acanthocephalans were checked in accordance with Amin (2013).

Phylum Acanthocephala
Class Eoacanthocephala
Order Neoechinorhynchida
Family Neoechinorhynchidae
Neoechinorhynchus (*N.*) *iraqensis* Amin, Al-Sady, Mhaisen & Bassat, 2001
Neoechinorhynchus (*N.*) *rutili* (Müller, 1780) Hamann, 1892
Neoechinorhynchus (*N.*) *zabensis* Amin, Abdullah & Mhaisen, 2003
Class Palaeacanthocephala
Order Echinorhynchida
Family Pomphorthnchidae
Pomphorhynchus laevis (Zoega in Müller, 1776) Van Cleave, 1924
Pomphorhynchus spindletruncatus Amin, Abdullah & Mhaisen, 2003

Neoechinorhynchus (*N.*) *iraqensis* Amin, Al-Sady, Mhaisen & Bassat, 2001 was reported from intestine of *P. abu* (reported as *L. abu*) from Greater Zab river (Abdullah, 2002; Hashim, 2014; Hashim et al., 2015) and Lesser Zab river (Abdullah, 2002) and from the intestine of *S. triostegus* from Greater Zab river (Hashim, 2014; Hashim et al., 2015). *N. iraqensis* was described as a new species from the intestine of *P. abu* (reported as *L. abu*) from Euphrates river, Al-Anbar province (Amin et al., 2001). *N. iraqensis* and the misidentified *N. agilis* in the Iraqi literature have so far 24 fish host species in Iraq.

Neoechinorhynchus (*N.*) *rutili* (Müller, 1780) Hamann, 1892 was reported from the intestine of *L. esocinus* (reported as *B. esocinus*) from Greater Zab river (Rasheed & Hussain, 1988; Ali, 1989), Lesser Zab river (Rasheed et al., 1989), Dokan lake (Abdullah, 1990; Abdullah & Ali, 1999; Abdullah & Rasheed, 2004b) and from Erbil's fish market (Abdullah, 2000). This parasite was recorded for the first time in Iraq from the

intestine of *P. abu* (reported as *Mugil abu*) from an oasis in Al-Anbar province (Herzog, 1969). It has so far 16 fish host species in Iraq.

Neoechinorhynchus (*N.*) *zabensis* Amin, Abdullah & Mhaisen, 2003b was reported from the intestine of *C. damascina* from Greater Zab river (Amin et al., 2003b; Abdullah, 2009a; Hashim, 2014; Hashim et al., 2015), Lesser Zab rivers (Amin et al., 2003b) and Dokan lake (Abdullah, 2009a), intestine of *C. trutta* from Greater Zab river (Amin et al., 2003b; Abdullah, 2009a), Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b) and from intestine of *C. umbla* (reported as *V. umbla*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2009b). This acanthocephalan was recorded as a new species from the intestine of both *C. damascina* and *C. trutta* from Greater Zab and Lesser Zab rivers (Amin et al., 2003b). It has so far seven fish host species in Iraq.

Pomphorhynchus laevis (Zoega in Müller, 1776) Van Cleave, 1924 was reported from intestine of *L. barbulus* (reported as *B. barbulus*) from Dokan lake (Abdullah, 1990, 1997b; Abdullah & Rasheed, 2004b), Greater Zab river (Abdullah, 1997b) and from Surdash of Sulaimania (Abdullah, 1997b) and from the intestine of *L. xanthopterus* (reported as *B. xanthopterus*) from Greater Zab river and Surdash stream of Sulaimania (Abdullah, 1997b). The first record of *P. laevis* in Iraq was that of Abdullah (1990). So far, only the above named two fish species are known as hosts for this acanthocephalan in Iraq.

Pomphorhynchus spindletruncatus Amin, Abdullah & Mhaisen, 2003a was reported from intestine of *L. vorax* (reported as *A. vorax*) from Greater Zab river (Abdullah, 2002; Amin et al., 2003a), intestine of *L. xanthopterus* (reported as *B. xanthopterus*) from Lesser Zab river (Abdullah, 2002; Amin et al., 2003a; Abdullah & Mhaisen, 2007a), intestine of *S. triostegus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b) and intestine of *S. lepidus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b). *P. spindletruncatus* was found for the first time in Iraq from both *L. vorax* (reported as *A. vorax*) and *L. xanthopterus* (reported as *B. xanthopterus*) from Greater Zab river and Lesser Zab river, respectively (Abdullah, 2002) but its publication was done later by Amin et al. (2003a). It has so far five fish host species in Iraq.

Phylum Annelida- Class Hirudinea

The phylum Annelida is represented in fishes of Kurdistan region with a leech species belonging to the genus *Cystobranchus* in addition to unidentified species of the genus *Piscicola*. Their systematic hierarchy,

based on EOL (2017), ITIS (2017), PESI (2017) and WoRMS (2017) is as indicated below.

Phylum Annelida
Class Clitellata
Order Rhynchobdellida
Family Piscicolidae
Cystobranchus mammillatus (Malm, 1863)
Piscicola spp.

Cystobranchus mammillatus (Malm, 1863) was reported from skin and fins of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a). No more hosts are so far known for this leech In Iraq.

Piscicola species was reported from skin of *L. esocinus* (reported as *B. esocinus*) from Greater Zab river (Ali, 1989). The first record of *Piscicola* species in Iraq was from skin of *Barbus schejch* (which is now an ambiguous synonym of *Luciobarbus pectoralis*) from Tigris river near Baghdad (Herzog, 1969). In addition to one identified *Piscicola* sp., four fish species are so far known as hosts for unidentified *Piscicola* species in Iraq.

Phylum Mollusca- class Bivalvia

The phylum Mollusca is represented in fishes of Kurdistan region with the glochidial larval stage of one species of the genus *Unio* as indicated below.

Phylum Mollusca
Class Bivalvia
Order Unionida
Family Unionidae
Unio pictorum (Linnaeus, 1758)

Unio pictorum (Linnaeus, 1758) was reported, as a larval stage, from gills of five fish species: *A. grypus* (reported as *B. grypus*), *C. luteus* (reported as *B. luteus*), *H. fossilis, L. barbulus* (reported as *B. barbulus*) and *M. mastacembelus* all from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2010). The first report of glochidial larvae of the clam *Unio pictorum* in Iraq was from gills of eight fish species: *A. grypus* (reported as *B. grypus*), *C. luteus* (reported as *B. luteus*), *C. regium*, *C. carpio*, *L. vorax* (reported as *A. vorax*), *L. xanthopterus* (reported as *B. xanthopterus*), *M. pelusius* and *P. abu* (reported as *L. abu*) from Diyala river (Ali et al., 1987a). The authority of *U. pictorum* was erroneously

stated as Zhadin, 1938 in most Iraqi literature. *U. pictorum* has so far 31 fish host species in Iraq.

Phylum Arthropoda

The phylum Arthropoda is represented in fishes of Kurdistan region with one species each of the genera *Argulus*, *Lamproglena, Lernaea*, *Pseudolamproglena* and *Tracheliastes*, three species of *Ergasilus* in addition to unidentified species of the genera *Ergasilus* and *Arrenurus* as indicated below. Due to recent changes in some crustacean ranks, WoRMS (2017) was followed to arrange the concerned taxonomic groups of the subphylum Crustacea of this phylum down to the scientific names.

Phylum Arthropoda
Subphylum Crustacea
Class Ichthyostraca
Order Arguloida
Family Argulidae
Argulus foliaceus (Linnaeus, 1758) Jurine, 1806
Class Hexanauplia
Order Poecilostomatoida
Family Ergasilidae
Ergasilus barbi Rahemo, 1982
Ergasilus mosulensis Rahemo, 1982
Ergasilus sieboldi von Nordmann, 1832
Ergasilus spp.
Order Cyclopoida
Family Lernaeidae
Lamproglena pulchella von Nordmann, 1832
Lernaea cyprinacea Linnaeus, 1758
Pseudolamproglena annulata Boxshall, 1976
Order Siphonostomatoida
Family Lernaeopodidae
Tracheliastes polycolpus Nordmann, 1832
Subphylum Chelicerata
Class Arachnida
Order Trombidiformes
Family Arrenuridae
Arrenurus sp.

