

Occurrence of Helminth Parasites in some Aquatic Birds in Bahr Al-Najaf Depression, Mid Iraq

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Abstract: During the period from October 2001 till April 2002, a total of 102 aquatic birds, belonging to 14 species were collected from Bahr Al-Najaf depression, southwest of Al-Najaf city, Mid Iraq. These birds included *Anas acuta*, *A. crecca*, *A. platyrhynchos*, *Aythya ferina*, *A. fuligula*, *A. nyroca*, *Fulica atra*, *Gallinula chloropus*, *Limosa limosa*, *Mareca penelope*, *M. strepera*, *Phoenicopterus roseus*, *Spatula clypeata* and *Tadorna tadorna*. These birds were infected with six species of trematodes (*Australapatemon minor*, *Echinoparyphium recurvatum*, *Echinostoma revolutum*, *Notocotylus urbanensis*, *Podocotyle reflexa* and *Psilochasmus longicirratu*), three species of cestodes (*Diorchis americanus*, *Fimbriaria fasciolaris* and *Sobolevicanthus gracilis*), two species of nematodes (*Amidostomum acutum* and *Tetrameres* sp.) and one acanthocephalan (*Polymorphus boschadis*). No infection were reported from both *A. nyroca* and *L. limosa*. Three trematode species (*N. urbanensis*, *P. reflexa* and *P. longicirratu*), one cestode (*D. americanus*) and one acanthocephalan (*P. boschadis*) were recorded for the first time in Iraq. Also, 32 new host species in Iraq were recorded for these helminths. *M. strepera* was infected with greatest number of helminth species (seven species). The highest intensity of infection (351 specimens of the cestode *S. gracilis*) was reported from *P. roseus*.

Keywords: Aquatic birds, Trematoda, Cestoda, Nematoda, Acanthocephala, Iraq

Introduction

Wetlands of middle and southern parts of Iraq are good habitats for many aquatic birds where they share adequate food and slightly warm water (Al-Hadithi, 1971). Bahr Al-Najaf depression lies southwest of Al-Najaf Al-Ashraf city, mid Iraq. This area is located between 31° 45' and 31° 57' north latitude and 44° 7' and 44° 16' east longitude (Abul-Fatih, 1970). This depression is a wetland area, about 360-750 km², composed of a lake or marsh-like area with limited orchards surrounded by vast desert or semi desert areas. Historically, it was a part of very wide water surface joined with Arabian Gulf by water canals which served as transportation between ancient Levant and Europe via Syria (Al-Hakeem, 2004).

During a two years period of sampling of Bahr Al-Najaf depression, Al-Awadi (1997) listed 16 species of phytoplankton, 18 species of large aquatic plants, five vegetation species along the margins of this depression, unnamed species of invertebrates, 11 fish species, 53 residential and migratory bird species and three mammal species. Mohammad et al. (2013) listed 25 plant species, two fish species, 14 reptile species, 72 bird species (inclusive of 37 migratory ones) and 15 mammal species. Recently, Albushabaa et al. (2019) listed 48 zooplankton taxa (26 copepods, 17 rotifers and five cladocerans) from this depression. Recent data on physical and chemical parameters as well as the concentration of five heavy metals in waters of this depression were given by Al-Zurfi et al. (2019). Al-Tae (2017) investigated the physical and chemical parameters of the waters of Bahr Al-Najaf depression in addition to the identification of 58 phytoplankton species there.

