

A Faunistic Survey on the Cercariae of *Bellamya (Viviparus) bengalensis* Snails and Their Zoonotic Importance

*H Ghobadi, A Farahnak

Dept. of Medical Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Iran

Abstract

Limited studies have been made on the cercariae from freshwater snails in Iran. This study was conducted to determine the cercariae fauna of *Bellamya (Viviparus) bengalensis* and evaluation of their zoonotic importance in Khuzestan province, south-west of Iran. For this purpose, 1143 *Bellamya* snails were collected from Ahoudasht region in central areas of the province during 2002-2003. *Bellamya* snails were examined for cercariae with shedding or crushing methods, and identified by systematic key references. Findings showed that 5(0.4%) *Bellamya* snails were infected with Xiphidiocercariae belonging to Plagiorchiidae helminth parasites. The zoonotic importance of these cercariae and life cycle of Plagiorchiidae helminth (Trematode) parasites are discussed.

Keywords: *Bellamya bengalensis*, Snail, Cercariae, Khuzestan, Iran

Introduction

Freshwater snails are the first intermediate host of the most of the trematodes. Snail transmitted diseases such as schistosomiasis, fascioliasis, paragonimiasis and clonorchiasis are national or international public health problems. *Bellamya (Viviparus) bengalensis* snail is a freshwater gastropoda. This snail is ovoviviparous and its operculum is a thin teardrop-shaped disk of flexible protein that forms a door close the aperture and two long cephalic tentacles are located dorsally beside the base of the snout. *Echinostoma* cercariae, especially *Echinostoma elongates* and *E. ryousus* have been reported from *Bellamya bengalensis* (1). Also, this snail has been shown 30% prevalence with *Paramphistome* cercariae in Assam (2).

In addition, cercariae *Laungakheraii* and cercariae *Bellamyaii* have been reported from this snail in Lucknow in India (3). *Bellamya* spp. has been reported as a new host for *Echinochasmus liliputanus* (4). *Bellamya bengalensis* having limited widespread in Khuzestan

province, south-west of Iran. Based on our previous observations, these snails are localized in Ahoudasht region in central areas of Khuzestan. The aim of this study was faunistic survey on the cercariae (larva trematode parasites) of *B. bengalensis* to detect the snail transmitted helminth diseases in the region.

Materials and Methods

This study was made on 1143 *B. bengalensis* snails in Mazraae 2 district from Ahoudasht region in south of *Dezful*. *Bellamya* snails were collected from the drains, ponds, canals and waterways by a wooden handle paddle with 1.5 meter long and net size 30×40 cm. The alive-catched snails were transferred to Dezful Health Research Center. The snails were kept in aquarium and examined for the presence of cercariae by shedding and/or crushing methods. In the first method, snails were put in petri dish containing dechlorinated tap water and were placed against light for two hours or overnight at the room temperature. In the second method,

the shell of snail was broken with tweezers and soft tissues were placed between 2 slides and squashed. Alive vigorous cercariae were obtained from infected snails and stained with azocarmine.

After measuring and drawing different parts of cercariae, the cercariae genera were identified according to systematic key reference (5). All snails were crushed after shedding, and were searched more precisely in order to find sporocysts, redia or metacercariae.

Results

From 1143 *B. bengalensis* snails examined, 5 cases (0.4%) were found to be infected with cercariae (Fig.1).

Morphological specificity of cercariae Oral and ventral sucker are almost equal in size. The penetration gland cells are several pairs and there is a vertical stylet in oral sucker. Tail without fine fold and excretory bladder is Y-shaped, and the genital primordium is posterior to ventral sucker. Body surface is provided with minute spines, a long esophagus is observed and intestinal caecum reaches to the posterior end of the body (Figs 2, 3). The cercariae were identified as Xiphidiocercariae from Armata group and Plagiorchiidae helminth (Trematode) parasite.

Morphometric specificity of cercariae The sizes of different organ of Xiphidiocercariae obtained from *B. bengalensi* are presented in Table 1.

Table 1: The sizes of different organs of Xiphidiocercariae obtained from *B. bengalensis*

Cercariae	Size (μ)					
	Body	Tail	Stylet	Pharynx	Oral sucker	Ventral sucker
Xiphidiocercariae	167×148	139×22	14×9	18×17	54×55	55×46
	333×93	172×18.6	2×87		70×55	68×33

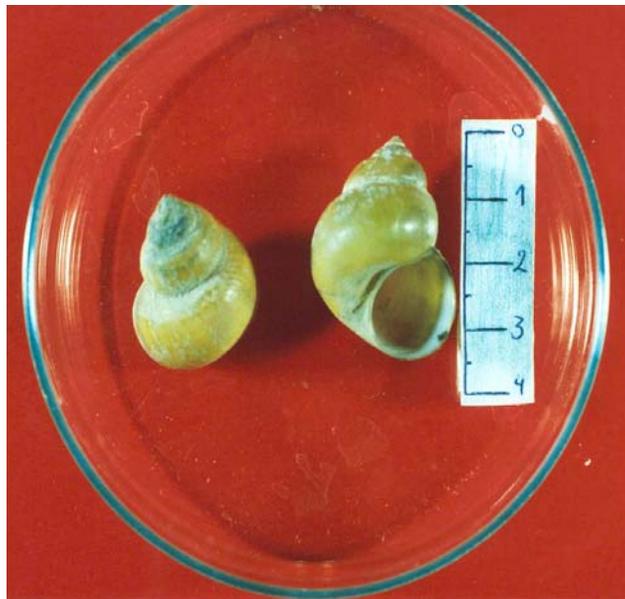


Fig. 1: Adult shell of *Bellamya bengalensis* snail in Khuzestan province.