Arrenurus species was reported from gill cavity of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a). This is the only mite species so far recorded from fishes of Iraq.

Argulus foliaceus (Linnaeus, 1758) Jurine, 1806 was reported from skin of *C. carpio* from Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2009) and from skin and fins of the same fish from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016) as well as from skin and fins of *M. mastacembelus* from Greater Zab river (Bashê, 2008; Bashê & Abdullah, 2010a). This crustacean was reported for the first time in Iraq from both *C. luteus* (reported as *B. luteus*) and *C. carpio* from Al-Habbaniyah lake (Herzog, 1969). It is a common fish louse in some fish farms as well as some inland waters in Iraq and it has so far 16 fish host species in Iraq.

Ergasilus barbi Rahemo, 1982 was reported from gills of *A. grypus* (reported as *B. grypus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a), *C. luteus* (reported as *B. luteus*) from Greater Zab river (Ali, 1989; Abdullah, 2002; Abdullah & Mhaisen, 2003, 2006b), *C. macrostomum* (misspelled as *C. macrostomus*) from Greater Zab river (Ali, 1989), Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *C. carpio* from a fish farm south of Erbil province (Abdullah, 2004), *Glyptothorax cavia* (reported as *Euglyptosternum lineatum*) from Greater Zab river (Ali, 1989), *L. barbulus* (reported as *B. barbulus*) from Greater Zab river (Ali, 1989) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *L. esocinus* (reported as *B. esocinus*) from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a), *L. kersin* (reported as *B. kersin*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *P. abu* (reported as *L. abu*) from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2006b, 2011c), *S. glanis* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b), *S. lepidus* (reported as *L. lepidus*) from Greater Zab river (Ali, 1989) and *S. spurius* (reported as *L. spurius*) from Greater Zab river (Ali, 1989). It is appropriate to mention here that neither *G. cavia* nor *Euglyptosternum lineatum* are found within the list of freswater fishes of Iraq (Coad, 2010). *E. barbi* was described as a new species from *A. grypus* (reported as *B. grypus*) from Tigris river at Mosul (Fattohy, 1975) and published later by Rahemo (1982). It has so far 14 fish host species in Iraq.

Ergasilus mosulensis Rahemo, 1982 was reported from gills of *C. luteus* (reported as *B. luteus*) from Dokan lake (Abdullah, 1990), *C. carpio* from Dokan lake (Abdullah, 1990), *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010) and from Greater Zab river

(E.F. Bilal, 2016) and *S. lepidus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b). This crustacean was described as a new species from *P. abu* (reported as *L. abu*) from Tigris river at Mosul (Fattohy, 1975) and published later by Rahemo (1982). It has so far 24 fish host species in Iraq.

Ergasilus sieboldi von Nordmann, 1832 was reported from gills of *A. marmid* from Lesser Zab river (Rasheed et al., 1989), *C. luteus* (reported as *B. luteus*) from Greater Zab river (Rasheed & Hussain, 1988), *C. regium* from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *P. abu* (reported as *L. abu*) from Dokan lake (Abdullah, 1990) and *S. triostegus* from Greater Zab river (Shwani, 2009; Abdullah & Shwani, 2010). *E. sieboldi* was recorded for the first time in Iraq from gills of *L. vorax* (reported as *A. vorax*) from Al-Habbaniya lake (Herzog, 1969). It has so far 26 fish host species in Iraq.

Ergasilus species was reported from gills of *C. luteus* (reported as *B. luteus*) from Greater Zab river (Rasheed & Hussain, 1988), skin and fins of *C. regium* from Greater Zab river (Al-Marjan, 2016) and gills of *M. sharpeyi* (reported as *B. sharpeyi*) from Greater Zab river (Rasheed & Hussain, 1988). In fishes of Iraq, the genus *Ergasilus* is so far represented with 11 valid species in addition to some unidentified species from 13 host species.

Lamproglena pulchella von Nordmann, 1832 was reported from gills of *C. damascina* (reported as *B. belayewi*) from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b), *C. trutta* from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *C. umbla* (reported as *V. umbla*) from Greater Zab river (Ali, 1989) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *C. luteus* (reported as *B. luteus*) from Greater Zab river (Ali, 1989; Abdullah, 2002; Abdullah & Mhaisen, 2006b) and from Darbandikhan lake (Abdullah, 2005), *C. regium* from Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2006b) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *C. macrostomum* from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *G. rufa* from Greater Zab river (Abdullah, 2002; Abdullah & Mhaisen, 2006b), *L. vorax* (reported as *A. vorax*) from Greater Zab river (Rasheed & Hussain, 1988), *L. barbulus* (reported as *B. barbulus*) from Greater Zab river (Ali, 1989) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *L. esocinus* (reported as *B. esocinus*) from Greater Zab river (Rasheed & Hussain, 1988; Ali, 1989), from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a), *L. kersin* (reported as *B. kersin*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *L. xanthopterus* (reported as *B. xanthopterus*) from Dokan lake (Abdullah, 1990; Abdullah

& Rasheed, 2004a), *S. cephalus* (reported as *L. cephalus*) from Greater Zab river (Ali, 1989), *S. lepidus* (reported as *L. lepidus*) from Greater Zab river (Ali, 1989; Abdullah, 2002; Abdullah & Mhaisen, 2006b) and from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008) and *S. spurius* (reported as *L. spurius*) from Greater Zab river (Ali, 1989). *L. pulchella* was firstly reported from Iraq from gills of both *C. regium* and *C. trutta* (reported as *V. trutta*) from Tigris river at Mosul city (Rahemo, 1977). So far, *L. pulchella* has 20 fish host species in Iraq.

Lernaea cyprinacea L., 1758 was reported, as adults and larvae, from skin, fins, anus, buccal cavity and gills of *A. grypus* (reported as *B. grypus*) from Mortuka stream and two fish farms south of Erbil province (Abdullah, 2004), Dokan lake (Abdullah & Ismail, 2004), *C. luteus* (reported as *B. luteus*) from Dokan lake (Abdullah, 1990; Abdullah & Ismail, 2004; Abdullah & Rasheed, 2004a), skin and fins of *C. regium* from Greater Zab river (Al-Marjan, 2016), *C. idella* from FAO fish projects in Duhok, Erbil and Suliemanyia regions (Ali, 2002), *C. macrostomum* from Dokan lake (Abdullah & Ismail, 2004), *C. carpio* from Dokan lake (Abdullah, 1990; Abdullah & Ismail, 2004; Abdullah & Rasheed, 2004a), from eight fish projects in Duhok region, 16 fish projects in Erbil region and 11 fish projects in Suliemanyia region (Ali, 2002), two fish farms south of Erbil province (Abdullah, 2004), Drabandikhan lake (Abdullah, 2005; Abdullah, 2013; Mama & Abdullah, 2013a; Abdullah & Abdullah, 2015a), Ainkawa fish hatchery (Al-Marjan, 2007; Al-Marjan & Abdullah, 2008, 2009), Lesser Zab river (Mama, 2012; Mama & Abdullah, 2012b) and from Agriculture College fish farm, University of Salahaddin, Erbil (Mustafa, 2016), *H. leucisculus* from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a), *H. molitrix* from FAO fish projects in Duhok and Erbil regions (Ali, 2002), *L. barbulus* (reported as *B. barbulus*) from Dokan lake (Abdullah & Ismail, 2004) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a), *L. esocinus* (reported as *B. esocinus*) from Dokan lake (Abdullah & Ismail, 2004) and from Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a), *L. xanthopterus* (reported as *B. xanthopterus*) from Dokan lake (Abdullah & Ismail, 2004) and *S. lepidus* (reported as *L. lepidus*) from Dokan lake (Abdullah, 1990; Abdullah & Ismail, 2004; Abdullah & Rasheed, 2004a). *L. cyprinacea* was reported for the first time in Iraq from seven fish species from Al-Zaafaraniya fish culture station, Baghdad (Al-Hamed & Hermiz, 1973). It is the commonest crustacean parasite among fishes of Iraq as it has so far 31 host species in different fish farms and hatcheries and in various inland waters of Iraq.

