Checklists of nematodes of freshwater and marine fishes of Basrah Province, Iraq

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Abstract- Reviewing the literature on all the nematodes parasitizing 45 species of freshwater and marine fishes of Basrah province (eight elasmobranchs and 37 teleosts) indicated the presence of 48 nematode taxa. Thirty-five of such nematodes were recorded from marine localities against eight taxa from freshwater localities and two taxa from both marine and freshwater localities. These nematodes belong to two classes, three orders and eight families. All such nematodes belong to the class Secernentea except two taxa which belong to the class Adenophorea. Orders Ascaridida and Spirurida are represented with 22 and 24 taxa, respectively, while order Enoplida has only two taxa. The total number of nematode species recorded for each fish host species fluctuated from a minimum of one nematode species in 17 fish hosts to a maximum of eight nematode taxa in Cynoglossus arel only. Number of fish hosts reported for these nematodes fluctuated from one host in case of 31 taxa to a maximum of 20 hosts in case of Contracaecum sp. 1 larva.

Keywords: Nematoda, freshwater fishes, marine fishes, Basrah province, Iraq.

Introduction

The nematodes show a very wide range of ecological adaptations. Most of them live in waters (fresh, brackish and sea waters) and in the soil, while others are semiparasitic or parasitic species attacking both animals and plants. Out of about 16,000 described species of nematodes, nearly 40% are animal parasites and some 8% of the known parasitic nematodes occur in invertebrates (Anderson, 1988).

Nematodes (Nematoda) represent the most frequent and the most important parasites of fishes in freshwater, brackishwater or marine environments throughout the world. They attack most body organs, parasitizing them as adults and/or as larvae. Some nematode species are known as the agents of serious fish diseases causing considerable losses in fish cultures and in some regions and some of them cause important public health problems such as anisakiosis, gnathostomosis or paracapillariosis (Moravec, 2007a). The significance of recognizing these parasites increases with development of aquaculture in many countries and with transcontinental transfers of fishes. A prerequisite for developing effective control measures in fish culture is the exact identification of these parasites as well as the knowledge of their frequently complicated host-parasite-environment relationships (Moravec, 1994).
The province of Basrah is the only province in Iraq which has an overlooking on the Arab Gulf. In this province, different varieties of aquatic environments are met. These included the shallow marshy area in the north, Shatt Al-Arab River, its tributaries and estuary, Shatt Al-Basrah canal as well as the marine habitats of the northwest part of the Arab Gulf (Mhaisen et al., 2013a). Information concerning nematodes of fishes of Basrah province are scattered in different local scientific references. Some of them are really outdated. Some nematodes as well as some fishes have been misidentified, misspelled or quoted with wrong authorities. For these reasons, it was decided to review these data in accordance with up-to-date nematode classification using major taxonomic accounts and also to revise fish names and provide an updated host-nematodes checklist in addition to the nematodes list. This review is a continuation of series of literature reviews on major groups of parasites of fishes of Basrah province (Mhaisen et al., 1993; 2013a, b, c; 2014). Finally, it was also planned to compare the richness of infected fishes of this province with nematodes with those of the whole country of Iraq based on data extracted from the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2014).

**Sources and Methods**

A total of 42 references (research papers, M. Sc. and Ph. D. theses and one conference abstract) dealing with nematodes of fishes of Basrah province were used to prepare the present review. Data from such references were gathered to provide nematodes list and host-nematodes list. The systematic account of different classes and orders of these nematodes is based on some textbooks and related revisions (Moravec, 2006; Anderson et al., 2009; Gibbons, 2010). For fishes, the scientific names were reported as they appeared in their original references but they were then checked with a recent account on freshwater fishes of Iraq (Coad, 2010). However, the valid names used here were based on Iwatsuki (2013) and with minor modifications, on relevant electronic sites (Eschmeyer, 2014; Froese and Pauly, 2014).

The index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2014) was used to show number of nematodes reported for each infected fish species in Basrah in comparison with that of the whole country of Iraq as well as the richness of fishes of Basrah with nematodes in comparison with such richness in fishes of the whole Iraq.

**Results and Discussion**

**Surveys Achieved on Fish Nematodes in Basrah:**

Digging for literature showed the presence of 42 references on nematodes of fishes of Basrah. From these references, five major categories of fish habitats can be grouped. These are:

1- The marshy area (Al-Hammar marsh and Al-Mdaina marshes) north of Basrah.
2- Shatt Al-Arab River and its creeks and canals.
3- Brackish waters of Shatt Al-Arab estuary near Al-Fao town, south of Basrah.
4- Fish farms in Basrah province.
5- Marine waters of the northwest of the Arab Gulf.
Report on fish nematodes from the marshy area of Basrah province were achieved in Al-Hammar marsh, north of Basrah (Al-Daraji, 1986; Dawood, 1986; Mohamad, 1989; Al-Salim and Mohamad, 1995; Jori, 2006; Abbas, 2007) as well as from Al-Mdaina (reported as Al-Mdina) marshes (Jori, 2005).

Some reports on fish nematodes were done on Shatt Al-Arab River (Al-Hadithi and Jawad, 1975; Al-Hadithi and Habish, 1977; Habish, 1977; Al-Hadithi and Habash, 1979; Anwar and Ismail, 1979; Al-Hadithi et al., 1980; Mhaisen, 1986; Ali, 2001) and its creeks and canals which included those from Mehaijeran Creek, south of Basrah city (Khamees, 1983; Mhaisen et al., 1986; Khamees and Mhaisen, 1988; Mhaisen et al., 1988), Al-Majidiah River (Mehdi, 1989), Garmat Ali River, north of Basrah city (Jori, 1998; Abdul-Rahman, 1999; Al-Niaeem, 1999; Al-Niaeem and Al-Azizz, 2002; Kadhim, 2009; Al-Janae’e, 2010), Al-Salihiya canal (Al-Janae’e, 2010) and Al-Tannuma canal (Al-Janae’e, 2010). In addition to these, some fishes were collected from Ashar fish market (Mhaisen, 1986). It is appropriate to mention here that the reference Anwar and Ismail (1979) was erroneously published as Ismail is the first name and hence the reference should be Anwar and Al-Hadithi (1979).

Only one report is known on fish nematodes from the brackish waters of Shatt Al-Arab estuary near Al-Fao town (Ali, 2001).

Only one report on nematodes from fish farms of Basrah province (Jassim, 2007) was done on fishes of Basrah University Experimental Fish Culture Station.


**Nematodes Recorded from Fishes of Basrah:**

The literature review indicated the existing of 48 nematode taxa belonging to two classes, three orders, eight superfamilies and eight families as indicated in Table (1). These nematodes are alphabetically presented under their orders, families and genera. Notes on misspelling in names of some nematodes and their hosts, authorities and synonyms are corrected in accordance with information from some systematic books (Moravec, 2006; Anderson et al., 2009; Gibbons, 2010) as well as some correspondence with some experts. Names of fish hosts are quoted as they appeared in the reviewed literature but the valid names have been updated according to Eschmeyer (2014) and Froese and Pauly (2014). The full authority of each valid fish host is shown in Table (2).

