

First report of parasites in *Lithoglyphus naticoides* (Gastropoda: Hydrobiidae) from Lake Lukomskoe (Belarus)

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Abstract

The Ponto-Caspian snail *Lithoglyphus naticoides* was recorded for the first time in Lake Lukomskoe in 2003. During parasitological examinations conducted in May and August 2006, the snail was found to harbor cercariae of three trematode species: *Palaeorchis* sp., *Rossicotrema donicum* and *Sphaerostomum bamae*. The finding of *R. donicum* is especially alarming because this highly specific parasite of *L. naticoides* can cause severe epizootics among its second intermediate hosts, i.e. perch and cyprinid fishes.

Key words: *Lithoglyphus naticoides*, *Palaeorchis* sp., *Rossicotrema donicum*, *Sphaerostomum bamae*, Belarus, Lake Lukomskoe

The gravel snail, *Lithoglyphus naticoides* (Pfeiffer, 1828), originating from the Ponto-Caspian region is currently widely distributed in waterbodies of Western Europe (Bij de Vaate et al. 2002). In 2003, it was found in Belarusian Lake Lukomskoe, and currently its population in this waterbody is expanding (Mastitsky and Samoilenko 2006). *Lithoglyphus* is known to serve as an intermediate host for several species of trematodes, some of which are highly pathogenic for their second intermediate hosts, i.e. fishes (Biserova 1990, 2005, Tyutin et al. 2006). As Lake Lukomskoe is used as both a commercial and recreational fishery, the assessment of potential parasitological consequences of this gravel snail's invasion is a pressing question. Results of the first examinations of *L. naticoides* for parasites are presented herein. The snails were collected on 30.05.2006 and 01.08.2006 from a depth of 0.5-0.8 m (coordinates of sampling point: N 54°38'44, E 29°06'20). In each

sampling month, fifty snails were individually placed into small transparent plastic containers (1.5x1.5x1.5 cm) with filtered lake water and left exposed to natural light. One day later, the water in these containers was checked under a stereomicroscope (x 20-70) for presence of any trematode cercariae which had emerged from the host. Recovered cercariae were identified according to Zdun (1961), Chernogorenko (1983) and Ivanov and Semenova (2004).

Three species of trematodes were observed to infect *L. naticoides* in Lake Lukomskoe (Table 1). Two of them, *Sphaerostomum bamae* (Müller, 1776) (family Opcoelidae) and *Palaeorchis* sp. (family Monorchidae) are widely distributed fish parasites, whose larvae can use several snail species as their first intermediate host (Zdun 1961, Chernogorenko 1983). It is most probable that subsequent to its invasion into Lake Lukomskoe, the gravel snail became an additional intermediate host for indigenous *S.*

bramae and *Palaeorchis* sp. In contrast, *Rossicotrema donicum* Skrjabin et Lindtrop, 1919 (family Heterophyidae; Figure 1) is highly specific to *Lithoglyphus* (Ivanov and Semenova 2004, Biserova 2005), indicating that this parasite might be co-introduced into the lake along with the snail.

Table 1. Prevalence of infection (%) of *L. naticoides* with trematodes in Lake Lukomskoe

Trematode species	30.05.2006 (n = 50)	01.08.2006 (n = 50)	Combined data for two sampling dates (n = 100)
<i>Palaeorchis</i> sp.	6	0	3
<i>Rossicotrema donicum</i>	14	6	10
<i>Sphaerostomum bramae</i>	8	18	13

