

MOLLUSCS LYMNAEIDAE – TREMATODES' INTERMEDIATE HOSTS IN THE WATER BODIES OF THE SYRDARYA RIVER

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ABSTRACT: The results of the study of the fauna of trematode cercaria, which develop in Lymnaeidae, in the region are presented. Parthenitae and cercariae are recorded in seven species of the genus *Lymnaea*, namely, *L. auricularia*, *L. truncatula*, *L. stagnalis*, *L. corvus*, *L. palustris*, *L. peregra*, and *L. bactriana*. Sixteen cercaria species of 14 genera and 9 families were revealed. Cercariae developing were recorded in the basins of Syrdarya water, cause trematodosis-induced diseases in fish, birds and mammals.

Keywords: Cercaria, Trematode, Parthenitae, Mollusk, Lymnaeidae, Syrdarya.

I. INTRODUCTION

The Syrdarya River basin is a natural geographical complex on a transboundary territory featuring a wide range of bodies of water with diverse ecological conditions. By now a large number of big multi-purpose reservoirs have been built within the Syrdarya basin, and some of them reach hundreds of thousands of hectares in area. Reservoirs are a relatively new type of water bodies characterised by specific ecological conditions [9]. The artificial reservoirs are homes for a wide range of animal species – components of their aquatic coenoses. Molluscs, the primary intermediate hosts of trematodes, make up a special group.

Molluscs from the family Lymnaeidae are very common throughout the globe and occur in various types of water, from fresh to brackish. The role pond snails play in the transmission of trematodes causing diseases in humans and domestic and game animals is well-known and needs no comment [5, 8, 10, 13]. However, the available scientific information on trematode larvae developing in the molluscs of the Syrdarya River water bodies is fragmentary and insufficient [1, 4, 11, 15].

The goal of this work is to establish the species diversity of cercariae developing in molluscs from the family Lymnaeidae living in the water bodies of the Syrdarya River and specify the pond snails' role in the transmission of trematodiasis to animals.

II. RESEARCH METHODOLOGY

The research was carried out in the north-east of Uzbekistan (Jizzah, Syrdarya and Tashkent Provinces) between 2017 and 2019.

The material was collected in bodies of water on the flood plains and deltas of the Syrdarya, Chirchik and Angren frequented by vertebrates. 9 mollusc species from the genus *Lymnaea*, family Lymnaeidae, were examined for trematode parthenitae and cercariae. In total 2234 individuals of pond snail were collected in different seasons (spring, summer and autumn) and examined following accepted malacological and parasitological methods [5, 7, 10, 12].

To identify molluscs infected with trematode larvae, we placed each of them in separate small glasses and watched until mature cercariae emerged from the snails. After that all the molluscs were dissected and examined with the help of a binocular microscope.

The morphological and biological characteristics of the parthenitae and cercariae were studied using common methods [5, 6]. The morphometric parameters of the cercariae were analysed with the help of an anaesthetised neutral red solution following this method [5]. The following techniques were used to identify cercaria species [5, 8, 13]. The cercariae were sketched using a drawing tube. The parthenitae and cercariae were measured on objects treated with hot 10% formalin solution.

III. EXPERIMENTAL RESULTS AND DISCUSSION

It was established that molluscs from the family Lymnaeidae inhabiting the Syrdarya water bodies in the north-east of Uzbekistan comprise nine species from the genus *Lymnaea*: *L. auricularia*, *L. bactriana*, *L. corvus*, *L. palustris*, *L. peregra*, *L. stagnalis*, *L. subdisjuncta*, *L. truncatula*, *L. tengriana*.

Molluscs in small bodies of water with weak currents, abundant aquatic vegetation, clayey bottoms and large amounts of decaying organic matter show a higher rate of infection with trematodes than those in bodies of water with strong currents.

Trematode parthenitae and cercariae were detected in 7 mollusc species from the genus *Lymnaea*: *L. auricularia*, *L. stagnalis*, *L. truncatula*, *L. corvus*, *L. palustris*, *L. peregra*, *L. bactriana*. The infection rate varied between 0.9% and 3.76% (Table 1).