**Class Adenophorea:**

This class is represented in fishes of Basrah with one order, the Enoplida.

**Order Enoplida:**

This order is represented in fishes of Basrah with one superfamily, the Trichinelloidea.
Superfamily Trichinelloidea:
This superfamily is represented in fishes of Basrah with the family Capillaridae only.

Family Capillaridae:
This family is represented in fishes of Basrah with two species belonging to the genera Capillaria and Pseudocapillaria.

Capillaria sp. was firstly reported from the intestine of Mesopotamichthys sharpeyi from Al-Hammar marsh (Al-Daraji, 1986) and then from the intestine of eight fish species from Garmat Ali River (Abdul-Rahman, 1999). These were: Barbus luteus (= Carasobarbus luteus), Chalcalburnus sellal (= Alburnus sellal), Ctenopharyngodon idella, Cyprinus carpio, Heteropneustes fossilis, Leuciscus vorax which was reported as Aspius vorax, Liza abu and Mastacembelus mastacembelus. It is appropriate to mention here that A. vorax is considered as a synonym of L. vorax according to Perea et al. (2010). This was ascertained by Eschmeyer (2014) and Froese and Pauly (2014). So far, ten hosts are known for Capillaria sp. in Iraq (Mhaisen, 2014).

Pseudocapillaria tomentosa (Dujardin, 1843) was recorded from the intestine of C. idella from Basrah University fish farm (Jassim, 2007). This is the only report of P. tomentosa from fishes of Iraq.

Class Secernentea:
This class is represented in fishes of Basrah with two orders, Ascaridida and Spirurida.

Order Ascaridida:
This order is represented in fishes of Basrah with two superfamilies, the Ascaridoidea and Seuratoidea.

Superfamily Ascaridoidea:
This superfamily is represented in fishes of Basrah with one family, the Anisakidae.

Family Anisakidae:
This family includes taxa belonging to genera Acanthocheilus, Anisakis, Contracaecum, Hysterohylacium, Mawsonascaris and Terranova in addition to unidentified anisakid specimen.

Adults and fourth larval stage of Acanthocheilus rotundatus (Rudolphi, 1819) were recorded from the stomach and fore intestine of Mustelus mosis, while the third larval stage was isolated from the intestine of Lethrinus nebulosus from Khor Al-Ummaia (Ali, 2008). No more records are available in Iraq (Mhaisen, 2014). Acanthocheilus parasites infect elasmobranchs, mainly sharks (Anderson et al., 2009). The occurrence of the third larval stage of A. rotundatus from L. nebulosus is considered as accidental due to the fact that the bony fishes have no rule in the life cycle of this parasite as this larva normally occurs in invertebrates and elasmobranchs (Ali, 2008). A. rotundatus belongs to a monotypic genus in the monogenic subfamily Acanthocheilinae (Moravec and Nagasawa, 2000).
Anisakis sp. larva was reported from the body cavity of Ablennes hians from Shatt Al-Arab estuary near Al-Fao town (Ali, 2001). The first Anisakis sp. larva was reported from the freshwater fish Cyprinion macrostomum from Dokan Lake (Abdullah, 1990). So far, five hosts are reported for Anisakis sp. in Iraq (Mhaisen, 2014). The final hosts of the members of Anisakis are marine mammals except sirenians (Anderson et al., 2009). Larvae of this parasite have serious economical and medical importance as raw fishes infected with Anisakis or Pseudoterranova are rejected through the industrial processing of the products. Anisakis larvae in human cause intestinal inflammation "anisakiasis" which shows something like the intestine cancer symptoms (Möller, 1989; Berland, 1996).

Unidentified larval specimen of the family Anisakidae was reported from the intestine of Carangoides malabricus from Iraqi marine waters (Al-Ataby, 2012), erroneously as Skrjabillanus sp. of the family Skrjabinallidae, order Dracunculoidea. One of us (A.H.A.) examined the single larva of this specimen. It was possible to see a muscular esophagus, ventriculus (glandular portion), appendage and a conical tail with sharp tip. No buccal capsule is present and hence it was erroneously identified as Skrjabillanus. Skrjabillanus species have a simple esophagus and a long esophagus gland (Anderson et al., 2009). They infect the gas bladder, urinary bladder, kidneys, subqumal part of scales and humour of eyes of freshwater fishes in Palearectic region (Moravec, 2006; Anderson et al., 2009; Gibbons, 2010). Skrjabillanus has four nominal species infecting tissues of freshwater fishes mainly cyprinids (Moravec, 2006).

Third larval stages of Contracaecum spp. were recorded from body cavity, internal organs and mesenteries of 20 fish species in Basrah. In Iraq, such larvae were recorded for the first time in Iraq from ten fish species from different inland waters of Iraq, excluding Basrah (Herzog, 1969). So far a total of 40 fish hosts are known for Contracaecum spp. larvae in Iraq (Mhaisen, 2014). Based on the differences in lengths of caecum to appendage, caecum to esophagus and appendage to esophagus (Moravec, 1994), 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 Heteropneustes fossilis by Ali (2001) and Contracaecum sp. 2 in H. fossilis only (Ali, 2001). Contracaecum sp. 1, which is conspecific with that of Shamsuddin et al. (1971), has a long caecum while Contracaecum sp. 2 has very small caecum.