Pseudolamproglena annulata Boxshall, 1976 was reported from gills of *C. umbla* (reported as *V. umbla*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008), *C. luteus* (reported as *B. luteus*) from Greater Zab river (Ali, 1989; Muhammad et al., 2013), from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a), Greater Zab and Lesser Zab rivers (Abdullah, 2002; Abdullah & Mhaisen, 2006b), Darbandikhan lake (Abdullah, 2005), *C. macrostomum* (also misspelled as *C. macrostomus*) from Greater Zab river (Ali, 1989; Abdullah, 2002; Abdullah & Mhaisen, 2006b), Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a), Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008) and Darbandikhan lake (Abdullah, 2013; Abdullah & Abdullah, 2015a, b), *C. carpio* from Dokan lake (Abdullah, 1990; Abdullah & Rasheed, 2004a) and *L. barbulus* (reported as *B. barbulus*) from Bahdinan river (Bilal, 2006; Bilal & Abdullah, 2008). This crustacean was recorded as a new species from gills of *C. macrostomum* from Tigris river at Mosul city (Boxshall, 1976). It has so far, 11 fish host species in Iraq.

Tracheliastes polycolpus Nordmann, 1832 was reported from pelvic and caudal fins of *C. macrostomum* (misspelled as *C. macrostomus*) from Greater Zab river (Ali, 1989) and dorsal fin of *L. kersin* (reported as *B. kersin*) from Darbandikhan lake (Abdullah, 2005). The first record of this crustacean from Iraq was that of Ali (1989) and so far it has four fish host species in Iraq.

Host-Parasite List

The scientific names of all fish species infected with parasites in Kuristan region (33 valid fish names and 18 synonyms) are alphabetically arranged in the following list. The full authorities of the valid fish species together with their orders and families are shown in Table (1). For each valid fish species, all recorded parasite species are alphabetically arranged according to the sequence of their major groups which are shown in the subsection of parasite-host list of the Results and Discussion of this article. The present host list includes the valid as well as the synonymous fish names. For fishes, the scientific names were reported as they appeared in their original references but they were then checked with an account on freshwater fishes of Iraq (Coad, 2010). As indicated earlier in the section of Sources and Methods, fish valid scientific names were checked according to Coad (2010) and their authorities were corrected according to Eschmeyer (2017) and Froese & Pauly (2017).

Acanthobrama marmid

Ciliophora: *Ichthyophthirius multifiliis*, *Trichodina domerguei*.

Myxozoa: *Myxobolus pfeifferi*.
Trematoda: *Diplostomum spathaceum*.
Monogenea: *Paradiplozoon barbi* (reported as *Diplozoon barbi*).
Cestoda: *Ligula intestinalis*, *Proteocephalus* sp.
Nematoda: *Contracaecum* sp.
Arthropoda: *Ergasilus sieboldi*.

***Alburnus mossulensis* (reported as *Chalcalburnus mossulensis*)**
Trematoda: *Pseudochetosoma salmonicola*.
Monogenea: *Dactylogyrus alatus*, *D. fallax*,

***Arabibarbus grypus* (reported as *Barbus grypus* and *Tor grypus*)**
Ciliophora: *Ichthyophthirius multifiliis*.
Myxozoa: *Myxobolus karuni*, *M. persicus*, *M. pfeifferi*, *M. poljanski*, *Myxobolus* sp.
Trematoda: *Diplostomum spathaceum*.
Monogenea: *Dactylogyrus barbioides*, *D. pavlovskyi*, *D. vastator*, *Dogielius persicus*.
Cestoda: *Diphyllobothrium latum*, *Khawia armeniaca*, *K. sinensis*, *Ligula intestinalis*, *Schyzocotyle acheilognathi* (reported as *Bothriocephalus acheilognathi*).
Nematoda: *Contracaecum* sp.
Mollusca: *Unio pictorum*.
Arthropoda: *Ergasilus barbi*, *Lernaea cyprinacea*.

Aspius vorax*: See *Leuciscus vorax

Barbus barbulus*: See *Luciobarbus barbulus

Barbus belayewi*: See *Capoeta damascina

Barbus esocinus*: See *Luciobarbus esocinus

Barbus grypus*: See *Arabibarbus grypus

Barbus kersin*: See *Luciobarbus kersin

Barbus lacerta
Myxozoa: *Myxobolus iranicus*.
Monogenea: *Dactylogyrus orbus*, *D. vastator*.

Barbus luteus*: See *Carasobarbus luteus

Barbus rajanorum

Myxozoa: *Myxobolus shadgani*.

Barbus sharpeyi*: See *Mesopotamichthys sharpeyi

Barbus subquincunciatus*: See *Luciobarbus subquincunciatus

Barbus xanthopterus*: See *Luciobarbus xanthopterus

***Capoeta damascina* (reported also as *Barbus belayewi*)**
Microspora: *Pleistophora longifilis*.
Trematoda: *Diplostomum spathaceum*.
Nematoda: *Contracaecum* sp., *Rhabdochona gnedini*, *Rhabdochona* (*R.*) *tigridis* (also reported as *R. tigrae*).
Acanthocephala: *Neoechinorhynchus* (*N.*) *zabensis*.
Arthropoda: *Lamproglena pulchella*.

Capoeta trutta
Ciliophora: *Chilodonella cyprini*, *Ichthyophthirius multifiliis*, *Riboscyphidia arctica* (reported as *Scyphidia arctica*).
Monogenea: *Dactylogyrus baueri*, *D. carassobarbi*, *D. elegantis*, *D. lenkorani*, *D. microcirrus*, *D. pulcher*, *D. skrjabinensis*, *D. vistulae*, *Dogielius mokhayeri*, *Gyrodactylus elegans*, *G. sprostonae*, *Paradiplozoon tadjikistanicum.*
Nematoda: *Contracaecum* sp., *Procamallanus viviparus*, *Rhabdochona* (*R.*) *denudata*, *R.* (*R.*) *tigridis* (also reported as *R. fortunatowi*.
Acanthocephala: *Neoechinorhynchus* (*N.*) *zabensis*.
Arthropoda: *Lamproglena pulchella*.

***Capoeta umbla* (reported as *Varicorhinus umbla*)**
Ciliophora: *Ichthyophthirius multifiliis*.
M yxozoa: *Myxobolus pfeifferi*.
Trematoda: *Clinostomum complanatum*, *Diplostomum spathaceum*, *Diplostomum* sp.
Monogenea: *Dactylogyrus carassobarbi*, *D. carpathicus*, *D. lenkorani*, *D. pulcher*, *D. vastator*.
Nematoda: *Rhabdochona* (*R.*) *gnedini*.
Acanthocephala: *Neoechinorhynchus* (*N.*) *zabensis*.
Arthropoda: *Lamproglena pulchella*, *Pseudolamproglena annulata*.

***Carasobarbus luteus* (reported also as *Barbus luteus*)**
Ciliophora: *Ichthyophthirius multifiliis*, *T. domerguei*.
Myxozoa: *Myxobolus iranicus, M. mesopotamiae*, *M. pfeifferi*.
Trematoda: *Clinostomum complanatum*, *Diplostomum spathaceum*.

Monogenea: *D. carassobarbi*, *D. carpathicus*, *D persis*, *D. varicorhini, D. vastator*, *Dogielius mokhayeri*, *D. persicus*, *D. planus*.
Cestoda: *Caryophyllaeus gotoi* (reported as *Paracaryophyllaeus gotoi*), *Khawia armeniaca*.
Nematoda: *Contracaecum* sp., *Cucullanus* sp., *Spiroxys* sp.
Mollusca: *Unio pictorum*.
Arthropoda: *Ergasilus barbi*, *E. mosulensis*, *E. sieboldi*, *Ergasilus* sp., *Lamproglena pulchella*, *Lernaea cyprinacea*, *Pseudolamproglena annulata*.

Carassius auratus
Ciliophora: *Chilodonella cyprini*, *Ichthyophthirius multifiliis*.
Monogenea: *Dactylogyrus anchoratus*, *D. baueri*, *D. dulkeiti*, *D. formosus*, *Gyrodactylus sprostonae*.

