Bull. Iraq Nat. Hist. Mus.
(2014)13 (2): 95-111

CHECKLISTS OF DIPLOZOID SPECIES (MONOGENEA) FROM FISHES OF IRAQ

Furhan T. Mhaisen* and Kefah N. Abdul-Ameer**
*Tegnervägen 6B, Katrineholm 641 36, Sweden
**Department of Biology, College of Education (Ibn Al-Haitham),
University of Baghdad, Baghdad, Iraq
e-mail: mhaisenft@yahoo.co.uk

ABSTRACT

Surveying 59 references concerning the occurrence of the monogeneans of the family Diplozoidae parasitizing fishes of Iraq showed the occurrence of 15 valid species of this family which included one species of *Diplozoon*, one species of *Eudiplozoon* and 13 species of *Paradiplozoon*. In addition to these species, some unidentified adult and larval (diporpa larvae) specimens of the genus *Diplozoon* were reported from 12 fish hosts among which four fish species showed no infection with any of the nominated diplozoid species while the others showed mixed diplozoid infections. These diplozoids were reported from 27 fish host species in Iraq. All the diplozoids were recorded from freshwater habitats except one *Dipolzoon* sp. which was recorded from a marine habitat. Hosts recorded for each of these diplozoids ranged from a minimum of one host in case of both *P. ergensi* and *P. tadzhikistanicum* to a maximum of 13 hosts in case of *P. kasimii*. Among the infected fishes, 13 hosts harbored only one diplozoid species each while a maximum of 10 diplozoid species were reported from both *Leuciscus vorax* and *Cyprinion macrostomum*.

INTRODUCTION

Members of the class Monogenea include small hermaphroditic flat worms that parasitize fishes and other aquatic animals. They infect fins, skin and gills of freshwater and marine fishes (Duijn, 1973). The class Monogenea, used to be known as monogenetic trematodes, includes skin and gill flat worms with direct life cycles (Amlacher, 1970). The monogeneans are important fish pathogens, especially for carp fingerlings under extensive fish culture practice and their direct life cycles and fish crowding are good conditions for their easy spread among fishes (Bauer *et al.*, 1969).

According to their attachment organs that are found in the posterior part of their bodies (haptor), monogeneans are divided into two subclasses: Monopisthocotylea which are provided either with hooks and hooklets and Polyopisthocotylea which are provided with clamps (Gussev, 1985). According to Pugachev *et al.* (2009), these two subclasses are considered as Polyonchoinea and Oligonchoinea, respectively. The Class Monogenea includes 62 families, of which the family Diplozoidae has seven genera (MonoDB, 2014). The range of the family Diplozoidae includes Eurasia (except Siberia) and the Afro-tropical regions (Aioanei, 1996).

Each individual of the two young fused diplozoid worms, forming a cross (Fig. 1), differentiates into two parts (Pugachev *et al.*, 2009): The anterior foliate part, which lies before

the cross, contains the vitellaria and bulk of intestine. The posterior part, which lies behind the cross, is differentiated into three sections: anterior section carrying the genital gland, mid section with termination of intestine trunk and posterior section with ventral surface bearing attachment clamps. The posterior part can have folds and dilations of different shapes which are used to differentiate different genera (Fig. 2).

In Iraq, since the detection of the first diplozoid species from fishes of Iraq (Fattohy, 1975), many surveys were achieved which contributed in recording more diplozoids in Iraq. Results of such surveys are scattered in different local scientific journals, M. Sc. and Ph. D. theses as well as in one report and one conference abstract. Some of such diplozoids have been misidentified or given with wrong authorities and some parasite names are misspelled. Some of the infected fishes were given in synonymous names. For these reasons, it was decided to review these surveys in accordance with list of fishes of Iraq (Coad, 2010) as well as with up-to-date fish scientific names (Froese and Pauly, 2014), to correct scientific names and authorities of the concerned diplozoids according to some major taxonomical references and a web sites (Gussev, 1985; Gibson *et al.*, 2005; Pugachev *et al.*, 2009; MonoDb, 2014) and to provide a host- diplozoid checklist. The monogeneans of fishes of Iraq constitute 30.5% of the total items of the parasitic species of fishes of Iraq (Mhaisen, 2014). The present checklist is the second checklist on monogeneans of Iraq, a continuation to a previous one concerned with gyrodactylids of fishes of Iraq (Mhaisen and Abdul-Ameer, 2013).

SOURCES AND METHODS

A total of 59 references (34 research papers, 19 M. Sc. theses, four Ph. D. theses, one report and one conference abstract) with information concerning diplozoids of fishes of Iraq were used to prepare the present review and checklists. Data from such references was gathered to provide diplozoid list and fish- diplozoid list. Names and authorities of these diplozoids were checked according to some taxonomical accounts (Bykhovskaya-Pavlovskaya *et al.*, 1962; Gussev, 1985; Khotenovsky, 1985; Pugachev *et al.*, 2009) as well as some well known specialized electronic sites (Gibson *et al.*, 2005; MonoDB, 2014). The scientific names of fishes were reported as they appeared in the reviewed Iraqi literature but they were then checked with the recent account on freshwater fishes of Iraq (Coad, 2010), but the valid names used here were based on a well-known electronic site (Froese and Pauly, 2014).

RESULTS AND DISCUSSION

Surveys achieved on diplozoids of fishes in Iraq:

The review of available Iraqi literature indicated that since the description of the first diplozoid species from fishes of Iraq (Fattohy, 1975), many surveys were achieved in different inland waters and fish farms and ponds which contributed in recording more diplozoids. The records of diplozoids of fishes of Iraq can be grouped into eight major categories according to localities of inspected fishes. These are:

1- Tigris River (Fattohy, 1975; Rahemo, 1980; Ali *et al.*, 1987; Abdul-Ameer, 1989; Rasheed, 1989; Rahemo and Ami, 1991; Balasem *et al.*, 1993; Al-Niaeemi, 1997; Rahemo and Al-Kallak, 1998; Adday *et al.*, 1999; Rahemo and Al-Niaeemi, 2001; Al-Jawda *et al.*, 2003; Al-Nasiri, 2009, 2010; Al-Nasiri and Mhaisen, 2009a,b; Al-Jubori, 2013; Rahemo and Ami, 2013) as well as some tributaries of Tigris River which included Greater Zab River (Ali, 1989; Abdullah, 2002; Abdullah and Mhaisen, 2004) and Lesser Zab River (Abdullah, 2002; Abdullah and Mhaisen, 2004; Nasraddin, 2013).

2- Euphrates River and its branches (Mhaisen *et al.*, 1997; Al-Awadi, 2003; Al-Waaly, 2005; Al-Jadoa and Al-Waaly, 2007; Al-Saadi, 2007; Al-Sa'adi, 2007; Hussain, 2007; Al-Saadi *et al.*, 2009, 2010).