Contracaecum sp. 1 larvae were recorded from the body cavity, mesenteries, liver, heart, gonads and kidneys of the following fishes of Basrah, which included the valid as well as the synonymised names. The references which refered to the fishes with synonymised name are marked here with an asterisk. The infected fishes included Aphanius dispar (Kadhim, 2009), Arabibarbus grypus which was reported as Barbus grypus (Al-Hadithi and Habish, 1977; Habish, 1977; B. luteus, which is a synonym of C. luteus (Al-Hadithi and Habish, 1977*; Habish, 1977*; Khamees, 1983; Al-Daraji, 1986; Mhaisen, 1986; Mhaisen et al., 1986; Khamees and Mhaisen, 1988; Abdul-Rahman, 1999*; Al-Niaaem, 1999*), Barbus sharpeyi, which is a synonym of M. sharpeyi (Al-Hadithi and Habish, 1977*; Habish, 1977*; Al-Daraji, 1986; Mhaisen, 1986; Abdul - Rahman, 1999*; Al-Niaaem and Al-Azizz, 2002*),
Barbus xanithopterus, which is a synonym of Luciobarbus xanithopterus (Al-Hadithi and Habish, 1977*; Habish, 1977*), C. sellal, which is a synonym of A. sellal (Abdul-Rahman, 1999*), Carassius auratus (Al-Janae’e, 2010), C. idella (Abdul-Rahman, 1999), C. carpio (Al-Hadithi and Habish, 1977*; Habish, 1977*; Mhaisen, 1986; Mohamad, 1989; Al-Salim and Mohamad, 1995; Abdul-Rahman, 1999), Johnius (Johnius) belangerii (Bannai, 2002), L. vorax which was reported as A. vorax (Al-Hadithi and Jawad, 1975; Al-Hadithi and Habish, 1977; Habish, 1977; Khamees, 1983; Al-Daraji, 1986; Mhaisen, 1986; Mhaisen et al., 1986; Abdul-Rahman, 1999), L. abu and its synonyms Mugil abu and M. hishni (Al-Hadithi and Jawad, 1975*; Al-Hadithi and Habish, 1977*; Al-Hadithi and Habash, 1979; Anwar and Ismail, 1979*; Al-Hadithi et al., 1980*; Khamees, 1983; Mhaisen, 1986; Mhaisen et al., 1986; 1988; Mehdi, 1989; Jori, 1998; Abdul-Rahman, 1999, 2001; Al-Janae’e, 2010), L. subviridis, Mugil dussumieri and M. subviridis which are all synonyms of Chelon subviridis (Al-Hadithi and Habish, 1977*; Habish, 1977*, M. mastacembelus (Abdul-Rahman, 1999), Mystus pelusius (Al-Hadithi and Habish, 1977; Habish, 1977; Abdul-Rahman, 1999), Otolithes ruber, erroneously spelled as Otolithus ruber (Bannai, 2002), Silurus triostegus and its synonym Parasilurus triostegus (Al-Hadithi and Habish, 1977; Habish, 1977; Al-Daraji, 1995; Jori, 2006; Abbas, 2007; Al-Janae’e, 2010), Synaptura orientalis, which is a synonym of Brachirus orientalis (Bannai, 2002) and Tenuinosida lileha (Al-Janae’e, 2010). It is appropriate to mention here that B. grypus is considered as a synonym of A. grypus according to Borkenhagen (2014). This was ascertained by Eschmeyer (2014) but not by Froese and Pauly (2014) yet. The sampling site of the infected fishes with Contracaecum sp. 1 larvae are not given here in order to economise space. However, such sites can be detected from the preceding subheading “surveys achieved on fish nematodes in Basrah” within the part of results and discussion.

Contracaecum sp. 2 larvae recorded from Basrah included only those from the body cavity and mesentery of H. fossilis from Shatt Al-Arab River near Nahr Khooz village (Ali, 2001).

Al-Daraji (1995) reported females of Contracaecum sp. from J. (J.) belangerii from Khor Al-Zubair estuary and Bannai (2002) recorded such females from three species of marine fishes (A. hians, Saurida undosquamis and Sillago sihama) from Khor Abdullah. It is well known that adult Contracaecum species are parasites of birds and mammals, so they cannot mature in fishes. Therefore, Ali (2008) and Al-Salim and Ali (2010) transferred the above female Contracaecum records of both Al-Daraji (1995) and Bannai (2002) to the genus Hysterobothrium Ward et Magath, 1917 and as only females were available, it is impossible to identify them to the species level.

Some adult Contracaecum species were recorded from some piscivorous birds in Basrah. C. microcephalum was reported from the purple heron Ardea purpurea (Al-Hadithi and Habish, 1977; Habish, 1977; Awad et al., 1994), from the pygmy cormorant Phalacrocorax pygmeus and the little egret Egretta gretzetta from Basrah marshes (Awad et al., 1994) and from E. gretzetta, the bittern Ardea ralloides and the little bittern Ixobrychus.
minutus from Al-Hammar marsh (Ali, 2008). C. micropapillatum was reported from the grey heron Ardea cinerea and A. ralloides from Al-Hammar marsh (Ali, 2008). C. multipapillatum and C. rudolphi (reported as C. spiculigerum) were reported from P. pygmeus from Basrah marsh (Awad et al., 1994). C. ovale was recorded from A. purpurea from Abu Zijri marsh north of Basrah province (Abdullah, 1988; Al-Hadithi and Abdullah, 1991) and from A. ralloides (Ali, 2008). Unidentified adult Contraacecum species were also reported from Phalacrocorax carbo from Shatt Al-Arab River (Abed, 2005) and from ten bird species in Meshab marsh (Al-Tameemi, 2013).

Fourth larval stage of Hysterothylacium reliquens (Norris & Overstreet, 1975) from fishes of Basrah were described from the intestine of Cynoglossus arel and L. nebulosus while the adults were reported from Trichiurus lepturus from Khor Al-Ummaia (Ali, 2008; Al-Salim and Ali, 2010).

Females of Hysterothylacium sp. 1 (misidentified as Contraacum sp.) were recorded from the intestine of J. (J.) belangerii from Khor Al-Zubair estuary (Al-Daraji, 1995). Bannai (2002) recorded the same females of Hysterothylacium sp. 1 (also misidentified as Contraacum sp.) from three species of marine fishes (A. hians, Saurida undosquamis and Sillago sihama) from Khor Abdullah.

One juvenile male of Hysterothylacium sp. 2 was isolated from the intestine of Drepane longimana from Khor Al-Ummaia (Ali, 2008; Al-Salim and Ali, 2010). It is easy to distinguish between Hysterothylacium sp. 1 and Hysterothylacium sp. 2 as the former one has relatively equal length ratio of caecum to appendage in comparison with short caecum in the latter species (the ratio of caecum to appendage is 1:7 in Hysterothylacium sp. 2) in addition to differences in the ratio of caecum to esophagus and appendage to esophagus (Deardorff and Overstreet, 1981). Li et al. (2013) included 70 valid species of Hysterothylacium. Hysterothylacium includes parasites of marine, estuarine and freshwater fishes (Gibbons, 2010). Humans can be accidentally infected upon eating raw infected fishes (Shamsi et al., 2013).

Six type species of the third larval stages of Hysterothylacium sp. were reported from six marine fishes from Khor Al-Ummaia. These were: Hysterothylacium sp. type BA larvae from the body cavity of two teleosts: Acanthopagrus arabicus, reported as A. latus (Ali, 2008; Al-Salim and Ali, 2010) and C. arel (Ali, 2008; Al-Salim and Ali, 2010; Ali and Al-Salim, 2012) as well as from the intestine of two sharks: Chiloscyllium arabicum and Sphyrna mokarran (Ali, 2008; Al-Salim and Ali, 2010), Hysterothylacium sp. type BB larvae from the body cavity of both C. arabicum (Ali, 2008; Al-Salim and Ali, 2010) and C. arel (Ali, 2008; Al-Salim and Ali, 2010; Ali and Al-Salim, 2012), Hysterothylacium sp. type BC larvae from the stomach serosa of C. arabicum (Ali, 2008; Al-Salim and Ali, 2010) and the body cavity of C. arel (Ali, 2008; Al-Salim and Ali, 2010; Ali and Al-Salim, 2012), Hysterothylacium sp. type BD larvae from the body cavity of C. arel (Ali, 2008; Al-Salim and Ali, 2010), Hysterothylacium sp. type BE larvae from gills of Rhizoprionodon acutus (Ali, 2008; Al-Salim and Ali, 2010) and Hysterothylacium sp. type BF from the body cavity of Tylosurus crocodilus (Ali, 2008; Al-Salim and Ali, 2010). The generic name of the host Rhizoprionodon was erroneously spelled as Rhizophydon by Ali (2008).
Ali (2008) described unidentified adult and fourth larval stages of species of *Mawsonascaris* from the intestine of *Himantura gerrardi* from Khor Al-Umma. Then, the same parasite was described as a new species which is *Mawsonascaris parva* by Ali et al. (2012) from the intestine of *Himantura randalli* as the type host was already described as a new species in the same year of parasite description from the Arab Gulf by Last et al. (2012). The genus *Mawsonascaris* includes six nominal species which infect the digestive tract of elasmobranchs (Ali et al., 2012; Li et al., 2012).