Chalcalburnus mossulensis*: See *Alburnus mossulensis

Chondrostoma regium
Ciliophora: *Apiosoma* sp., *Ichthyophthirius multifiliis*, *Tetrahymena* sp., *Trichodina domerguei*, *Trichodina* sp.
Myxozoa: *Myxobolus bulbocordis*, *M. sharpeyi*.
Trematoda: *Diplostomum spathaceum*, *Diplostomum* sp.
Monogenea: *Dactylogyrus elegantis*, *D. kulwieci*, *D. polylepidis*, *D. pulcher*, *Dactylogyrus* sp., *Paradiplozoon barbi* (reported as *Diplozoon barbi*), *P. pavlovskii*, *P. vojteki*.
Nematoda: *Contracaecum* sp.
Arthropoda: *Ergasilus sieboldi*, *Ergasilus* sp., *Lamproglena pulchella*, *Lernaea cyprinacea*.

Ctenopharyngodon idella
Arthropoda: *Lernaea cyprinacea*.

Cyprinion macrostomum
Ciliophora: *Ichthyophthirius multifiliis*, *Trichodina domerguei*.
Myxozoa: *Myxobolus persicus*, *M. pfeifferi*, *Myxobolus* sp.
Trematoda: *Clinostomum complanatum*, *Diplostomum spathaceum*, *Diplostomum* sp., *Paracoenogonimus ovatus*.
Monogenea: *Dactylogyrus cyprinioni*, *D. macrostomi*, *D. mascomai*, *D. pulcher*, *D. vastator*, *Diplozoon* sp., *Dogielius mokhayeri*, *D. molnari*, *D. persicus, Paradiplozoon barbi* (also reported as *Diplozoon barbi*), *P. cyprini*, *P. homoion*, *P. kasimii* (reported as *Diplozoon kasimii*), *P. pavlovskii* (reported as *D. pavlovskii*).

Nematoda: *Anisakis* sp., *Contracaecum* sp., *Philometra* sp., *Procamallanus viviparus*, *Rhabdochona* (*R.*) *denudata*, *R.* (*R.*) *similis*, *R.* (*R.*) *tigridis*.
Arthropoda: *Ergasilus barbi*, *Lamproglena pulchella*, *Lernaea cyprinacea*, *Pseudolamproglena annulata*, *Tracheliastes polycolpus*.

Cyprinus carpio
Ciliophora: *Apiosoma amoebae*, *Balantidium polyvacuolum*, *Chilodonella cyprini*, *Ichthyophthirius multifiliis*, *Tetrahymena pyriformis*, *Trichodina acuta*, *T. anguilli*, *T. domerguei*, *T. heterodentata*, *T. mutabilis*, *T. nobilis*, *T. reticulata*, *Trichodina* sp.
Myxozoa: *Myxobolus cyprinicola, M. parvus*, *M. pfeifferi*, *Myxobolus* sp.
Trematoda: *Diplostomum spathaceum*.
Monogenea: *Dactylogyrus achmerowi*, *D. anchoratus*, *D. arcuatus*, *D. baueri*, *D. charbinensis*, *D. deziensioides*, *D. extensus*, *D. formosus*, *D. inexpectatus*, *D. minutus*, *D. molnari*, *D. sahuensis*, *D. vastator*, *Dactylogyrus* sp., *Diplozoon* sp., *Gyrodactylus baicalensis*, *G. barbi*, *G. cyprini*, *G. elegans*, *G. gobioninum*, *G. katharineri*, *G. kherulensis*, *G. longoacuminatus*, *G. macracanthus* (reported as *G. paralatus*), *G. medius*, *G. molnari*, *G. shulmani*, *G. sprostonae*, *G. vicinus*, *Mazocraes alosae*, *Paradiplozoon cyprini*.
Cestoda: Caryophyllid species, *Schyzocotyle acheilognathi* (reported as *Bothriocephalus acheilognathi, B. gowkongensis* and *B. opsariichthydis*).
Nematoda: *Contracaecum* sp.
Arthropoda: *Argulus foliaceus*, *Ergasilus barbi*, *E. mosulensis*, *Lernaea cyprinacea*, *Pseudolamproglena annulata*.

Euglyptosternum lineatum*: See *Glyptothorax cavia

Garra rufa
Trematoda: *Diplostomum spathaceum*.
Monogenea: *Dactylogyrus acinacus*, *D. rectotrabus*, *Paradiplozoon bingolensis*.
Nematoda: *Contracaecum* sp.
Arthropoda: *Lamproglena pulchella*.

***Glyptothorax cavia* (reported as *Euglyptosternum lineatum*)**
Arthropoda: *Ergasilus barbi*.

Hemiculter leucisculus
Monogenea: *Paradiplozoon leucisci*.
Arthropoda: *Lernaea cyprinacea*.

Heteropneustes fossilis

Trematoda: *Diplostomum spathaceum*.
Monogenea: *Gyrodactylus gussevi*.
Nematoda: *Contracaecum* sp., *Spiroxys* sp.
Mollusca: *Unio pictorum*

Hypophthalmichthys molitrix
Ciliophora: *Ichthyophthirius multifiliis*, *Trichodina domerguei*.
Monogenea: *Dactylogyrus hypophthalmichthys*, *D. skrjabini*, *D. suchengtaii*, *G. macracanthus* (reported as *G. paralatus*).
Arthropoda: *Lernaea cyprinacea*.

Leuciscus cephalus*: See *Squalius cephalus

Leuciscus lepidus*: See *Squalius lepidus

Leuciscus spurius*: See *Squalius spurius

***Leuciscus vorax* (reported also as *Aspius vorax*)**
Myxozoa: *Myxobolus oviformis*.
Monogenea: *Dogielius mokhayeri*.
Nematoda: *Contracaecum* sp., *Rhabdochona* (*Rhabdochona*) sp., *Spiroxys* sp.
Acanthocephala: *Pomphorhynchus spindletruncatus*.
Arthropoda: *Lamproglena pulchella*,

Liza abu*: See *Planiliza abu

***Luciobarbus barbulus* (reported as *Barbus barbulus*)**
Ciliophora: *Ichthyophthirius multifiliis*.
Myxozoa: *Myxobolus macrocapsularis*, *M. pfeifferi*, *M. shadgani*.
Trematoda: *Diplostomum spathaceum*, *Diplostomum* sp., *Pseudochetosoma salmonicola*.
Monogenea: *Dactylogyrus barbuli*, *D. deziensioides*, *D. deziensis*, *D. inutilis*, *D. vastator*, *Paradiplozoon pavlovskii* (reported as *D. pavlovskii*).
Cestoda: *Caryophyllaeus fimbriceps*, *Monobothrium wageneri*.
Nematoda: *Contracaecum* sp., *Rhabdochona* (*Globochona*) *chodukini*, *Rhabdochona* (*Globochona*) sp.
Acanthocephala: *Pomphorhynchus laevis*.
Mollusca: *Unio pictorum*.
Arthropoda: *Ergasilus barbi*, *Lamproglena pulchella*, *Lernaea cyprinacea*, *Pseudolamproglena annulata*.

***Luciobarbus esocinus* (also reported as *Barbus esocinus*)**
Ciliophora: *Ichthyophthirius multifiliis*.

Myxozoa: *Myxobolus molnari*, *M. pfeifferi*, *M. sphaericus* (reported as *M. sphaerica*).
Trematoda: *Clinostomum complanatum*, *Diplostomum* sp.
Monogenea: *Dactylogyrus affinis*, *D. anchoratus D. deziensis*, *D. inutilis*, *D. kulwieci*, *D. vastator*.
Cestoda: *Khawia armeniaca*, *Proteocephalus coregoni*.
Nematoda: *Contracaecum* sp.
Acanthocephala: *Neoechinorhynchus rutili*.
Annelida: *Piscicola* sp.
Arthropoda: *Ergasilus barbi*, *Lamproglena pulchella*, *Lernaea cyprinacea*.

