

Checklists of Fish Parasites of Basrah Marshlands, Iraq

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Abstract: Literature reviews of all reports concerning the parasitic fauna of fishes of Basrah marshlands, southern Iraq showed that a total of 78 parasite species are so far known from 11 fish species investigated for parasitic infections. The parasitic fauna included four euglenozoans, seven ciliophorans, eight myxozoans, 11 trematodes, 15 monogeneans, nine cestodes, seven nematodes, two acanthocephalans, one clam glochidium and 14 crustaceans. The infection with some trematodes and nematodes as well as with the clam occurred with their larval stages, while the remaining infections were either with trophozoites or adult parasites. Among the inspected fishes, *Silurus triostegus* was infected with the highest number of parasite species (59 parasite species), followed by *Carasobarbus luteus* (16 species), *Leuciscus vorax* (15 species), while four fish species (*Gambusia holbrooki*, *Luciobarbus xanthopterus*, *Planiliza subviridis* and *Poecillia latipinna*) were infected with only one parasite species each. The third larval stage of the nematode *Contracaecum* species was the commonest parasite species as it was recorded from eight fish species, followed by both the myxozoan *Myxobolus pfeifferi* and the crustaceans *Ergasilus mosulensis* and *Ergasilus* sp. which were reported from five fish host species each, while 74.4% of the parasite species were recorded from a single host fish species each.

Keywords: Checklists, Parasites, Fishes, Basrah marshlands, Iraq.

INTRODUCTION

The Mesopotamian marshes or Iraqi marshes were once the largest wetlands in southwest Asia. They are a wetland area located in southern Iraq. The three main marsh areas are Al-Hawizeh, Central, and Al-Hammar (Richardson & Hussain, 2006). Draining of portions of the marshes began in the 1950s and continued through the 1970s to reclaim land for agriculture and oil exploration. However, in the late 1980s and 1990s, this work was expanded and accelerated. Accordingly, two thirds

of the marshes were not receiving water inputs in 1993, and at 2000 less than 10% remained (Al-Ansari & Knutsson, 2011). Since 2003, the area was reflooded and by March 2004, nearly 20% of the original marsh area was reflooded (Richardson et al., 2005). Hussain (2014) gave a detailed account on different aspects, both positive and negative, of biotopes of Iraqi marshes. Since 2016, the mesopotamian marshes are listed as a UNESCO Heritage Site.

The marshy area represents an important habitat for many commercial fishes of Iraq, both migratory and resident ones. Mohamed & Hussain (2012) recognized 11 migratory marine fish species and 20 freshwater fish species in Al-Hammar marsh during 2005-2006. Mhaisen & Al-Kanaani (1994) demonstrated the suitability of the southern marshes for culturing the common carp *Cyprinus carpio*. Salman (2011) discussed different suggested aquaculture activities to enhance aquaculture in the southern marshes of Iraq.

The parasitic fauna of fishes of Basrah marshlands had received little attention from fish parasitologists in Iraq. Reports on fish parasites of this area included those from Al-Hammar marsh, north of Basrah (Al-Daraji, 1986; Dawood, 1986; Mohamad, 1989; Al-Daraji, 1990; Al-Daraji & Al-Salim, 1990; Al-Salim & Al-Daraji, 1990, 1992; Al-Salim & Mohamad, 1995; Bannai et al., 2005; Jarallah et al., 2005; Jori, 2006, 2007; Abbas, 2007; Awad & Abbas, 2009; Al-Tameemi, 2013; Awad & Al-Tameemi, 2013; Al-Daraji et al., 2014), from Al-Mdaina (misspelled as Al-Mdina) marshes (Jori, 2005) as well as from fishes purchased from both Al-Ashar and Basrah fish markets (Mhaisen, 1986) which were captured from Basrah marshlands. One report from Al-Hammar marsh (Ali et al., 1990) cannot be taken in consideration as no host-parasite account was given.

As only one previous list concerning fish parasites of Basrah marshlands (Mhaisen, 1995), is available, and due to the accumulation of new data after the publication of that review, the present article is done to gather and review the above literature in order to give parasite-host list and host-parasite list. The aims of this article also include updating knowledge on validity and synonymy of all concerned parasites and updating the scientific names of all infected fishes (Table 1) in this marshy area.

SOURCES AND METHODS

Twenty references (10 research papers, four unpublished M. Sc. theses, two unpublished Ph. D. Theses and four conference abstracts) dealing, totally or partially, with the parasites of fishes of Basrah marshlands were used to prepare the present article. Data from such

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; WoRMS, 2017) as well as some relevant taxonomic references (Gibson et al., 1996; Eiras et al., 2005; Amin, 2013). The layout and names of the major taxonomic groups (phyla, classes, orders and families) of the concerned parasites followed two checklists of FAO Fisheries Technical Papers (Arthur & Te, 2006; Kirjušina & Vismanis, 2007) except for some cases which were given in their relevant parasitic groups. For fishes, the scientific names were reported as they appeared in their original references but then their valid names and their authorities were checked according to well known specialized electronic sites (Eschmeyer, 2017; Froese & Pauly, 2017). To demonstrate number of host species so far recorded for any particular parasite species in Basrah marshlands in comparison with number of host species recorded for that parasite species from the whole water bodies of Iraq, the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2017) was used for this purpose.

Parasitological Investigations Achieved on Fishes of Basrah Province Marshlands

The following is a brief account on available references concerning the parasitic fauna of fishes of Basrah marshlands (Fig. 1). In order to avoid repetition, the full details on these parasites (their scientific names, hosts and site of infection) will be given in the subtitle of Parasite-Host List within the section of Results and Discussion.

Al-Daraji (1986) inspected four fish species from Al-Hammar marsh and recorded 24 parasite species, among which two unidentified *Trypanosoma* species. Description of these two trypanosomal species was given later (Al-Salim & Al-Daraji, 1990, 1992). In addition, a paper extracted from Al-Daraji (1986), dealing with six of these parasites was published (Al-Daraji & Al-Salim, 1990).

While investigating the biology of the common carp *Cyprinus carpio* from Al-Hammar marsh, Dawood (1986) detected one cestode and one nematode species in this fish.

Among 41 freshwater and marine fish species from Basrah marshlands investigated for parasites, Mhaisen (1986) recorded 11 parasite species which included seven parasite species from four fish species which were brought from two fish markets in Basrah city. Such fishes were captured from Basrah marshlands.

Mohamad (1989) investigated the parasitic fauna of *Heteropneustes fossilis* from Al-Hammar marsh and recorded six parasite species. A paper, extracted from Mohamad (1989), dealing with four of these

parasites was published later (Al-Salim & Mohamad, 1995).

Al-Daraji (1990) detected three cestode species from four fish species of Al-Hammar marsh.

Mhaisen (1995) gave a first review on the parasitic fauna of fishes of the marshlands. At that time 29 parasite species were so far known from eight fish species.

Bannai et al. (2005) in a conference abstract reported three parasite species from *C. carpio* from the Al-Hammar marsh.

Jarallah et al. (2005) reported one parasite species as well as bacterial and fungal species from *G. holbrooki* (reported as *G. affinis*) from the Al-Hammar marsh in a conference abstract.

Jori (2005) reported two nematode species from *C. carpio* captured from Al-Mdaina marshes.

Jori (2006) recorded 45 parasite species and two fungal species from the silurid fish *Silurus triostegus* from Al-Hammar marsh through her Ph. D. thesis project.

Abbas (2007) detected 16 parasite species and one fungal species from *S. triostegus* from Al-Hammar marsh through his Ph. D. thesis project. A paper, extracted from Abbas (2007), dealing with three of these parasites was published later (Awad & Abbas, 2009).

Jori (2007) recorded one myxozoan parasite from the mugilid fish *Planiliza subviridis* (reported as *Liza subviridis*) from Al-Hammar marsh.

Ali et al. (1990), in a conference abstract, reported from gills of 12 fish species from Al-Hammar marsh a total of 42 parasite species of which 21 as new records in Iraq but no host was demonstrated for each parasite species.

Al-Tameemi (2013) recorded the third larval stage of the nematode *Contraecaecum* sp. in the body cavity of *Poecillia latipinna* which was found in the stomach of the aquatic bird *Ceryle rudis* from Al-Hammar marsh. A paper, extracted from Al-Tameemi (2013), was published which included this record (Awad & Al-Tameemi, 2013).

Al-Daraji et al. (2014) reported the occurrence of plerocercoids of two *Triaenophorus* species from *S. triostegus* (reported as *Parasilurus triostegus*) from Al-Hammar marsh.

RESULTS AND DISCUSSION

Surveying literature concerning the parasites which are so far recorded from fishes of Basrah marshlands showed the occurrence of 78 parasite species. These parasites included four euglenozoans, seven ciliophorans, eight myxozoans, 11 trematodes, 15 monogeneans, nine

cestodes, seven nematodes, two acanthocephalans, one mollusc glochidium and 14 crustaceans.

Parasite-Host List

Species of the parasitic fauna of fishes of Basrah marshlands are grouped here into 10 major groups (phylum or subphylum for some species or class for others) as indicated in Table (2). For each major group, a list of species is given according to their systematic account. This is followed by an alphabetical listing of each parasite species in each major group. Parasite listing includes alphabetically arranged fish hosts involved for each parasite. For each parasite species, its first record in Iraq is indicated and the total number of its hosts so far recorded from fishes of Iraq is extracted from the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2017) without mentioning this reference each time in order to economise space.

Phylum Euglenozoa

The phylum Euglenozoa is represented in fishes of Basrah marshlands with three species of the genus *Trypanosoma* in addition to some unidentified species of this genus as indicated below. WoRMS (2017) is followed to arrange taxonomy of the phylum Euglenozoa.

