

DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

The aim of the project is to understand biological and environmental factors affecting the spread and level of infection with *Spirometra erinaceieuropaei* tapeworm in selected wild mammal species – paratenic hosts (badger and raccoon dog) – in which, under the skin, larvae of the tapeworm (plerocercoids) develop. The material collected from badger, raccoon dog and other intermediate hosts (wild boar, amphibians and reptiles) as well as from definitive hosts (wolf, lynx) will allow to investigate the diversity of the parasite in the geographical scale and its transmission routes in wild animal populations. In addition, the tapeworm causes the disease - sparganosis, which can be dangerous to humans.

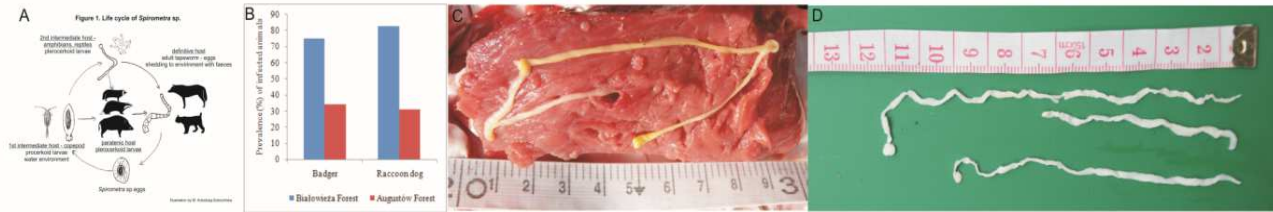


Fig. 1. Life cycle of the tapeworm (A), the results of preliminary study (B) and plerocercoids found in wild boar and badger (C and D).

In the project, we also plan to examine whether and which way the parasites are transmitted into new areas and new hosts as well as how, how quickly and how often the hosts are successively infected with *S. erinaceieuropaei*. Genetic analysis of differences between individual larvae obtained from different hosts (mammals, amphibians, reptiles) and different locations: Białowieża, Augustów Forests and areas in between as well as study of badger and raccoon dog diet and age will allow us to answer above questions.

Preliminary study conducted at the Mammal Research Institute Polish Academy of Sciences (MRI PAS) on 40 raccoon dogs and 20 badgers indicated different levels of parasite infection in Białowieża and Augustów Forests as well as interspecies and interindividual variation in the infection intensity (Fig. 1). Our research hypothesis assumes that diet, age and sex of the animal influence the infection intensity – older animals will have more and larger larvae in result of multiple infection and growth of larvae in the host organism. Furthermore, we assume that the genetic differences of *S. erinaceieuropaei* larvae isolated from the same host individual will show multiple infections from various sources. On the basis of genetic diversity between populations we will know the way how the tapeworm spread in the environment.

The study material will include carcasses of: 200 raccoon dogs, 50 badgers, 30 wild boars, 150 amphibians and reptiles, and 1,200 larvae of *S. erinaceieuropaei* collected from the hosts inhabiting Białowieża and Augustów Forests and areas between them. No animal will be killed specifically for this project. Animals will be collected from hunters or found dead on the roads (e.g. amphibians and reptiles).

The studied animals will be measured and dissected to isolate parasites and other research material - stomachs (for diet analysis) and teeth (for age analysis). Genetic analyzes of parasites will be made on the basis of: mitochondrial DNA, which will allow the identification of haplotypes and evaluating their diversity at the level of population and microsatellite DNA, to estimate the level of genetic diversity of parasites within single hosts and population. The research team has the experience in the methods planned in the project; the equipment necessary to carry out the planned study is available in the MRI PAS.

The planned project will be the first analysis of: (1) both biological (species, age, sex) and environmental (diet, environment, location) factors influencing the spread, frequency, and level of *S. erinaceieuropaei* infection in populations of wild animals, (2) phylogenetic relatedness of *S. erinaceieuropaei* tapeworms isolated from the hosts which inhabit different areas and (3) transmission routes of the parasite in the wild. The study is interdisciplinary and applied a variety of research methods: parasitological, genetic, ecological that enable a comprehensive examination of parasite-host interactions. Research will be conducted on a comprehensive and unique material derived from the wild badgers, raccoon dogs, wild boars, amphibians and reptiles inhabiting north-eastern Poland. These results will be extremely valuable, because only few studies from Europe describes intermediate, paratenic and definitive hosts of *S. erinaceieuropaei* and from our preliminary studies we can suppose that this parasite is widely distributed in Polish nature. The spread, transmission routes, level of infection and the genetic diversity of *S. erinaceieuropaei* in Europe has not been studied yet. Thus, a comprehensive approach to the presented research task linking the study on biology, ecology and phylogenetics of parasites and the biology and ecology of vertebrates is highly innovative and will allow for significant increase of knowledge of this little-known parasite, which is the etiological agent of dangerous zoonosis – sparganosis.