3- The region of Shatt Al-Arab River, Basrah which included Garmat Ali River (Al-Ali, 1998; Abdul-Rahman, 1999; Al-Salim and Al-Ali, 2000; Al-Niaeem, 2006; Al-Janae'e, 2010), Al-Salihiya River (Al-Janae'e, 2010) and Mehaijeran Creek (Khamees, 1983; Mhaisen *et al.*, 1986).
4- Some lakes, depressions and marshes: These included surveys from Kasnazan Lake, Erbil (Abdullah, 2004), Darbandikhan Lake (Abdullah, 2013), Dokan Lake (Abdullah, 1990; Abdullah and Rasheed, 2004), Al-Qadisiya Dam Lake (Asmar *et al.*, 1999; Balasem *et al.*, 2003) and Al-Hammar Marsh (Al-Daraji, 1986; Al-Daraji and Al-Salim, 1990).
5- Some drainage networks (Balasem *et al.*, 2002; Asmar *et al.*, 2003; Mhaisen *et al.*, 2003; Al-Waaly, 2005; Al-Jadoa and Al-Waaly, 2007).
6- Khor Al-Zubair Estuary in southern Iraq (Mhaisen and Al-Maliki, 1996).
7- Fish hatcheries (Mama, 2012; Mama and Abdullah, 2012a,b).
8- Fish ponds and farms which included some from Sulaimania (Ali, 2002), Al-Amiriya region, Baghdad (Al-Nasiri, 2000, 2003), Babylon (Al-Zubaidy, 1998; Muhammed, 2000; Al-Taei, 2013) in addition to some floating cages at Shatt Al-Hilla (Al-Taei, 2013).

Diplozoids recorded from fishes in Iraq:

The review of literature indicated that a total of 15 valid diplozoid species, belonging to genera *Diplozoon*, *Eudiplozoon* and *Paradiplozoon* are so far known from fishes of Iraq in addition to some unidentified specimens of the genus *Diplozoon*. Table (1) shows an up-to-date list of all diplozoids so far recorded from fishes of Iraq.

As the identification of the three diplozoid genera was confused in some Iraqi literature, the following key, modified from Seddon (2004) and Pugachev *et al.* (2009), is given to fulfill their exact and easy recognition.

1(2). There are no dilations of the middle part of the posterior end of the body ……..…… *Paradiplozoon*
2(1). The middle part of the posterior end of the body toward the posterior end has dilations of different shapes ……..…….……...… 3
3(4). Dilations of the middle part of the posterior end of the body have large folds ……..…...……...…..…… *Eudiplozoon*
4(3). Dilations of the middle part of the posterior end of the body are without folds ..……...……...…. *Diplozoon*

The following is an account of the alphabetical list of such parasites in Iraq. Diplozoid names and their authorities are checked according to some major taxonomical accounts and web sites (Gussev, 1985; Gibson *et al.*, 2005; Pugachev *et al.*, 2009; MonoDb, 2014). The alphabetically arranged names of hosts for each parasite are quoted as they appeared in their original literature but the valid names have been updated according to Froese and Pauly (2014) and the full authority of each valid fish host is shown in the host- diplozoid list. References on records of each host infected with each diplozoid species are chronologically arranged but references of the same year are alphabetically arranged.

1- *Diplozoon paradoxum* von Nordmann, 1832:

This parasite was reported for the first time in Iraq from *Barbus luteus*, which is a synonym of *Carasobarbus luteus*, from Al-Husainia creek, Karbala province by Al-Saadi (2007). Now, it has five hosts (Mhaisen, 2014). These are: *Aspius vorax*, which is a synonym of *Leuciscus vorax* (Al-Sa'adi, 2007), *B. luteus*, which is a synonym of *C. luteus* (Al-Saadi, 2007; Al-Saadi *et al.*, 2009; 2010), *Cyprinion macrostomum* (Al-Nasiri, 2009; Al-Jubori, 2013), *Cyprinus carpio* (Al-Sa'adi, 2007; Al-Taei, 2013) and *Liza abu* (Al-Sa'adi, 2007).

2- *Diplozoon* spp.:

Different adult specimens of unidentified *Diplozoon* were reported from different parts of Iraq from the following 11 fish hosts (Mhaisen, 2014). These are: *Alburnus caeruleus* (Al-Jawda *et al.*, 2003), *Alburnus capito*, which is a synonym of *A. mossulensis* (Al-Jawda *et al.*, 2003), *A. vorax*, which is a synonym of *L. vorax* (Abdul-Rahman, 1999), *B. luteus*, which is a synonym of *C. luteus* (Al-Waaly, 2005; Al-Jadoa and Al-Waaly, 2007), *C. macrostomum* (Abdullah, 2004), *C. carpio* (Abdul-Rahman, 1999; Muhammed, 2000; Ali, 2002), *Heteropneustes fossilis* (Abdul-Rahman, 1999), *Leuciscus lepidus*, which is a synonym of *Squalius lepidus* (Abdullah, 2004), *L. abu* (Abdul-Rahman, 1999), *Mastacembelus mastacembelus* (Abdul-Rahman, 1999) and *Periophthalmus waltoni* (Mhaisen and Al-Maliki, 1996). The above record of *Diplozoon* sp. from *P. waltoni* is the only record of diplozoids from marine fishes of Iraq.

In addition to the above mentioned records of adult unidentified *Diplozoon* specimens, larval stages (diporpa) of unidentified *Diplozoon* species were reported from three fish hosts in Iraq. These are: *A. vorax*, which is a synonym of *L. vorax* (Al-Daraji, 1986; Al-Ali, 1998; Al-Salim and Al-Ali, 2000), *B. luteus*, which is a synonym of *C. luteus* (Al-Nasiri, 2000) and *Silurus glanis* (Al-Niaeemi, 1997; Rahemo and Al-Niaeemi, 2001).

3- *Eudiplozoon nipponicum* (Goto, 1891):

This parasite was recorded for the first time in Iraq from *C. carpio* by Al-Nasiri (2003) as *Diplozoon nipponicum* but then, it was reported as *E. nipponicum* by all subsequent researchers. So far, three hosts are known for *E. nipponicum* in Iraq (Mhaisen, 2014). These are: *A. vorax*, which is a synonym of *L. vorax* (Al-Jubori, 2013), *Barbus sharpeyi*, which is a synonym of *Mesopotamichthys sharpeyi* (Al-Saadi, 2007; Al-Saadi *et al.*, 2010) and *C. carpio* (Al-Nasiri, 2003 as *D. nipponicum*; Al-Sa'adi, 2007; Al-Jubori, 2013; Al-Taei, 2013).

4- *Paradiplozoon amurense* (Akhmerov, 1974):

This parasite was recorded for the first time in Iraq from *C. macrostomum* by Al-Nasiri (2010) and then from the same host as well as from *B. luteus*, which is a synonym of *C. luteus* by Al-Jubori (2013). It is appropriate to mention here that both Al-Nasiri (2010) and Al-Jubori (2013) had stated the specific name as *amurensis* instead of *amurense* and Al-Nasiri (2010) erroneously stated the authority of this parasite without brackets. According to Gussev (1985), Pugachev *et al.* (2009) and a personal communication between the senior author of this paper and Dr. David I. Gibson of the British Museum (Natural History) on 24th April 2014, the specific name should be *amurense* and not *amurensis* as it was erroneously stated (Al-Nasiri, 2010; Al-Jubori, 2013). Also, the authority should be inside the brackets (Gussev, 1985, Gibson *et al.*, 2005; Pugachev *et al.*, 2009).