Phylum Euglenozoa

Class Kinetoplastea

Order Trypanostomatida

Family Trypanosomatidae

Trypanosoma arabica Al-Salim & Al-Daraji, 1990

Trypanosoma basrensis Al-Salim & Al-Daraji, 1992

Trypanosoma carasobarbi Al-Salim, 1985

Trypanosoma spp.

Trypanosoma arabica Al-Salim & Al-Daraji, 1990 was described as a new species from the blood plasma of *S. triostegus* from Al-Hammar marsh (Al-Salim & Al-Daraji, 1990) and was reported later from the same fish and locality (Jori, 2006). No type material of such new species was preserved in any museum. It is appropriate to mention here that this species was reported earlier as *Trypanosoma* sp. from the same fish (which was reported by its synonym *P. triostegus*) and from the same locality by Al-Daraji (1986). No more records of *T. arabica* are so far known from fishes of Iraq.

Trypanosoma basrensis Al-Salim & Al-Daraji, 1992 was described as a new species from the blood of *Leuciscus vorax* (reported as *Aspius vorax*)

from Al-Hammar marsh (Al-Salim & Al-Daraji, 1992). No type material of such new species was preserved in any museum. It is appropriate to mention here that this species was reported earlier as *Trypanosoma* sp. from the same fish and the same locality by Al-Daraji (1986). No more records of *T. basrensis* are so far known from fishes of Iraq.

Trypanosoma carasobarbi Al-Salim, 1985 was reported from blood of *Carasobarbus luteus* from Al-Hammar marsh (Al-Daraji, 1986). It was originally described as a new species from the heart blood of *C. luteus* from Shatt Al-Arab river (Al-Salim, 1985). Again, no type material of such new species was preserved in any museum. *T. carasobarbi* was reported later from the same fish (by its synonym *Barbus luteus*) from Al-Hammar marsh (Al-Daraji & Al-Salim, 1990). So far, *C. luteus* is the only host for *T. carasobarbi* in fishes of Iraq. As explained by Mhaisen et al. (2016), authors of most *Trypanosoma* species so far reported as new species in Iraq failed to deposit any trypanosome materials in any museum or research institution and naming of such new species was based on a false assumption that a new host and a new geographical area for a trypanosome mean a new trypanosomal species.

Trypanosoma species were reported from blood of both *L. vorax* (reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji, 1986) and *S. triostegus* (also reported as *P. triostegus*) from Al-Hammar marsh (Al-Daraji, 1986; Jori, 2006). These trypanosomal species, reported by Al-Daraji (1986), were later recognized as *T. basrensis* and *T. arabica*, respectively (Al-Salim & Al-Daraji, 1990, 1992). Thirteen fish species are so far reported as hosts for some unidentified *Trypanosoma* species in Iraq.

Phylum Ciliophora

This phylum is represented in fishes of Basrah marshlands with one species each of the genera *Chilodonella* and *Ichthyophthirius* and four species of the genus *Trichodina* in addition to some unidentified species of the genus *Trichodina* as indicated below. WoRMS (2017) is followed to arrange taxonomy of the phylum Ciliophora.

Phylum Ciliophora

Class Phyllopharyngea

Order Chlamydidontida

Family Chilodonellidae

Chilodonella hexasticha (Kiernik, 1909) Kahl, 1931

Class Oligohymenophorea

Order Hymenostomatida

Family Ichthyophthiriidae

Ichthyophthirius multifiliis Fouquet, 1876

Order Mobilida

Family Trichodinidae

Trichodina domerguei (Wallengren, 1897) Haider, 1964*Trichodina nigra* Lom, 1961*Trichodina prowazeki* Grupcheva & Lom, 1980*Trichodina reticulata* Hirschmann & Partsch, 1955*Trichodina* sp.

Chilodonella hexasticha (Kiernik, 1909) Kahl, 1931 was reported from gills of *S. triostegus* from Al-Hammar marsh (Abbas, 2007). That was the first record of *C. hexasticha* in Iraq which has so far only two host species in Iraq.

Ichthyophthirius multifiliis Fouquet, 1876 was reported from gills of both *C. luteus* from Al-Hammar marsh (Al-Daraji, 1986) and *L. vorax* (reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji, 1986; Al-Daraji & Al-Salim, 1990) and skin and gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006; Abbas, 2007). Mhaisen (1986) reported *I. multifiliis* from *C. luteus* from Al-Ashar fish market and *L. vorax* (reported as *A. vorax*) from Basrah fish market. *I. multifiliis* was recorded for the first time in Iraq from *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.

Trichodina domerguei (Wallengren, 1897) Haider, 1964 was reported from skin and gills of *H. fossilis* from Al-Hammar marsh (Mohamad, 1989; Al-Salim & Mohamad, 1995) and from blood, gills and skin of *S. triostegus* from Al-Hammar marsh (Jori, 2006). The occurrence of *T. domerguei* from the blood of *S. triostegus* is doubtful as trichodinids usually live on fish gills but in weakened fishes they possibly cover the entire surface of the fish (Hoffman, 1999). The first record of *T. domerguei* in Iraq was from eight freshwater fish species from Tigris river, Al-Tharthar lake and fish markets in Baghdad city (Shamsuddin et al., 1971). So far, 39 fish host species are known for *T. domerguei* in Iraq which makes it the most distributed ciliophoran species in fishes of Iraq.

Trichodina nigra Lom, 1961 was reported from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). Its first record in Iraq was from both *C. carpio* and *Hypophthalmichthys molitrix* from Al-Furat fish farm (Al-Zubaidy, 1998). Nine fish host species are so far known for *T. nigra* in Iraq.

Trichodina prowazeki Grupcheva & Lom, 1980 was reported from blood and heart muscle of *S. triostegus* from Al-Hammar marsh (Jori, 2006) which was its first report in Iraq as well. The occurrence of this

parasite in the blood and heart muscle is doubtful (see Mhaisen et al., 2016). No more records are so far known for *T. prowazeki* in fishes of Iraq.

Trichodina reticulata Hirschmann & Partsch, 1955 was reported from skin, gills and blood of *S. triostegus* from Al-Hammar marsh (Jori, 2006) which was its first report in Iraq as well. Such occurrence in fish blood is also doubtful (see Mhaisen et al., 2016). Five fish host species are so far known for *T. reticulata* in Iraq (Mhaisen, 2017).

Trichodina species were so far reported from blood and heart muscle of *S. triostegus* from Al-Hammar marsh (Jori, 2006). Occurrence of *Trichodina* sp. from the blood and heart muscle of *S. triostegus* (Jori, 2006) is doubtful (see Mhaisen et al., 2016). In addition to 32 recognized *Trichodina* species so far recorded from fishes of Iraq, some unidentified species of *Trichodina* were so far recorded from eight fish species.

Phylum Cnidaria- Class Myxozoa

The Myxozoa is represented in fishes of Basrah marshlands with one species of the genus *Henneguya* and five species of *Myxobolus* in addition to some unspecified species of the genera *Myxobolus* and *Thelohanellus* as indicated below. The authority of most *Myxobolus* species was checked in accordance with Eiras *et al.* (2005). Okamura *et al.* (2015) reviewed the multicellular nature of myxozoan spores and led to early proposals that myxozoans should not be classified as Protozoa but as Metazoa. Fiala *et al.* (2015) considered the Myxozoa as an unranked subphylum of the phylum Cnidaria. A recent phylogenomic analysis demonstrated by Chang *et al.* (2015) confirmed that myxozoans are cnidarians. WoRMS (2017) is followed to arrange taxonomy of the myxozoans.

Phylum Cnidaria

Class Myxozoa

Order Bivalvulida

Family Myxobolidae

Henneguya tachysuri Menon, 1979

Myxobolus cyprinicola Reuss, 1906

Myxobolus diversus Nie & Li, 1973

Myxobolus intrachondrealis Molnár, 2000

Myxobolus mesopotamiae Molnár, Masoumian & Abbasi, 1996

Myxobolus pfeifferi Thélohan, 1895

Myxobolus sp.

Thelohanellus sp.

Henneguya tachysuri Menon, 1979 was reported from the subcutaneous tissues of *S. triostegus* from Al-Hammar marsh (Jori, 2006) and from the stomach of the same fish and same locality by Abbas (2007). No more records are so far known for this parasite in Iraq.

Myxobolus cyprinicola Reuss, 1906 was reported from the intestine of *S. triostegus* from Al-Hammar marsh (Abbas, 2007). This parasite was reported for the first time in Iraq from gills and fins of *C. carpio* from Dokan lake (Abdullah, 1997) and so far it has ten host species in Iraq.

Myxobolus diversus Nie & Li, 1973 was reported only from fins of *Planiliza subviridis* (reported as *Liza subviridis*) from Al-Hammar marsh (Jori, 2007). No more records are available for this parasite in Iraq.

Myxobolus intrachondrealis Molnár, 2000 was reported only from *C. carpio* from the southern part of Al-Hammar marsh in a conference abstract (Bannai et al., 2005) without mentioning parasite authority and the site of infection. In addition, the generic name was misspelled as *Myxobobulus*. That was its first record in Iraq and so far, *M. intrachondrealis* has three fish host species in Iraq.

Myxobolus mesopotamiae Molnár, Masoumian & Abbasi, 1996 was reported from fins of *S. triostegus* from the southern part of Al-Hammar marsh (Jori, 2006). This parasite was reported for the first time in Iraq from *C. luteus* (reported as *B. luteus*) from Greater Zab river (Abdullah, 2002) and so far it has three host species in Iraq.