***Luciobarbus kersin* (reported as *Barbus kersin*)**
Euglenozoa: *Trypanosoma* sp.
Monogenea: *Dactylogyrus barbuli*, *D. carpathicus*, *D. deziensioides*, *D. deziensis*, *D. kersini*.
Cestoda: *Caryophyllaeus fimbriceps*, *Khawia armeniaca*.
Nematoda: *Contracaecum* sp., *Rhabdochona* (*Globochona*) *chodukini*, *R.* (*G.*) *kurdistanensis*, *Rhabdochona* (*Globochona*) sp., *Rhabdochona* (*Rhabdochona*) sp.
Arthropoda: *Ergasilus barbi*, *Lamproglena pulchella*, *Tracheliastes polycolpus*.

***Luciobarbus subquincunciatus* (reported as *B. subquincunciatus*)**
Nematoda: *Contracaecum* sp.

***Luciobarbus xanthopterus* (reported also as *Barbus xanthopterus*)**
Myxozoa: *Myxobolus pfeifferi*.
Monogenea: *Dactylogyrus affinis*, *D. barbuli*, *D. carpathicus*, *D. cornu*, *D. deziensioides*, *Paradiplozoon pavlovskii* (reported as *D. pavlovskii*).
Cestoda: *Caryophyllaeus fennica* (reported as *Caryophyllaeides fennicus*).
Nematoda: *Contracaecum* sp.
Acanthocephala: *Pomphorhynchus laevis*, *P. spindletruncatus*.
Arthropoda: *Lamproglena pulchella*, *Lernaea cyprinacea*.

Mastacembelus mastacembelus
Euglenozoa: *Trypanosoma* sp.
Ciliophora: *Ichthyophthirius multifiliis*, *Trichodina pediculus*.
Trematoda: *Allocreadium transversale*, *Asymphylotrema macracetabulum* (reported as *Asymohylodora macracetabulum*), *Clinostomum complanatum*, *Diplostomum flexicaudum*, *D. spathaceum*, *Pseudochetosoma salmonicola*.
Monogenea: *Dactylogyrus vistulae*, *Mastacembelocleidus heteranchorus*.

Cestoda: *Khawia armeniaca*, *Ligula intestinalis*, *Polyonchobothrium magnum*, *Senga* sp.
Nematoda: *Agamospirura* sp., *Anisakis* sp., *Contracaecum* sp., *Procamallanus viviparus*, *Spiroxys* sp.
Annelida: *Cystobranchus mammillatus*.
Mollusca: *Unio pictorum*.
Arthropoda: *Argulus foliaceus, Arrenurus* sp.

***Mesopotamichthys sharpeyi* (reported as *Barbus sharpeyi*)**
Myxozoa: *Myxobolus bulbocordis*, *M. pfeifferi*, *M. sharpeyi*.
Arthropoda: *Ergasilus* sp.

***Planiliza abu* (reported as *Liza abu*)**
Myxozoa: *Myxobolus sandrae*, *M. sphaericus* (reported as *M. sphaerica*), *Myxobolus* sp.
Trematoda: *Diplostomum spathaceum*.
Monogenea: *Microcotyle donavini*.
Nematoda: *Contracaecum* sp.
Acanthocephala: *Neoechinorhynchus* (*N.*) *iraqensis*.
Arthropoda: *Ergasilus barbi*, *E. sieboldi*.

Silurus glanis
Euglenozoa: *Trypanosoma* sp.
Ciliophora: *Trichodina domerguei*.
Trematoda: *Diplostomum spathaceum*, *Orientocreadium siluri*.
Monogenea: *Thaparocleidus vistulensis* (reported as *Ancylodiscoides vistulensis*).
Cestoda: *Glanitaenia osculata* (reported as *Proteocephalus osculatus*), *Postgangesia inarmata*.
Nematoda: *Procamallanus siluri*, *Spiroxys* sp.
Arthropoda: *Ergasilus barbi*.

Silurus triostegus
Euglenozoa: *Trypanosoma* sp.
Ciliophora: *Apiosoma robusta*, *Chilodonella cyprini*, *Ichthyophthirius multifiliis*, *Riboscyphidia arctica* (reported as *Scyphidia arctica*), *Tetrahymena pyriformis*, *Trichodina erbilensis*, *T. kurdistani*, *T. mutabilis*, *T. pediculus*, *T. ranae*.
Myxozoa: *Myxobolus poljanski*.
Trematoda: *Azygia robusta*, *Diplostomum flexicaudum*, *D. spathaceum*, *Megamonostomella rashediansis*, *Orientocreadium siluri*.

Monogenea: *Gyrodactylus kherulensis*, *Thaparocleidus vistulensis* (also reported as *Ancylodiscoides vistulensis*).
Cestoda: *Glanitaenia osculata* (reported as *Proteocephalus osculatus*), *Neogryporhynchus cheilancristrotus*, *Postgangesia inarmata*, *Tetracampos ciliotheca* (reported as *Polyonchobothrium clarias*).
Nematoda: *Contracaecum* sp., *Procamallanus viviparus*.
Acanthocephala: *Neoechinorhynchus iraqensis*, *Pomphorhynchus spindletruncatus*.
Arthropoda: *Ergasilus mosulensis*, *E. sieboldi*.

***Squalius cephalus* (reported as *Leuciscus cephalus*)**
Ciliophora: *Trichodina domerguei*.
Myxozoa: *Myxobolus pfeifferi*.
Trematoda: *Pseudochetosoma salmonicola*.
Monogenea: *Dactylogyrus macracanthus*, *D. vastator*.
Nematoda: *Contracaecum* sp.
Arthropoda: *Lamproglena pulchella*.

***Squalius lepidus* (reported as *Leuciscus lepidus*)**
Ciliophora: *Ichthyophthirius multifiliis*.
Myxozoa: *Myxobolus amurensis*, *M. rotundus*.
Trematoda: *Clinostomum complanatum*, *Diplostomum spathaceum*.
Monogenea: *Dactylogyrus dyki*, *D. elegantis*, *D. macracanthus*, *D. vastator*, *D. vistulae*, *Diplozoon* sp., *Paradiplozoon amurense*, *P. leucisci*.
Cestoda: *Schyzocotyle acheilognathi* (reported as *Bothriocephalus acheilognathi*).
Nematoda: *Contracaecum* sp.
Acanthocephala: *Pomphorhynchus spindletruncatus*.
Arthropoda: *Ergasilus barbi*, *E. mosulensis*, *Lamproglena pulchella*, *Lernaea cyprinacea*.

***Squalius spurius* (reported as *Leuciscus spurius*)**
Ciliophora: *Trichodina domerguei*.
Myxozoa: *Myxobolus pfeifferi*.
Trematoda: *Diplostomum* sp.
Monogenea: *Dactylogyrus vastator*, *Paradiplozoon barbi* (reported as *Diplozoon barbi*).
Arthropoda: *Ergasilus barbi*, *Lamproglena pulchella*.

Tor grypus*: See *Arabibarbus grypus

Varicorhinus umbla*: See *Capoeta umbla

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Table 1: List of fishes of Kurdistan region investigated for parasites.

Class Actinopterygii
Order Cypriniformes
Family Cyprinidae
Acanthobrama marmid Heckel, 1843
Alburnus mossulensis Heckel, 1843
Arabibarbus grypus (Heckel, 1843)
Barbus lacerta Heckel, 1843
Barbus rajanorum Heckel, 1843
Capoeta damascina (Valenciennes, 1842)
Capoeta trutta (Heckel, 1843)
Capoeta umbla (Heckel, 1843)
Carasobarbus luteus (Heckel, 1843)
Carassius auratus (Linnaeus, 1758)
Chondrostoma regium (Heckel, 1843)
Ctenopharyngodon idella (Valenciennes, 1844)
Cyprinion macrostomum Heckel, 1843
Cyprinus carpio Linnaeus, 1758
Garra rufa (Heckel, 1843)
Hemiculter leucisculus (Basilewsky, 1855)
Hypophthalmichthys molitrix (Valenciennes, 1844)
Leuciscus vorax (Heckel, 1843)
Luciobarbus barbulus (Heckel, 1847)
Luciobarbus esocinus Heckel, 1843
Luciobarbus kersin Heckel, 1843
Luciobarbus subquincunciatus (Günther, 1868)
Luciobarbus xanthopterus Heckel, 1843
Mesopotamichthys sharpeyi (Günther, 1874)
Squalius cephalus (Linnaeus, 1758)
Squalius lepidus Heckel, 1843

Squalius spurius Heckel, 1843
Order Siluriformes
Family Bagridae
Glyptothorax cavia (Hamilton, 1822)
Family Siluridae
Silurus glanis Linnaeus, 1758
Silurus triostegus Heckel, 184
Family Heteropneustidae
Heteropneustes fossilis (Bloch, 1794)
Order Synbranchiformes
Family Mastacembelidae
Mastacembelus mastacembelus (Banks & Solander, 1794)
Order Mugiliformes
Family Mugilidae
Planiliza abu (Heckel, 1843)

Table 2: List of parasite species and their fish host species in Kurdistan region, Iraq.