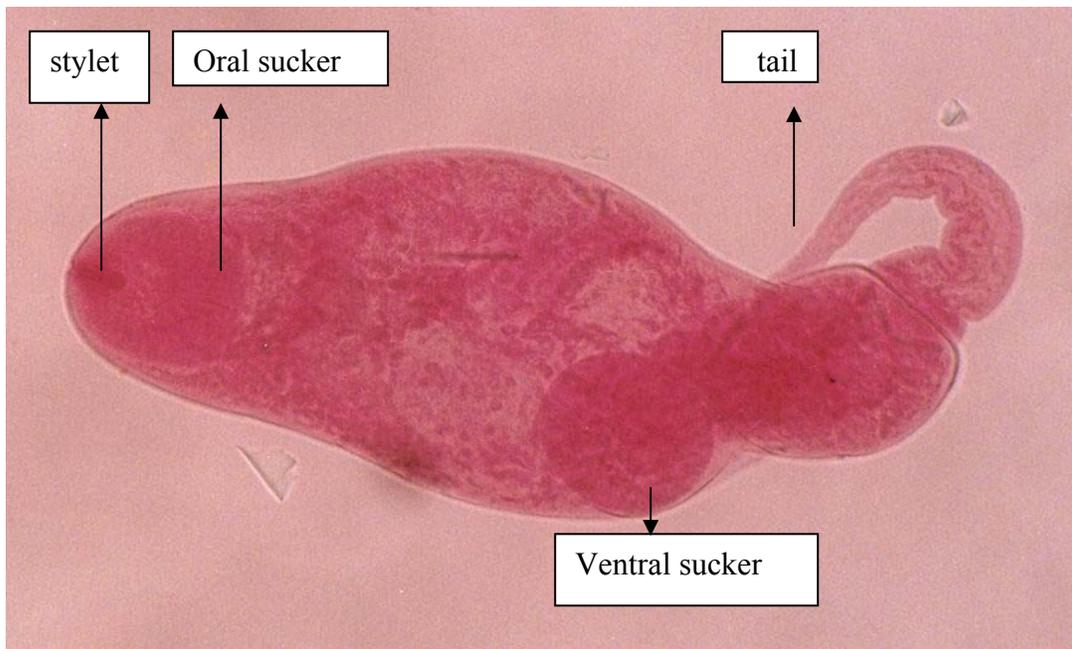


Fig. 2: Xiphidiocercariae (Plagiorchiidae helminth parasite) obtained from *Bellamya bengalensis* snail in Khuzestan province.