5- *Paradiplozoon barbi* (Reichenbach-Klinke, 1951):

This parasite was reported for the first time in Iraq from *Chondrostoma nasus*, *C. regium* (erroneously reported as *C. regius*) and *C. carpio* by Rasheed (1989) as *Diplozoon barbi* Reichenbach-Klinke, 1951. Also, all the subsequent records in the Iraqi literature referred to this parasite as *D. barbi*. According to Khotenovsky (1985), *D. barbi* is a synonym of *P. barbi*. Eight hosts are so far known for this parasite in Iraq (Mhaisen, 2014). These are: *Acanthobrama marmid* (Abdullah, 2002; Abdullah and Mhaisen, 2004), *Barbus esocinus*, which is a synonym of *Luciobarbus esocinus* (Rahemo and Ami, 2013), *B. luteus*, which is a synonym of *C. luteus* (Rahemo and Al-Kallak, 1998; Al-Saadi, 2007; Al-Saadi *et al.*, 2010), *C. nasus* (Rasheed, 1989), *C. regium* (Rasheed, 1989; Abdullah, 2002; Abdullah and Mhaisen, 2004), *C. macrostomum* (Ali, 1989; Al-Nasiri, 2009), *C. carpio* (Rasheed, 1989; Al-Zubaidy,

1998; Al-Saadi, 2007; Al-Nasiri, 2009; Al-Saadi *et al.*, 2010) and *Leuciscus spurius*, which is a synonym of *Squalius spurius* (Ali, 1989).

6- *Paradiplozoon bliccae* (Reichenbach-Klinke, 1961):

This parasite was reported for the first time in Iraq from both *C. macrostomum* and *C. carpio* by Al-Nasiri (2009). Later on, it was recorded from both *C. macrostomum* and *L. abu* by Al-Jubori (2013). So, three hosts are so far known for *P. bliccae* in Iraq.

7- *Paradiplozoon cyprini* Khotenovsky, 1982:

This parasite was reported for the first time in Iraq from *Barbus grypus* (Al-Nasiri and Mhaisen, 2009a). Later on, it was reported from the same host (Al-Nasiri and Mhaisen, 2009b) as well as three other hosts: *B. luteus*, which is a synonym of *C. luteus* (Al-Jubori, 2013), *C. macrostomum* (Al-Jubori, 2013) and *C. carpio* (Mama, 2012; Mama and Abdullah, 2012a, b; Nasraddin, 2013).

8- *Paradiplozoon ergensi* (Pejčoch, 1968):

This parasite was reported for the first time in Iraq from *A. vorax*, which is a synonym of *L. vorax* by Al-Jubori (2013). No more records are so far available in Iraq (Mhaisen, 2014).

9- *Paradiplozoon homoion* (Bychowsky & Nagibina, 1959):

This parasite was reported for the first time in Iraq from *Barbus xanthopterus*, which is a synonym of *Luciobarbus xanthopterus* by Al-Saadi (2007). Later on, it was reported from *A. vorax*, which is a synonym of *L. vorax* (Al-Sa'adi, 2007), *B. xanthopterus*, which is a synonym of *L. xanthopterus* (Al-Sa'adi, 2007; Al-Saadi *et al.*, 2009, 2010), *C. macrostomum* (Nasraddin, 2013) and *C. carpio* (Al-Sa'adi, 2007).

10- *Paradiplozoon kasimii* (Rahemo, 1980):

This parasite was reported for the first time in Iraq from *C. macrostomum*, erroneously reported as *C. macrostomus*, from Tigris River in Mosul by Fattohy (1975) and published by Rahemo (1980) as *Diplozoon kasimii*. Khotenovsky (1985) transferred this parasite to the genus *Paradiplozoon* and considered it as a species inquirenda as in its description it was unknown about the presence or absence of folds on the ventral posterior part of the body, a clamp structure, size and shape of the median hooks, sizes of suckers and eggs form. Now, *P. kasimii* has 13 fish hosts in Iraq (Mhaisen, 2014) although all references concerned with this parasite in Iraq still refer to it as *D. kasimii*. These hosts are *A. caeruleus* (Asmar *et al.*, 2003; Mhaisen *et al.*, 2003), *A. vorax*, which is a synonym of *L. vorax* (Balasem *et al.*, 1993; Mhaisen *et al.*, 1997; Abdul-Rahman, 1999; Asmar *et al.*, 1999; Al-Janae'e, 2010), *B. esocinus*, which is a synonym of *L. esocinus* (Asmar *et al.*, 1999), *B. luteus*, which is a synonym of *C. luteus* (Al-Daraji and Al-Salim, 1990; Abdul-Rahman, 1999; Asmar *et al.*, 1999; Al-Awadi, 2003; Al-Waaly, 2005; Al-Jadoa and Al-Waaly, 2007; Al-Saadi, 2007; Al-Saadi *et al.*, 2010) in addition to *C. luteus* (Khamees, 1983; Al-Daraji, 1986; Mhaisen *et al.*, 1986), *B. sharpeyi*, which is a synonym of *M. sharpeyi* (Abdul-Rahman, 1999; Balasem *et al.*, 2002), *B. xanthopterus*, which is a synonym of *L. xanthopterus* (Asmar *et al.*, 1999; Hussain, 2007), *Carassius carassius* (Abdul-Rahman, 1999), *Chalcalburnus sellal*, which is a synonym of *Alburnus sellal* (Abdul-Rahman, 1999), *C. macrostomum* (Fattohy, 1975; Rahemo, 1980; Ali *et al.*, 1987; Abdul-Ameer, 1989; Abdullah, 2002; Abdullah and Mhaisen, 2004; Hussain, 2007), *C. carpio* (Abdul-Rahman, 1999; Al-Niaeem, 2006), *Garra rufa* (Balasem *et al.*, 2002), *L. abu* (Al-Janae'e, 2010) and *Liza subviridis* which is a synonym of *Chelon subviridis* (Abdul-Rahman, 1999).

11- *Paradiplozoon leucisci* Khotenovsky, 1982:

This parasite was reported for the first time in Iraq from both *Hemiculter leucisculus* and *S. lepidus* by Abdullah (2013). No more records are so far available in Iraq (Mhaisen, 2014).

12- *Paradiplozoon megan* (Bychowsky & Nagibina, 1959):

This parasite was reported for the first time in Iraq from both *A. vorax*, which is a synonym of *L. vorax* and *B. xanthopterus*, which is a synonym of *L. xanthopterus*, by Al-Saadi (2007). Later on, it was reported from the above two hosts (Al-Saadi *et al.*, 2009, 2010) as well as from *B. luteus*, which is a synonym of *C. luteus* (Al-Sa'adi, 2007).