The aquatic birds are vulnerable to many parasitic infections which may cause considerable mechanical and chemical damages to host vital organs and may decrease host weight and its egg production (Soulsby, 1968). Some aquatic birds act as final hosts for some helminths which use fishes as intermediate hosts (Mhaisen, 1983). According to Mhaisen (2020), some helminths like *Apophallus muhlingi*, *Ascocotyle coleostoma*, *Clinostomum complanatum*, *Diplostomum spathaceum* and *Contracaecum* spp. which are known to infect many freshwater fish species from different parts of Iraq, are also known (mainly as adults) to infect some aquatic birds in different inland waters of Iraq such as *Ardea alba* (as *Egretta alba*), *A. cinerea*, *A. purpurea*, *Ardeola ralloides*, *Botaurus stellaris*, *Bubulcus ibis*, *Ceryle rudis*, *Egretta garzetta*, *Fulica atra*, *Halcyon smyrnensis*, *Himantopus himantopus*, *Ichthyaelus ichthyaelus* (as *Larus ichthyaelus*), *Larus argentatus*, *L. canus*, *L. genei*, *Microcarbo pygmaeus* (as *Phalacrocorax pygmaeus*), *Nycticorax nycticorax*, *Phalacrocorax carbo*, *Platalea leucorodia*, *Tringa totanus* and *Vanellus leucurus* (Al-Hadithi & Habish, 1977; Khamees, 1983; Abdullah, 1988; Mahmoud & Mohammad, 1989; Mhaisen et al., 1990; Mhaisen & Abul-Eis, 1992; Abdullah (1993), Awad et al., 1994; Al-Awadi, 1997; Abed, 2005; Ali, 2008; Al-Awadi et al., 2010; Al-Salim & Ali, 2010; Al-Moussawi & Mohammad, 2011; Mohammad & Al-Moussawi, 2011; Al-Kinanny, 2013; Al-Tameemi, 2013; Awad & Al-Tameemi, 2013; Swadi, 2013; Al-Moussawi, 2014; Yaseen, 2018). In addition, some aquatic birds may transmit some pathogenic viruses to fishes (Peters & Neukirch, 1986).

Al-Awadi (1997) carried out a two-year period of investigation on the helminth fauna of 11 species of aquatic birds from Bahr Al-Najaf depression. Mizhir (2002) investigated 14 species of aquatic birds from this area for helminth infections. Also, Khudhaer et al. (2008) studied the histopathological changes in the intestine of three aquatic birds due to the infections with four cestode species from this area. So, the present article, which is abstracted from Mizhir (2002), is aimed to through the light on her investigation of such helminthic fauna.

Materials and Methods

From October 2001 till April 2002, aquatic birds were bought from bird markets at Al-Najaf Al-Ashraf city. According to bird sellers, such birds were hunted from Bahr Al-Najaf depression. Such birds were brought to the laboratory where they were dissected out and their alimentary canal, liver, gonads, kidneys and air sacs were removed and placed in normal saline. Such organs were opened and inspected for parasites. Detected worms were fixed in 10% formalin, stained in Semichon's acid carmine and mounted in Canada balsam according to Garcia & Ash (1979). Identification of aquatic birds was done according to Heinzl et al. (1974) and Mahdi (1982), while their valid scientific names followed BirdLife International (2020). Helminth identification followed Dawes (1946), Yamaguti (1959, 1961, 1963, 1971) and Soulsby (1968). The percentage incidence and mean intensity of infection were calculated as defined by Margolis et al. (1982).

Results and Discussion

A total of 102 aquatic birds were inspected for parasites. These birds belonged to 14 species as demonstrated below together with their orders and families in accordance with BirdLife International (2020). Their numbers are indicated in curly brackets after the authority of each bird species.

Class Aves

Order Phoenicopteriformes

Family Phoenicopteridae

Phoenicopus roseus Pallas, 1811 {1}

Order Anseriformes

Family Anatidae

Anas acuta Linnaeus, 1758 {14}

Anas crecca Linnaeus, 1758 {16}

Anas platyrhynchos Linnaeus, 1758 {2}

Aythya ferina (Linnaeus, 1758) {1}

Aythya fuligula (Linnaeus, 1758) {2}

Aythya nyroca (Güldenstädt, 1770) {3}

Mareca penelope (Linnaeus, 1758) {1}

Mareca strepera (Linnaeus, 1758) {33}

Spatula clypeata (Linnaeus, 1758) {14}

Tadorna tadorna (Linnaeus, 1758) {1}

Order Gruiformes

Family Rallidae

Fulica atra Linnaeus, 1758 {8}

Gallinula chloropus (Linnaeus, 1758) {4}

Order Charadriiformes

Family Scolopacidae

Limosa limosa (Linnaeus, 1758) {2}

No any external parasites were detected from any of the examined birds. However, six trematodes, three cestodes, two nematodes and one acanthocephalan species were detected from these birds. These worms are listed here according to GBIF (2020), with some authority additions according to BirdLife International (2020) and WoRMS (2020) in the following systematic scheme.