Two unidentified larval species of *Terranova* types BA and BB were recorded from three carcharhinid sharks from Khor Al-Umma. *Terranova* sp. type BA larvae were reported from the stomach and intestine of *Carcharhinus dussumieri* (Ali, 2008; Ali and Al-Salim, 2013), gills, liver, stomach and intestine of *C. sorrah* (Ali, 2008; Ali and Al-Salim, 2013) and from stomach and intestine of *R. acutus* (Ali, 2008; Ali and Al-Salim, 2013). According to Ali (2013), *C. sorrah* was reported as *C. macloti* by Ali (2008). *Terranova* sp. type BB larvae were reported from the stomach of *C. dussumieri* (Ali, 2008; Ali and Al-Salim, 2013), intestine of *C. sorrah* (Ali, 2008; Ali and Al-Salim, 2013) and from stomach of *R. acutus* (Ali, 2008; Ali and Al-Salim, 2013). All specimens of *Terranova* spp. from Basrah belonging to the third larval stages and a single specimen to early fourth larval stage inside the cuticle of the previous stage (larva with lips but lacks tooth) of *Terranova* sp. type BB were reported from carcharhinid sharks due either to newly infection which might took place with these parasites or to unsuitable final hosts.

**Superfamily Seuratoidea:**

This superfamily is represented in fishes of Basrah with one family, the Cucullanidae.

**Family Cucullanidae:**

This family is represented in fishes of Basrah with three species of the genus *Cucullanus* in addition to some specimens of unidentified species of this genus.

*Cucullanus armatus* Yamaguti, 1954 was reported only from the intestine of *Netuma thalassina* from Khor Al-Umma (Ali, 2008; Al-Salim and Ali, 2011).

*Cucullanus cyprini* Yamaguti, 1941 was recorded from five freshwater fishes from Garmat Ali River (Abdul-Rahman, 1999). These were *B. luteus (= C. luteus), C. carpio, A. vorax (=L. vorax), M. pelusius* and *S. triostegus*. *C. cyprini* was reported for the first time in Iraq from both *Alburnus caeruleus* and *B. xanthopterus* which is a synonym of *L. xanthopterus* from Al-Tharthar Lake, mid Iraq (Al-Saadi, 1986). *C. cyprini* has so far 14 hosts in Iraq (Mhaisen, 2014).

*Cucullanus otolithi* (Ashraf, Khanum & Farooq, 1977) Al-Salim & Ali, 2011 was reported from the intestine of *O. ruber* from Khor Al-Zubair estuary (Al-Daraji, 1995) as *Indocucullanus otolithi*. The generic name *Otolithes* was misspelled as *Otolithus* by Al-Daraji (1995). According to Anderson et al. (2009), the genus *Indocucullanus* is considered as a synonym of *Cucullanus*.

Females of *Cucullanus* sp. were recorded only from the intestine of *L.
*nebulosus* from Khor Al-Ummaia (Ali, 2008; Al-Salim and Ali, 2011). Previously, male *Cucullanus* sp. was reported from *C. macrostomum* from Tigris River at Mosul city (Fattohy, 1975).

*Cucullanus* sp. larvae were isolated only from the mesenteries of *B. luteus* (= *C. luteus*) from Shatt Arab River (Al-Hadithi and Habish, 1977; Habish, 1977). Larvae of *Cucullanus* sp. have so far three fish hosts in Iraq (Mhaisen, 2014).

**Order Spirurida:**

This order comprises approximately half number of all nematode taxa so far recorded from fishes of Basrah. It is represented in fishes of Basrah with five superfamilies: Camallanoidea, Dracunculoidea, Gnathostomatoidea, Thelazioidea and Spiruroidea.

**Superfamily Camallanoidea:**

This superfamily is represented in fishes of Basrah with one family, the Camallanidae.

**Family Camallanidae:**

This family is represented in fishes of Basrah with unidentified species belonging to the genus *Camallanus*.

*Camallanus ancyldirus* Ward & Magath, 1916 was recorded only from the intestine of *C. carpio* in Al-Mdaina marshes (Jori, 2005). Personal communication between one of us (A.H.A.) and Dr. František Moravec concerning *C. ancyldirus* reported by Jori (2005) revealed that this species is not *C. ancyldirus*. So, it is designated as *Cucullanus* sp. 1 in the present checklist.

*Camallanus kirandensis* Baylis, 1928 was reported only from the intestine of *S. triostegus* in Al-Hammar marsh (Jori, 2006). Again, the personal communication between with Dr. František Moravec concerning *C. kirandensis* reported by Jori (2006) revealed that it is not *C. kirandensis*. So, it is designated as *Cucullanus* sp. 2 in the present checklist.

Specimens of the fourth larval stage of *Camallanus* sp. were recorded only from the mesenteries of *C. arel* from Khor Al-Ummiah (Ali, 2008; Al-Salim and Ali, 2011).

**Superfamily Dracunculoidea:**

This superfamily is represented in fishes of Basrah with one family, the Philometridae.

**Family Philometridae:**

This family is represented in fishes of Basrah with seven species of the genus *Philometra* and two species of the genus *Philometroides* in addition to four unidentified species of the genus *Philometra*. All the 13 taxa recorded in this family, except one species (*Philometroides cyprini*), were reported from marine waters.

*Philometra brachiri* Moravec & Ali, 2014 was described only from the ovaries of the oriental sole *B. orientalis* from Khor Al-Ummaia (Moravec and Ali, 2014).
Philometra johnii Moravec & Ali, 2013 was described only from the ovaries of sin croaker Johnius dussumieri from Khor Al-Ummaia (Moravec and Ali, 2013).

Philometra otilithi Moravec & Manoharan, 2013 was recorded only from the ovaries of the tigerteeth croaker O. ruber from Khor Al-Ummaia (Moravec and Ali, 2014).

Philometra piscaria Moravec & Justine, 2014 was recorded only from the ovaries of the orange-spotted grouper Epinephelus coioides from Khor Al-Ummaia (Moravec and Ali, 2014).

Philometra strongylurae Moravec & Ali, 2005 was described from the subcutaneous muscles of the beak and gills of both the banded needlefish Strongylura leiura (Moravec and Ali, 2005; Ali, 2008) and spottail needlefish S. strongylura from Khor Al-Ummaia (Moravec and Ali, 2005).

Philometra tricornuta Moravec & Ali, 2014 was described only from musculature of the caudal peduncle of the greater lizardfish Saurida tumbil from Khor Al-Ummaia (Moravec and Ali, 2014).