13- *Paradiplozoon pavlovskii* (Bychowsky & Nagibina, 1959):

This parasite was reported for the first time in Iraq from *A. vorax*, which is a synonym of *L. vorax* by Khamees (1983) under the name *Diplozoon pavlovskii*. Some other reports referred to it as *D. pavlovskii* (Mhaisen *et al.*, 1986; Abdul-Ameer, 1989; Abdullah, 1990; Rahemo and Ami, 1991; Adday *et al.*, 1999; Al-Nasiri, 2000; Abdullah, 2002; Balasem *et al.*, 2003; Abdullah and Mhaisen, 2004; Abdullah and Rasheed, 2004) but some other reports referred to it under its valid name *P. pavlovskii* (Al-Daraji, 1986; Al-Daraji and Al-Salim, 1990; Al-Niaeemi, 1997; Abdul-Rahman, 1999; Rahemo and Al-Niaeemi, 2001; Al-Saadi, 2007; Al-Nasiri, 2009; Al-Saadi *et al.*, 2010; Abdullah, 2013; Al-Jubori, 2013). The overall hosts for this parasite and its synonyms (indicated with an asterisk) are so far 11 hosts in Iraq (Mhaisen, 2014). These are: *A. vorax*, which is a synonym of *L. vorax* (Khamees, 1983*; Al-Daraji, 1986; Mhaisen *et al.*, 1986*; Al-Daraji and Al-Salim, 1990; Abdul-Rahman, 1999; Adday *et al.*, 1999*; Al-Nasiri, 2000*; Al-Saadi, 2007; Al-Saadi *et al.*, 2010), *Barbus barbulus* (Abdullah, 1990*; 2002*; Abdullah and Mhaisen, 2004*), *B. luteus*, which is a synonym of *C. luteus* (Abdul-Ameer, 1989*; Al Daraji and Al-Salim, 1990; Abdul-Rahman, 1999; Balasem *et al.*, 2003*; Al-Saadi, 2007; Al-Saadi *et al.*, 2010), *C. luteus* (Al-Daraji, 1986), *B. sharpeyi*, which is a synonym of *M. sharpeyi* (Balasem *et al.*, 2003*), *B. xanthopterus*, which is a synonym of *L. xanthopterus* (Abdullah, 2002*; Balasem *et al.*, 2003*; Abdullah and Mhaisen, 2004*; Al-Saadi, 2007; Al-Saadi *et al.*, 2010), *C. carassius* (Abdul-Rahman, 1999), *C. regium* (Abdul-Ameer, 1989*; Adday *et al.*, 1999*; Al-Nasiri, 2009; Abdullah, 2013), *C. macrostomum* (Abdullah, 1990*; Abdullah and Rasheed, 2004*; Al-Nasiri, 2009; Al-Jubori, 2013), *C. carpio* (Al-Nasiri, 2009), *S. glanis* (Al-Niaeemi, 1997; Rahemo and Al-Niaeemi, 2001) and *Varicorhina trutta*, which is a synonym of *Capoeta trutta* (Rahemo and Ami, 1991*).

14- *Paradiplozoon rutili* (Gläser, 1967):

This parasite was reported for the first time in Iraq from both *A. vorax*, which is a synonym of *L. vorax* and *C. macrostomum* by Al-Jubori (2013). No more records are so far available in Iraq (Mhaisen, 2014).

15- *Paradiplozoon tadzhikistanicum* (Gavrilova & Dzhalilov, 1965):

This parasite was reported for the first time in Iraq from *C. trutta* by Nasraddin (2013). It is appropriate to mention here that Nasraddin (2013) erroneously reported the name as *P. tadjikistanicum* while the correct name is *P. tadzhikistanicum* (Gussev, 1985; Khotenovsky, 1985; Aioanei, 1996; Gibson *et al.*, 2005) and she didn't put the authority inside the brackets. The second name in the authority of this parasite was given as Djalilov by Pugachev *et al.* (2009) and Nasraddin (2013) while it was stated as Dzhalilov by Gussev (1985) and Gibson *et al.* (2005). No more records are so far available for this parasite in Iraq (Mhaisen, 2014).

16- *Paradiplozoon vojteki* (Pejčoch, 1968):

This parasite was reported for the first time in Iraq from *B. xanthopterus*, which is a synonym of *L. xanthopterus* by Al-Saadi (2007). Later on, it was reported from the same host (Al-Saadi *et al*., 2009, 2010) as well as from *A. vorax*, which is a synonym of *L. vorax* (Al-Sa'adi, 2007; Al-Jubori, 2013) and *B. luteus*, which is a synonym of *C. luteus* (Al-Jubori, 2013). It is appropriate to mention here that Gibson *et al.* (2005) and Pugachev *et al.* (2009) spelled the authority name of this parasite as Pejcoch instead of Pejčoch.

Fish-Diplozoids List:

The following list shows which diplozoids are so far recorded from fishes of Iraq. Fish scientific names, both valid and synonymous, are alphabetically arranged. The full authorities of the valid hosts only are also cited according to Froese and Pauly (2014). Diplozoid species reported from each valid fish species, together with diplozoids of fish synonym (when applicable) were gathered within the valid host and also alphabetically arranged. To minimize the size of this article, references for each diplozoid species from each host are not provided here. Such references can be easily obtained from the relevant diplozoid species mentioned earlier in this paper.

Acanthobrama marmid Heckel, 1843: *Paradiplozoon barbi*.
Alburnus caeruleus Heckel, 1843: *Diplozoon* sp. and *Paradiplozoon kasimii*.
Alburnus capito: See *Alburnus mossulensis*.
Alburnus mossulensis Heckel, 1843, reported as *A. capito*: *Diplozoon* sp.
Alburnus sellal Heckel, 1843, reported as *Chalcalburnus sellal*: *Paradiplozoon kasimi*.
Aspius vorax: See *Leusiscus vorax*.
Barbus barbulus Heckel, 1847: *Paradiplozoon pavlovskii*.
Barbus esocinus: See *Luciobarbus esocinus*.
Barbus grypus Heckel, 1843: *Paradiplozoon cyprini*.
Barbus luteus: See *Carasobarbus luteus*.
Barbus sharpeyi: See *Mesopotamichthys sharpeyi*.
Barbus xanthopterus: See *Luciobarbus xanthopterus*.
Capoeta trutta (Heckel, 1943), also reported as *Varicorhinus trutta*: *Paradiplozoon pavlovskii* and *P. tadzhikistanicum.*
Carasobarbus luteus (Heckel, 1843), also reported as *B. luteus*: *D. paradoxum*, *Diplozoon* sp. (adult and diporpa larva), *Paradiplozoon amurense*, *P. barbi*, *P. cyprini*, *P. kasimii*, *P. megan*, *P. pavlovskii* and *P. vojteki*.
Carassius carassius (Linnaeus, 1758): *Paradiplozoon kasimii* and *P. pavlovskii*.
Chalcalburnus sellal: See *Alburnus sellal*.
Chelon subviridis (Valenciennes, 1836), reported as *Liza subviridis*: *Paradiplozoon kasimii*.
Chondrostoma nasus (Linnaeus, 1758): *Paradiplozoon barbi*.
Chondrostoma regium (Heckel, 1843): *Paradiplozoon barbi* and *P. pavlovskii*.
Cyprinion macrostomum Heckel, 1843: *Diplozoon paradoxum*, *Diplozoon* sp., *Paradiplozoon amurense*, *P. barbi*, *P. bliccae*, *P. cyprini*, *P. homoion*, *P. kasimii*, *P. pavlovskii* and *P. rutili*.
Cyprinus carpio Linnaeus, 1758: *Diplozoon paradoxum*, *Diplozoon* sp., *Eudiplozoon nipponicum*, *Paradiplozoon barbi*, *P. bliccae*, *P. cyprini*, *P. homoion*, *P. kasimii* and *P. pavlovskii*.
Garra rufa (Heckel, 1843): *Paradiplozoon kasimii*.
Hemiculter leucisculus (Basilewsky, 1855): *Paradiplozoon leucisci*.
Heteropneustes fossilis: *Diplozoon* sp.
Leusiscus lepidus: See *Squalius lepidus*.
Leusiscus spurius: See *Squalius spurius*.