Phylum Platyhelminthes

Class Trematoda

Order Plagiorchiida

Family Echinostomatidae

Echinoparyphium recurvatum (Linstow, 1873) Dietz, 1909

Echinostoma revolutum (Fröhlich, 1802) Rudolphi, 1809

Family Notocotylidae

Notocotylus urbanensis Cort, 1914

Family Opecoelidae

Podocotyle reflexa (Creplin, 1825) Odhner, 1905

Family Psilostomidae

*Psilochasmus longicirratu*s Skrjabin, 1913

Order Diplostomida

Family Strigeidae

Australapatemon minor (Yamaguti, 1933)

Class Cestoda

Order Cyclophyllidea

Family Hymenolepididae

Diorchis americanus Ransom, 1909

Fimbriaria fasciolaris (Pallas, 1781) Fröhlich, 1802

Sobolevicanthus gracilis (Zeder, 1803) Spassky & Spasskaja, 1954

Phylum Nematoda

Class Secernentea

Order Rhabditida

Family Tetrameridae

Tetrameres sp.

Order Strongylidea

Family Amidostomidae

Amidostomum acutum Seurat, 1918

Phylum Acanthocephala

Class Palaeacanthocephala

Order Polymorphida

Family Polymorphidae

Polymorphus boschadis (Schrank, 1788) Railliet, 1919

Photographs and measurements of the newly-recorded helminths are demonstrated in Mizhir (2002). The following is a brief account on the occurrence of these parasites in the studied aquatic birds of Bahr Al-Najaf depression. These

parasites are alphabetically arranged in their major groups. Their hosts are also alphabetically arranged.

Phylum Platyhelminthes- Class Trematoda

Australapatemon minor was recorded from the small intestine of *Spatula clypeata* with a prevalence of 7.1% and mean intensity of 7. This worm was reported for the first time in Iraq (as *Apatemon minor*) from *Aythya ferina* from Basrah province by Al-Mayah (1990). So, *S. clypeata* of the present investigation represents a new host record for this worm in Iraq. According to GBIF (2020), *Apatemon minor* is considered as a synonym of *Australapatemon minor*. The genus *Australapatemon* Sudarikov, 1959 has two doubtful species and four accepted species inclusive of *Australapatemon minor* which has two synonyms: *Apatemon minor* Yamaguti, 1933 and *Australapatemon skrjabini* Ryjikov, Leonov & Zimbaluk, 1964 according to GBIF (2020). However, no any species of this genus are listed by WoRMS (2020).

Echinoparyphium recurvatum was recorded from the small intestine of *Aythya fuligula* with a prevalence of 50% and mean intensity of 7. This parasite was reported for the first time in Iraq from *Chettusia leucura*, which is a synonym of *Vanellus leucurus* according to BirdLife International (2020) and GBIF (2020), from Basrah province by Abdullah (1988). So, *A. fuligula* of the present investigation represents a new host record for this worm in Iraq. According to GBIF (2020), the genus *Echinoparyphium* Dietz, 1909 has two doubtful species and 29 accepted species inclusive of *E. recurvatum* which has three synonyms: *Distoma recurvatum* Linstow, 1873; *Distomum recurvatum* Linstow, 1873 and *Echinostomum recurvatum* (Linstow, 1873), while WoRMS (2020) enlisted only five valid species of this genus, inclusive of *E. recurvatum*.