Philometra tylosuri Moravec & Ali, 2005 was described only from the musculature and subcutaneous tissues of the hound needlefish T. crocodilus from Al-Fao coast (Moravec and Ali, 2005).

Four unidentified species of Philometra were also reported from the ovaries of S. leiura and T. crocodilus from Shatt Al-Arab estuary at Al-Fao town (Ali, 2001) and from the body cavity of both Sphyreana jello and N. thalassina from Khor Al-Ummaia (Ali, 2008). Due to the rather high degree of host specificity in philometrids (Moravec, 2006) and their species-characteristic tissue sites (Moravec and Ali, 2005; Moravec, 2006), it can be assumed that the above-named four unidentified Philometra spp. belong to different species and account separately in the present study as Philometra spp. 1-4. The genus Philometra includes parasites of body cavity and tissues of marine, brackish and freshwater fishes. A total of 105 nominal species of Philometra are encountered up to the end of 2013 (Personal communication with Dr. F. Moravec).

Philometroides acanthopagri Moravec, Jassim & Al-Salim, 2012 was described only from the musculature near the pectoral fin and nasal cavity of Acanthopagrus latus from the coastal marine waters of the Arab Gulf (Moravec et al., 2012; Jassim, 2013). According to the personal communication between one of us (A.H.A.) and Prof. Dr. Y. Iwatsuki on 8th Dec. 2013, A. latus is not distributed in the Arab Gulf and hence A. latus, reported here, is actually representing A. arabicus. This fact comes in agreement with Iwatsuki (2013), Adday (2013), Eschmeyer (2014) and Froese and Pauly (2014).

Philometroides cyprini (Ishii, 1931) Nakajima, 1970 was misidentified as Philometroides carasii (Ishii, 1931) Nakajima & Egusa, 1977 from the body cavity of C. carpio from Al-Mdaina marshes (Jori, 2005). Personal communication between one of us (A.H.A.) and Dr. F. Moravec indicated that the description provided by Jori (2005) is apparently misidentification of the nematode with P. cyprini. The genus Philometroides includes 30 valid species which parasitise freshwater, brackish and marine fishes (Moravec and Manoharan, 2013).
Superfamily Gnathostomatoidea:

This superfamily is represented in fishes of Basrah with two families: Gnathostomidae and Physalopteridae.

Family Gnathostomatidae:

This family is represented in fishes of Basrah with adults and larval forms of unidentified Echinocephalus.

Adults of Echinocephalus sp. were recorded from the intestine of both Himantura randalli (reported as H. gerrardi) and Pastinachus sephen in Khor Al-Ummaia (Ali, 2008).

Echinocephalus sp. 1 larvae were reported from the intestinal wall of both J. belangerii and S. sihama from Khor Abdullah (Bannai, 2002; Awad et al., 2003) and from the intestine of S. triostegus from Al-Hammar marsh (Jori, 2006). The generic name Sillago was misspelled as Silago by Awad et al. (2003). Bannai (2002), Awad et al. (2003) and Jori (2006) stated that Echinocephalus sp. larvae were provided with four transverse rows of spines on the cephalic bulb. As Echinocephalus spp. larvae are known to have 6-8 rows of spines (Millemann, 1963; Moravec and Justine, 2006), we conclude that the report of four rows of spines as indicated by the above three references from Basrah is erroneous and it is possible to indicate that with deformed specimens or improperly preserved ones loss of spines is quite possible.

Echinocephalus sp. 2 larvae were recorded from the mesenteries of both C. arabicum and C. arel from Khor Al-Ummaia (Ali, 2008; Ali and Al-Salim, 2013). Echinocephalus sp. 2 larvae have six transverse rows of spines on the cephalic bulb in comparison with larvae of Echinocephalus sp. 1 which were claimed by Bannai (2002), Awad et al. (2003) and Jori (2006) to have four rows. In addition, in Echinocephalus sp. 2 larvae, Ali (2008) and Ali and Al-Salim (2013) showed the presence of two groups of ventro-dorsally minute spines between the pseudolips and the first row of the large spines, each group consists of three transverse rows, the first and second rows have two minute spines and the last row has three minute spines, while such minute spines were never mentioned by Bannai (2002), Awad et al. (2003) and Jori (2006) in Echinocephalus sp. 1 larvae. The genus Echinocephalus has ten nominal species as parasites of the alimentary canal of elasmobranchs (Moravec, 2007b). It is difficult to separate different larval stages of Echinocephalus by morphological criteria. Also, it is difficult to associate the morphologically dissimilar larvae with their respective adults other than by observing specimens actually undergoing the final moult (Andrews et al., 1988; Beveridge, 1991; Moravec and Justine, 2006). There is a concern that at least some species of Echinocephalus may have public health significance as potential invaders of the human digestive tract (Bower, 2006).

Family Physalopteridae:

This family is represented in fishes of Basrah with three taxa, one belongs to the genus Paraleptus and two taxa belong to the subfamily Proleptinae.

Unidentified species of Paraleptus was reported from the stomach of C. arabicum in Khor Al-Ummaia (Ali, 2008). This is the only report on Paraleptus in Iraq (Mhaisen, 2014). The genus Paraleptus is one of the four genera of the subfamily Proleptinae which includes parasites of elasmobranchs.
(Moravec, 2007b). *Paraleptus* has eight valid species (Personal communication between A.H.A. and Dr. Liang Li on 17th Feb. 2014).

Unidentified larval species type BA of the subfamily Proleptinae was isolated from the mesenteries of *Cynoglosus arel* (Ali, 2008; Ali and Al-Salim, 2013). Another larval species type BB of this subfamily was recorded from the intestine of *C. carpio* from University of Basrah fish farm (Jassim, 2007).

**Superfamily Thelazioidea:**
This superfamily is represented in fishes of Basrah with the family Rhabdochonidae.

**Family Rhabdochonidae:**
This family is represented in fishes of Basrah with one species of the genus *Rhabdochona*.

*Rhabdochona garuai* Agrawal, 1965 was recorded from the intestine of *S. triostegus* in Al-Hammar marsh (Jori, 2006). Dr. F. Moravec examined the illustration and description of *R. garuai* of Jori (2006) and believed that it was a misidentification of *R. garuai* by Jori (2006). So, we regrettfully consider *R. garuai*, reported by Jori (2006) as *Rhabdochona* sp. The genus *Rhabdochona* comprises a large number of species parasitizing freshwater fishes in all the zoogeographical regions (Moravec, 2010). This genus includes four subgenera: the monotypical subgenus *Rhabdochona*, *Globochona*, *Globochonoides* and *Sinonema* which differ from each others mainly by numbers of anterior prostomal teeth, presence/ absence of lateral alae and some other features (Moravec, 2010). *R. garuai* belongs to the subgenus *Globochona*. The genus *Rhabdochona* has 97 valid species at the present (Moravec et al., 2013).

**Superfamily Spiruroidea:**
Unidentified larval specimens belonging to this superfamily were isolated from the mesenteries of *A. grypus* (reported as *B. grypus*) and *C. luteus* (reported as *B. luteus*) from Shatt Al-Arab River (Al-Hadithi and Habish, 1977; Habish, 1977).