Myxobolus pfeifferi Thélohan, 1895 was reported from Al-Hammar marsh from different external and internal sites of *C. luteus* (also reported as *B. luteus*) by Al-Daraji (1986) and Al-Daraji & Al-Salim (1990), *L. vorax* (reported as *A. vorax*) by Al-Daraji (1986) and Al-Daraji & Al-Salim (1990), *Mesopotamichthys sharpeyi* (also reported as *Barbus sharpeyi*) by Al-Daraji (1986) and Al-Daraji & Al-Salim (1990), *Planiliza abu* (reported as *Liza abu*) by Al-Daraji (1986) and Al-Daraji & Al-Salim (1990) and *S. triostegus* by Al-Daraji & Al-Salim (1990), Jori (2006) and Abbas (2007) as well as its synonym *P. triostegus* by Al-Daraji (1986). *M. pfeifferi* was reported for the first time in Iraq from *Acanthobrama marmid* from Tigris river at Mosul city (Fattohy, 1975) and so far, it was recorded from 35 fish host species in Iraq which makes it the most distributed *Myxobolus* species in fishes of Iraq.

Myxobolus species were reported from cardiac muscle and tissues of *S. triostegus* from Al-Hammar marsh (Jori, 2006). Three myxozoans reported from gills of some fishes from Al-Hammar marsh by Ali et al. (1990) cannot be taken in consideration as no adequate information on their hosts was documented. So far, seven fish species are known as hosts for unidentified *Myxobolus* species from fishes of Iraq.

Thelohanellus species was reported only from *C. carpio* from the southern part of Al-Hammar marsh in a conference abstract (Bannai et al., 2005) without mentioning the site of infection and the generic name was misspelled as *Thelohanettus*. The genus *Thelohanellus* has so far one identified species and one unidentified species in fishes of Iraq.

Addendum: There were two reports on the occurrence of *Glugea plecoglossi* Takahashi & Egusa, 1974 from skin, liver and intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006) and from the stomach of the same fish from the same region (Abbas, 2007). Both researchers claimed that *G. plecoglossi* is a protozoan. In fact, it belongs to the Microspora, which, based on analyses of various molecular markers, was considered as a separate phylum in the kingdom Fungi (Dyková, 2006; EOL, 2017; WoRMS, 2017). Therefore, *G. plecoglossi* will not be included in this article.

Phylum Platyhelminthes- Class Trematoda

The class Trematoda of the phylum Platyhelminthes is represented in fishes of Basrah marshlands with one species each of the genera *Ascocotyle*, *Aspidogaster*, *Diplostomum*, *Hemiurus*, *Monodharmis* and *Proctoeces*, two species each of genera *Clinostomum* and *Orientocreadium* in addition to unidentified species of the *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 also taken in consideration.

Phylum Platyhelminthes

Class Trematoda

Subclass Aspidogastrea

Superfamily Aspidogastroidea

Family Aspidogastridae

Aspidogaster enneatus Eckmann, 1932

Subclass Digenea

Superfamily Schistosomatoidea

Family Clinostomidae

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899

Clinostomum phalacrocoracis Dubois, 1931

Superfamily Diplostomoidea

Family Diplostomidae

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876

Superfamily Gymnophalloidea

Family Fellodistomidae

Proctoeces maculatus (Looss, 1901) Odhner, 1911

Family Tandanicolidae

Monodharmis torpedinis Dollfus, 1937

Superfamily Hemiuroidea

Family Hemiuridae

Hemiurus sigani Fischthal & Kuntz, 1964

Superfamily Opisthorchioidea

Family Heterophyidae

Ascocotyle coleostoma (Looss, 1896) Looss, 1899

Superfamily Monorchioidea

Family Lissorchiidae

Asymphylogora sp.

Superfamily Plagiorchioidea

Family Orientocreadiidae

Orientocreadium batrachoides Tubangui, 1931*Orientocreadium pseudobagri* Yamaguti, 1934

Ascocotyle coleostoma (Looss, 1896) Looss, 1899 was reported as metacercariae from Al-Hammar marsh from gills of both *H. fossilis* (Mohamad, 1989; Al-Salim & Mohamad, 1995) and *S. triostegus* (Jori, 2006; Abbas, 2007). The first record of *A. coleostoma* in Iraq was from both *H. fossilis* and *P. abu* (reported as *L. abu*) from Diyala river (Ali et al., 1986). Adults of *A. coleostoma* infect some piscivorous birds such as the grey heron *Ardea cinerea* in Babylon (now Al-Furat) fish farm, mid Iraq (Mhaisen & Abul-Eis, 1992). So far, a total of 34 fish species were reported as hosts for *A. coleostoma* in Iraq.

Aspidogaster enneatus Eckmann, 1932 was reported from intestine of four fish species from Al-Hammar marsh: *C. luteus*, *L. vorax* (reported as *A. vorax*), *M. sharpeyi* and *S. triostegus* (reported as *P. triostegus*) by Al-Daraji (1986). The specific name of this parasite, *enneatus*, was erroneously spelled as *enneatis* by Al-Daraji (1986) and now is corrected in accordance with a relevant electronic site (WoRMS, 2017). So far, only these four above-named fish species are known as hosts for *A. enneatus* from fishes of Iraq.

Asymphylogora species (unidentified) were reported from intestine of three fish species from Al-Hammar marsh: *C. luteus* by Al-Daraji (1986), *M. sharpeyi* by Al-Daraji (1986) and *S. triostegus* (also reported as *P. triostegus*) by Al-Daraji (1986) and Jori (2006). The first record of *Asymphylogora* species in Iraq was that of Al-Daraji (1986) and so far, four identified *Asymphylogora* species are known in fishes of Iraq in

addition to some unidentified species of this genus from these three fish species.

Clinostomum complanatum (Rudolphi, 1814) Braun, 1899 was reported as metacercaria from *C. luteus* from Al-Ashar fish market (Mhaisen, 1986), skin and muscles of *H. fossilis* from Al-Hammar marsh (Mohamad, 1989; Al-Salim & Mohamad, 1995), *L. vorax* (reported as *A. vorax*) from Basrah fish market (Mhaisen, 1986) and gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). As explained in Mhaisen et al. (2013a), the authority of *C. complanatum* in the above Iraqi literature was reported in different forms and according to personal communication with Dr. David I. Gibson; this authority should be Rudolphi, 1914 (inside parentheses). Metacercaria of *C. complanatum* was reported for the first time in Iraq from both *C. luteus* and *L. vorax* (reported as *A. vorax*) from Mehajieran creek, Basrah (Khamees, 1983). Adults of *C. complanatum* were detected from three aquatic birds from Al-Hammar marsh, viz. *Ardea cinerea* by Ali (2008) and Al-Salim & Ali (2010), *Ardeola ralloides* by Ali (2008), Al-Salim & Ali (2010) and Al-Tameemi (2013) as well as *Egretta garzetta* by Al-Tameemi (2013). Some species of *Clinostomum* are known to have a public health importance (Hoffman, 1999). Metacercariae of *C. complanatum*, the causative of the yellow grub disease, are widely distributed in freshwater fishes of Iraq as it has so far 23 fish host species.

Clinostomum phalacrocoracis Dubois, 1931 was reported as metacercaria from Al-Hammar marsh from skin and gill cavity of three fish species: *C. luteus* by Al-Daraji (1986), *L. vorax* (reported as *A. vorax*) by Al-Daraji (1986) and *P. abu* (reported as *L. abu*) by Al-Daraji (1986) as well as from skin, fins and muscles of *S. triostegus* (Abbas, 2007; Awad & Abbas, 2009). The first record of *C. phalacrocoracis* in Iraq was that of Al-Daraji (1986) and it has so far nine fish host species in Iraq. Two immature specimens of *C. phalacrocoracis* were found in the pygmy cormorant *Phalacrocorax pygmaeus* from Basrah (Al-Mayah, 1994).

Diplostomum spathaceum (Rudolphi, 1819) Olsson, 1876 was reported as metacercaria from eyes of *S. triostegus* from Al-Hammar marsh (Abbas, 2007; Awad & Abbas, 2009). Metacercariae of *D. spathaceum* were recorded for the first time in Iraq from *C. luteus* (reported as *B. luteus*), *Cyprinion macrostomum* and *C. carpio* from Dokan lake (Abdullah, 1990). Metacercariae of *D. spathaceum* are common in freshwater fishes of Iraq and are responsible for the worm cataract which causes fish blindness (Mhaisen, 2004). The adult worms of *D. spathaceum* were found in two gull species (*Larus canus* and *L. ichthyæetus*) from Shatt Al-

Arab river (Mhaisen et al., 1990) as well as from four aquatic birds (*Actitis hypoleucos*, *Himantopus himantopus*, *Larus genei* and *L. ichthyaetus*) from Al-Hammar marsh (Al-Tameemi, 2013). The infection of the black-headed gull *L. ridibundus* with adults of *D. spathaceum* from Basrah was also noticed (Al-Hadithi & Mustafa, 1991). As stated by Hoffman (1999), metacercariae of *D. spathaceum* were found in lens cataracts of a 5-month-old child and a 55-year-old fisherman in England. So far, 35 fish host species are known for these metacercariae in Iraq.

Hemiurus sigani Fischthal & Kuntz, 1964 was reported from intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). *H. sigani* is a marine species (WoRMS, 2017) while *S. triostegus* is a freshwater fish. No more hosts are so far known for *H. sigani* in Iraq.

Monodharmis torpedinis Dollfus, 1937 was reported as *Monodharmis philippinensis* Velasquez, 1961 from intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). *M. philippinensis* is unaccepted name and according to WoRMS (2017), the accepted name is *M. torpedinis*. No more hosts are so far known for *M. torpedinis* in Iraq.

Orientocreadium batrachoides Tubangui, 1931 was reported from intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). No more records for *O. batrachoides* are so far known in fishes of Iraq.

