Journal Tikrit Univ. For Agri. Sci. Vol. (13) No. (1) ,(2013)
ISSN-1813-1646

Protozoan parasites of five fish species from the Tigris River in Salah Al-Deen province, Iraq

Fatima S. Al-Nasiri
Department of Biology, College of Science, Tikrit University (fshnasiri@yahoo.com)

KeyWords:
Fishes, Iraq, Parasites, Protozoa

Correspondence:
Fatima S. Al-Nasiri
Department of Biology, College of Science, Tikrit University

Received:
25-10-2011
Accepted:
16-5-2012

Abstract

Five species of fish collected from the Tigris River at Tikreet city, Salah Al-Deen province, Iraq, were screened for protozoan parasites. Among four species of Cyprinidae and one Mugilidae, seven species of protozoan parasites were encountered and three are reported for the first time in Iraq. These parasites inlcuded *Apiosoma megamicronucleatum* (Timofeev), *Eimeria sinensis* Chen, *Myxobolus musculi* Keysselitz. Also, new host records in Iraq for *Myxidium rhodei* Léger and *Myxobolus persicus* Masoumian, Baska & Molnar.

الحيوانات الابتدائية المتطفلة على خمسة انواع من الاسماك من نهر دجلة في محافظة صلاح الدين، العراق

فاطمة شهاب الناصري

قسم علوم الحياة، كلية العلوم، جامعة تكريت، تكريت، العراقfshnasiri@yahoo.com

الخلاصة

تم جمع خمسة انواع من الاسماك من نهر دجلة عند مدينة تكريت، محافظة صلاح الدين. حيث تم فحص اربعة انواع من اسماك العائلة الشبوطية ونوعا واحدا من اسماك عائلة البياح لغرض الكشف عن الحيوانات الابتدائية المتطفلة. وقد كانت هذه الاسماك مصابة بسبعة انواع من الطفيليات. ومن بين هذه الطفيليات سجلت ثلاثة انواع (*Apiosoma megamicronucleatum Eimeria sinensis*, , *Myxobolus musculi*) لاول مرة في العراق. فضلا عن ذلك فقد تم تسجيل مضيفات جديدة لنوعين من الحيوانات الابتدائية المتطفلة (*Myxidium rhodei* , *Myxobolus persicus*).

الكلمات الدالة :
حيوانات ابتدائية ، اسماك ، نهر دجلة ، العراق

للمراسلة :
فاطمة شهاب الناصري

قسم علوم الحياة ، كلية العلوم ، جامعة تكريت

الاستلام:
25-10-2011
القبول :
16-5-2012

Introduction

Fishes in nature are infected with a great variety of protozoan parasites, which may occur both within and on the surface of the host (Hoffman, 1999). In some settings, large populations of protozoa can appear on the body, fins and gills of fish. When present in large numbers, protozoa often cause gross pathological changes and damages to the host (Heckman, 1996; Hoffman, 1999). For example, some pathogenic sporozoans that infect the gills form cysts that appear as small knots on the gill lamellae near the arch. Light infections do not affect fish but larger numbers of cysts hinder respiration due to blood vessel occlusion. Death may result, with symptoms consistent with suffocation (Duijn, 1973). The ciliated protozoan, *Apiosoma* sp., produces whitish spots on skin and gills. When present in high numbers, *Apiosoma* sp. can cause inflammation, necrosis, and ulceration of the skin and degeneration of gill tissues leading to secondary infection (Duijn, 1973; Hoole et al., 2001). Members of the coccidian genus *Eimeria* infect internal organs causing severe

lesions, such as the nodular coccidiosis in carp caused by *E. subepithelialis* Moroff & Fiebiger. A number of coccidians are blood parasites that can cause anemia in infected fish, which may manifest as pale gills (Duijn, 1973; Roberts, 1978).

Data on the parasites of fishes in Iraq are scarce. The most extensive source of information is an unpublished catalogue of reports assembled by F. T. Mhaisen (Personal Communication, 2011, University of Baghdad), which includes 217 reports on the parasites of freshwater fishes of Iraq, as well as 88 reports on parasites of farmed fishes. Among these, only seven concern fishes of the Tigris River passing through Salah Al-Deen province (Abdul Ameer, 1989; Al-Jawda et al., 2000; Al-Nasiri, 2008; Al-Nasiri, 2009; Al-Nasiri & Mhaisen, 2009a, b; Al-Nasiri, 2010); two reports include data on parasites of fishes from elsewhere in this province (Nawab Al-Deen, 1994; Muhammed, 1995). Among these nine reports in Salah Al-Deen province, only four (Abdul-Ameer, 1989; Al-Jawda *et al*., 2000; Al-Nasiri, 2008; Al-Nasiri & Mhaisen, 2009b) reports were done for identify protozoan parasites of fishes in the Tigris River.