Leusiscus vorax (Heckel, 1843), reported as *Aspius vorax*: *Diplozoon paradoxum*, *Diplozoon* sp. (adult and diporpa larva), *Eudiplozoon nipponicum*, *Paradiplozoon ergensi*, *P. homoion*, *P. kasimii*, *P. megan*, *P. pavlovskii*, *P. rutili* and *P. vojteki*.

Liza abu (Heckel, 1843): *Diplozoon paradoxum*, *Diplozoon* sp., *Paradiplozoon bliccae* and *P. kasimi*.

Liza subviridis: See *Chelon subviridis*:

Luciobarbus esocinus Heckel, 1843, reported as *B. esocinus*: *Paradiplozoon barbi* and *P. kasimii*.

Luciobarbus xanthopterus Heckel, 1943, reported as *B. xanthopterus*: *Paradiplozoon homoion*, *P. kasimii*, *P. megan*, *P. pavlovskii* and *P. vojteki*.

Mastacembelus mastacembelus (Banks & Solander, 1794): *Diplozoon* sp.

Mesopotamichthys sharpeyi (Günther, 1874), reported as *B. sharpeyi*: *Eudiplozoon nipponicum*, *Paradiplozoon kasimii* and *P. pavlovskii*.

Periophthalmus waltoni Koumans, 1941: *Diplozoo*n sp.

Silurus glanis Linnaeus, 1758: *Diplozoon* sp. (diporpa larva) and *Paradiplozoon pavlovskii*.

Squalius lepidus Heckel, 1843, also reported as *Leuciscus lepidus*: *Diplozoon* sp. and *Paradiplozoon leucisci*.

Squalius spurius Heckel, 1843, reported as *Leuciscus spurius*: *Paradiplozoon barbi*.

Varicorhinus trutta: See *Capoeta trutta*.

ACKNOWLEDGEMENTS

Thanks are due to Dr. David I. Gibson of the British Museum (Natural History), London for his declaration about the specific name of the monogenean *Paradiplozoon amurense*. Also, thanks are due to Dr. Delane C. Kritsky of the Idaho State University for his comments and Prof. Dr. Erhan Soylu of Marmara University, Turkey for sending the senior author a copy of Khotenovsky's (1985) paper.

LITERATURE CITED

Abdul-Ameer, K. N. 1989. Study of the parasites of freshwater fishes from Tigris River in Salah Al-Dien province, Iraq. M. Sc. Thesis, Coll. Sci., Univ. Baghdad: 98pp. (In Arabic).

Abdullah, S. M. A. 1990. Survey of the parasites of fishes of Dokan Lake. M. Sc. Thesis, Coll. Sci., Univ. Salahaddin: 115pp. (In Arabic).

Abdullah, S. M. A. 2002. Ecology, taxonomy and biology of some parasites of fishes from Lesser Zab and Greater Zab rivers in north of Iraq. Ph. D. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 153pp. (In Arabic).

Abdullah, S. M. A. 2004. Comparison between the parasitic infections of fishes caught in two of each of small natural habitats and fish farms in Erbil city. Zanco, 16(4): 43-50. (In Arabic).

Abdullah, S. M. A. & Mhaisen, F. T. 2004. Parasitic infections with monogenetic trematodes on fishes of Lesser Zab and Greater Zab rivers in northern Iraq. Zanco, 16(4): 43-52.

Abdullah, S. M. A. & Rasheed, A. A. M. 2004. Parasitic fauna of some freshwater fishes from Dokan Lake, north of Iraq. I: Ectoparasites. Ibn Al-Haitham J. Pure Appl. Sci., 17(1): 34-46.

Abdullah, Y. S. 2013. Study on the parasites of some fishes from Darbandikhan Lake in Kurdistan region, Iraq. M. Sc. Thesis, Fac. Sci. & Sci. Educ., Univ. Sulaimani: 116pp.

Abdul-Rahman, N. M. 1999. Parasites infection in fish from Garmat Ali River and its relation with food items. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 103pp. (In Arabic).

Adday, T. K.; Balasem, A. N.; Mhaisen, F. T. & Al-Khateeb, G. H. 1999. A second survey of fish parasites from Tigris River at Al-Zaafaraniya, south of Baghdad. Ibn Al-Haitham J. Pure Appl. Sci., 12(1): 22-31.

Aioanei, F. 1996. Continental and peripheral lineages of monogeneans in fresh waters. Trav. Mus. Hist. Nat., «Grigore Antipas», 36: 391-424.

Al-Ali, Z. A. J. R. 1998. A study of some trematodes and its histopathological effects from three species of fish (family Cyprinidae) in Basrah province. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 107pp. (In Arabic).

Al-Awadi, H. M. H. 2003. Parasitic faunae (Protozoa and Monogenea) of six species of fish from Euphrates River near Kufa district (Najaf Al-Ashraf province), Iraq. Babylon Univ. J., Pure Appl. Sci., 8(3): 529-532.

Al-Daraji, S. A. M. 1986. Survey of parasites from five species of fishes found in Al-Hammar Marsh. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 130pp. (In Arabic).

Al-Daraji, S. A. M. & Al-Salim, N. K. 1990. Parasitic fauna of five species of fishes from Al-Hammar Marsh, Iraq. I: Protozoa and Monogenea. Mar. Mesopot., 5(2): 275-282.

Ali, B. A.-R. 1989. Studies on parasites of some freshwater fishes from Greater Zab- Iski-Kalak. M. Sc. Thesis, Coll. Sci., Univ. Salahadden: 120pp. (In Arabic).

Ali, M. D. 2002. A survey on health and diseases of carp fish raised in fish culture projects/ Erbil, Duhok and Suliemanyia region & other activities. Report prepared for FAO Representation in Iraq. FAO Coordination Office for Northern Iraq- Animal Production Unit: 33pp.

Ali, N. M.; Salih, N. E. & Abdul-Ameer, K. N. 1987. Parasitic fauna of some freshwater fishes from Tigris River, Baghdad, Iraq. II: Trematoda. J. Biol. Sci. Res., 18(2): 19-27.

Al-Jadoa, N. A. & Al-Waaly, A. B. M. 2007. A comparative study of monogenetic parasites of *Barbus luteus* in Al-Daghara River and drainage water and new record in Iraq of cestodes worm *Eubothrium salvelini*. Al-Qadisia J. Vet. Med. Sci., 6(1): 72-78. (In Arabic).

Al-Janae'e, A. M. S. 2010. Parasites of some Iraqi fishes in two localities varied in their trophic levels in inland water of Basrah. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 228pp. (In Arabic).