Echinostoma revolutum was recorded from the small intestine of both *Anas platyrhynchos* and *Spatula clypeata* with prevalence of 50% and 7.1%, respectively and mean intensity of 1 and 3, respectively. This worm was reported for the first time in Iraq from *Porphyrio poliocephalus*, which is now a synonym of *P. porphyrio* subsp. *poliocephalus* according to GBIF (2020), from Basrah province by Abdullah (1988) and then from *Mareca strepera* (reported as *Anas strepera*) from the same province by Al-Mayah (1990). However, later reports were published, before the existence of the present article, on the occurrence of *E. revolutum* from *A. platyrhynchos* from Al-Razzaza region, Kerbala province by Al-Massoudi et al. (2007), from both *Fulica atra* and *Mergus serrator* from Basrah province by Al-Kinanny (2013) and from *Gallinula chloropus* from Basrah province by Al-Tameemi (2013). So, *A. platyrhynchos* and *S. clypeata* of the present investigation represent two new host records for this worm in Iraq. It is relevant to mention here that Abdullah (1993) had recorded three other *Echinostoma* species for the first time in Iraq (*E. crecci*, *E. fulicae* and *E. pekinensis*) from *G. chloropus* from Basrah province and then Al-Awadi et al. (2010) had reported another *Echinostoma* species (*E. chloropodis*) from the intestine of both *F. atra* and *G. chloropus* from Bahr Al-Najaf depression. Al-

Mayah (1994) had reported unidentified *Echinostoma* species from *V. leucurus* from Basrah province. According to GBIF (2020), the genus *Echinostoma* Rudolphi, 1809 has 14 doubtful species and 61 accepted species inclusive of *E. revolutum* which has *Fasciola revoluta* Fröhlich, 1802 as a synonym, while WoRMS (2020) enlisted only seven valid species of this genus, inclusive of *E. revolutum*.

Notocotylus urbanensis was recorded from the intestinal caeca of six bird species, namely: *Anas acuta*, *A. platyrhynchos*, *Fulica atra*, *Mareca strepera*, *Phoenicopterus roseus* and *Spatula clypeata* with a prevalence of 7.2%, 100%, 37.6%, 18.9%, 100% and 28.6%, respectively and a mean intensity of 1, 18, 10.6, 27, 36 and 9, respectively. This represents the first record of this parasite from birds of Iraq and hence the above-named bird species are considered as the first six host records for *N. urbanensis* in Iraq. It is appropriate to mention here that Al-Awadi et al. (2010) had reported another *Notocotylus* species (*N. gibbus*) from the intestine of both *F. atra* and *G. chloropus* from Bahr Al-Najaf depression and Al-Tameemi (2013) recorded *N. attenuatus* from both *Anas crecca* and *G. chloropus* from Basrah province. According to GBIF (2020), the genus *Notocotylus* Diesing, 1839 has one doubtful species and 38 accepted species, inclusive of *N. urbanensis*, while WoRMS (2020) enlisted only eight valid species of this genus, exclusive of *N. urbanensis*.

Podocotyle reflexa was reported as *Psilolecithum longorchum* Oshmarin, 1964 from the small intestine of *Spatula clypeata* with a prevalence of 14.3% and mean intensity of 51.5. This represents the first record of this parasite from birds of Iraq and hence *S. clypeata* is considered as the first host record for this parasite in Iraq. It is reliable to state here that Kostadinova (2001) had re-examined the type material of *P. longorchum* and identified it as *P. reflexa*. *Psilolecithum longorchum* is considered as a doubtful species (GBIF, 2020). According to this later electronic site, the genus *Podocotyle* Dujardin, 1845 has three doubtful species and 39 accepted species. However, WoRMS (2020) enlisted 28 accepted species, inclusive of *P. reflexa*.

*Psilochasmus longicirratu*s was recorded from the small intestine of both *Aythya fuligula* and *Mareca strepera* with prevalence of 50% and 3%, respectively and mean intensity of 9 and 1, respectively. This represents the first record of this parasite from birds of Iraq and hence *A. fuligula* and *M. strepera* are considered as the first two host records for this parasite in Iraq. It is relevant to mention here that Al-Awadi et al. (2010) had reported another *Psilochasmus* species (*P. oxyurus*) from the intestine of *F. atra* from Bahr Al-Najaf depression. According to GBIF (2020), the genus *Psilochasmus* Lühe, 1909 has two doubtful species and four accepted species, inclusive of *P. longicirratu*s, while WoRMS (2020) enlisted only four valid species of this genus, inclusive of *P. longicirratu*s.

