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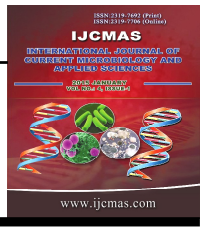

Original Research Article

The Parasitic Infection of the Freshwater Snails Collected in Central Iraq

Mohammad K. Mohammad*

Iraq Natural History Research Center and Museum, University of Baghdad, Bab Al-Muadham, P. O. Box 59028, Baghdad, Iraq
**Corresponding author*

Keywords

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A B S T R A C T

Seven species of freshwater snails were monthly collected in central Iraq. *Melanopsis praemorsa, Melanoides tuberculata, Radix* sp., *Bellamya bengalensis, Physella acuta, Theodoxus jordani* and *Gyraulus huwaizahensis* were examined for the natural parasitic infection in central Iraq. The results were discussed with the pertinent literature.

Introduction

The parasitic infection of the Iraqi freshwater snails is rather poorly known. The few papers appeared dealing with this matter was mainly preliminary surveys for cercaria types identified to the family level. Waston and Najim (1956) studied bilharziasis in Iraq and wrote some observations on schistosome dermatitis. Shamsuddin and Al-Adhami (1968) commented on larval trematodes in two species of snails from Mosul, Iraq. Wajdi *et al.* (1979) examined the susceptibility of Iraqi fresh water snails to infection with *Schistosoma haematobium* and *Schistosoma mansoni* Egyptian strains at the seventies decade of the 20th century characterized with presence of millions of Egyptian workers in Iraq. Jaffer (1980) commented on larval trematodes in Iraqi snails providing figures, descriptions and measurements. Mohammad (1983) indicated natural infection of *Bulinus truncatus* collected in Babylon province with larval stages of an echinostome trematode species. Yacoub (1985) studied the epidemiology of *Schistosoma haematobium* infection in Basrah, southern Iraq. Al- Mayah (1990) in his search for helminthes in some aquatic birds, wrote some notes about swimmer itch in Basrah. Al-Mayah (1998) revealed presence of larval trematoda in some freshwater gastropods collected in Basra province, southern Iraq. Al-Ali (2002), Al-Mayah *et al.* (2005) and Al-Mayah and Awad (2005) studied the growth and development of *Fasciola gigantica* in the snail intermediate host *Lymnaea auricularia*. Al-Khuzaee (2008, 2009) studied the swimmer's itch in Al-Nagaf Al-Ashraf province. Al- Taee *et*

al. (2011) found six types of cercariae in *Melanopsis nodosa* collected from Al-Husseinia creek, Kerbala province. Al-Waaly (2014) found that 13% of *Radix* sp., 77% of *Melanopsis praemorsa* and 26% of *Melanoides tuberculata* were infected with six forms of *Cercariae, Xiphidiocercariae, Echinostomcercaria, Gymnocephalous cercariae, Furcocercariae, Microcercous* and *Parapleurophocercous* and these larval stages belong to 8 families: Plagiorchiidae, Psilostomidae, Echinostomatidae, Notocotylidae, Opecoeliidae, Sanguinicolidae, Heterophyidae and Cyathocotylidae.

The aim of this work is to examine the natural parasitic infection of the freshwater snails collected in central Iraq.

Materials and Methods

Random samples of snails were collected monthly from irrigation channels in the vicinity of Al-Diwaniya city and adjacent areas, central Iraq during 2014. The snails were either collected with a scoop or picked up directly by hand, maintained in suitable size plastic container filled with freshwater from the irrigation channel and brought to the lab as soon as possible. Individual snails were sorted according to their species and kept for overnight in a small Petri dish with a small amount of dechlorinated water and examined the next day for cercariae under dissecting microscope. Photomicrographs were taken with a digital camera (Infinity Lite K-100).