Al-Jawda, J. M.; Balasem, A. N.; Mhaisen, F. T.; Al-Shaikh, S. M. J.; Asmar, K. R. & Adday, T. K. 2003. Some fish parasites from Tigris River at Neinava province, north of Iraq. Basrah J. Agric. Sci., 16(2): 19-29.

Al-Jubori, M. I. A. 2013. Parasitic infections of some cyprinid and mugilid families fishes from Tigris River passing through Tikrit city. M. Sc. Thesis, Coll. Sci., Univ. Tikrit: 86pp. (In Arabic).

Al-Nasiri, F. S. 2000. Parasitic infections of fishes in a man-made lake at Al-Amiriya region, Baghdad. M. Sc. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 133pp. (In Arabic).

Al-Nasiri, F. S. 2003. First occurrence of the monogenetic trematode *Diplozoon nipponicum* Goto, 1891 in Iraq from common carp *Cyprinus carpio* (Pisces). Iraqi J. Agric. (Spec. Issue), 8(6): 95-99.

Al-Nasiri, F. S. 2009. Diplozoid species (Monogenea) parasitizing gills of some cyprinid fishes from Tigris River passing through Tikreet city, Salah Al-Deen province. Iraqi J. Agric. (Spec. Issue), 14(5): 182-186.

Al-Nasiri, F. S. 2010. First record of *Paradiplozoon amurensis* (Monogenea: Diplozoidae) in Iraq from gills of the cyprinid fish *Cyprinion macrostomum*. Parassitologia, 52: 439-440.

Al-Nasiri, F. S. & Mhaisen, F. T. 2009a. First record of *Paradiplozoon cyprini* Khotenovsky, 1982 (Monogenea: Diplozoidae) in Iraq, from gills of the cyprinid fish *Barbus grypus*. J. Tikrit Univ. Agric. Scs., 9(1): 535-540.

Al-Nasiri, F. S. & Mhaisen, F. T. 2009b. Parasites of fishes collected from Tigris River, Salah Al-Deen province, Iraq. Ibn Al-Haitham J. Pure Appl. Sci., 22(2): 1-8.

Al-Niaeem, K. S. K. 2006. Infection distribution of fish parasites in Basrah province and pathological effects of *Saprolegnia* sp. and its susceptibility to some plant extracts. Ph. D. Thesis, Coll. Agric., Univ. Basrah: 172pp. (In Arabic).

Al-Niaeemi, B. H. S. 1997. A study on parasites of the fish *Silurus glanis* L., from Tigris River in Mosul city with special reference to the histopathological effects caused by some infections. M. Sc. Thesis, Coll. Sci., Univ. Mosul: 116pp. (In Arabic).

Al-Saadi, A. A. J. J. 2007. Ecology and taxonomy of parasites of some fishes and biology of *Liza abu* from Al-Husainia creek in Karbala province, Iraq. Ph. D. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 155pp. (In Arabic).

Al-Saadi, A. A. J.; Mhaisen, F. T. & Hasan, H. R. 2009. Description of five monogenetic trematodes for the first time from fishes of Iraq. Iraqi J. Agric. (Spec. Issue), 14(1): 187-193.

Al-Saadi, A. A. J.; Mhaisen, F. T. & Hasan, H. R. 2010. Ectoparasites of seven fish species from Al-Husainia creek, Karbala province, mid Iraq. J. Kerbala Univ., 8(4): 1-7.

Al-Sa'adi, B. A.-H. E. 2007. The parasitic fauna of fishes of Euphrates River: Applied study in Al-Musaib city. M. Tech. Thesis, Al-Musaib Technic. Coll., Found. Technic. Educ.: 102pp. (In Arabic).

Al-Salim, N. K. & Al-Ali, Z. A. 2000. A study of some trematodes and its histopathological effects from three species of fish (family Cyprinidae) in Basrah province. 1- Taxonomy study. Mar. Mesopot., 15(2): 459-473. (In Arabic).

Al-Taei, N. T. M. 2013. Study of some of the environmental aspects for a group of the external parasitic animals for common carp *Cyprinus carpio* L. in cages and pond at Al-Saddah/ Babylon province. M. Tech. Thesis, Al-Musayab Technic. Coll., Found. Technic. Educ.: 117 pp. (In Arabic).

Al-Waaly, A. B. M. 2005. A comparative study for parasites of *Barbus luteus* fishes in Al-Daghara River and drainage water. M. Sc. Thesis, Coll. Educ., Univ. Al-Qadisia: 101pp. (In Arabic).

Al-Zubaidy, A. B. 1998. Studies on the parasitic fauna of carps in Al-Furat fish farm, Babylon province, Iraq. Ph. D. Thesis, Coll. Sci., Univ. Babylon: 141pp. (In Arabic).

Amlacher, E. 1970. Textbook of fish diseases (Engl. transl.). T.F.H. Publ., Jersey City: 302pp.

Asmar, K. R.; Balasem, A. N.; Adday, T. K. & Al-Jawda, J. M. (2003). Parasitic infections in some lotic water systems in mid Iraq. Iraqi J. Agric. (Spec. Issue), 8(6): 59-65. (In Arabic).

Asmar, K. R.; Balasem, A. N.; Mhaisen, F. T.; Al-Khateeb, G. H. & Al-Jawda, J. M. 1999. Survey of the parasites of some fish species from Al-Qadisiya Dam Lake, Iraq. Ibn Al-Haitham J. Pure Appl. Sci., 12(1): 52-61.

Balasem, A. N.; Mhaisen, F. T.; Al-Jawda, J. M. & Asmar, K. R. 2002. Collection of some fish parasites from the northern sector of Saddam's River, mid Iraq. Sci. J. Iraqi Atom. Energy Commiss., 4(2): 186-191.

Balasem, A. N.; Mhaisen, F. T.; Adday, T. K.; Al-Jawda, J. M. & Asmar, K. R. 2003. A second survey of parasitic infections in freshwater fishes from Al-Qadisiya Dam Lake, Euphrates River, Iraq. Mar. Mesopot., 18(2): 123-140. (In Arabic).

Balasem, A. N.; Mhaisen, F. T.; Al-Shaikh, S. M. J.; Al-Khateeb, G. H.; Asmar, K. R. & Adday, T. K. 1993. Survey of fish parasites from Tigris River at Al-Zaafaraniya, south of Baghdad, Iraq. Mar. Mesopot., 8(3): 226-235.

Bauer, O. N.; Musselius, V. A. & Strelkov, Yu. A. 1969. Diseases of pond fishes. Izdat. Kolos, Moscow: 220pp. (In Russian).

Bykhovskaya-Pavlovskaya, I. E.; Gusev, A. V.; Dubinina, M. N.; Izyumova, N. A.; Smirnova, T. S.; Sokolovskaya, I. L.; Shtein, G. A.; Shul'man, S. S. & Epshtein, V. M. 1962. Key to parasites of freshwater fish of U.S.S.R. Akad. Nauk, S.S.S.R., Moscow: 727pp. (In Russian).

Coad, B. W. 2010. Freshwater fishes of Iraq. Pensoft Publ., Moscow: 274pp. + 16pls.

Duijn, van C. Jnr. 1973. Diseases of fishes, 3rd edn., Iliffe Books, London: 372pp.