Orientocreadium pseudobagri Yamaguti, 1934 was reported from intestine of both *M. sharpeyi* by Al-Daraji (1986) and *S. triostegus* (reported as *P. triostegus*) by Al-Daraji (1986) and as *S. triostegus* by Jori (2006). The year of authority of this parasite was erroneously given as 1954 instead of 1934 by both Al-Daraji (1986) and Jori (2006). The first record of *O. pseudobagri* in Iraq was that of Al-Daraji (1986) and so far ten host species are known for this parasite in Iraq.

Proctoeces maculatus (Looss, 1901) Odhner, 1911 was reported from intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). So far, no more records for *P. maculatus* are known from fishes of Iraq.

Phylum Platyhelminthes- Class Monogenea

The class Monogenea of the phylum Platyhelminthes is represented in fishes of Basrah marshlands with one species each of the genera *Ancylo-discoides*, *Bychowskyella*, *Dactylogyrus*, *Gyrodactylus*, *Hamatopeduncularia*, *Microcotyle* and *Paradactylogyrus*, two species of the genus *Paradiplozoon* in addition to unidentified species of the genera *Cleidodiscus*, *Dactylogyrus*, *Diplozoon*, *Gyrodactylus*, *Haliotrema* and *Pseudodiscocotyla* as indicated below. MonoDB (2017) was followed to arrange taxonomy of these monogeneans.

Phylum Platyhelminthes

Class Monogenea

Subclass Monopisthocotylea

Order Dactylogyridea

Family Ancylo-discoididae

Ancylo-discoides parasiluri Yamaguti, 1937

Bychow-skyella gharui (Tripathi, 1959) Gusev, 1961

Cleidodiscus sp.

Hamatopeduncularia arii Yamaguti, 1953

Family Ancyrocephalidae

Haliotrema sp.

Paradactylogyrus bati Tripathi, 1959

Family Dactylogyridae

Dactylogyrus fotedari (Jain, 1960) Gusev, 1973

Dactylogyrus sp.

Order Gyrodactylidea

Family Gyrodactylidae

Gyrodactylus vimbi Shul'man, 1954

Gyrodactylus sp.

Subclass Polyopisthocotylea

Order Mazocraeidea

Family Diplozoidae

Diplozoon sp.

Paradiplozoon kasimii (Rahemo, 1980) Khotenovsky, 1985

Paradiplozoon pavlovskii (Bychow-sky & Nagibina, 1959)
Khotenovsky, 1985

Family Discocotylidae

Pseudodiscocotyla sp.

Family Microcotylidae

Microcotyle donavini van Beneden & Hesse, 1863

Ancylo-discoides parasiluri Yamaguti, 1937 was reported from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006; Abbas, 2007). No more hosts are so far known for this monogenean from Iraq.

Bychow-skyella gharui (Tripathi, 1959) Gusev, 1961 was recorded from gills of *S. triostegus* from Al-Hammar marsh by Jori (2006) who misspelled the specific name as *qharui*. So far, *S. triostegus* is the only known host for *B. gharui* in Iraq.

Cleidodiscus species was recorded from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). This is the only record of the genus *Cleidodiscus* from fishes of Iraq.

Dactylogyrus fotedari (Jain, 1960) Gusev, 1973 was erroneously reported as *Dactylogyrus calbasi* Jain, 1960 from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). *D. calbasi* was renamed as *D. fotedari* by Gibson et al. (1996). No more hosts are so far known for this monogenean from Iraq. As indicated by Lim et al. (2001), there are a number of monogeneans, from Indian catfish, which were incorrectly included in *Dactylogyrus* and *Urocleidus*. It is possible that they belong to *Thaparocleidus* or *Bychowskyella*, but the details of description given by Jori (2006) are not adequate to demonstrate this.

Dactylogyrus species were reported from Al-Hammar marsh by Al-Daraji (1986) and Al-Daraji & Al-Salim (1990) from gills of four fish species: *C. luteus* and its synonym *B. luteus*, *L. vorax* (reported as *A. vorax*), *Mesopotamichthys sharpeyi* and its synonym *B. sharpeyi* and *S. triostegus* (reported as *P. triostegus*). In addition to the 84 identified *Dactylogyrus* species from fishes of Iraq, some unidentified species of this genus were so far reported from nine fish host species in Iraq.

Diplozoon species, as diporpa larvae, were reported from gills of *L. vorax* (reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji, 1986). Such larvae were so far known from five fish species in Iraq.

Gyrodactylus vimbi Shul'man, 1954 was recorded from skin and gills of *S. triostegus* from Al-Hammar marsh by Jori (2006) who has erroneously stated the year of authority of this parasite as 1953 instead of 1954. No more hosts are so far known for *G. vimbi* from Iraq.

Gyrodactylus species (unidentified) were reported from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). In addition to the 51 identified *Gyrodactylus* species from fishes of Iraq, some unidentified species of this genus were so far reported from 15 fish host species in Iraq.

Haliotrema species was recorded from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). No more hosts are so far known for *Haliotrema* sp. from Iraq.

Hamatopeduncularia arii Yamaguti, 1953 was recorded from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). This is the only record of *H. arii* from fishes of Iraq.

Microcotyle donavini van Beneden & Hesse, 1863 was recorded from gills of *L. vorax* (reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji & Al-Salim, 1990). The unidentified *Microcotyle* species reported from gills of *A. vorax* by Al-Daraji (1986) was later identified as *M. donavini* (Al-Daraji & Al-Salim, 1990). This parasite was recorded for the first time in Iraq from *P. abu* (reported as *L. abu*) from a fish farm at Babylon

province (Ali et al., 1989). Ten host species are so far known for *M. donavini* in Iraq.

Paradactylogyrus bati Tripathi, 1959 was recorded from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). No more hosts are so far known for *P. bati* from Iraq.

Paradiplozoon kasimii (Rahemo, 1980) Khotenovsky, 1985 was reported as *Diplozoon kasimii* Rahemo, 1980 from gills of *C. luteus* and its synonym *B. luteus* from Al-Hammar marsh (Al-Daraji, 1986; Al-Daraji & Al-Salim, 1990). *D. kasimii* was recorded for the first time in Iraq from *C. macrostomum* from Tigris river at Mosul (Fattohy, 1975) but its publication was done later (Rahemo, 1980). *P. kasimii* has so far 13 fish host species in Iraq.

Paradiplozoon pavlovskii (Bychowsky & Nagibina, 1959) Khotenovsky, 1985 was reported from gills of both *C. luteus* (and its synonym *B. luteus*) and *L. vorax* (reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji, 1986; Al-Daraji & Al-Salim, 1990). *P. pavlovskii* was reported for the first time in Iraq as *Diplozoon pavlovskii* from *L. vorax* (reported as *A. vorax*) from Mehajieran creek, Basrah (Khamees, 1983). Khotenovsky (1985) transferred this parasite from the genus *Diplozoon* to the genus *Paradiplozoon*. *P. pavlovskii* has so far 12 fish host species in Iraq.

Pseudodiscocotyla species was recorded only from gills of *S. triostegus* from Al-Hammar marsh (Abbas, 2007). No more hosts are so far known for *Pseudodiscocotyla* sp. from Iraq.

Phylum Platyhelminthes- Class Cestoda

The class Cestoda of the phylum Platyhelminthes is represented in fishes of Basrah marshlands with one species each of the genera *Postgangesia* and *Schyzocotyle*, two species each of the genera *Khawia* and *Triaenophorus* in addition to unidentified species of the genera *Schyzocotyle*, *Senga* and *Tetracampos* as indicated below. The classification of these cestodes is based on different revisions (Kuchta & Scholz, 2007; Kuchta et al., 2008, 2012) and Global Cestode Database (2017) was used for checking their authorities. To economise space, personal communications with some cestode specialists (Prof. Dr. Tomáš Scholz and Dr. Roman Kuchta) to check the validity of some species were demonstrated in Mhaisen et al. (2013b).

Phylum Platyhelminthes

Class Cestoda

Order Caryophyllidea

Family Lytocestida

Khawia armeniaca (Cholodkovsky, 1915) Kulakovskaya, 1961

Khawia sinensis Hsü, 1935

Order Bothriocephalidea

Family Bothriocephalidae

Schyzocotyle acheilognathi (Yamaguti, 1934) Brabec, Waeschenbach, Scholz, Littlewood & Kuchta, 2015

Schyzocotyle spp.

Senga sp.

Tetracampos sp.

Family Triaenophoridae

Triaenophorus crassus Forel, 1868

Triaenophorus nodulosus (Pallas, 1781) Rudolphi, 1819

Order Proteocephalidea

Family Proteocephalidae

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

Khawia armeniaca (Cholodkovsky, 1915) Kulakovskaya, 1961 was reported from Al-Hammar marsh from the intestine of three fish species: *Luciobarbus xanthopterus* (reported as *Barbus xanthopterus*) by Al-Daraji (1990), *M. sharpeyi* by Al-Daraji (1986) and *S. triostegus* (also reported as *P. triostegus*) by Al-Daraji (1986) and Al-Daraji (1990). The first record of *K. armeniaca* from Iraq was that of Al-Daraji (1986). *K. armeniaca* and its synonyms in Iraq (see Mhaisen et al., 2013b) have so far eight host species.

Khawia sinensis Hsü 1935 was reported from the intestine of *C. carpio* from Al-Hammar marsh (Bannai et al., 2005). The generic name was misspelled as *Khawwia*. The first record of this worm from Iraq was from *Arabibarbus grypus* (reported as *Barbus grypus*) from Darbandikhan lake (Abdullah, 2005). So far, *K. sinensis* has three host species in Iraq.

Postgangesia inarmata de Chambrier, Al-Kallak & Mariaux, 2003 was reported as *Gangesia parasiluri* Yamaguti, 1934 from the intestine of *S. triostegus* from Al-Hammar marsh (Al-Daraji, 1990). As explained by Mhaisen et al. (2013b), specimens of *G. parasiluri* are probably misidentified and they belong to *P. inarmata*. *P. inarmata* was described as a new species from *S. glanis* from Tigris river at Mosul city (de Chambrier et al., 2003). *P. inarmata* has so far three host species in Iraq.