In light of this scarcity of information, in the present investigation we surveyed and identified the protozoan parasites of fishes from the Tigris River passing through Salah Al-Deen province.

Materials and Methods

Between January and the end of June, 2010, 186 fish belonging to five species and two families were collected from the Tigris River passing through Tikreet city in Salah Al-Deen province (Table 1). These comprised the following Cyprinidae: *Barbus grypus* Heckel, *Barbus luteus* (Heckel), *Chondrostomua regium* (Heckel), *Cyprinion macrostomum* Heckel; and of the Mugilidae, *Liza abu* (Heckel). All were transported alive to the laboratory. Smears of the skin, buccal cavity, gills, gills cavity, fins and viscera were examined. If the smear was positive, a drop of neutral red and glycerin (1:3) was added to make temporary preparation. For myxosporean parasites, vacuoles were visualized by adding of Lugols' solution to fresh spores (Masoumian et al., 1996). Drawings of parasites were made with a drawing tube on an Olympus compound microscope. Parasites were identified according to Bykhovskaya-Pavlovskaya et al. (1962) and Shul'man (1984).

Results and Discussion

In fish from five species and two families collected from the Tigris River at Tikreet city, seven species of protozoan parasites were encountered. These included six species of sporozoans, namely *Eimeria sinensis* Chen, *Myxidium rhodei* Léger, *Myxobolus karuni* Masoumian, Baska et Molnar, *Myxobolus oviformis* Thélohan, *Myxobolus musculi* Keysselitz, *Myxobolus persicus* Masoumian, Baska et Molnar; and one ciliate, *Apiosoma megamicronucleatum* (Timofeev).

The host, prevalence, and infection site of each parasite species are summarized in Table (1). In the following desciptive accounts, measurements are given in µm.

Apiosoma megamicronucleatum* syn. *Glossatella megamicronucleata (Fig. 1A)

Body barrel-like, 27-42 × 18-30. Pellicle transversely striated. Body free of cilia except for perisomal disk and one transversal band at level of broad part of macronucleus, where short cilia occur. Macronucleus large (9-12×3-9) and semilunar in shape, with transverse elongatation and concave posterior surface. Micronucleus (3-4×3-7) also elongated transversely, lying at posterior end of macronucleus in its semilunar emargination.

Eimeria sinensis (Fig. 1B-C)

Oocyst spherical, thick-walled with bi-layered cuticle, without vestigial body, diameter 9.2-10.7. Spores 7-8×4, containing 2 botuliform sporozoites with one pole somewhat attenuated and a relatively large, coarsely granular vestigial body.

Myxobolus musculi (Fig. 1D)

Species identified from spores. Vegetative stage forming longitudinal milk-white cysts. Spore regularly oval or slightly tapered anteriorly. Polar capsule pyriform. Intracapsular process small and conspicuous. Spores 9-13×8-11, thickness 5-7. Larger polar capsules 4-7× 3-4, smaller polar capsules 4-6×2-4.

The protozoan parasites recorded herein, in fishes of Salah Al-Deen province, represent three new records for Iraq and two new host records, and thus extend our knowledge of the parasite fauna of fishes in general and those in Iraqi hosts in particular.

Although these records are new to more widely accessible, peer-reviewed literature, some similar host and locality records have been made previously in local reports. In F. T. Mhaisen's catalogue, 108 species of protozoan parasites have so far been reporteed from freshwater fishes in Iraq, but only 26 of these are from the province of Salah Al-Deen. Even considering Mhaisen's catalogue, three of the protozoan parasites encountered here (*Apiosoma megamicronucleatum*, *Eimeria sinensis*, *Myxobolus musculi*) are new records for Iraq. The description and measurements of these three parasites are in agreement with of Bykhovskaya-Pavlovskaya *et al*. (1962) and Shul'man (1984).

Myxidium rhodei was first reported from *Barbus sharpeyi* from the Al-Qadisiya reservoir by Balasem et al. (1997). It has subsequently been reported from the same locality in *Barbus luteus* (Asmar et al., 1999) and, in the Tigris River, in *Acanthobrama marmid* at Neinava province (Al-Khateeb et al., 1997), and in *Barbus xanthopterus* in Tigris river at Al-Zaafaraniya (Adday et al., 1999). The present observation of *M. rhodei* in *Cyprinion macrostomum*

thus represents a new host record for Iraq, as well as the first record in fishes of the Tigris River in Salah Al-Deen province.

The first and only Iraqi record of *Myxobolus karuni* was that of Abdullah (2002), who reported it in *Barbus grypus* from the Lesser Zab River in the north of the country. The present account represents a second report of this parasite in *B. grypus* and the first occurrence in fishes in the Tigris River in Salah Al-Deen province.