Parasite major groups	Fish host species
Phylum Euglenozoa - Class Kinetoplastea	
Trypanosoma spp.	*Luciobarbus kersin*, *Mastacembelus mastacembelus*, *Silurus glanis*, *S. triostegus*
Phylum Microsporidia- Class Microsporea	
Pleistophora longifilis	*Capoeta damascina*
Phylum Ciliophora- classes Litostomatea, Phyllopharyngea and Oligohymenophorea	
Apiosoma amoebae	*Cyprinus carpio*
Apiosoma robusta	*Silurus triostegus*
Apiosoma sp.	*Chondrostoma regium*
Balantidium polyvacuolum	*Cyprinus carpio*
Chilodonella cyprini	*Capoeta trutta, Carassius auratus*, *Cyprinus carpio*, *Silurus triostegus*
Ichthyophthirius multifiliis	*Acanthobrama marmid*, *Arabibarbus grypus*, *Capoeta trutta*, *C. umbla*, *Carasobarbus luteus*, *Carassius auratus*, *Chondrostoma regium*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Luciobarbus barbulus*, *L. esocinus*, *Mastacembelus*

	mastacembelus, *Silurus triostegus*, *Squalius lepidus*
Riboscyphidia arctica	*Capoeta trutta*, *Silurus triostegus*
Tetrahymena pyriformis	*Cyprinus carpio*, *Silurus triostegus*
Tetrahymena sp.	*Chondrostoma regium*
Trichodina acuta	*Cyprinus carpio*
Trichodina anguilli	*Cyprinus carpio*
Trichodina domerguei	*Acanthobrama marmid*, *Carasobarbus luteus*, *Chondrostoma regium*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Silurus glanis*, *Squalius cephalus*, *S. spurius*
Trichodina erbilensis	*Silurus triostegus*
Trichodina heterodentata	*Cyprinus carpio*
Trichodina kurdistani	*Silurus triostegus*
Trichodina mutabilis	*Cyprinus carpio, Silurus triostegus*
Trichodina nobilis	*Cyprinus carpio*
Trichodina pediculus	*Mastacembelus mastacembelus*, *Silurus triostegus*
Trichodina ranae	*Silurus triostegus*
Trichodina reticulata	*Cyprinus carpio*
Trichodina spp.	*Chondrostoma regium*, *Cyprinus carpio*
Phylum Cnidaria- Class Myxozoa	
Myxobolus amurensis	*Squalius lepidus*
Myxobolus bulbocordis	*Chondrostoma regium*, *Mesopotamichthys sharpeyi*
Myxobolus cyprinicola	*Cyprinus carpio*
Myxobolus iranicus	*Barbus lacerta*, *Carasobarbus luteus*
Myxobolus karuni	*Arabibarbus grypus*
Myxobolus macrocapsularis	*Luciobarbus barbulus*
Myxobolus mesopotamiae	*Carasobarbus luteus*
Myxobolus molnari	*Luciobarbus esocinus*
Myxobolus oviformis	*Leuciscus vorax*
Myxobolus parvus	*Cyprinus carpio*
Myxobolus persicus	*Arabibarbus grypus*, *Cyprinion macrostomum*
Myxobolus pfeifferi	*Acanthobrama marmid*, *Arabibarbus grypus*, *Capoeta umbla*, *Carasobarbus luteus*, *Cyprinion macrostomum*, *Cyprinus carpio, Luciobarbus barbulus*, *L. esocinus*, *L. xanthopterus*, *Mesopotamichthys sharpeyi*, *Squalius cephalus*, *S. spurius*
Myxobolus poljanski	*Arabibarbus grypus, Silurus triostegus*

Myxobolus rotundus	*Squalius lepidus*
Myxobolus sandrae	*Planiliza abu*
Myxobolus shadgani	*Barbus rajanorum*, *Luciobarbus barbulus*
Myxobolus sharpeyi	*Chondrostoma regium*, *Mesopotamichthys sharpeyi*
Myxobolus sphaericus	*Luciobarbus esocinus*, *Planiliza abu*
Myxobolus sp.	*Arabibarbus grypus*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Planiliza abu*
Phylum Platyhelminthes- Class Trematoda	
Allocreadium transversale	*Mastacembelus mastacembelus*
Asymphylotrema macracetabulum	*Mastacembelus mastacembelus*
Azygia robusta	*Silurus triostegus*
Clinostomum complanatum (larva)	*Capoeta umbla*, *Carasobarbus luteus*, *Cyprinion macrostomum*, *Luciobarbus esocinus*, *Mastacembelus mastacembelus*, *Squalius lepidus*
Diplostomum flexicaudum (larva)	*Mastacembelus mastacembelus*, *Silurus triostegus*
Diplostomum spathaceum (larva)	*Acanthobrama marmid*, *Arabibarbus grypus*, *Capoeta damascina*, *C. umbla*, *Carasobarbus luteus*, *Chondrostoma regium*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Garra rufa*, *Heteropneustes fossilis*, *Luciobarbus barbulus*, *Mastacembelus mastacembelus*, *Planiliza abu*, *Silurus glanis*, *S. triostegus*, *Squalius lepidus*
Diplostomum spp.	*Capoeta umbla*, *Chondrostoma regium*, *Cyprinion macrostomum*, *Luciobarbus barbulus*, *L. esocinus*, *Squalius spurius*
Megamonostomella rashediansis	*Silurus triostegus*
Orientocreadium siluri	*Silurus glanis*, *S. triostegus*
Paracoenogonimus ovatus	*Cyprinion macrostomum*
Pseudochetosoma salmonicola	*Alburnus mossulensis*, *Luciobarbus barbulus*, *Mastacembelus mastacembelus*, *Squalius cephalus*
Phylum Platyhelminthes- Class Monogenea	
Dactylogyrus achmerowi	*Cyprinus carpio*
Dactylogyrus acinacus	*Garra rufa*
Dactylogyrus affinis	*Luciobarbus esocinus*, *L. xanthopterus*
Dactylogyrus alatus	*Alburnus mossulensis*
Dactylogyrus anchoratus	*Carassius auratus*, *Cyprinus carpio*, *Luciobarbus esocinus*