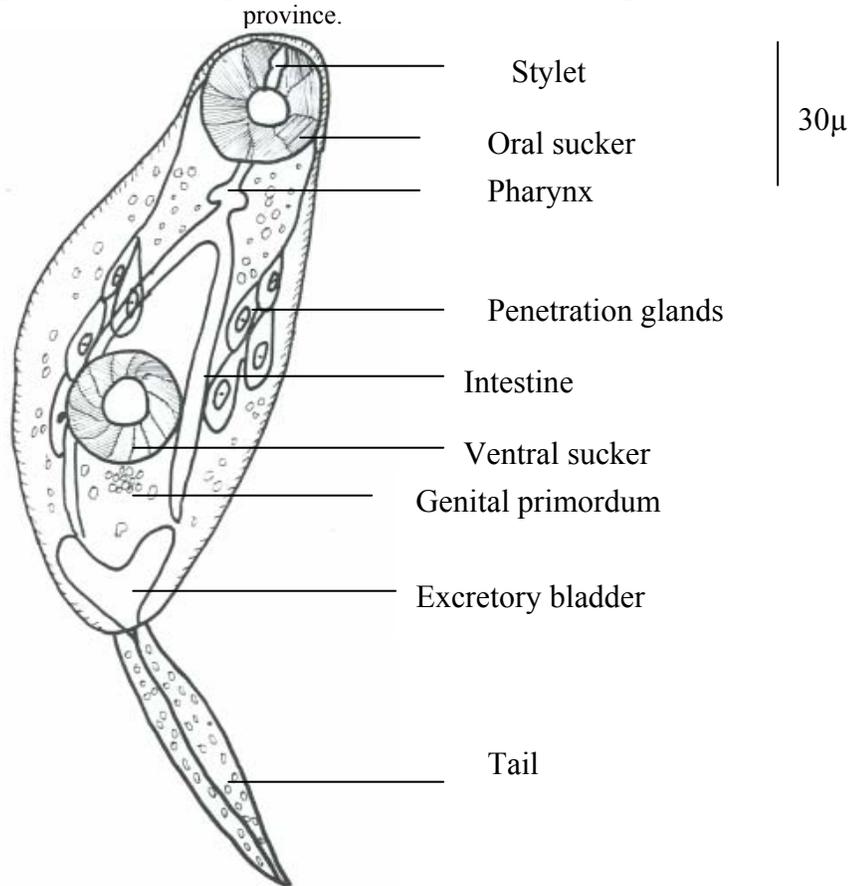


Fig. 3: Drawing picture of Xiphidiocercaria obtained from *Bellamya bengalensis* snail

Discussion

This study provides the first estimate of larva trematode parasites among snails and their zoonotic importance in animal or on human health. The region has some drains, canals and ponds which are using for bathing, drinking and washing by people. The places are suitable habitats for living *B. bengalensis* snails and this snail displayed significant variation in numbers between seasons and was most prevalent in winter. *Bellamyia* snails are considered to be the first intermediate host for larva trematode parasites (5). In the present study, we found Plagiorchiidae family cercariae in this snail, too. The Plagiorchiidae is a large family of digeneans infecting vertebrates of all classes (6). The second intermediate hosts for Plagiorchiidae parasites are fish and aquatic insect larvae. Definitive host is the entire vertebrate including human (7). In humans, *Plagiorchis* spp. cause intestinal infections, and to date 11 cases of natural human infections with *Plagiorchis* spp. have been confirmed in Phillipine, Indonesia, Korea, Thailand and Japan (8, 9). Natural human infection by *Plagiorchis muris* has been recorded from Japan. The patient was 40-years-old and had multiple infection because of *Metagonimus takatashi* and *Echinostoma hottense*, his clinical signs were aphtus stomatitis with ulcer on the tongue and buccal mucosa but did not complain of any subjective gastrointestinal symptoms related to the above fluke infection, he had eaten several kinds of raw freshwater fish (9). There is little information about cattle and human plagiorchiasis, but as in other countries, is apparently being increased. This is necessary to note that, owing to the resemblance of eggs of this parasite to those of *Opisthorchis viverrini* and *Clonorchis sinensis*, it is believed that the human infections with this helminth usually go unnoticed in most cases (8). Although there are some reports in which the parasite has been reported in a variety of hosts including different carnivores, but to date there

are no reports of human infection in Iran (10). In the present study, we demonstrated the infection of *Bellamyia* snails with Plagiorchiidae helminth parasites which can infect both human and animals. More surveys are needed to identify the real prevalence of the helminth both in human and animal hosts in Iran, and also to determine the range of snail hosts of the parasite in enzootic areas of the disease, as well as the life cycle and biology of plagiorchidae and its effects on man should be elucidated.

Acknowledgements

We wish to thank Dr. A. Mansoorian for his review on snails, Dr. I. Mobedi for his views on cercariae. Thanks also M Jahanbani, R Poorshojaii and A Shakerian for snail sampling and H. Kotalan for transporting and N. Mirsepahi for her helping. This study was supported by Tehran University of Medical Sciences.

References

1. Malek EA (1974). *Medical and Economic Malacology*, Academic Press. p. 68-69.
2. Pande P G (1935). Acute paramphistomiasis of cattle in Assam. A preliminary report. *Indian J Vet Sci Ani Hus*, 5:364-75.
3. Srivastava S, Saxena V (1992). Two new cercariae from the snail, *Bellamyia*. *Indian Vet Med J*, 16(2):127-35.
4. Xiang X, Dabing L, Tianping W (1995). Epidemiological studies on *Echinochasmus liliputanus* infection. II Infection and seasonal variation in intermediate hosts. *Chinese J Parasit Dis Con*, 8(1):24-7.
5. Frandsen F, Christnsen N Q (1984). An introductory guide to the identification of cercariae from Africa freshwater snails with special reference to cercariae of trematode species of medical veterinary- importance. *Acta Trop*, 41: 81-202.

6. Alberto B, Jaceline C, Fernande Z, Gerald W, Eachad J, Seed R (2001). *Parasitism, The diversity and ecology of animal parasites*. Cambridge University Press.
7. Muller R (2002). *Worms and Human Disease*. CABI publishing, 2nd ed. Oxon, Wallingford, UK, p. 58.
8. Garcia L S (2001). *Diagnostic medical parasitology*. 4th ed. LSG&Associatees, Santa Monica, California, p. 491.
9. Sung-Jong Hong, Ho-choon Woo, Jong-Yilchai (1996). A human case of *Plagiorchis* (Tanabe, 1922: Digenea) infection in the Republic of Korea: Freshwater fish as a possible source of Infection. *J Parasitol*, 82 (4):647-49.
10. Eslami A (1989). *Veterinary Helminhtology*. Volume (1), Trematodes, publisher Tehran University.