**Addendum:**
With this article, checklists of all the groups of parasitic worms infecting fishes of Basrah province were achieved. However, only one group remains untreated. This is the group of leeches (phylum Annelida, class Clitellata, subclass Hirudinea). Only one report on this group from fishes of Basrah is available. This is the record of the leech *Hemiclepsis marginata* (O. F. Müller, 1774) from gills of *L. abu* at the junction of Al-Khora canal with Shatt Al-Arab River (Mhaisen et al., 1993). This leech was reported for the first time in Iraq from the skin of three fish species in fish ponds near Baghdad (Khalifa, 1985). In Iraq, six taxa of leeches are so far documented (Mhaisen, 2014).

**Host-Nematodes List:**
The names of all fish hosts infected with nematodes in Basrah province (45 valid fish names and 18 synonyms) are alphabetically arranged. For each host, the nematode species are also alphabetically arranged. For each parasite species, the references are chronologically arranged but references of the
same year are alphabetically arranged. The present host list included the valid as well as the synonymous names.

_Ablennes hians_: Anisakis sp. larva (Ali, 2001) and Hysterothylacium sp. 1, reported as Contracaecum sp. (Bannai, 2002).

_Acanthopagrus latus_: See Acanthopagrus arabicus.

_Acanthopagrus arabicus_, reported as A. _latus_: Hysterothylacium sp. type BA larva (Ali, 2008; Al-Salim and Ali, 2010) and Philometroides acanthopagri (Moravec et al., 2012; Jassim, 2013).

_Alburnus sellal_, reported as Chalcalburnus sellal: Capillaria sp. (Abdul-Rahman, 1999) and Contracaecum sp. 1 larva (Abdul-Rahman, 1999).

_Aphanius dispar_: Contracaecum sp. 1 larva (Kadhim, 2009).


_Aspius vorax_: See Leuciscus vorax.

_Barbus grypus_: See Arabibarbus grypus.

_Barbus luteus_: See Carasobarbus luteus.

_Barbus sharpeyi_: See Mesopotamichthys sharpeyi.

_B. xanthopterus_: See Luciobarbus xanthopterus.

_Brachirus orientalis_, reported also as Synaptura orientalis: Contracaecum sp. 1 larva (Bannai, 2002) and Philometra brachiri (Moravec and Ali, 2014).

_Carangoides malabricus_: Anisakidae gen. sp. larva, misidentified as Skrjabillanus sp. (Al-Ataby, 2012).


_Carassius auratus_: Contracaecum sp. 1 larva (Al-Janaee’e, 2010).


_Carcharhinus macloti_: See Carcharhinus sorrah.

_Carcharhinus sorrah_, reported as Carcharhinus macloti: Terranova sp. BA larva (Ali, 2008; Ali and Al-Salim, 2013) and Terranova sp. BB larva (Ali, 2008; Ali and Al-Salim, 2013).

_Chalcalburnus sellal_: See Alburnus sellal.

_Chelon subviridis_, reported as Liza subviridis, Mugil dussumieri and M. _subviridis_: Contracaecum sp. 1 larva (Al-Hadithi and Habish, 1977; Habish, 1977; Abdul-Rahman, 1999).

Ctenopharyngodon idella: *Capillaria* sp. (Abdul-Rahman, 1999), *Contracaecum* sp. 1 larva (Abdul-Rahman, 1999) and *Pseudocapillaria tomentosa* (Jassim, 2007).


*Drepane longimana*: *Hysteroythlacium* sp. 2 (Ali, 2008; Al-Salim and Ali, 2010).


*Heteropneustes fossilis*, reported also as *Sacchobranchus fossilis*: *Capillaria* sp. (Abdul-Rahman, 1999), *Contracaecum* sp. 1 larva (Al-Hadithi and Habish, 1977; Habish, 1977; Mhaisen, 1986; Mohamad, 1989; Al-Salim and Mohamad, 1995; Abdul-Rahman, 1999) and *Contracaecum* sp. 2 larva (Ali, 2001).

*Himantura gerrardi*: See *Himantura randalli*.

*Himantura randalli*: *Mawsonascaris parva* (adult and larva) which are the same as *Mawsonascaris* sp. (Ali, 2008; Ali et al., 2012) and *Echinocephalus* sp. (Ali, 2008).

*Johnius belangerii*: *Contracaecum* sp. 1 larva (Bannai, 2002), *Echinocephalus* sp. 1 larva (Bannai, 2002; Awad et al., 2003) and *Hysteroythlacium* sp. 1, reported as *Contracaecum* sp. (Al-Daraji, 1995).

*Johnius (Johnius) belangerii*: See J. belangerii.


*Liza abu*, reported also as *Mugil hishni* and *Mugil abu*: *Capillaria* sp. (Abdul-Rahman, 1999) and *Contracaecum* sp. 1 larva (Al-Hadithi and Jawad, 1975; Al-Hadithi and Habish, 1977; Habish, 1977; Al-Hadithi and Habash, 1979; Anwar and Ismaeel, 1979; Al-Hadithi et al., 1980;
Checklists of nematodes of freshwater and marine fishes of Basrah


*L. subviridis*: See *Chelon subviridis*.

*Luciobarbus xanthopterus*, reported as *Barbus xanthopterus*: *Contracaecum* sp. 1 larva (Al-Hadithi and Habish, 1977; Habish, 1977).

*Mastacembelus mastacembelus*: *Capillaria* sp. (Abdul-Rahman, 1999) and *Contracaecum* sp. 1 larva (Abdul-Rahman, 1999).

*Mesopotamichthys sharpeyi*, also reported as *Barbus sharpeyi*: *Capillaria* sp. (Al-Daraji, 1986) and *Contracaecum* sp. 1 larva (Al-Hadithi and Habish, 1977; Habish, 1977; Al-Daraji, 1986; Mhaisen, 1986; Abdul-Rahman, 1999; Al-Niaeem and Al-Azizz, 2002).

*Mugil abu*: See *Liza abu*.

*Mugil dussumieri*: See *Chelon subviridis*.

*Mugil hishni*: See *Liza abu*.

*Mugil subviridis*: See *Chelon subviridis*.


*Otolithes ruber*: *Contracaecum* sp. 1 larva (Bannai, 2002), *Cucullanus otolithi*, reported as *Indocucullanus otolithi* (Al-Daraji, 1995) and *Philometra otolithi* (Moravec and Ali, 2014).

*Parasilurus triostegus*: See *Silurus triostegus*.


*Saccobranchus fossilus*: See *Heteropneustes fossilis*.


*Saurida undosquamis*: *Hysterothylacium* sp. 1, reported as *Contracaecum* sp. 1 (Bannai, 2002).

*Sillago sihama*: *Echinocephalus* sp. 1 larva (Bannai, 2002; Awad et al., 2003) and *Hysterothylacium* sp. 1, reported as *Contracaecum* sp. 1 (Bannai, 2002).