Phylum Platyhelminthes- Class Cestoda

Diorchis americanus was recorded from the small intestine of *Fulica atra* with a prevalence of 12.5% and mean intensity of 53. This represents the first record of

this parasite from birds of Iraq and hence *F. atra* is considered as the first host record for this parasite in Iraq. It is reliable to state here that three other *Diorchis* species were previously recorded in Iraq. These included *D. brevis* from both *F. atra* and *G. chloropus* from Basrah province by Abdullah (1988) and from the same two bird host species from Al-Najaf province by Al-Awadi (1997) and Al-Awadi et al. (2010), *D. ransomi* from *F. atra* from Basrah province by Abdullah (1988), from *Aythya farina*, *A. nyroca* and *Mareca strepera* from Basrah province by Al-Mayah (1990) and from *F. atra* from Thi-Qar province by Al-Kinnany (2013) and *D. inflatus* from *F. atra* from Bahr Al-Najaf depression by Al-Awadi (1997) and Al-Awadi et al. (2010). In addition, unidentified *Diorchis* species from *M. strepera* from Basrah province was reported by Al-Mayah (1990). According to GBIF (2020), the genus *Diorchis* Clerc, 1903 has 36 accepted species, inclusive of *D. americanus*, while WoRMS (2020) enlisted only two valid species of this genus, exclusive of *D. americanus*.

Fimbriaria fasciolaris was recorded from the small intestine of both *Mareca strepera* and *Tadorna tadorna* with prevalence of 6.1% and 100%, respectively and mean intensity of 4.5 and 3, respectively. This worm was reported for the first time in Iraq from *Anas platyrhynchos* from Basrah province by Al-Hadithi & Mustafa (1991) and then from *Anas crecca* from the same province by Al-Mayah (1999), as well as from *A. platyrhynchos* from Kut city by Mahmoud (2001). However, later report was published, before the existence of the present article, on the occurrence of this cestode from *Gallinula chloropus* from Basrah province by Al-Tameemi (2013). So, *M. strepera* and *T. tadorna* of the present investigation represent two new host records for this cestode in Iraq. According to GBIF (2020), the genus *Fimbriaria* Fröhlich, 1802 has seven accepted species, inclusive of *F. fasciolaris* which has *Taenia fasciolaris* Pallas, 1781 as a synonym, while WoRMS (2020) enlisted only two valid species of this genus, inclusive of *F. fasciolaris*.

Sobolevicanthus gracilis was recorded from the intestine of four bird species, namely: *Anas crecca*, *Aythya fuligula*, *Mareca strepera* and *Phoenicopus roseus* with a prevalence of 31.3%, 50%, 6.1%, and 100%, respectively and a mean intensity of 10.8, 16, 7.5 and 351, respectively. This cestode was reported for the first time in Iraq from *Anas platyrhynchos* from Baghdad city by Mahmoud (2001). So, *A. crecca*, *M. strepera*, *A. fuligula* and *P. roseus* of the present investigation represent four new host records for this cestode in Iraq. According to GBIF (2020), the genus *Sobolevicanthus* Spasskii & Spasskaya, 1954 has 19 accepted species, inclusive of *S. gracilis* which has two synonyms: *Halysis gracilis* Zeder, 1803 and *Hymenolepis meleagridis* Clerc, 1902. However, four species of this genus, inclusive of *S. gracilis* are listed by WoRMS (2020).