Dactylogyrus arcuatus	*Cyprinus carpio*
Dactylogyrus barbioides	*Arabibarbus grypus*
Dactylogyrus barbuli	*Luciobarbus barbulus*, *L. kersin*, *L. xanthopterus*
Dactylogyrus baueri	*Capoeta trutta*, *Carassius auratus*, *Cyprinus carpio*
Dactylogyrus carassobarbi	*Capoeta trutta*, *C. umbla*, *Carasobarbus luteus*
Dactylogyrus carpathicus	*Capoeta umbla*, *Carasobarbus luteus*, *Luciobarbus kersin*, *L. xanthopterus*
Dactylogyrus charbinensis	*Cyprinus carpio*
Dactylogyrus cornu	*Luciobarbus xanthopterus*
Dactylogyrus cyprinioni	*Cyprinion macrostomum*
Dactylogyrus deziensioides	*Cyprinus carpio*, *Luciobarbus barbulus*, *L. kersin*, *L. xanthopterus*
Dactylogyrus deziensis	*Luciobarbus barbulus*, *L. esocinus*, *L. kersin*
Dactylogyrus dulkeiti	*Carassius auratus*
Dactylogyrus dyki	*Squalius lepidus*
Dactylogyrus elegantis	*Capoeta trutta*, *Chondrostoma regium*, *Squalius lepidus*
Dactylogyrus extensus	*Cyprinus carpio*
Dactylogyrus fallax	*Alburnus mossulensis*
Dactylogyrus formosus	*Carassius auratus*, *Cyprinus carpio*
Dactylogyrus hypophthalmichthys	*Hypophthalmichthys molitrix*
Dactylogyrus inexpectatus	*Cyprinus carpio*
Dactylogyrus inutilis	*Luciobarbus barbulus*, *L. esocinus*
Dactylogyrus kersini	*Luciobarbus kersin*
Dactylogyrus kulwieci	*Chondrostoma regium*, *Luciobarbus esocinus*
Dactylogyrus lenkorani	*Capoeta trutta*, *C. umbla*
Dactylogyrus macracanthus	*Squalius lepidus*
Dactylogyrus macrostomi	*Cyprinion macrostomum*
Dactylogyrus mascomai	*Cyprinion macrostomum*
Dactylogyrus microcirrus	*Capoeta trutta*
Dactylogyrus minutus	*Cyprinus carpio*
Dactylogyrus molnari	*Cyprinus carpio*
Dactylogyrus orbus	*Barbus lacerta*
Dactylogyrus pavlovskyi	*Arabibarbus grypus*
Dactylogyrus persis	*Carasobarbus luteus*
Dactylogyrus polylepidis	*Chondrostoma regium*
Dactylogyrus pulcher	*Capoeta trutta*, *C. umbla*, *Chondrostoma regium*, *Cyprinion macrostomum*
Dactylogyrus rectotrabus	*Garra rufa*
Dactylogyrus sahuensis	*Cyprinus carpio*

Dactylogyrus skrjabinensis	*Capoeta trutta*
Dactylogyrus skrjabini	*Hypophthalmichthys molitrix*
Dactylogyrus suchengtaii	*Hypophthalmichthys molitrix*
Dactylogyrus varicorhini	*Carasobarbus luteus*
Dactylogyrus vastator	*Arabibarbus grypus*, *Barbus lacerta*, *Capoeta umbla*, *Carasobarbus luteus*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Luciobarbus barbulus*, *L. esocinus*, *Squalius cephalus*, *S. lepidus*, *S. spurius*
Dactylogyrus vistulae	*Capoeta trutta*, *Mastacembelus mastacembelus*, *Squalius lepidus*
Dactylogyrus spp.	*Chondrostoma regium*, *Cyprinus carpio*
Diplozoon spp.	*Cyprinion macrostomum*, *Cyprinus carpio*, *Squalius lepidus*
Dogielius mokhayeri	*Capoeta trutta*, *Carasobarbus luteus*, *Cyprinion macrostomum*, *Leuciscus vorax*
Dogielius molnari	*Cyprinion macrostomum*
Dogielius persicus	*Arabibarbus grypus*, *Carasobarbus luteus*, *Cyprinion macrostomum*
Dogielius planus	*Carasobarbus luteus*
Gyrodactylus baicalensis	*Cyprinus carpio*
Gyrodactylus barbi	*Cyprinus carpio*
Gyrodactylus cyprini	*Cyprinus carpio*
Gyrodactylus elegans	*Capoeta trutta*, *Cyprinus carpio*
Gyrodactylus gobioninum	*Cyprinus carpio*
Gyrodactylus gussevi	*Heteropneustes fossilis*
Gyrodactylus katharineri	*Cyprinus carpio*
Gyrodactylus kherulensis	*Cyprinus carpio*, *Silurus triostegus*
Gyrodactylus longoacuminatus	*Cyprinus carpio*
Gyrodactylus macracanthus	*Cyprinus carpio*, *Hypophthalmichthys molitrix*
Gyrodactylus medius	*Cyprinus carpio*
Gyrodactylus molnari	*Cyprinus carpio*
Gyrodactylus shulmani	*Cyprinus carpio*
Gyrodactylus sprostonae	*Capoeta trutta*, *Carassius auratus*, *Cyprinus carpio*
Gyrodactylus vicinus	*Cyprinus carpio*
Mastacembelocleidus heteranchorus	*Mastacembelus mastacembelus*
Mazocraes alosae	*Cyprinus carpio*
Microcotyle donavini	*Planiliza abu*
Paradiplozoon amurense	*Squalius lepidus*
Paradiplozoon barbi	*Acanthobrama marmid*, *Chondrostoma regium*, *Cyprinion macrostomum*, *Squalius spurius*

Paradiplozoon bingolensis	*Garra rufa*
Paradiplozoon cyprini	*Cyprinion macrostomum*, *Cyprinus carpio*
Paradiplozoon homoion	*Cyprinion macrostomum*
Paradiplozoon kasimii	*Cyprinion macrostomum*
Paradiplozoon leucisci	*Hemiculter leucisculus*, *Squalius lepidus*
Paradiplozoon pavlovskii	*Chondrostoma regium*, *Cyprinion macrostomum*, *Luciobarbus barbulus*, *L. xanthopterus*
Paradiplozoon tadjikistanicum	*Capoeta trutta*
Paradiplozoon vojteki	*Chondrostoma regium*
Thaparocleidus vistulensis	*Silurus glanis*, *S. triostegus*
Phylum Platyhelminthes- Class Cestoda	
Caryophyllides fennica	*Luciobarbus xanthopterus*
Caryophyllaeus fimbriceps	*Luciobarbus barbulus*, *L. kersin*
Caryophyllaeus gotoi	*Carasobarbus luteus*
Caryophyllaeus laticeps	*Luciobarbus xanthopterus*
Caryophyllid species	*Cyprinus carpio*
Diphyllobothrium latum	*Arabibarbus grypus*
Glanitaenia osculata	*Silurus glanis*, *S. triostegus*
Khawia armeniaca	*Arabibarbus grypus*, *Carasobarbus luteus*, *Luciobarbus esocinus*, *L. kersin*, *Mastacembelus mastacembelus*
Khawia sinensis	*Arabibarbus grypus*
Ligula intestinalis	*Acanthobrama marmid*, *Arabibarbus grypus*, *Mastacembelus mastacembelus*
Monobothrium wageneri	*Luciobarbus barbulus*
Neogryporhynchus cheilancristrotus	*Silurus triostegus*
Polyonchobothrium magnum	*Mastacembelus mastacembelus*
Postgangesia inarmata	*Silurus glanis*, *S. triostegus*
Proteocephalus coregoni	*Luciobarbus esocinus*
Proteocephalus sp.	*Acanthobrama marmid*
Schyzocotyle acheilognathi	*Arabibarbus grypus*, *Cyprinus carpio*, *Squalius lepidus*
Senga sp.	*Mastacembelus mastacembelus*
Tetracampos ciliotheca (larva)	*Silurus triostegus*
Phylum Nematoda- Class Secernentea	
Agamospirura sp.	*Mastacembelus mastacembelus*
Anisakis sp.	*Cyprinion macrostomum*, *Mastacembelus mastacembelus*
Contracaecum spp. (larva)	*Acanthobrama marmid*, *Arabibarbus grypus*, *Capoeta damascina*, *C. trutta*, *Carasobarbus luteus*, *Chondrostoma regium*, *Cyprinion macrostomum*, *Cyprinus*