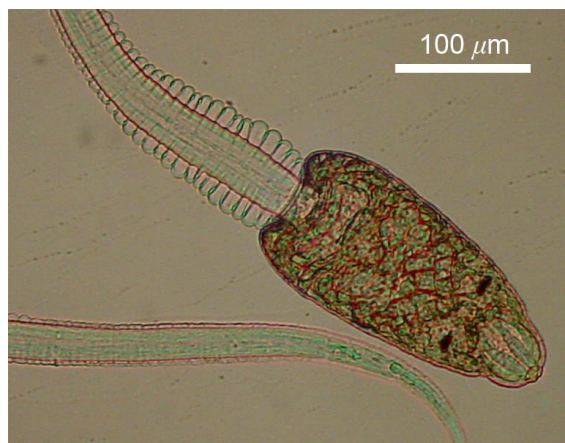


Figure 1. Live cercariae of the trematode *Rossicotrema donicum*. Phase-contrast microscopy after staining with neutral red (Photo by Sergey Mastitsky)

The finding of *R. donicum* in Lake Lukomskoe presents an alarming signal. Metacercariae of this parasite cause a type of lethal ‘black-spotted disease’ in perch and some cyprinid fishes as they embed themselves into the skin, musculature and fins of the hosts (Figure 2). Feeding on infected fish can in turn lead to highly pathogenic effects in birds and mammals, including humans (Biserova 2005). When interviewed, several amateur fishermen reported



Figure 2. Black-spotted disease in *Perca fluviatilis* Linnaeus, 1758 presumably caused by *Rossicotrema donicum*. Small black metacercarial parasites can be seen embedded into the skin and fins. Fishes were caught in Lake Lukomskoe on 30.07.2006 (Photo by Sergey Mastitsky)

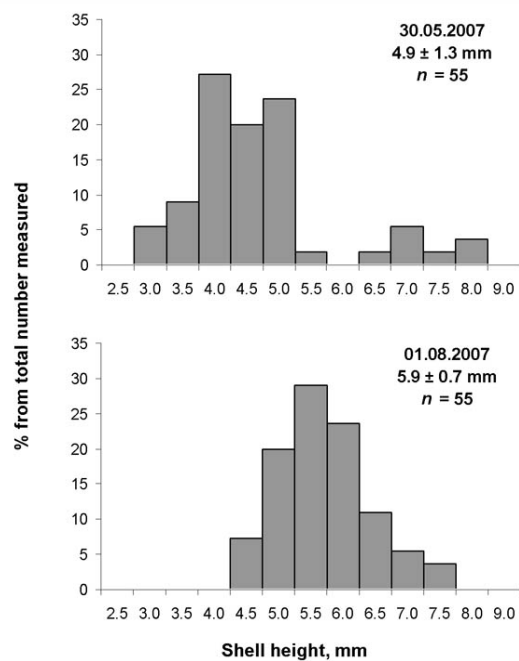


Figure 3. Size structure of *Lithoglyphus naticoides* population in two sampling months based on measurements of the shell height. Mean heights (\pm SD) and sample sizes are indicated

increasing numbers of fish in recent catches from Lake Lukomskoe exhibiting symptoms of black-spotted disease (Leonid D. Burko, Belarusian State University, personal communication). This may be directly related to the introduction of the gravel snail and its specific parasite *R. donicum*. However, more detailed studies are required to reveal the etiology of the mentioned black spots as they can also be caused by several other indigenous trematodes, for example *Diplostomum*

spp. (Biserova 2005). As the population of *L. naticoides* in the lake is expanding (Mastitsky and Samoilenko 2006), the prevalence and intensity of *R. donicum* infection in fishes can be expected to increase in the near future. Therefore, for reasons of Public Health, local epidemiological services are recommended to intensify the parasitological monitoring of fish products coming from Lake Lukomskoe.

The prevalence of infection of *L. naticoides* with trematodes was low to moderate and demonstrated some seasonality, i.e. by August, the percentage of infection in samples analysed considerably declined for *Palaeorchis* sp. and *R. donicum* and increased for *S. bramae* (Table 1). The rising of *S. bramae* prevalence could be related to a corresponding increase of mean size of the snails' shells (Figure 3), while dynamics of *Palaeorchis* sp. and *R. donicum* prevalence could be dependent on some other factors unaccounted for in this preliminary study.

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