Fattohy, Z. I. 1975. Studies on the parasites of certain teleostean fishes from the River Tigris, Mosul, Iraq. M. Sc. Thesis, Coll. Sci., Univ. Mosul: 136pp.

Froese, R. & Pauly, D. (Eds.). 2014. FishBase. World Wide Web electronic publication. www.fishbase.org. (Version April 2014).

Gibson, D. I.; Bray, R. A. & Harris, E. A. (Compilers). 2005. Host-Parasite Database of the Natural History Museum, London. URL.

Gussev, A. V. 1985. Parasitic metazoans: Class Monogenea. In: Bauer, O.N. (Ed.). Key to the parasites of freshwater fish fauna of U.S.S.R., Vol. 2. Nauka, Petersburg: 1-424. (In Russian).

Hussain, H. T. 2007. Survey of ectoparasites of some fishes of Al-Hilla River in Babylon province. J. Babylon Univ., Sci., 14(3): 228-232. (In Arabic).

Khamees, N. R. 1983. A study of the parasites of *Carasobarbus luteus* (Heckel), *Liza abu* (Heckel) and *Aspius vorax* Heckel from Mehaijeran canal, south of Basrah. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 148pp. (In Arabic).

Khotenovsky, I. A. 1985. Suborder Octomacrinea Khotenovsky (Fauna of the USSR, Monogenea, New Series No. 132). Nauka Publishing House, Petersburg: 262pp. (In Russian).

Mama, K. S. 2012. A comparative study on the parasitic fauna of the common carp *Cyprinus carpio* from Ainkawa Fish Hatchery (Erbil) and Lesser Zab River in Kurdistan Region, Iraq. M. Sc. Thesis, Coll. Educ.- Sci. Dept., Univ. Salahaddin: 89pp.

Mama, K. S. & Abdullah, S. M. A. 2012a. First record of *Paradiplozoon cyprini* Khotenovsky, 1982 (Monogenea) on common carp *Cyprinus carpio* from Ainkawa Fish Hatchery in Kurdistan Region, Iraq. Int. J. Environ. Wat., 1(1): 281-284.

Mama, K. S. & Abdullah, S. M. A. 2012b. A comparative study on the parasitic fauna of the common carp *Cyprinus carpio* from Ainkawa Fish Hatchery (Erbil) and Lesser Zab River in Kurdistan region, Iraq. Mesopot. J. Agric., 42(2): 19-26.

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

Mhaisen, F. T. & Abdul-Ameer, K. N. 2013. Checklists of *Gyrodactylus* species (Monogenea) from fishes of Iraq. Basrah J. Agric. Sci., 26 (Spec. Issue 1): 8-25.

Mhaisen, F. T. & Al-Maliki, N. S. 1996. Parasites, diseases and food of the dark-blotched mudskipper *Periophthalmus waltoni* (Perciformes: Gobiidae) in the Khor Al-Zubair Estuary (Iraq). Zool. Mid. East, 13: 85-87.

Mhaisen, F. T.; Al-Salim, N. K. & Khamees, N. R. 1986. The parasitic fauna of two cyprinids and a mugilid fish from Mehaijeran creek, Basrah. J. Biol. Sci. Res., 17(3): 63-73.

Mhaisen, F. T.; Al-Khateeb, G. H.; Balasem, A. N. & Mutar, A. J. 1997. On a collection of some fish parasites from Euphrates River, Anbar province, Iraq. Babylon Univ. J., Pure Appl. Sci., 2(3): 267-272.

Mhaisen, F. T.; Al-Khateeb, G. H.; Balasem, A. N.; Al-Shaikh, S. M. J.; Al-Jawda, J. M. & Mohammad-Ali, N. R. 2003. Occurrence of some fish parasites in Al-Madaen drainage network, south of Baghdad. Bull. Iraq Nat. Hist. Mus., 10(1): 39-47.

MonoDb 2014. MonoDb.org. A web-host for the Monogenea. (Accessed April 2014).

Muhammed, S. K. 2000. An external and eye parasite survey for carp fishes in Al-Eskandaryia region (Babylon). M. Sc. Thesis, Coll. Vet. Med., Univ. Baghdad: 82pp. (In Arabic).

Nasraddin, M. O. 2013. Some ecological aspects of monogenean infections on some fishes from Lesser Zab River near Koysinjaq city, Kurdistan region, Iraq. M. Sc. Thesis, Coll. Sci., Univ. Salahaddin: 108pp.

Pugachev, O. N.; Gerasev, P. I.; Gussev, A. V.; Ergens, R. & Khotenowsky, I. 2009. Guide to Monogenoidea of freshwater fish of Palaearctic and Amur regions. Ledizioni LediPublishing, Milano: 567pp.

Rahemo, Z. I. F. 1980. *Diplozoon kasimii* new species from a freshwater teleost fish, *Cyprinion macrostomum* Heckel. Bull. Biol. Res. Cent., Baghdad, 12(1): 109-114.

Rahemo, Z. I. F. & Al-Kallak, S. N. H. 1998. Parasitic fauna of the freshwater fish, *Barbus luteus*, from Tigris River passing through Hammam Al-Alil, Mosul, Iraq. Türk. Parazitol. Derg., 22(3): 330-333.

Rahemo, Z. I. F. & Al-Niaeemi, B. H. S. 2001. Parasites of *Silurus glanis* inhabiting Tigris River passing Mosul city. J. Al-Qadisiya, Pure Sci., 6(3): 116-125. (In Arabic).

Rahemo, Z. I. F. & Ami, S. N. 1991. Helminth parasites of some teleost fishes from Tigris River. Mesopot. J. Agric., 23(3): 9-14. (In Arabic).

Rahemo, Z. I. F. & Ami, S. N. 2013. Studies on the freshwater fish (bizz), *Barbus esocinus* caught from Mosul Dam Lake, Iraq. J. Univ. Zakho, 1(A), No. 2: 692-698.

Rasheed, A.-R. A.-M. 1989. First record of *Diplozoon barbi* Reichenbach-Klinke, 1951 from some freshwater fishes from Tigris River, Baghdad, Iraq. Zanco, 2(3): 5-15.

Seddon, L. 2004. Aspects of the morphology and ecology of a *Diplozoon* species (Monogenea) from the gills of *Labeo umbratus* in the Vaal Dam and Vaal River barrage, Gauteng, South Africa. M. Sc. Diss., Fac. Sci., Rand Afrikaans Univ., Johannesburg: 98pp.