Schyzocotyle acheilognathi (Yamaguti, 1934) Brabec, Waeschenbach, Scholz, Littlewood & Kuchta, 2015 was reported by its synonym *Bothriocephalus acheilognathi* from intestine of both *C. carpio* from Al-Hammar marsh (Dawood, 1986) and *S. triostegus* from Al-Hammar marsh (Abbas, 2007; Awad & Abbas, 2009). *B. acheilognathi* was reported for the first time in Iraq from *C. carpio* from unspecified fish farms (Khalifa, 1982). Also, *S. acheilognathi* was reported by another

synonym, *B. gowkongensis*, from the intestine of *C. luteus* from Basrah fish market (Mhaisen, 1986). Based on recent molecular study, Brabec et al. (2015) considered *B. acheilognathi* and *B. gowkongensis* as synonyms of *S. acheilognathi*. At the present time, *S. acheilognathi* and its synonyms (*B. acheilognathi*, *B. gowkongensis* and *B. opsariichthydis*) have so far a total of 21 host species in Iraq.

Schyzocotyle species was reported as *Bothriocephalus* sp. from intestine of both *C. luteus* and *S. triostegus* (reported as *P. triostegus*) from Al-Hammar marsh (Al-Daraji, 1986). According to Brabec et al. (2015), the genus *Bothriocephalus* is transferred to *Schyzocotyle* which is characterised by possession of a heart-shaped scolex. Prof. Tomáš Scholz ascertained in a personal communication with one of us (AHA) on 29 April 2017 that *Bothriocephalus* sp. of Al-Daraji (1986) should be considered as *Schyzocotyle* sp. Dr. Roman Kuchta on 30 April 2017 also confirmed this. Five fish host species in Iraq were so far known for unidentified *Schyzocotyle* sp., all of which were reported as *Bothriocephalus* sp.

Senga species was reported as *Polyonchobothrium* sp. depending on a single immature specimen, from the intestine of *L. vorax* (reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji, 1990). However, as demonstrated by Mhaisen et al. (2013b), Dr. Roman Kuchta believes that this immature specimen belongs to *Senga* sp. In Iraq, three identified species of *Senga* and unidentified *Senga* species were so far reported from one fish host species.

Tetracampos species was reported as *Polyonchobothrium clarias* (Woodland, 1925) Meggitt, 1930 from the intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). The generic name *Polyonchobothrium* was misspelled as *Polyoncobothrium* by Jori (2006). According to Kuchta & Scholz (2007) and Kuchta et al. (2008, 2012), *P. clarias* is considered as a new synonym of *Tetracampos ciliotheca* Wedl, 1861. However, as explained by Mhaisen et al. (2013b), Dr. Roman Kuchta believes that the drawings and description of this specimen, forwarded to him, might represent *Tetracampos* sp. So far, two host species are known for *Tetracampos* sp. from fishes of Iraq.

Triaenophorus crassus Forel, 1868 was reported as plerocercoids from muscles of *P. triostegus* (a synonym of *S. triostegus* according to Coad, 2010) from Al-Hammar marsh (Al-Daraji et al., 2014). No more records are so far known on *T. crassus* from fishes of Iraq.

Triaenophorus nodulosus (Pallas, 1781) Rudolphi, 1819 was reported as plerocercoids from intestine of *P. triostegus* from Al-Hammar marsh

(Al-Daraji et al., 2014). As explained above in case of the previous *T. crassus*, the host species must be *S. triostegus*. It is appropriate to mention here that Al-Daraji et al. (2014) had erroneously reported the year of authority of this cestode as 1790 instead of 1781. So far, no more records are known on *T. nodulosus* from fishes of Iraq.

Phylum Nematoda

The phylum Nematoda is represented in fishes of Basrah marshlands with one species each of the genus *Philometroides* in addition to unidentified species of the genera *Camallanus*, *Capillaria*, *Contracaecum*, *Echinocephalus* and *Rhabdochona* as indicated below. Names and authorities of these nematodes were checked in accordance with Anderson et al. (2009) and Gibbons (2010).

Phylum Nematoda

Class Adenophorea

Order Enoplida

Superfamily Trichinelloidea

Family Capillaridae

Capillaria sp.

Class Secernentea

Order Ascaridida

Superfamily Ascaridoidea

Family Anisakidae

Contracaecum sp. 1 larva

Order Spirurida

Superfamily Camallanoidea

Family Camallanidae

Camallanus sp. 1

Camallanus sp. 2

Superfamily Dracunculoidea

Family Philometridae

Philometroides cyprini (Ishii, 1931) Nakajima, 1970

Superfamily Gnathostomatoidea

Family Gnathostomatidae

Echinocephalus sp. larva

Superfamily Thelazioidea

Family Rhabdochonidae

Rhabdochona sp.

Camallanus ancyloides Ward & Magath, 1916 was recorded from the intestine of *C. carpio* in Al-Mdaina marshes (Jori, 2005). According to Ali

et al. (2014), personal communication with Dr. František Moravec concerning *C. ancyloDIRUS* reported by Jori (2005) revealed that this species is not *C. ancyloDIRUS*. So, it is designated as *Camallanus* sp. 1 in the present checklist. No more records are so far known on *C. ancyloDIRUS* from fishes of Iraq.

Camallanus kirandensis Baylis, 1928 was reported from the intestine of *S. triostegus* in Al-Hammar marsh (Jori, 2006). Again, according to Ali et al. (2014), personal communication with Dr. František Moravec concerning *C. kirandensis* reported by Jori (2006) revealed that it is not *C. kirandensis*. So, it is designated as *Camallanus* sp. 2 in the present checklist. So far, no more records are known on *C. kirandensis* from fishes of Iraq.

Capillaria species was reported from the intestine of *M. sharpeyi* from Al-Hammar marsh (Al-Daraji, 1986). So far, ten host species are known for *Capillaria* sp. in fishes of Iraq.

Contracaecum species 1 larvae were recorded from body cavity, mesenteries and different internal organs of *C. luteus* from Al-Hammar marsh (Al-Daraji, 1986) and from Basrah fish market (Mhaisen, 1986), *C. carpio* from Al-Hammar marsh (Dawood, 1986), *H. fossilis* from Al-Hammar marsh (Mohamad, 1989; Al-Salim & Mohamad, 1995), *L. vorax* (which was also reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji, 1986) and from Basrah fish market (Mhaisen, 1986), *M. sharpeyi* from Al-Hammar marsh (Al-Daraji, 1986) and from Al-Ashar fish market (Mhaisen, 1986), *P. abu* (reported as *L. abu*) from Al-Ashar fish market (Mhaisen, 1986), *Poecillia latipinna* from the stomach of the aquatic bird *Ceryle rudis* from Al-Hammar marsh (Al-Tameemi, 2013; Awad & Al-Tameemi, 2013) and *S. triostegus* (also reported as *P. triostegus*) by Al-Daraji (1986), Jori (2006) and Abbas (2007). Based on the differences in lengths of caecum to appendage, caecum to esophagus and appendage to esophagus, Ali et al. (2014) demonstrated that two types of *Contracaecum* species are found in fishes of Basrah. These are *Contracaecum* sp. 1 which is found in all fishes of Basrah infected with *Contracaecum* sp. larvae, except *H. fossilis* by Ali (2001) and *Contracaecum* sp. 2 in *H. fossilis* only (Ali, 2001). *Contracaecum* sp. 1 has a long caecum while *Contracaecum* sp. 2 has very small caecum. *Contracaecum* spp. larvae were recorded for the first time in Iraq from ten fish species from different inland waters of Iraq, excluding Basrah (Herzog, 1969). These were: *A. grypus* (reported as *B. grypus*), *C. luteus* (reported as *B. luteus*), *H. fossilis*, *L. vorax* (reported as *A. vorax*), *L. esocinus* (reported as *B. esocinus*), *L. xanthopterus* (reported as *B. xanthopterus*), *M. sharpeyi* (reported as *B. sharpeyi*), *M. pelusius*, *P. abu*.

(as *Mugil abu*) and *S. triostegus*. Adult *Contracaecum* species were reported from ten aquatic birds (*Ardea cinerea*, *A. purpurea*, *Ardeola ralloides*, *Bubulcus ibis*, *Egretta garzetta*, *H. himantopus*, *L. genei*, *Nycticorax nycticorax*, *Phalacrocorax carbo* and *P. pygmeus*) from Al-Hammar marsh (Al-Tameemi, 2013) as well as from five aquatic birds (*A. purpurea*, *Egretta alba*, *E. garzetta*, *Phalacrocorax* sp. and *Platalea leucordia*) from Shatt Al-Arab river (Al-Hadithi & Habish, 1977). So far, a total of 40 fish host species are known for *Contracaecum* spp. larvae in Iraq.

Echinocephalus species larvae were reported from intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). The first occurrence of larvae of *Echinocephalus* species from Iraq was reported from two marine fish species from Khor Abdullah, Arab Gulf (Bannai, 2002). So far, five host species are known for *Echinocephalus* sp. from fishes of Iraq in addition to one fish host for one specified species of this genus.

Philometroides cyprini (Ishii, 1931) Nakajima, 1970 was misidentified as *Philometroides carassii* (Ishii, 1931) Nakajima & Egusa, 1977 from the body cavity of *C. carpio* from Al-Mdaina marshes (Jori, 2005). As demonstrated by Ali et al. (2014), personal communication with Dr. František Moravec indicated that the description provided by Jori (2005) is apparently a misidentification of the nematode with *P. cyprini*. No more hosts are so far known for *P. cyprini* in Iraq.