The first record in Iraq of *Myxobolus oviformis*, recorded herein in *Barbus luteus*, was that of Herzog (1969), who encountered it in *Aspius vorax*, *Barbus esocinus*, *B. grypus* and *B. sharpeyi*. *Myxobolus oviformis* has since been found in 20 fish species in Iraq, including *B. luteus*, according to reports in F. T. Mhaisen's catalogue. This includes a report of *M. oviformis* from *B. luteus* collected along many parts of the Tigris River, including Salah Al-Deen province (Al-Jawda et al., 1998).

In this study, *Myxobolus persicus* was also detected in *B. luteus*. Since Abdullah's (2002) report of this parasite from *B. grypus* and *C. macrostomum* from the Lesser Zab River in northern Iraq, no further records have been published. Thus, the present account of *M. persicus* in *B. luteus* represents an additional host record for Iraq and the first record in fishes of the Tigris River in Salah Al-Deen province.

The generally low prevalence of sporozan infections observed in the present study is in agreement with many other surveys (Hoffman, 1996), and could reflect naturally low infection levels or the rapid loss of parasitized fish from populations due to mortality. The high proportion of *B. grypus* infected with *M. karuni* could be an artifact of the small number of hosts examined (n=3, see Table 1).

In summary, during the course of the present investigations three species of protozoan parasites have been added to the known parasite fauna of fishes in Iraq. This brings the total number of protozoan parasites so far recorded in Iraq to 111 species. In addition, *C. macrostomum* and *B. luteus* were recorded as new hosts for *M. rhodei* and *M. persicus*, respectively.

Table (1): Protozoan parasites found in 186 fish collected from the Tigris River in Salah Al-Deen province, Iraq, between January and June, 2010.

Parasite	Host (n examined)	Prevalence (%)	Infection site
Apiosoma megamicronucleatum *	*Liza abu* (62)	4.83	Skin
Eimeria sinensis *	*Liza abu* (62)	3.22	Skin, gill
Myxidium rhodei	*Cyprinion macrostomum* **(56)	1.78	Gill
Myxobolus karuni	*Barbus grypus* (3)	66.66	Gill
Myxobolus oviformis	*Barbus luteus* (36)	2.77	Gill
Myxobolus musculi *	*Chondrostoma regium* (29) *Cyprinion macrostomum* (56)	10.34 3.57	Gill Gill
Myxobolus persicus	*Barbus luteus* ** (36)	5.55	Gill

* New parasite record in Iraq.
** New host record in Iraq.

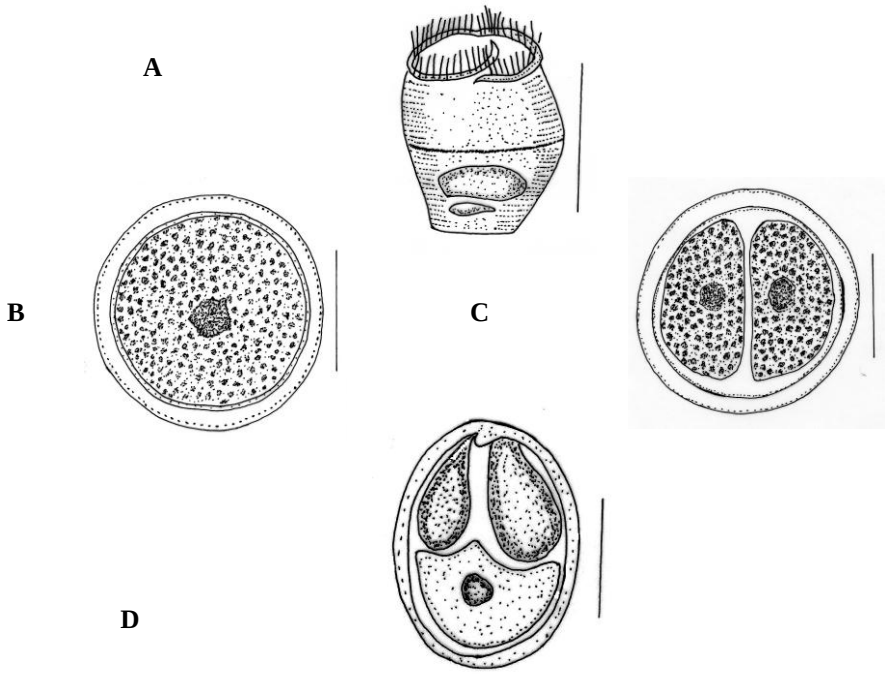

Figure (1): Drawings of : (A) *Apiosoma megamicronucleatum*. (B-C) *Eimeria sinensis* Development of spore. (D) *Myxobolus musculi* spore. (Scale bars: 20 µm in A, 5 µm in B, C, D).