*Silurus triostegus*, reported also as *Parasilurus triostegus*: *Camallanus* sp., reported as *C. kirandensis* (Jori, 2006), *Contracaecum* sp. 1 larva (Al-Hadithi and Habish, 1977; Habish, 1977; Al-Daraji, 1986; Abdul-Rahman, 1999; Jori, 2006; Abbas, 2007; Al-Jana'e, 2010), *Cucullanus cyprini* (Abdul-Rahman, 1999), *Echinocephalus* sp. 1 larva (Jori, 2006) and *Rhabdochona* sp., misidentified as *R. garuai* (Jori, 2006).

*Sphyraena jello*: *Philometra* sp. 3 (Ali, 2008).

*Sphyra mokarran*: *Hysterothylacium* sp. type BA larva (Ali, 2008; Al-Salim and Ali, 2010).


Synaptura orientalis: See Brachirus orientalis.

Tenualosa ilisha: Contracaecum sp. 1 larva (Al-Janae’e, 2010).


To sum up, it is worthwhile to show here that the 48 nematode taxa so far recorded from fishes of Basrah province represent 60% of the total number of nematode taxa from freshwater and marine fishes of whole Iraq (Mhaisen, 2014). Such high percentage is due to the presence of marine nematodes from fishes of Basrah province in addition to the freshwater nematodes.

Acknowledgements

Thanks are due to Dr. František Moravec of the Institute of Parasitology, Biology Centre of the Academy of Sciences of the Czech Republic for his comments and advice on some nematode taxonamy. Thanks are also due to Dr. Li Liang of the College of Life Science, Hebei Normal University, China for providing us with information on Paraleptus and Acanthocheilus. Thanks are due to Prof. Dr. Yukio Iwatsuki of the Department of Marine Biology and Environmental Sciences, Faculty of Agriculture, University of Miyazaki, Japan for confirming the identity of images of Acanthopagrus arabilicus from Shatt Al-Arab River.

Table 1. List of nematodes of fishes of Basrah province.

<table>
<thead>
<tr>
<th>Phylum Nematoda</th>
<th>Class Adenophorea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Enoplida</td>
<td>Superfamily Trichinelloidea</td>
</tr>
<tr>
<td>Family Capillaridae</td>
<td>Capillaria sp. (9/10)</td>
</tr>
<tr>
<td></td>
<td>Pseudocapillaria tomentosa (Dujardin, 1843) (1/1)</td>
</tr>
<tr>
<td>Class Secernentea</td>
<td>Order Ascaridida</td>
</tr>
<tr>
<td>Superfamily Ascaridoidea</td>
<td>Family Anisakidae</td>
</tr>
<tr>
<td>Acanthocheilus rotundatus (Rudolphi, 1819) adult and larva (2/2)</td>
<td></td>
</tr>
<tr>
<td>Anisakis sp. larva (1/5)</td>
<td></td>
</tr>
<tr>
<td>Anisakidae gen. sp. larva (1/1)</td>
<td></td>
</tr>
<tr>
<td>Contracaecum sp. 1 larva (20/40)</td>
<td></td>
</tr>
<tr>
<td>Contracaecum sp. 2 larva (1/1)</td>
<td></td>
</tr>
<tr>
<td>Hysterothylacium reliquens (Norris &amp; Overstreet, 1975) adult and larva (3/3)</td>
<td></td>
</tr>
<tr>
<td>Hysterothylacium sp. 1 ♀ (4/4)</td>
<td></td>
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<tr>
<td>Hysterothylacium sp. 2 ♂ (1/1)</td>
<td></td>
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<tr>
<td>Hysterothylacium sp. Type BA larva (4/4)</td>
<td></td>
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<tr>
<td>Hysterothylacium sp. Type BB larva (2/2)</td>
<td></td>
</tr>
</tbody>
</table>
Hysterothylacium sp. Type BC larva {2/2}
Hysterothylacium sp. Type BD larva {1/1}
Hysterothylacium sp. Type BE larva {1/1}
Hysterothylacium sp. Type BF larva {1/1}

Mawsonascaris parva Ali, Zhang, Al-Salim & Li, 2012 adult and larva {1/1}

Terranova sp. Type BA larva {5/3}
Terranova sp. Type BB larva {3/3}

Superfamily Seuratoidea

Family Cucullanidae

Cucullanus armatus Yamaguti, 1954 {1/1}
Cucullanus cyprini Yamaguti, 1941 {5/14}

Cucullanus otolithi (Ashraf, Khanum & Farooq, 1977) Al-Salim & Ali, 2011 {1/1}

Cucullanus sp. {1/2}

Cucullanus sp. larva {1/3}

Order Spirurida

Superfamily Camallanoidea

Family Camallanidae

Camallanus sp. 1 {1/1}
Camallanus sp. 2 {1/1}

Camallanus sp. larva {1/1}

Superfamily Dracunculoidea

Family Philometridae

Philometra brachiri Moravec & Ali, 2014 {1/1}
Philometra johnii Moravec & Ali, 2013 {1/1}
Philometra otolithi Moravec & Manoharan, 2013 {1/1}
Philometra piscaria Moravec & Justine, 2014 {1/1}
Philometra strongylurae Moravec & Ali, 2005 {2/2}
Philometra tricorhina Moravec & Ali, 2014 {1/1}
Philometra tylosuri Moravec & Ali, 2005 {1/1}

Philometra spp. 1-4 {4/7}

Philometroides acanthopagri Moravec, Jassim & Al-Salim, 2012 {1/1}
Philometroides cyprini (Ishii, 1931) Nakajima, 1970 {1/1}

Superfamily Gnathostomatoidea

Family Gnathostomatidae

Echinocephalus spp. {2/2}
Echinocephalus sp. 1 larva {3/3}
Echinocephalus sp. 2 larva {2/2}

Family Physalopteridae

Paraleptus sp. {1/1}
Proleptinae gen. sp. type BA larva {1/1}
Proleptinae gen. sp. type BB larva {1/3}

Superfamily Thelazioidae

Family Rhabdochonidae

Rhabdochona sp. {1/1}

Superfamily Spiruroidea

Spiruroidea gen. sp. larva {2/2}

### Footnotes

8 Arranged according to Moravec (2006), Anderson et al. (2009) and Gibbons (2010).

* Numbers in curly brackets occurring after the authority of each parasite refer to number of host species recorded for that parasite in Basrah province/number of hosts recorded for the same parasite from the whole inland waters of Iraq based on data obtained from the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2014).
Table 2. List of fishes of Basrah province and their richness with the nematodes.