Rhabdochona garuai Agrawal, 1965 was recorded from the intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). Dr. František Moravec examined the illustration and description of *R. garuai* of Jori (2006) and believed that it was a misidentification of *R. garuai*. So, Ali et al. (2014) considered *R. garuai*, reported by Jori (2006) as *Rhabdochona* sp. Seven host species are so far known for *Rhabdochona* sp. in Iraq.

Phylum Acanthocephala

The phylum Acanthocephala in fishes of Basrah marshlands as well as some fishes collected from both Al-Ashar and Basrah fish markets which were originally fished from Basrah marshlands, is represented with one species of the genus *Neoechinorhynchus* in addition to unidentified species of the genus *Echinorhynchus* as indicated below. Names and authorities of these 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

Class Palaeacanthocephala
Order Echinorhynchida
Family Echinorhynchidae
Echinorhynchus sp.

Echinorhynchus species was reported from intestine of *S. triostegus* from Al-Hammar marsh (Abbas, 2007). The first occurrence of *Echinorhynchus* species from Iraq was reported from one marine fish species from Khor Al-Zubair, Arab Gulf (Al-Daraji, 1995). Two host species are so far known for *Echinorhynchus* sp. from fishes of Iraq.

Neoechinorhynchus iraqensis Amin, Al-Sady, Mhaisen & Bassat, 2001 (erroneously reported as *N. agilis*) was reported from intestine of *P. abu* (reported as *L. abu*) from Al-Hammar marsh (Al-Daraji, 1986) and from both Al-Ashar and Basrah fish markets (Mhaisen, 1986). *N. iraqensis* was also reported from intestine of *S. triostegus* from Al-Hammar marsh (Jori, 2006). *N. iraqensis* was described for the first time in Iraq as *species de novo* from *P. abu* (reported as *L. abu*) from the Euphrates river at Al-Faluja town (Amin et al., 2001). Prior to this description, specimens of this parasite were erroneously identified as *Neoechinorhynchus agilis* (Rud., 1819), firstly by Habash & Daoud (1979) and later on by 28 reports from different parts of Iraq (Mhaisen, 2002). *N. iraqensis* (and the erroneously reported *N. agilis* from fishes of Iraq) have so far 24 fish host species in Iraq.

Phylum Mollusca- Class Bivalvia

The phylum Mollusca is represented in fishes of Basrah marshlands with the glochidial larval stage of no identity as indicated below.

Phylum Mollusca

Class Bivalvia

Order Unionida

Family Unionidae

Unidentified glochidium larva

Glochidial larval forms were detected from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006; Abbas, 2007). The first report of glochidial larvae from 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.,

1987). Glochidial larvae were so far recorded from 31 fish host species in Iraq.

Phylum Arthropoda- Subphylum Crustacea

The subphylum Crustacea of the phylum Arthropoda is represented in fishes of Basrah marshlands with one species each of the genera *Argulus*, *Dermoergasilus*, *Lamproglena*, *Lernaea*, *Lernanthropus* and *Paraergasilus*, four species of *Ergasilus* in addition to unidentified species of the genera *Abasia*, *Argulus* and *Ergasilus* as well as one unidentified genus of the family Bomolochidae as indicated below. Khamees et al. (2015) enlisted the crustacean fauna of both freshwater and marine fishes of Basrah province, Iraq based on Ahyong et al. (2011), but as Prof. Geoffry Boxshall indicated in his correspondence with one of us (AHA) on 26th May 2017, the overall classification of the Crustacea has been changing quite fast as a result of molecular sequence data. However, Boxshall still feels that the order Poecilostomatoida is just a synonym of Cyclopoida due to the established changes in WoRMS (2017) which came from a single gene tree (the gene 18S) and he considered it as a not strong evidence. The present classification in WoRMS (2017) for the Crustacea reflects changes proposed in two studies (Regier et al., 2010; Oakley et al., 2012). So, in the present article, WoRMS (2017) is followed to arrange the concerned taxonomic groups of the Crustacea as indicated below.

Phylum Arthropoda

Subphylum Crustacea

Class Ichthyostraca

Subclass Branchiura

Order Arguloida

Family Argulidae

Argulus foliaceus (L., 1758) Jurine, 1806

Argulus sp.

Class Hexanauplia

Subclass Copepoda

Order Poecilostomatoida

Family Bomolochidae

Bomolochidae gen. sp.

Family Ergasilidae

Dermoergasilus varicoleus Ho, Jayarajan & Radhakrishnan, 1992

Ergasilus mosulensis Rahemo, 1982

Ergasilus ogawai Kabata, 1992

Ergasilus pararostralis Amado, in Amado, da Rocha, Piasecki, Al-Daraji & Mhaisen, 2001

Ergasilus rostralis Ho, Jayarajan & Radhakrishnan, 1992

Ergasilus spp.

Paraergasilus inflatus Ho, Khamees & Mhaisen, 1996

Order Cyclopida

Family Lernaeidae

Lamproglena pulchella von Nordmann, 1832

Lernaea cyprinacea L., 1758

Order Siphonostomatoida

Family Caligidae

Abasia sp.

Family Lernanthropidae

Lernanthropus polynemi Richiardi, 1881

Abasia species was erroneously reported as *Alicaligus* sp. from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). Based on personal communication with Prof. Dr. Geoffry Boxshall, Khamees et al. (2015) considered *Alicaligus* sp. reported by Jori (2006) as *Abasia* sp. No more hosts are so far known for *Abasia* sp. in Iraq.

Argulus foliaceus (L., 1758) Jurine, 1806 was reported from skin of *P. abu* (reported as *Liza abu*) from Al-Ashar fish market (Mhaisen, 1986). *A. foliaceus* 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.

Argulus species was reported from the skin of *C. luteus* from Al-Hammar marsh (Al-Daraji, 1986). This was the first record of unidentified *Argulus* species from fishes of Iraq. So far, three host species are known for *Argulus* sp. in addition to three identified *Argulus* species in Iraq.

Bomolochus species was reported from gills of *S. triostegus* from Al-Hammar marsh by Jori (2006). From re-examination of the description and illustrations of *Bomolochus* sp. of Jori (2006) and in accordance with Prof. Dr. Geoffry Boxshall (personal communication), it appeared that such specimens do not belong to *Bomolochus*, and hence Khamees et al. (2015) referred to such specimens as Bomolochidae gen. sp. The family Bomolochidae has so far 10 species infecting fishes of Iraq.

Dermoergasilus varicoleus Ho, Jayarajan & Radhakrishnan, 1992 was reported from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). The first record of *D. varicoleus* in Iraq was from *P. abu* (reported as *L.*

abu) from Shatt Al-Arab river (Khamees & Mhaisen, 1995). Nine host species are so far known for *D. varicoleus* in Iraq.

Ergasilus mosulensis Rahemo, 1982 was reported from gills of five fish species: *C. luteus* from Al-Hammar marsh (Al-Daraji, 1986) and from Basrah fish market (Mhaisen, 1986), *L. vorax* (reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji, 1986), *M. sharpeyi* from Al-Hammar marsh (Al-Daraji, 1986), *P. abu* (reported as *L. abu*) from Al-Hammar marsh (Al-Daraji, 1986) and from Al-Ashar fish market (Mhaisen, 1986) and from *S. triostegus* (also reported as *P. triostegus*) from Al-Hammar marsh (Al-Daraji, 1986; Jori, 2006; Abbas, 2007). *E. mosulensis* 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 ogawai Kabata, 1992 was identified as *Ergasilus* sp. 2 from gills of *H. fossilis* by Mohamad (1989) from Al-Hammar marsh. According to Adday & Khamees (2010), *Ergasilus* sp. 2 of Mohamad (1989) is considered as *E. ogawai*. The first record of *E. ogawai* in Iraq was from four fish species from Garmat Ali river, Basrah (Adday, 2001). These were: *Acanthopagrus latus* (a misidentification of *A. arabicus*), *M. mastacembelus*, *M. pelusius* and *S. triostegus*. So far, 17 host species are known for *E. ogawai* in Iraq.

Ergasilus pararostralis Amado, in Amado, da Rocha, Piasecki, Al-Daraji & Mhaisen, 2001 was reported from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). The first report on *E. pararostralis* in Iraq was from *P. subviridis* (reported as *L. subviridis*) from Khor Al-Zubair esyuary, Arab Gulf (Amado et al., 2001). Only two host species are so far known for *E. pararostralis* in Iraq.

Ergasilus rostralis Ho, Jayarajan & Radhakrishnan, 1992 was reported from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). The first record of *E. rostralis* in Iraq was from *P. abu* (reported as *L. abu*) from Shatt Al-Arab river (Khamees & Mhaisen, 1995). *E. rostralis* has so far 20 fish hosts in Iraq.

Ergasilus species were reported from gills of *C. luteus* from Al-Hammar marsh (Al-Daraji, 1986), gills of *H. fossilis* from Al-Hammar marsh (Mohamad, 1989), gills of *L. vorax* (reported as *A. vorax*) from Al-Hammar marsh (Al-Daraji, 1986), gills and dorsal fin of *P. abu* (reported as *L. abu*) from Al-Hammar marsh (Al-Daraji, 1986) and gills of *S. triostegus* (reported as *P. triostegus*) from Al-Hammar marsh (Al-Daraji, 1986). As demonstrated by Adday & Khamees (2010), *Ergasilus* sp. 2 reported by Mohamad (1989) from *H. fossilis* actually represents *E. ogawai*, while *Ergasilus* sp. 1 reported by Mohamad (1989) from *H.*

fossilis represents an unidentified *Ergasilus* sp. The first report on unidentified *Ergasilus* sp. in Iraq was that from *P. abu* (reported as *L. abu*) from Al-Latifiya fish farm (Ali & Shaaban, 1984). The genus *Ergasilus* is represented in fishes of Iraq with 11 valid species in addition to some unidentified species from 14 host species.