Acknowledgements

I am grateful to Furhan T. Mhaisen (University of Baghdad) for access to his catalogue of parasites and pathogens of fishes of Iraq. Also, special thanks are due to Dr. Sean Locke (Environment Canada) for linguistic revision of manuscript with valuable suggestions.

References

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, Iraq (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, Iraq (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 Journal for Pure and Applied Science, 12 (1): 22-31.

Al-Jawda, J.M.; Balasem, A.N.; Mhaisen, F.T. & Al-Khateeb, G.H. (1998). Paracitic fauna of fishes in Tigris river at Salah Al-Deen province. 3rd Sci. Conf., Coll. Education (Ibn Al-Haitham), Baghdad: 14-16 December (Abstract).

Al-Jawda, J.M.; Balasem, A.N.; Mhaisen. F.T. & Al-Khateeb, G.H. (2000). Parasitic fauna of fishes from Tigris river at Salah Al-Deen province, Iraq. The Iraqi Journal of Biological Sciences, 19 & 20: 16-24.

Al-Khateeb, G.H.; Mhaisen, F.T.; Balasem, A.N.; Al-Shaikh, S.M.J. & Adday, T.K. (1997). Collection of somefish parasites from Tigris river at Neinava province. 14th Sci. Conf., Iraqi Biol. Soc., Kufa: 11-13 March (Abstract).

Al-Nasiri, F.S. (2008). *Myxobolus* spp. (Myxosporea: Myxozoa) infections in some fishes of Tigris river at Tikreet city, Iraq. 4th Sci. Educ. Sump., Tikreet Univ., Tikreet: 17-18 March (In Arabic).

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 Journal of Agriculture (Special 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 (3-4): 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*. Journal of Tikrit University for Agricultural Sciences, 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 Journal for Pure and Applied Science, 22 (2): 1- 8.

Asmar, K.R.; Balasem, A.N.; Mhaisen, F.T.; Al-Khateeb, G.H. & Al-Jawada J.M. (1999). Survey of the parasites of some fish species from Al-Qadisiya dam lake, Iraq. Ibn-Al-Haitham Journal for Pure and Applied Science, 12 (1): 52-61.

Balasem, A.N.; Mhaisen, F.T.; Al-Khateeb, G.H. & Asmar, K.R. (1997). Recording of two species of *Myxidium* Butschli, 1882 (Sporozoa: Myxosporidia) for the first time in fishes of Iraq. Al-Mustansiriya Journal of Sciences, 8 (3): 92-95.

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 the U. S. S. R. Akad. Nauk, S. S. S. R., Moscow (In Russian).

Duijn van, C. Jnr. (1973). Diseases of fishes. Third Edition. Iliffe Books, London.

Heckmann, R. (1996). Protozoan parasites of fish, part 1. Aquaculture Magazine, 22 (3): 44-57.

Herzog, P.H. (1969). Untersuchungen über die parasiten der süßwasserfische des Irak. Archive of Fischereiwiss, 20 (2/3): 132-147 (In German).

Hoffman, G.L. (1998). Parasites of North American freshwater fishes. Second Edition. Univ. California Press, London.

Hoole, D.; Bucke, D.; Burgess, P. & Wellby, I. (2001). Diseases of carp and other cyprinid fishes. Blackwell science, London.

Masoumian, M.; Baska, F. & Molnár, K.J. (1996). Description of *Myxobolus bulbocordis* sp. Nov. (Myxosporea: Myxobolidae) from the heart of *Barbus sharpeyi* (Gunther) and histopathological changes produced by the parasite. Journal of Fish Diseases, 19: 15-21.

Mhaisen, F.T. (2011). Index-catalogue of parasites and disease agents of fishes of Iraq, Unpublished data (mhaisen@yahoo.co.uk).

Muhammed, S.A. (1995). Studies on the cestodes parasitized in some teleost fishes in Tigris river. Ph.D. Thesis, Coll. Sci., Univ. Mosul, Iraq (In Arabic).

Nawab Al-Deen, F.M. (1994). Studies on the nematode parasites in many species of freshwater fishes in Iraq.M.Sc. Thesis, Coll. Sci., Univ. Mosul, Iraq (In Arabic).

Roberts, R.J. (1978). Fish pathology. Second Edition. Bailliere Tindall, London.

Shul'man, S.S. (1984). Parasitic protozoans. In: Key to the parasites of freshwater fish fauna of the USSR, 1 (ed. by O.N. Bauer), pp. 1-428. Nauka, Leningrad (In Russian).