	carpio, *Garra rufa*, *Heteropneustes fossilis*, *Leuciscus vorax*, *Luciobarbus barbulus, L. esocinus, L. kersin, L. subquincunciatus, L. xanthopterus*, *Mastacembelus mastacembelus*, *Planiliza abu*, *Silurus triostegus*, *Squalius cephalus*, *S. Lepidus*
Cucullanus sp.	*Carasobarbus luteus*
Philometra sp.	*Cyprinion macrostomum*
Procamallanus siluri	*Silurus glanis*
Procamallanus viviparus	*Capoeta trutta*, *Cyprinion macrostomum*, *Mastacembelus mastacembelus*, *Silurus triostegus*
Rhabdochona (*Globochona*) *chodukini*	*Luciobarbus barbulus, L. kersin*
Rhabdochona (*G.*) *kurdistanensis*	*Luciobarbus kersin*
Rhabdochona (*G.*) sp.	*Luciobarbus barbulus, L. kersin*
Rhabdochona (*Rhabdochona*) *denudata*	*Capoeta trutta*, *Cyprinion macrostomum*
Rhabdochona (*R.*) *gnedini*	*Capoeta damascina*, *C. umbla*
Rhabdochona (*R.*) *similis*	*Cyprinion macrostomum*
Rhabdochona (*R.*) *tigridis*	*Capoeta damascina*, *C. trutta*, *Cyprinion macrostomum*
Rhabdochona (*R.*) sp.	*Leuciscus vorax*, *Luciobarbus kersin*
Spiroxys sp.	*Carasobarbus luteus*, *Heteropneustes fossilis*, *Leuciscus vorax*, *Mastacembelus mastacembelus*, *Silurus glanis*
Phylum Acanthocephala- classes Eoacanthocephala and Palaeacanthocephala	
Neoechinorhynchus (*N.*) *iraqensis*	*Planiliza abu*, *Silurus triostegus*
Neoechinorhynchus (*N.*) *rutili*	*Luciobarbus esocinus*
Neoechinorhynchus (*N.*) *zabensis*	*Capoeta damascina*, *C. trutta*, *C. umbla*
Pomphorhynchus laevis	*Luciobarbus barbulus, L. xanthopterus*
Pomphorhynchus spindletruncatus	*Leuciscus vorax*, *Luciobarbus xanthopterus*, *Silurus triostegus*, *Squalius lepidus*
Phylum Annelida - Class Clitellata	
Cystobranchus mammillatus	*Mastacembelus mastacembelus*
Piscicola sp.	*Luciobarbus esocinus*
Phylum Mollusca- Class Bivalvia	
Unio pictorum	*Arabibarbus grypus*, *Carasobarbus luteus*, *Heteropneustes fossilis*, *Luciobarbus barbulus, Mastacembelus mastacembelus*
Phylum Arthropoda- classes Ichthyostraca, Hexanauplia and Arachnida	
Arrenurus sp.	*Mastacembelus mastacembelus*
Argulus foliaceus	*Cyprinus carpio*, *Mastacembelus mastacembelus*

Ergasilus barbi	*Arabibarbus grypus*, *Carasobarbus luteus*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Glyptothorax cavia*, *Luciobarbus barbulus, L. esocinus, L. kersin*, *Planiliza abu*, *Silurus glanis*, *Squalius lepidus*, *S. spurius*
Ergasilus mosulensis	*Carasobarbus luteus*, *Cyprinus carpio*, *Silurus triostegus*, *Squalius lepidus*
Ergasilus sieboldin	*Acanthobrama marmid*, *Carasobarbus luteus*, *Chondrostoma regium*, *Planiliza abu*, *Silurus triostegus*
Ergasilus sp.	*Carasobarbus luteus*, *Chondrostoma regium*, *Mesopotamichthys sharpeyi*
Lamproglena pulchella	*Capoeta damascina*, *C. trutta, C. umbla, Carasobarbus luteus*, *Chondrostoma regium*, *Cyprinion macrostomum*, *Garra rufa*, *Leuciscus vorax*, *Luciobarbus barbulus, L. esocinus, L. kersin*, *L. xanthopterus*, *Squalius cephalus*, *S. lepidus*, *S. spurius*
Lernaea cyprinacea	*Arabibarbus grypus*, *Carasobarbus luteus*, *Chondrostoma regium*, *Ctenopharyngodon idella*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Hemiculter leucisculus*, *Hypophthalmichthys molitrix*, *Luciobarbus barbulus, L. esocinus, L. xanthopterus*, *Squalius lepidus*
Pseudolamproglena annulata	*Capoeta umbla, Carasobarbus luteus*, *Cyprinion macrostomum*, *Cyprinus carpio*, *Luciobarbus barbulus*
Tracheliastes polycolpus	*Cyprinion macrostomum*, *Luciobarbus kersin*

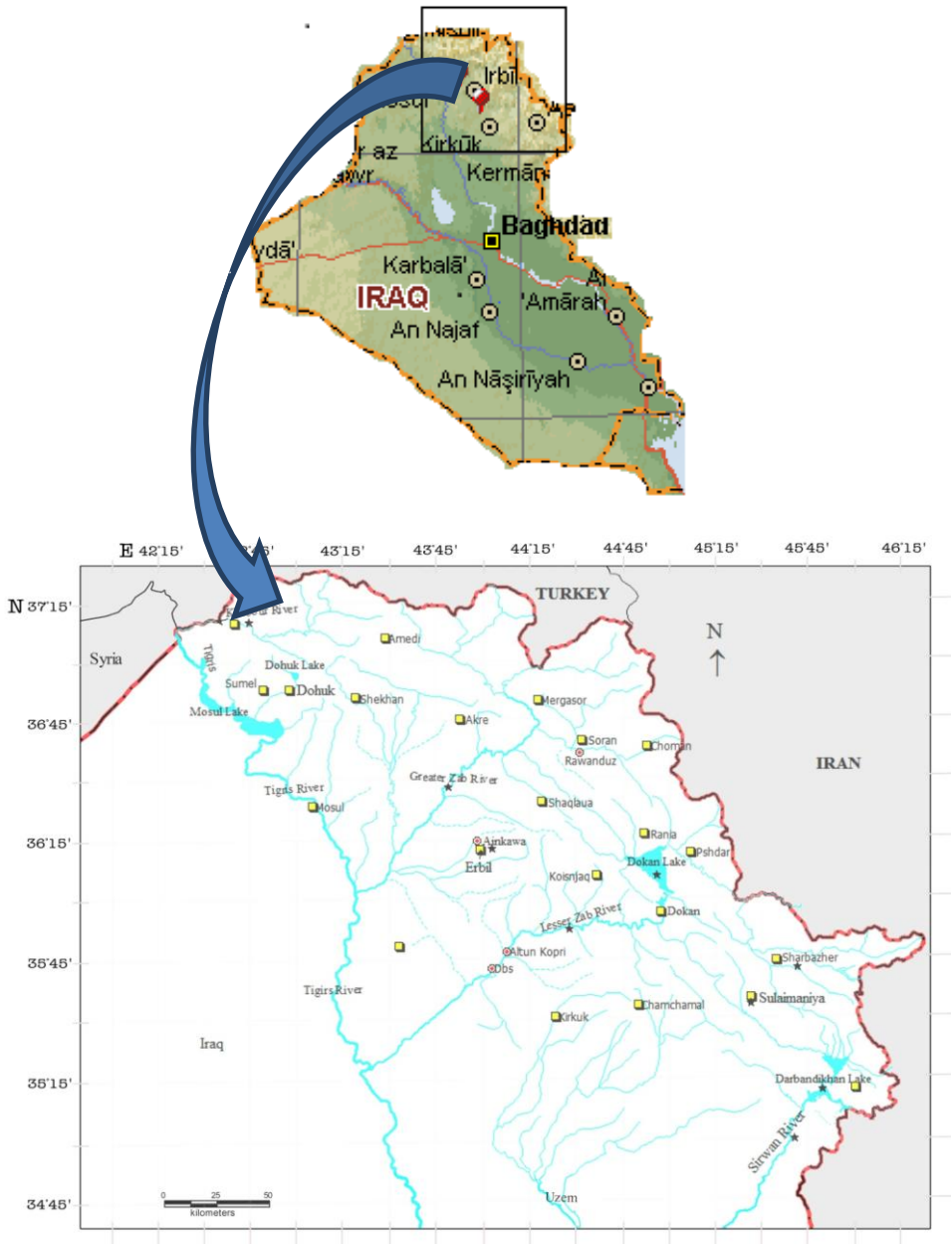

Figure 1: Map of Iraq (above) and Kurdistan region (below) showing the sites from where fishes were collected for parasitological investigation.

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