Results and Discussion

Seven species of freshwater snails were collected in this study. *Melanopsis praemorsa* represents the most common species among them with presence of all of its three forms the nodular, ribbed and smooth which were formerly treated as separate species namely *M. nodosa*, *M. costata* and *M. buccinoidea* respectively. The later is the common form among the other two forms. Ali *et al.* (2007) considered 4 species of *Melanopsis*. Mohammad (1983) considered the snails collected from the Sulphur-rich water in Ain Al-Tamur, Kerbala province, central Iraq as *M. buccinoidea*. The same situation is with *Lymnaea* and *Radix* records. For example, *L. auricularia* was frequently recorded from Iraq (Mohammad, 1983; Al-Kubaisee and Altaif, 1989; Al-Asadi, 2011; Al-Jibouri *et al.*, 2011), while Naser *et al.* (2008) and Al-Waaly (2014), the latter author examined the snails with morphology, molecular procedures and scanning electron microscopy, emphasized that *L. auricularis* does not exists in Iraq. This situation caused some confusion regarding the specific names of Cercariae host snails. This is important especially in the strategies to control fascioliasis in that it will be not effective without proper identification of snail hosts (Pfenninger *et al.*, 2006).

Table 1 shows that the total infection rate in the present snails collection is 30.7%. *M. praemorsa* ranks first with rate of 57.4%, then *M. tuberculata* with rate of 32.9%, *Radix* sp. with rate of 16.4%, *B. bengalensis* with rate of 8.2% and finally *Physella acuta* with rate of 0.34%. No cercariae were shed from the snails *T. jordani* and *G. huwaizahensis*. The rate of infection for *M. praemorsa* is 57.4. Al-Taee *et al.* (2011) although he examined 4 freshwater snail species in Al-Husseinia creek, Kerbala Province, middle of Iraq, he got cercariae from *M. nodosa* (= *praemorsa*) only with infection rate of 27.98%. This difference may be attributed to ecological differences between the two sites of collection. It is different also from that of Al-Waaly (2014) who found it 77% in the snails collected

from middle and south of Iraq. This is because he collect his material during February to May 2014, a period characterized with relatively high shedding rate of cercariae while the present collection stretches over the whole year 2014, smaller sample size examined in his work, and the ecological differences between collection sites since his study included the middle and south of Iraq while the present study is devoted for the central Iraq. Infection rate in *B. bengalensis* is relatively high. This may related, partly at least, to high reproduction rate of this snails since the author noticed that new offspring was observed even at cold winter months November and December.

The rate of infection for *M. tuberculata* and *Radix* sp. are 32.9% and 16.4% respectively. Al-Waaly (2014) found them 26% and 13% respectively. This is rather hard to explain, but the suitability of the ecological conditions in south of Iraq, the collection site of a large part of his snails, may be applicable.

Physella acuta does not harbor any cercaria infection except one case of presence of the commensal *Chaetogaster limnae* (Annelida: Oligochaeta) (Fig. 1). This worm is recorded from *Bulinus truncatus* (Al-Khafaji *et al.*, 2008), from some freshwater snails in Basra Marshes (Al-Abbad, 2009), and from *Radix* sp. (Al-Waaly, 2014). It is recorded in this study from *B. bengalensis* which gets infection with a nematode also, *Radix* sp. and *P. acuta*. Grewal *et al.* (2003) mentioned that 61 species of nematodes known to use molluscs as intermediate hosts most of them (49) belong to Metastrongyloidea (Order Strongylida).

A larval stage of apparently oxyurid nematode emerged from *Bellamya* snails (Fig. 2). Mohammad (1983) reported infection of *Bulinus truncatus* with an unidentified nematode. This constitutes the first report in Iraq on a nematode recovered from the freshwater snail *B. bengalensis*. The present case represents a second of its kind. However, identification of this nematode is not possible without experimental infection in the lab to suitable definitive host.