Lamproglena pulchella von Nordmann, 1832 was reported by Al-Daraji (1986) from gills of both *L. vorax* (as *A. vorax*) from Al-Hammar marsh and *M. sharpeyi* from Al-Hammar marsh. The first record of *L. pulchella* in Iraq was from *Chondrostoma regium* (misspelled as *C. regius*) and *Capoeta trutta* (reported as *Varicorhinus trutta*) from Tigris river at Mosul (Rahemo, 1977). This species has so far 20 fish host species in Iraq.

Lernaea cyprinacea L., 1758 was reported, in an abstract (Jarallah et al., 2005) from skin and gills of *G. holbrooki* (which was misidentified as *G. affinis*) from Al-Hammar marsh. The generic name was misspelled as *Lernea*. This crustacean was reported for the first time in Iraq from seven fish species from Al-Zaafaraniya fish culture station, Baghdad (Al-Hamed & Hermiz, 1973). These were *A. grypus* (reported as *B. grypus*), *C. luteus* (reported as *B. luteus*), *C. auratus*, *C. idella*, *C. carpio*, *H. molitrix* and *L. xanthopterus* (reported as *B. xanthopterus*). It is the commonest crustacean parasite among fishes of Iraq as it has so far 31 host species in fish farms, hatcheries and various inland waters of Iraq.

Lernanthropus polynemi Richiardi, 1881 was misidentified as *Lernanthropus trifoliatus* Bassett-Smith, 1898 from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). The first report on this crustacean in Iraq was from *Otolithus ruber* from Khor Abdullah, Arab Gulf by Bannai (2002) who misspelled the fish generic name *Otolithes* as *Otolithus* and reported the parasite as *L. trifoliatus* with the specific name erroneously misspelled as *trithfoliatus* instead of *trifoliatus*. So far, *L. polynemi* has two fish host species in Iraq.

Paraergasilus inflatus Ho, Khamees & Mhaisen, 1996 was reported from gills of *S. triostegus* from Al-Hammar marsh (Jori, 2006). *P. inflatus* was described as a new species from *P. abu* (reported as *L. abu*) from Shatt Al-Arab river (Ho et al., 1996). It has so far seven fish host species in Iraq.

Host-Parasite List

The valid names of all fish host species (Table 1) included 11 names as well as eight synonymous and misidentified names. The infected fishes with different parasite species in Basrah marshlands are alphabetically arranged here. For each host, the parasite species are also alphabetically arranged within their major groups. The present host list included the

valid as well as the synonymous fish names. The valid scientific names of these fishes and their authorities (Table 1) were corrected mainly according to Eschmeyer (2017) and Froese & Pauly (2017), but Durand (2016) was followed for the recent valid names of members of fish family Mugilidae.

Aspius vorax*: See *Leuciscus vorax

Barbus luteus*: See *Carasobarbus luteus

Barbus sharpeyi*: See *Mesopotamichthys sharpeyi

Barbus xanthopterus*: See *Luciobarbus xanthopterus

***Carasobarbus luteus* (reported also as *Barbus luteus*)**

Euglenozoa: *Trypanosoma carasobarbi*.

Ciliophora: *Ichthyophthirius multifiliis*.

Myxozoa: *Myxobolus pfeifferi*.

Trematoda: *Aspidogaster enneatus*, *Asymphylodora* sp., *Clinostomum complanatum*, *C. phalacrocoracis*.

Monogenea: *Dactylogyrus* sp., *Paradiplozoon kasimi* (reported as *Diplozoon kasimii*), *P. pavlovskii*.

Cestoda: *Schyzocotyle* sp. (reported as *Bothriocephalus* sp.).

Nematoda: *Contraecaecum* sp. 1.

Crustacea: *Argulus* sp., *Ergasilus mosulensis*, *Ergasilus* sp.

Cyprinus carpio

Myxozoa: *Myxobolus intrachondrealis*, *Thelohanellus* sp.

Cestoda: *Khawia sinensis*, *Schyzocotyle acheilognathi* (reported as *Bothriocephalus acheilognathi*).

Nematoda: *Camallanus* sp. 1 (reported as *Camallanus ancyloDIRUS*), *Contraecaecum* sp. 1, *Philometroides cyprini* (misidentified as *P. carassii*).

Gambusia affinis*: See *Gambusia holbrooki

***Gambusia holbrooki* (misidentified as *G. affinis*)**

Crustacea: *Lernaea cyprinacea*.

Heteropneustes fossilis

Ciliophora: *Trichodina domerguei*.

Trematoda: *Ascocotyle coleostoma*, *Clinostomum complanatum*.

Nematoda: *Contraecaecum* sp. 1.

Crustacea: *Ergasilus ogawai* (reported as *Ergasilus* sp.), *Ergasilus* sp.

***Leuciscus vorax* (reported as *Aspius vorax*)**

Euglenozoa: *Trypanosoma basrensis*, *Trypanosoma* sp. (assigned later as *T. basrensis*).

Ciliophora: *Ichthyophthirius multifiliis*.

Myxozoa: *Myxobolus pfeifferi*.

Trematoda: *Aspidogaster enneatus*, *Clinostomum complanatum*, *C. phalacrocoracis*.

Monogenea: *Dactylogyrus* sp., *Diplozoon* sp., *Microcotyle donavini* (also reported as *Microcotyle* sp.), *Paradiplozoon pavlovskii*.

Cestoda: *Senga* sp. (reported as *Polyonchobothrium* sp.).

Nematoda: *Contraecum* sp. 1.

Crustacea: *Ergasilus mosulensis*, *Ergasilus* sp., *Lamproglena pulchella*.

Liza abu*: See *Planiliza abu

Liza subviridis*: See *Planiliza subviridis

***Luciobarbus xanthopterus* (reported as *Barbus xanthopterus*)**

Cestoda: *Khawia armeniaca*.

***Mesopotamichthys sharpeyi* (reported also as *Barbus sharpeyi*)**

Myxozoa: *Myxobolus pfeifferi*.

Trematoda: *Aspidogaster enneatus*, *Asymphyrodora* sp., *Orientocreadium pseudobagri*.

Monogenea: *Dactylogyrus* sp.

Cestoda: *Khawia armeniaca*.

Nematoda: *Capillaria* sp., *Contraecum* sp. 1.

Crustacea: *Ergasilus mosulensis*, *Lamproglena pulchella*.

Parasilurus triostegus*: See *Silurus triostegus

***Planiliza abu* (reported as *Liza abu*)**

Myxozoa: *Myxobolus pfeifferi*.

Trematoda: *Clinostomum phalacrocoracis*.

Nematoda: *Contraecum* sp. 1.

Acanthocephala: *Neoechinorhynchus iraqensis* (reported as *N. agilis*).

Crustacea: *Argulus foliaceus*, *Ergasilus mosulensis*, *Ergasilus* sp.

***Planiliza subviridis* (reported as *L. subviridis*)**

Myxozoa: *Myxobolus diversus*.

Poecilia latipinna

Nematoda: *Contraecum* sp. 1.

***Silurus triostegus* (reported also as *Parasilurus triostegus*)**

Euglenozoa: *Trypanosoma arabica*, *Trypanosoma* sp. (assigned later as *T. arabica*).

Ciliophora: *Chilodonella hexasticha*, *Ichthyophthirius multifiliis*, *Trichodina domerguei*, *T. nigra*, *T. prowazeki*, *T. reticulata*, *Trichodina* sp.

Myxozoa: *Henneguya tachysuri*, *Myxobolus cyprinicola*, *M. mesopotamiae*, *M. pfeifferi*, *Myxobolus* sp.

Trematoda: *Ascocotyle coleostoma*, *Aspidogaster enneatus*, *Asymphylodora* sp., *Clinostomum complanatum*, *C. phalacrocoracis*, *Diplostomum spathaceum*, *Hemiurus sigani*, *Monodharmis torpedinis* (reported as *M. philippinensis*), *Orientocreadium batrachoides*, *O. pseudobagri*, *Proctoeces maculatus*.

Monogenea: *Ancylodiscoides parasiluri*, *Bychowskyella gharui*, *Cleidodiscus* sp., *Dactylogyrus fotedari* (reported as *D. calbasi*), *Dactylogyrus* sp., *Gyrodactylus vimbi*, *Gyrodactylus* sp., *Haliotrema* sp., *Hamatopeduncularia arii*, *Paradactylogyrus bati*, *Pseudodiscocotyla* sp.

Cestoda: *Khawia armeniaca*, *Postgangesia inarmata* (reported as *Gangesia parasiluri*), *Schyzocotyle acheilognathi* (reported as *Bothriocephalus acheilognathi*), *Schyzocotyle* sp. (reported as *Bothriocephalus* sp.), *Tetracampos* sp. (reported as *Polyonchobothrium clarias*), *Triaenophorus crassus*, *T. nodulosus*.

Nematoda: *Camallanus* sp. 2 (reported as *Camallanus kirandensis*), *Contraecaecum* sp. 1, *Echinocephalus* sp., *Rhabdochona* sp. (misidentified as *R. garuai*).

Acanthocephala: *Echinorhynchus* sp., *Neoechinorhynchus iraqensis*.

Mollusca: *Glochidium* larva.

Crustacea: *Abasia* sp. (reported as *Alicaligus* sp.), Bomolochidae gen. sp. (reported as *Bomolochus* sp.), *Dermaergasilus varicoleus*, *Ergasilus mosulensis*, *E. pararostralis*, *E. rostralis*, *Ergasilus* sp., *Lernanthropus polynemi* (misidentified as *Lernanthropus trifoliatus*), *Paraergasilus inflatus*.

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Table 1: List of fishes of Basrah marshlands which showed parasitic infections.