Table (1): An updated list of diplozoids of fishes of Iraq*

Phylum Platyhelminthes
Class Monogenea
Subclass Polyopisthocotylea
Order Mazocraeidea
Suborder Discocotylinea
Family Diplozoidae
Subfamily Diplozoinae
Diplozoon paradoxum von Nordmann, 1832
Diplozoon spp. (adults and diporpa larvae)
Eudiplozoon nipponicum (Goto, 1891)
Paradiplozoon amurense (Akhmerov, 1974)
Paradiplozoon barbi (Reichenbach-Klinke, 1951)
Paradiplozoon bliccae (Reichenbach-Klinke, 1961)
Paradiplozoon cyprini Khotenovsky, 1982
Paradiplozoon ergensi (Pejcoch, 1968)
Paradiplozoon homoion (Bychowsky & Nagibina, 1959)
Paradiplozoon kasimii (Rahemo, 1980)
Paradiplozoon leucisci Khotenovsky, 1982
Paradiplozoon megan (Bychowsky & Nagibina, 1959)
Paradiplozoon pavlovskii (Bychowsky & Nagibina, 1959)
Paradiplozoon rutili (Gläser, 1967)
Paradiplozoon tadzhikistanicum (Gavrilova & Djalilov, 1965)
Paradiplozoon vojteki (Pejěoch, 1968)

* According to Khotenovsky (1985) and Pugachev *et al.* (2009).

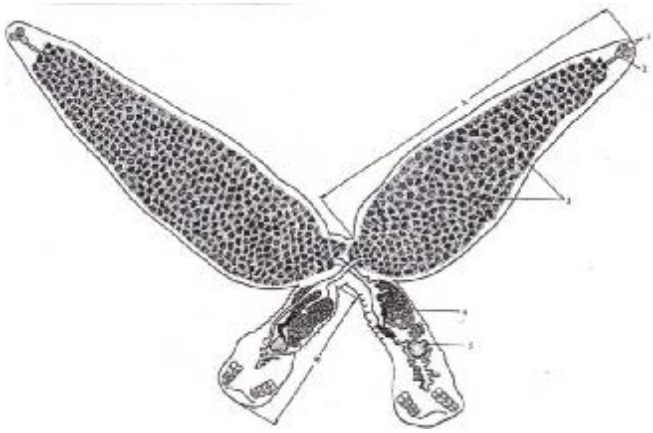

Fig. (1): Illustration of *Paradiplozoon bliccae* showing the typical cross of two fused diplozoid specimens (after Pugachev *et al.*, 2009). A- Anterior part of the body, B- Posterior part of the body, 1- Suckers, 2- Pharynx, 3- Vitellaria, 4- Testis, 5- Ovary.

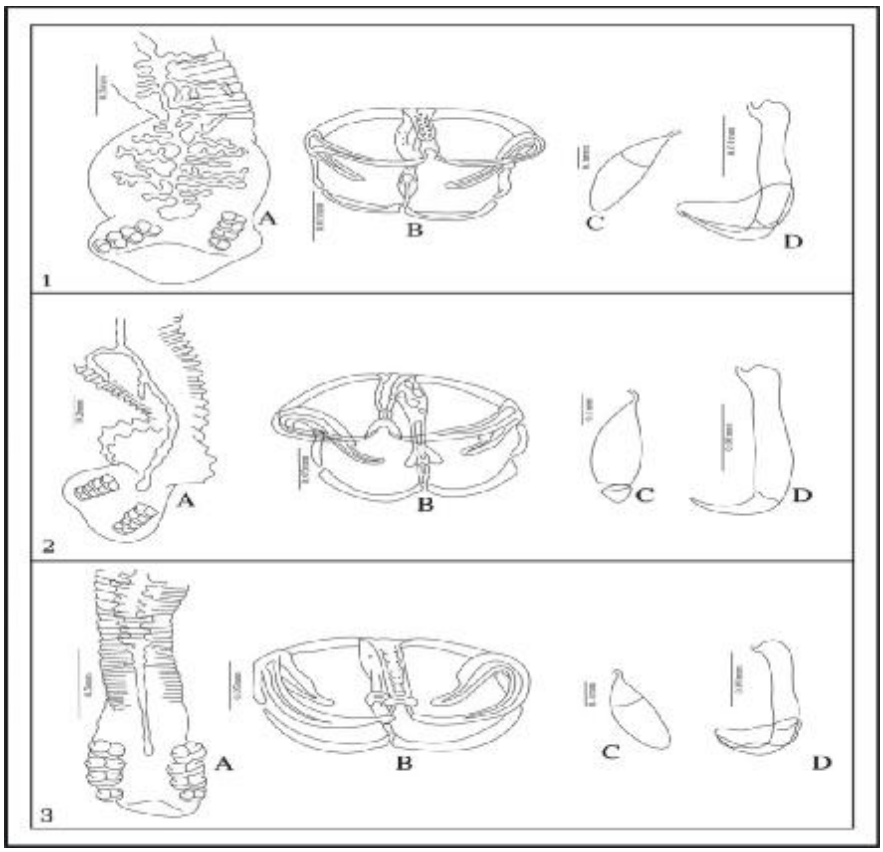

Fig. (2): Comparative illustrations of three genera of diplozoids from fishes of Iraq (after Gussev, 1985). 1- *Diplozoon paradoxum*, 2- *Eudiplozoon nipponicum* and 3- *Paradiplozoon pavlovskii*. (A- Posterior part of body, B- Clamp structure, C- Egg with operculum vesicle, D- Central hook).

Bull. Iraq Nat. Hist. Mus.
(2014)13 (2): 95-111

قوائم مرجعية لأنواع عائلة Diplozoidae (صنف أحادية المنشأ) من أسماك العراق

فرحان ضمد محيسن* وكفاح ناصر عبدالأمير**
* بناية 6B، 36 641 كاترياهولم، السويد
** قسم علوم الحياة، كلية التربية (إبن الهيثم)، جامعة بغداد، بغداد، العراق
e-mail: mhaisenft@yahoo.co.uk

الخلاصة

أظهر إستعراض ٥٩ مصدرا معنيا بظهور الديدان أحادية المنشأ العائدة لعائلة دبلوزويدي Diplozoidae المتطفلة على أسماك العراق وجود ١٥ نوعا شرعيا من هذه العائلة ضمت نوعا واحدا من الجنس *Diplozoon* ونوعا واحدا من الجنس *Eudiplozoon* و ١٣ نوعا من الجنس *Paradiplozoon*. وإضافة لهذه الأنواع تم تسجيل بعض النماذج البالغة واليرقية (يرقات الدايبوربا diporpa larvae) غير المشخصة من الجنس *Diplozoon* من ١٢ مضيّفا من الأسماك من ضمنها أربعة أنواع من الأسماك لم تظهر بها إصابة بأي من أنواع الدبلوزويدات المشخصة في حين أظهرت المضيّفات الباقية حصول إصابات مختلطة بالدبلوزويدات. سجلت هذه الدبلوزويدات من ٢٧ نوعا مضيّفا من الأسماك في العراق. سجلت كل هذه الأنواع من بيئات مائية عذبة بإستثناء نوع واحد غير مشخص من الجنس *Diplozoon* مسجل من بيئة بحرية. تراوح عدد أنواع المضيّفات المسجلة لكل من هذه الطفيليات من مضيّف واحد كحد أدنى في كل من الطفيلي *P. ergensi* والطفيلي *P. tadzhikistanicum* إلى أقصى عدد من المضيّفات وهو ١٣ نوعا في حالة الطفيلي *P. kasimii*. من ضمن هذه الأسماك المصابة، آوى ١٣ مضيّفا نوعا واحدا من الدبلوزويدات لكل منها في حين سجل أقصى عدد وهو عشرة أنواع من الدبلوزويدات في كل من سمكة الشلك والبنيني كبير الفم.