Four types of cercariae are recognized in this study:

1- *Parapleurolophocercous cercaria*(Fig. 3): Body oval with two eye spots at the anterior part. Tail long with prominent lateral finfold. It is observed in *M. praemorsa* while Al-Waaly (2014) reported it from *Melanoides tuberclata*. However both snails belong to snail family Thiaridae.
2- *Echinostomous cercaria* (Fig. 4): Body oval and the ventral sucker situated at the middle. It is observed in *Melanoides tuberculata* while Al-Waaly (2014) recorded it in *Radix* sp.
3- *Furcocercous cercaria* (Fig. 5): It is a monostome cercaria (Fig. 5a) and the tail is bifurcated (Fig. 5b) with a dorsoventral finfold (Fig. 5c). It is reported from *M. praemorsa* in this study. Al-Taee *et al.* (2011) and Al-Waaly (2014) found this type in the same species in Iraq.
4- *Xiphidiocercous cercaria* (Fig. 6): Elongated pyriform shaped with relatively short tail. It has a stylet situated anterior to oral sucker (Fig. 6a). Many of these cercariae were encysted within few minutes after emergence on plastic Petri dish wall (Fig. 6b). Its reporting from *M. praemorsa* is in agreement with Al-Taee *et al.* (2011) who found this type in *M. nodosa* (=*praemorsa*) collected in Kerbala province central Iraq and

also with Bdir and Adwan (2012) who recorded this type in *M. praemorsa* in Palestine, but it is in disagreement with Al-Waaly (2014) who found this type in *Radix* sp. collected in the middle and south of Iraq.

Table.1 number of monthly examined and infected snails in central provinces in 2014

Month / species		*Melanopsis praemorsa*	*Melanoides Tuberculata*	*Physella acuta*	*Radix* sp.	*Theodoxus Jordani*	*Gyraulus huwaizahensis*	*Bellamya bengalensis*	total
January	Ex.	12	9	13	0	11	0	5	50
	Inf.	1	1	0	0	0	0	0	2
February	Ex.	27	20	23	10	22	0	11	113
	Inf.	4	1	0	2	0	0	0	7
March	Ex.	34	22	11	8	51	31	27	184
	Inf.	21	4	0	1	0	0	4	30
April	Ex.	82	46	49	31	115	23	57	403
	Inf.	65	22	0	5	0	0	5	97
May	Ex.	109	30	31	11	35	9	42	267
	Inf.	90	21	0	3	0	0	7	121
June	Ex.	66	31	30	19	11	17	40	214
	Inf.	50	10	1	3	0	0	4	68
July	Ex.	50	40	23	17	13	6	33	182
	Inf.	41	20	0	4	0	0	1	66
August	Ex.	56	19	12	6	0	0	30	123
	Inf.	40	3	0	0	0	0	1	44
September	Ex.	80	19	13	1	0	0	23	136
	Inf.	62	1	0	0	0	0	1	64
October	Ex.	41	7	67	7	0	1	12	135
	Inf.	20	0	0	0	0	0	0	20
November	Ex.	72	0	15	0	0	0	0	87
	Inf.	13	0	0	0	0	0	0	13
December	Ex.	112	0	18	0	0	0	0	130
	Inf.	3	0	0	0	0	0	0	3
Total	Ex.	741	252	295	110	285	87	280	1793
	Inf.	425	83	1	18	0	0	23	550
	%	57.4	32.9	0.34	16.4	0	0	8.2	30.7