Table 1. The species representativeness of molluscs from the genus *Lymnaea* and their rate of infection with trematode cercariae in the region under study

№	View	Investigated, ind.	Infected, %
1	<i>L. auricularia</i>	585	3.76%
2	<i>L. bactriana</i>	271	1.8%
3	<i>L. truncatula</i>	355	1.0%
4	<i>L. tengriana</i>	184	-
5	<i>L. subdisjuncta</i>	148	-
6	<i>L. stagnalis</i>	181	3.3%
7	<i>L. palustris</i>	205	0.9%
8	<i>L. peregra</i>	138	1.4%
9	<i>L. corvus</i>	167	1.7%
		2234	1.98%

A total of 16 cercaria species from 14 genera and 9 families were identified (Table 2).

Table 2. Species diversity of trematode cercariae detected in molluscs from the genus *Lymnaea* in the studied region

Family and view of cercariae	The hosts	
	first intermediate	definitive
Fasciolidae:		
<i>Fasciola hepatica</i> L., 1758	<i>L. truncatula</i>	Mammals
<i>Fasciola gigantica</i> (Cobb., 1856)	<i>L. auricularia</i>	Mammals
Notocotylidae:		
<i>Notocotylus attenuatus</i> Rud., 1909	<i>L. auricularia</i>	Birds
Echinostomidae:		
<i>Echinostoma revolutum</i> (Frochlich, 1802)	<i>L. stagnalis</i>	Birds
<i>Echinoparyphium aconiatum</i> (Deitz, 1909)	<i>L. auricularia</i>	Birds
<i>Echinoparyphium recurvatum</i> Linstow, 1879	<i>L. auricularia</i>	Birds
<i>Hypoderaeum conoideum</i> Bloch, 1879	<i>L. stagnalis</i>	Birds
Plagiorchiidae:		
<i>Opisthioglyphe ranae</i> (Froelich, 1791)	<i>L. stagnalis</i>	Amphibia
<i>Haplometra cylindracea</i> (Zeder, 1800)	<i>L. auricularia</i>	Amphibia
Sanguinicolidae:		
<i>Sanguinicola inermis</i> Plechn, 1905	<i>L. auricularia</i> <i>L. peregra</i>	Fish
Bilharziellidae:		
<i>Trichobilharzia ocellata</i> (La Valette, 1854)	<i>L. stagnalis</i> <i>L. auricularia</i>	Birds
Schistosomatidae:		
<i>Schistosoma turkestanicum</i> Skrjabin, 1913	<i>L. auricularia</i>	Mammals
Strigeidae:		
<i>Apatemon gracilis</i> (Rud., 1819)	<i>L. stagnalis</i>	Birds
<i>Cotylurus cornutus</i> (Rud., 1819)	<i>L. stagnalis</i>	Birds
Diplostomidae:		
<i>Diplostomum spathaceum</i> (Rud., 1819)	<i>L. stagnalis</i> <i>L. auricularia</i>	Birds
<i>D. helveticum</i> (Dubois, 1929)	<i>L. auricularia</i>	Birds

The quantitative and qualitative composition of cercariae varies considerably in different mollusc species. The largest number of trematode larvae species (9) and the highest infection rate were recorded in *L. auricularia*.

Maritae parasitise fish, amphibians, birds and mammals. It was established that cercariae of trematodes *T. ocellata* and *Sch. turkestanicum* cause cercarial dermatitis in humans [2, 3, 14]. Trematodes whose mature forms parasitise aquatic and semi-aquatic birds comprised the largest portion of our cercaria collection.

According to the research, most of the detected cercariae in their later phases use several animals as secondary intermediate hosts. The life cycle of these trematodes (genera *Apatemon*, *Cotylurus*, *Diplostomum*, *Echinostoma*, *Hypoderaeum*) can be described as trixenous (three-host). The other species are dixenous (two-host) trematodes (Table 2). Among the latter *Sanguinicola inermis*, *Trichobilharzia ocellata* and *Schistosoma turkestanicum* form a special group. Cercariae of these trematodes penetrate actively into the blood vessels of their definitive host through their integument.

The results of the research into the natural infection of Lymnaeidae with trematode cercariae in the Syrdarya water bodies show that the molluscs infected with the flukes facilitate the transmission of trematodiasis to fish, birds and mammals. Some of the cercaria species – *T. ocellata* and *Sch. turkestanicum* – cause cercarial dermatitis in humans in areas liable to this disease within the studied region.

The results of the research aim to improve methods to control trematodiasis in animals in certain regions in Uzbekistan.

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