



Findings of Fluke *Prosolecithus Danubica* (Trematoda, Dicrocoeliidae) in Shrews in South-West Belarus

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Abstract

The helminthological examination of one hundred sixty-three specimens of shrews of four species (2 bicoloured white-toothed shrews, 139 common shrews, 14 lesser shrews, 8 water shrews) captured on drainage channel banks of eight reclamation systems in Brest Polesie (Brest, Zhabinka and Malorita districts of Brest region; South-West Belarus) during 2015–2020 were carried out. 5.1 % examined common shrews were infected with fluke *Prosolecithus danubica* Tkach et Bray, 1995. Number of helminth specimens varied from 1 to 32. The result of previous studies in this region was also taken into account. A total of fluke *P. danubica* found in eight specimens of common shrews lives on drainage channel banks in four reclamation systems of Brest Polesie (2 systems were located in Brest district and 2 systems were located in Malorita district, South-West Belarus). All helminths were found in gall-bladder and/or bile-ducts of the liver. The information about shrews infected this fluke are presented. This investigation expands the areal of fluke *P. danubica* in Europe.

Keywords: *Prosolecithus danubica*; Common Shrew; Drainage Channel Banks; Brest Polesie; Belarus

Introduction

The family Dicrocoeliidae include about 400 species parasitize reptiles, birds and mammals also humans [1]. Localize these helminths mainly in the liver. Three species from this family registered in Belarus [2]. They parasitize liver of birds and mammals, and apply to genus *Dicrocoelium* Dujardin, 1845 (one species) and genus *Lyperosomum* Looss, 1899 (two species).

The genus *Prosolecithus* Yamaguti, 1971 is one a genus from family Dicrocoeliidae. Two species of this genus known in world fauna [3]. Fluke *Prosolecithus danubica* Tkach et Bray, 1995 found only on islands of the Danube delta, Odessa region, Ukraine [4]. It hosts is the common shrew and the

Mediterranean water shrew. Fluke *Prosolecithus pellucidus* Pojmańska, et al. [5] found only in the common shrew in Western Poland. Both species is small helminths. Body length varied from 2.16 to 3.30 mm, eggs of first species (*P. danubica*) have length 0.038–0.046, and eggs of second species (*P. pellucidus*) have length 0.028–0.036 mm [4].

The aim of the current study was to investigation of prevalence of fluke *P. danubica* in sorcid mammals (shrews) living on drainage channel banks in South-West Belarus.

Materials and Methods

This report contained the information about of helminthological investigation of sorcid mammals (family

Soricidae) caught on eight reclamation systems in Brest Polesie (Brest, Zhabinka and Malorita districts of Brest region; western part of Belorussian Polesie; South-West Belarus) during 2015–2020. Animals were catch with aid of mousetraps. 25 mousetraps placed along drainage channel banks in line on 4 days. This are 100 mousetrap-days. A total carried out 4,400 mousetrap-days on drainage channel banks that were at mixed forests, on arable lands and pastures, along the roads. Pieces of rye bread fried in sunflower oil served as bait for the animals.

One hundred sixty-three shrews (family Soricidae) of four species were captured. Among them: 2 bicoloured white-toothed shrews (*Crocidura leucodon* Hermann, 1780; 1 male and 1 female; 2 adults), 139 common shrews (*Sorex araneus* Linnaeus, 1758; 69 males and 70 females; 21 adults and 118 immatures), 14 lesser shrews (*S. minutus* Linnaeus, 1766; 4 males and 10 females; 4 adults and 10 immatures) and 8 water shrews (*Neomys fodiens* Pennant, 1771; 6 males and 2 females; 1 adult and 7 immatures).

Dead animals were examination according to method of full helminthological dissection as described by Skrjabin [6]. Shrew liver was placed in the compressorium. Then they squeezed this organ and looked under a microscope.

The monograph by Genov [7], the article by Tkach, et al. [4] and Keys to the Trematoda [8] contributed to the identification of liver fluke species in shrews.

Results and Discussion

Fluke *Prosolecithus danubica* found only in common shrews (Table 1). 5.3 % animals were infected in 2016, 5.9 % in 2018, 5.4 % in 2019 and 16.7 % in 2020. A total 5.1 % examined common shrews were infected during 2015–2020. Number of helminths varied from 1 to 32. They were localized in gall-bladder and/or bile-ducts of the liver. The size of the eggs was 0.042x0.020 mm, which is typical for this species. Immature common shrews were usually infected. Not objective regularity in infestation between males and females.

Date of animal catch	Area of animal catch	Sex of animal	Puberty of animal	Number of helminths
26.07.2016	Drainage channel bank at mixed forest in Brest district (12 km of the highway Brest–Moscow)	Female	Adult	32
27.08.2018	Drainage channel bank on pasture in Malorita district (20 km of the highway Brest–Kovel)	Male	Adult	13
30.08.2018	Drainage channel bank on pasture in Malorita district (20 km of the highway Brest–Kovel)	Female	Immature	2
0.112256944	Drainage channel bank at road in Malorita district (20 km of the highway Brest–Kovel)	Male	Immature	3
0.153923611	Drainage channel bank at road in Malorita district (20 km of the highway Brest–Kovel)	Female	Immature	1
31.07.2020	Drainage channel bank on arable land in Malorita district (Vysokoe village)	Female	Immature	5
0.070601852	Drainage channel bank on arable land in Malorita district (Vysokoe village)	Male	Immature	24

Table 1: Findings of fluke *Prosolecithus danubica* in the common shrews that lives of drainage channel banks in Brest Polesie (data of investigations during 2015-2020).

Infected animals were found on three reclamation systems: one is located in Brest district and two is located in Malorita district. All infected shrews lived on the channel banks in various places of their passage.

It should be pointed out that in the period 1996–1999 I found two specimens of fluke in gall-bladder of the liver in common shrew, which were taken as a species *Skrjabinoplagiorchis polonicus* [9,10]. They localized in adult male of common shrew caught 03.05.1998 on a drainage

channel bank near a pasture of the reclamation system located in the floodplain of the Mukhavets river in the Brest city. Based on a detailed study of these specimens, comparing them with the description of the fluke *P. danubica* given in the article as well as with flukes that I found in common shrews, I came to the conclusion that this flukes of the species *P. danubica* and not of the species *S. polonicus*. Fluke *S. polonicus* is a typical parasite of the liver and intestines of rodents and belongs to the family Plagiorchidae [7]. While the species *P. danubica* is part of the family Dicrocoeliidae

and parasitize shrews [3,4].

Brest Polesie (South-West Belsrus) is the second known area in Europe where the fluke *P. danubica* was found.

A total of fluke *P. danubica* found in eight specimens of common shrews lives on drainage channel banks in four reclamation systems of Brest Polesie: 2 systems located in Brest district and 2 systems located in Malorita district, South-West Belarus.

My research expands information about the areal of fluke *P. danubica* in Europe. It includes South-West Belarus (Brest Polesie).

Thus, the areal of fluke *P. danubica* covers the territory from the Odessa region, Ukraine to the Brest Polesie, South-West Belarus. 100 % of examined common shrews and water shrews were infected on Ancudinov Island, Ukraine as well as 5.1 % common shrews in Belarus. Obligatory definitive host for this helminth species is the common shrew.

Conclusion

The areal of the fluke *P. danubica* captures South-West Belarus. The common shrew is an obligatory definitive host. Infected animals were found on the drainage channel banks of reclamation systems in the Brest Polesie.

Conflict of Interest

The author states that there is no conflict of interest.

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