Class Actinopterygii
Order Cypriniformes
Family Cyprinidae
<i>Carasobarbus luteus</i> (Heckel, 1843)
<i>Cyprinus carpio</i> Linnaeus, 1758
<i>Leuciscus vorax</i> (Heckel, 1843)
<i>Luciobarbus xanthopterus</i> Heckel, 1843
<i>Mesopotamichthys sharpeyi</i> (Günther, 1874)
Order Siluriformes
Family Siluridae
<i>Silurus triostegus</i> Heckel, 1843
Family Heteropneustidae
<i>Heteropneustes fossilis</i> (Bloch, 1794)
Order Cyprinodontiformes
Family Poeciliidae
<i>Gambusia holbrooki</i> Girard, 1859
<i>Poecilia latipinna</i> (Lesueur, 1821)
Order Mugiliformes
Family Mugilidae
<i>Planiliza abu</i> (Heckel, 1843)
<i>Planiliza subviridis</i> (Valenciennes, 1836)

Table 2: List of parasite species and their fish host species in Basrah marshlands.

Parasite major groups	Fish host species
Phylum Euglenozoa- Class Kinetoplastea	
<i>Trypanosoma arabica</i>	<i>Silurus triostegus</i>
<i>Trypanosoma basrensis</i>	<i>Leuciscus vorax</i>
<i>Trypanosoma carasobarbi</i>	<i>Carasobarbus luteus</i>
<i>Trypanosoma</i> spp.	<i>Leuciscus vorax, Silurus triostegus</i>
Phylum Ciliophora- classes Phyllopharyngea and Oligohymenophorea	
<i>Chilodonella hexasticha</i>	<i>Silurus triostegus</i>
<i>Ichthyophthirius multifiliis</i>	<i>Carasobarbus luteus, Leuciscus vorax, Silurus triostegus</i>
<i>Trichodina domerguei</i>	<i>Heteropneustes fossilis, Silurus triostegus</i>
<i>Trichodina nigra</i>	<i>Silurus triostegus</i>
<i>Trichodina prowazeki</i>	<i>Silurus triostegus</i>
<i>Trichodina reticulata</i>	<i>Silurus triostegus</i>
<i>Trichodina</i> sp.	<i>Silurus triostegus</i>
Phylum Cnidaria- Class Myxozoa	
<i>Henneguya tachysuri</i>	<i>Silurus triostegus</i>
<i>Myxobolus cyprinicola</i>	<i>Silurus triostegus</i>
<i>Myxobolus diversus</i>	<i>Planiliza subviridis</i>
<i>Myxobolus intrachondrealis</i>	<i>Cyprinus carpio</i>
<i>Myxobolus mesopotamiae</i>	<i>Silurus triostegus</i>
<i>Myxobolus pfeifferi</i>	<i>Carasobarbus luteus, Leuciscus vorax, Mesopotamichthys sharpeyi, Planiliza abu, Silurus triostegus</i>
<i>Myxobolus</i> sp.	<i>Silurus triostegus</i>
<i>Thelohanellus</i> sp.	<i>Cyprinus carpio</i>
Phylum Platyhelminthes- Class Trematoda	
<i>Ascocotyle coleostoma</i> *	<i>Heteropneustes fossilis, Silurus triostegus</i>
<i>Aspidogaster enneatus</i>	<i>Carasobarbus luteus, Leuciscus vorax, Mesopotamichthys sharpeyi, Silurus triostegus</i>
<i>Asymphyiodora</i> spp.	<i>Carasobarbus luteus, Mesopotamichthys sharpeyi, Silurus triostegus</i>
<i>Clinostomum complanatum</i> *	<i>Carasobarbus luteus, Heteropneustes fossilis, Leuciscus vorax, Silurus triostegus</i>
<i>Clinostomum phalacrocoracis</i> *	<i>Carasobarbus luteus, Leuciscus vorax, Planiliza abu, Silurus triostegus</i>
<i>Diplostomum spathaceum</i> *	<i>Silurus triostegus</i>
<i>Hemiurus sigani</i>	<i>Silurus triostegus</i>
<i>Monodharmis torpedinis</i>	<i>Silurus triostegus</i>
<i>Orientocreadium batrachoides</i>	<i>Silurus triostegus</i>

<i>Orientocreadium pseudobagri</i>	<i>Mesopotamichthys sharpeyi</i> , <i>Silurus triostegus</i>
<i>Proctoeces maculatus</i>	<i>Silurus triostegus</i>
Phylum Platyhelminthes- Class Monogenea	
<i>Ancylo-discoides parasiluri</i>	<i>Silurus triostegus</i>
<i>Bychow-skyella gharui</i>	<i>Silurus triostegus</i>
<i>Cleidodiscus</i> sp.	<i>Silurus triostegus</i>
<i>Dactylogyrus fotedari</i>	<i>Silurus triostegus</i>
<i>Dactylogyrus</i> spp.	<i>Carasobarbus luteus</i> , <i>Leuciscus vorax</i> , <i>Mesopotamichthys sharpeyi</i> , <i>Silurus triostegus</i>
<i>Diplozoon</i> sp.*	<i>Leuciscus vorax</i>
<i>Gyrodactylus vimbi</i>	<i>Silurus triostegus</i>
<i>Gyrodactylus</i> sp.	<i>Silurus triostegus</i>
<i>Haliotrema</i> sp.	<i>Silurus triostegus</i>
<i>Hamatopeduncularia arii</i>	<i>Silurus triostegus</i>
<i>Microcotyle donavini</i>	<i>Leuciscus vorax</i>
<i>Paradactylogyrus bati</i>	<i>Silurus triostegus</i>
<i>Paradiplozoon kasimii</i>	<i>Carasobarbus luteus</i>
<i>Paradiplozoon pavlovskii</i>	<i>Carasobarbus luteus</i> , <i>Leuciscus vorax</i>
<i>Pseudodiscocotyla</i> sp.	<i>Silurus triostegus</i>
Phylum Platyhelminthes- Class Cestoda	
<i>Khawia armeniaca</i>	<i>Luciobarbus xanthopterus</i> , <i>Mesopotamichthys sharpeyi</i> , <i>Silurus triostegus</i>
<i>Khawia sinensis</i>	<i>Cyprinus carpio</i>
<i>Postgangesia inarmata</i>	<i>Silurus triostegus</i>
<i>Schyzocotyle acheilognathi</i>	<i>Cyprinus carpio</i> , <i>Silurus triostegus</i>
<i>Schyzocotyle</i> spp.	<i>Carasobarbus luteus</i> , <i>Silurus triostegus</i>
<i>Senga</i> sp.	<i>Leuciscus vorax</i>
<i>Tetracampos</i> sp.	<i>Silurus triostegus</i>
<i>Triaenophorus crassus</i> *	<i>Silurus triostegus</i>
<i>Triaenophorus nodulosus</i> *	<i>Silurus triostegus</i>
Phylum Nematoda- classes Adenophorea and Secernentea	
<i>Camallanus</i> sp. 1	<i>Cyprinus carpio</i>
<i>Camallanus</i> sp. 2	<i>Silurus triostegus</i>
<i>Capillaria</i> sp.	<i>Mesopotamichthys sharpeyi</i>
<i>Contra-caecum</i> sp. 1*	<i>Carasobarbus luteus</i> , <i>Cyprinus carpio</i> , <i>Heteropneustes fossilis</i> , <i>Leuciscus vorax</i> , <i>Mesopotamichthys sharpeyi</i> , <i>Planiliza abu</i> , <i>Poecilia latipinna</i> , <i>Silurus triostegus</i>
<i>Echinocephalus</i> sp.*	<i>Silurus triostegus</i>
<i>Philometroides cyprini</i>	<i>Cyprinus carpio</i>
<i>Rhabdochona</i> sp.	<i>Silurus triostegus</i>

Phylum Acanthocephala- classes Eoacanthocephala and Palaeacanthocephala	
<i>Echinorhynchus</i> sp.	<i>Silurus triostegus</i>
<i>Neoechinorhynchus iraqensis</i>	<i>Planiliza abu, Silurus triostegus</i>
Phylum Mollusca- Class Bivalvia	
Glochidial larval form	<i>Silurus triostegus</i>
Phylum Arthropoda- Subphylum Crustacea- classes Ichthyostraca and Hexanauplia	
<i>Abasia</i> sp.	<i>Silurus triostegus</i>
<i>Argulus foliaceus</i>	<i>Planiliza abu</i>
<i>Argulus</i> sp.	<i>Carasobarbus luteus</i>
Bomolochidae gen. sp.	<i>Silurus triostegus</i>
<i>Dermoergasilus varicoleus</i>	<i>Silurus triostegus</i>
<i>Ergasilus mosulensis</i>	<i>Carasobarbus luteus, Leuciscus vorax, Mesopotamichthys sharpeyi, Planiliza abu, Silurus triostegus</i>
<i>Ergasilus ogawai</i>	<i>Heteropneustes fossilis</i>
<i>Ergasilus pararostralis</i>	<i>Silurus triostegus</i>
<i>Ergasilus rostralis</i>	<i>Silurus triostegus</i>
<i>Ergasilus</i> spp.	<i>Carasobarbus luteus, Heteropneustes fossilis, Leuciscus vorax, Planiliza abu, Silurus triostegus</i>
<i>Lamproglena pulchella</i>	<i>Leuciscus vorax, Mesopotamichthys sharpeyi</i>
<i>Lernaea cyprinacea</i>	<i>Gambusia holbrooki</i>
<i>Lernanthropus polynemi</i>	<i>Silurus triostegus</i>
<i>Paraergasilus inflatus</i>	<i>Silurus triostegus</i>

* Larval form.



Figure 1: Map of Basrah marshlands showing the sites from where fishes were collected for parasitological investigation.

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