Phylum Nematoda

Amidostomum acutum was recorded from the duodenum of *Fulica atra*, *Gallinula chloropus* and *Mareca strepera* with a prevalence of 25%, 50% and 12.1%, respectively and a mean intensity of 24.5, 30 and 5, respectively. This nematode was reported for the first time in Iraq from *Anas platyrhynchos* from

Baghdad city and Kut city by Mahmoud (2001). However, later reports were published before the existence of the present article on the occurrence of *A. acutum* from *A. platyrhynchos* from Al-Diwaniya and Diyala provinces by Mohammad & Al-Moussawi (2011) and from *Spatula clypeata* from Baghdad by Al-Moussawi (2014). So, *F. atra*, *G. chloropus* and *M. strepera* of the present investigation represent three new host records for this nematode in Iraq. In addition, Mahmoud & Mohammad (1989) reported *Amidostomum fulicae* (Rudolphi, 1819) from *F. atra* from Baghdad, while *A. fulicae* was also reported by Swadi (2013) from both *G. chloropus* and *Himantopus himantopus* from Shatt Al-Arab river, north of Basrah province and Al-Kinanny (2013) reported it from both *F. atra* and *G. chloropus* from Al-Hammar marsh at Thi-Qar province. Yaseen (2018) reported *Amidostomum quasifulicae* Macko, 1966 from *H. himantopus* from Al-Faw town, south eastern Basrah province. According to GBIF (2020), the genus *Amidostomum* Railliet & Henry, 1909 has six accepted species, inclusive of *A. acutum* which has ten synonyms: *Amidostomum anatinum* Sugimoto, 1928; *Amidostomum boschadis* Petrov & Fedjuschin, 1949; *Amidostomum chevreuxi* Seurat, 1918; *Amidostomum fuligulae* Maplestone, 1930; *Amidostomum monodon* (Linstow, 1882); *Amidostomum orientale* Rijikov & Pavlov, 1959; *Amidostomum petrovi* Shachtachtinskaja, 1956; *Amidostomum skrjabini* Boulenger, 1926; *Strongylus acutum* Lundahl, 1848 and *Strongylus monodon* Linstow, 1882. However, only one species of this genus (*A. acutum*) is listed by WoRMS (2020).

Tetrameres sp. was recorded from the proventriculus of 11 bird species, namely: *Anas acuta*, *A. crecca*, *A. platyrhynchos*, *Aythya ferina*, *A. fuligula*, *Fulica atra*, *Gallinula chloropus*, *Mareca penelope*, *M. strepera*, *Phoenicopterus roseus* and *Spatula clypeata*, with a prevalence of 28.6%, 12.5%, 50%, 100%, 50%, 25%, 25%, 100%, 9.1%, 100% and 35.7%, respectively and a mean intensity of 3, 2, 2, 2, 8, 7.5, 1, 3, 9.3, 14 and 5, respectively. This nematode was reported for the first time in Iraq from *F. atra*, *G. chloropus* and *Porphyrio porphyrio* (which is now a synonym of *P. porphyrio* subsp. *poliocephalus* according to GBIF, 2020) from Basrah province by Abdullah (1988). Then, it was reported from *M. strepera* and *Spatula querquedula* (reported as *Anas querquedula*) from the same province by Al-Mayah (1990), from *G. chloropus* and *Microcarbo pygmaeus* (reported as *Phalacrocorax pygmaeus*) from Basrah province by Awad et al. (1994), from *F. atra* from Bahr Al-Najaf depression by Al-Awadi (1997) and from *Calidris alpina* (misspelled as *Galidris alpina*), *Egretta garzetta*, *E. gularis* and *Himantopus himantopus* by Yaseen (2018) from Al-Faw town, south eastern Basrah province. So, *Anas acuta*, *A. crecca*, *A. platyrhynchos*, *Aythya ferina*, *A. fuligula*, *M. penelope*, *P. roseus* and *S. clypeata* of the present investigation represent eight new host records for such unidentified *Tetrameres* species in birds of Iraq. However, later reports were published, before the existence of the present article, on the occurrence of *Tetrameres* species from *F. atra*, *G. chloropus* and *Microcarbo pygmaeus* (reported as *Phalacrocorax pygmaeus*) from Thi-Qar province by Al-Kinanny (2013), ten aquatic bird species (*A. crecca*, *Ardea purpurea*, *Ardeola ralloides*, *Egretta garzeta*, *F. atra*, *G. chloropus*, *H. himantopus*, *Larus genei*,

Vanellus indicus (reported as *Hoplopterus indicus*) and *Vanellus leucurus* (reported as *Chettusia leucura*) from Basrah province by Al-Tameemi (2013) and from two aquatic birds: *H. himantopus* and *V. leucurus* (reported as *Chettusia leucura*) from Thi Qar province by Alrikaby (2016) who also recorded three identified *Tetrameres* species (*T. dubia*, *T. nouveli* and *T. spinose*). According to GBIF (2020), the genus *Tetrameres* Creplin, 1846 has 22 accepted species. However, only two species of this genus are listed by WoRMS (2020).