<table>
<thead>
<tr>
<th>Class</th>
<th>Order</th>
<th>Family</th>
<th>Species</th>
<th>Author</th>
<th>Year</th>
<th>richness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elasmobranchii</td>
<td>Orectolobiformes</td>
<td>Hemiscylliidae</td>
<td>Chiloscyllium arabicum</td>
<td>Gubanov, 1980</td>
<td>5/5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carcharhiniformes</td>
<td>Carcharhinidae</td>
<td>Carcharhinus dussumieri</td>
<td>Müller &amp; Henle, 1839</td>
<td>2/2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Carcharhinus sorrah</td>
<td>Müller &amp; Henle, 1839</td>
<td>2/2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Rhizoprionodon acutus</td>
<td>Rüppell, 1837</td>
<td>3/3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sphyrnidae</td>
<td></td>
<td>Sphyra mokarran</td>
<td>Rüppell, 1837</td>
<td>1/1</td>
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<td></td>
<td>Triakidae</td>
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<td>Mustelus mosis</td>
<td>Hemrich &amp; Ehrenberg, 1899</td>
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<tr>
<td>Myliobatiformes</td>
<td>Dasyatidae</td>
<td></td>
<td>Himantura randalli</td>
<td>Last, Manjaji-Matsumoto &amp; Moore, 2012</td>
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<td>Order Clupeiformes</td>
<td>Clupeidae</td>
<td>Tenualosa ilisha</td>
<td>Hamilton, 1822</td>
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<td></td>
<td>Cyprinidae</td>
<td></td>
<td>Alburnus sellal</td>
<td>Heckel, 1843</td>
<td>3/6</td>
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<td>Heckel, 1843</td>
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<td>Carassius auratus</td>
<td>Linnaeus, 1758</td>
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<td>Ctenopharyngodon idella</td>
<td>Valenciennes, 1844</td>
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<td>Cyprinus carpio</td>
<td>Linnaeus, 1758</td>
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<td>Leuciscus vorax</td>
<td>Heckel, 1843</td>
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<td>Luciovarbus xanthopterus</td>
<td>Heckel, 1843</td>
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<td>Mesopotamichthys sharpeyi</td>
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<td>Siluriformes</td>
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<td>Bagridae</td>
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<td>Heteropneustidae</td>
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<td>Heteropneustes fossilis</td>
<td>Bloch, 1794</td>
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<td>Siluridae</td>
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<td>Silurus triostegus</td>
<td>Heckel, 1843</td>
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<td>Aulopiformes</td>
<td>Synodontidae</td>
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<td>Saurida tumil</td>
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<tr>
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<td>Belonidae</td>
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<td>Saurida undisquamis</td>
<td>Richardson, 1848</td>
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<td>Belonidae</td>
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<td>Ablelennes hians</td>
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<td>Bleeker, 1850</td>
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<td></td>
<td></td>
<td></td>
<td>Strongylura strongylura</td>
<td>van Hasselt, 1823</td>
<td>1/1</td>
<td></td>
</tr>
</tbody>
</table>
Tylosurus crocodilus (Péron & Lesueur, 1821) {3/3}
Order Cyprinodontiformes
Family Cyprinodontidae
* Aphanius dispar (Rüppell, 1829) {1/1}
Order Perciformes
Family: Carangidae
Carangoides malabricus (Bloch & Schneider, 1801) {1/1}
Family Drepaneidae
Drepane longimana (Bloch & Schneider, 1801) {1/1}
Family Lethrinidae
Lethrinus nebulosus (Forsskål, 1775) {3/3}
Family Sciaenidae
Johnius belangeri (Cuvier, 1830) {3/3}
Johnius dussumieri (Cuvier, 1830) {1/1}
Otolithes ruber (Bloch & Schneider, 1801) {3/3}
Family: Serranidae
Epinephelus coioides (Hamilton, 1822) {1/1}
Family Sillaginidae
Sillago sihama (Forsskål, 1775) {2/2}
Family Sparidae
Acanthopagrus arabicus Iwatsuki, 2013 {2/2}
Family Sphyraenidae
Sphyraena jello (Cuvier, 1829) {1/1}
Family Trichiuridae
Trichurus lepturus Linnaeus, 1758 {1/1}
Order Synbranchiformes
Family Mastacembelidae
* Mastacembelus mastacembelus (Banks & Solander, 1794) {2/6}
Order Mugiliformes
Family Mugilidae
** Chelon subviridis (Valenciennes, 1836) {1/1}
* Liza abu (Heckel, 1843) {2/5}
Order Pleuronectiformes
Family Cynoglossidae
Cynoglossus arel (Bloch & Schneider, 1801) {8/8}
Family Soleidae
Brachirus orientalis (Bloch & Schneider, 1801) {2/2}

§ Richness of fishes with nematodes: number of nematode species recorded in any particular fish in Basrah province/ number of nematode species recorded from that fish from the whole waters of Iraq, based on the index-catalogue of parasites and disease agents of fishes of Iraq (Mhaisen, 2014).
* Freshwater fishes, ** marine fishes entering freshwaters and the remaining fishes are marine fishes.

References


Mehdi, D.S. 1989. Effect of parasites on the biochemical constituents of fishes...


Mhaisen, F.T. 2014. Index-catalogue of parasites and disease agents of fishes of Iraq (Unpublished: mhaisenft@yahoo.co.uk).


Moravec, F. 2010. Some aspects of the taxonomy, biology, possible evolution and biogeography of nematodes of the spirurine genus Rhabdochona


Moravec, F. and Manoharan, J. 2013. Gonad-infecting philometrids (Nematoda: Philometridae) including four new species from marine fishes off the eastern coast of India. Systematic Parasitology, 60(2): 105-122.


قوائم مرجعية للديدان الخيطية في أسماك المياه العلبة والبحرية في محافظة البصرة، العراق

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1641 6B كاترينا هولم، السويد

المستخلص- أظهر استعراض المراجع حول كل الديدان الخيطية المتضمنة على
45 نوعًا من أسماك المياه العلبة والبحرية في محافظة البصرة (ثنائيات أسماء من
صفنية الغلاصم و 37 نوعًا من الأسماك العظمية) وجود 48 مرتبتين تصنيفية
من الديدان الخيطية. من بين تلك الديدان الخيطية سجلت 35 مرتبة من Taxon
مواقع مياه بحرية مقابل 11 منها سجلت من مواقع مياه عذبة وانتقت فقط منها
سجلاً من مواقع مياه بحرية وعذبة نفس الوقت. تعود هذه الديدان إلى صنفين
وثلاث رتب واثنين غواص. جميع الديدان الخيطية هذه تعود لصنف سيرننشيا
بالإضافة إلى مرتبتين تصنيفيتين تعودان لصنف أديفووريا
Taxon. تمثلت رتبة أسكاريديا Ascaridda بهن 22 مرتبة تصنيفية
Adenophorea Enopliida ورتة سباوروريدا Spururida بهن 24 Mرتبة تصنيفية ورتية أنابيلدا
بمرتبتين فقط. تدهن عدد الكلي للمراتب تصنيفية للديدان الخيطية لكل نوع من
الأسماك المتضمنة مابين 17 حدة وحدة هو مرتبة واحدة من الديدان الخيطية في 17
نوعًا مشتقاتاً من الأسماك إلى حد أقصى وهو مرتان مراتب تصنيفية في حالة
فقط. وتذهب عدد أنواع الأسماك Constracaeum sp. الاصابة ببرقاق الدودة
Cynoglossus arel C. Contracaecum sp. الاصابة ببرقاق الدودة
C. Contraeaeum sp. 1