Fig.1 *Chaetogaster limnaei* (Oligochaeta) from *Bellamya bengalensis*

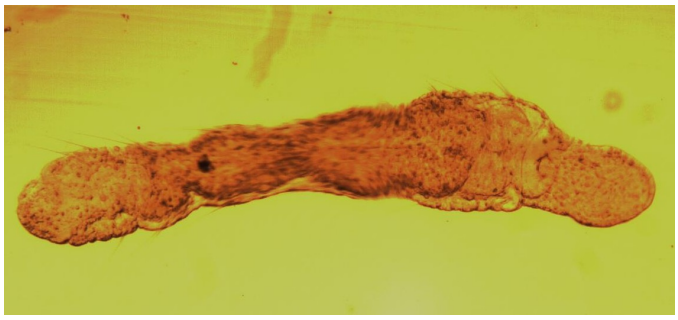

Fig.2 Larval stage of apparently oxyurid nematode from *Bellamya bengalensis*

Fig.3 *Parapleurolophocercous cercaria* from *Melanopsis praemorsa*

Fig.4 *Echinostomous cercaria* from *Melanoides tuberculata*

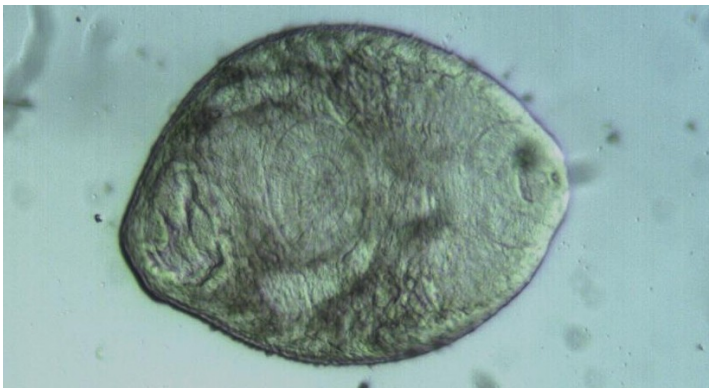

Fig.5a *Furcocercous cercaria* body from *Melanopsis praemorsa* details showing the oral sucker

Fig.5b *Furcocercous cercaria* from *Melanopsis praemorsa*

Fig.5c *Furcocercous cercaria* from *Melanopsis praemorsa*, details of Cercaria tail showing the arrangement of fins

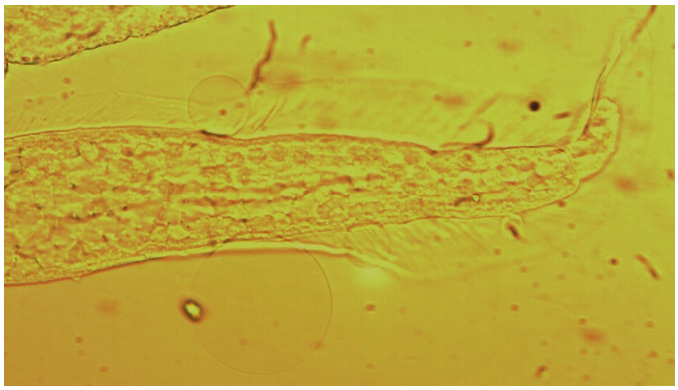

Fig.6a Encysted *Xiphidiocercous metacercaria* from *Melanopsis praemorsa*

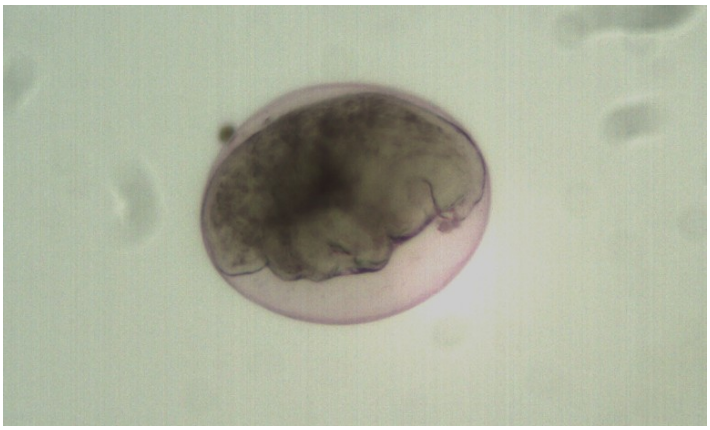

Fig.6b Free swimming *Xiphidiocercous cercaria* from *Melanopsis praemorsa*

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