Phylum Acanthocephala

Polymorphus boschadis was recorded from the small intestine of *Mareca strepera* with a prevalence of 6.1% and mean intensity of 1. This represents the first record of this parasite from birds of Iraq and hence *M. strepera* is considered as the first host record for this parasite in Iraq. It is reliable to state here that Al-Mayah (1990) had reported another acanthocephalan, *P. minutus* for the first time in Iraq from *M. strepera* from Basrah province. According to GBIF (2020), the genus *Polymorphus* Lühe, 1911 has two doubtful species and 44 accepted species, inclusive of *P. boschadis* which has two synonyms: *Echinorhynchus anatis* Gmelin, 1791 and *Echinorhynchus boschadis* Schrank, 1788. However, 16 valid species of this genus, inclusive of *P. boschadis* are listed by WoRMS (2020).

Table 1 demonstrates the helminth- aquatic bird list reported from Bahr Al-Najaf depression of the present investigation with an emphasis on new aquatic bird species records and new helminth records in Iraq.

Finally, it is appropriate to mention here that no infections were reported from both *Aythya nyroca* and *Limosa limosa* of the present investigation although three and two bird specimens, respectively were examined for parasitic infections.

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Table 1: List of parasite species from aquatic birds of Bahr Al-Najaf Depression.

Helminth major groups and species	Aquatic bird host species
Phylum Platyhelminthes- Class Trematoda	
<i>Australapatemon minor</i>	<i>Spatula clypeata</i> *
<i>Echinoparyphium recurvatum</i>	<i>Aythya fuligula</i> *
<i>Echinostoma revolutum</i>	<i>Anas platyrhynchos</i> *, <i>Spatula clypeata</i> *
<i>Notocotylus urbanensis</i> **	<i>Anas acuta</i> *, <i>A. platyrhynchos</i> *, <i>Fulica atra</i> *, <i>Mareca strepera</i> *, <i>Phoenicopterus roseus</i> *, <i>Spatula clypeata</i> *
<i>Podocotyle reflexa</i> **	<i>Spatula clypeata</i> *
<i>Psilochasmus longicirratu</i> **	<i>Aythya fuligula</i> *, <i>Mareca strepera</i> *
Phylum Platyhelminthes- Class Cestoda	
<i>Diorchis americanus</i> **	<i>Fulica atra</i> *
<i>Fimbriaria fasciolaris</i>	<i>Mareca strepera</i> *, <i>Tadorna tadorna</i> *
<i>Sobolevicanthus gracilis</i>	<i>Anas crecca</i> *, <i>Aythya fuligula</i> *, <i>Mareca strepera</i> *, <i>Phoenicopterus roseus</i> *
Phylum Nematoda	
<i>Amidostomum acutum</i>	<i>Fulica atra</i> *, <i>Gallinula chloropus</i> *, <i>Mareca strepera</i> *
<i>Tetrameres</i> sp.	<i>Anas acuta</i> *, <i>A. crecca</i> *, <i>A. platyrhynchos</i> *, <i>Aythya farina</i> *, <i>A. fuligula</i> *, <i>Fulica atra</i> , <i>Gallinula chloropus</i> , <i>Mareca penelope</i> *, <i>M. strepera</i> , <i>Phoenicopterus roseus</i> *, <i>Spatula clypeata</i> *
Phylum Acanthocephala	
<i>Polymorphus boschadis</i> **	<i>Mareca strepera</i> *

* New aquatic bird host record in Iraq, ** New helminth record in Iraq.

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