

The role of sylvatic rodents in transmission of *Toxocara canis* in NE Poland

Martyna Krupińska¹, Daniela Antolová², Katarzyna Tołkacz³, Aleksander Goll¹, Joanna Nowicka¹, Anna Bajera⁴, Jerzy M. Behnke⁵, Maciej Grzybek^{1*}

¹Institute of Maritime and Tropical Medicine, Medical University of Gdańsk, Gdańsk, Poland

²Slovak Academy of Sciences, Košice, Slovakia

³Institute of Biochemistry and Biophysics, PAS, Warsaw, Poland

⁴University of Warsaw, Warsaw, Poland

⁵University of Nottingham, United Kingdom

Toxocara canis is a cosmopolitan nematode parasite of carnivores, notably canids, both wild and domestic, which act as definitive hosts. Eggs consumed by paratenic hosts, such as rodents, cannot develop further into the adult stage, but infective larvae can persist in their tissue for an extended time, constituting a reservoir of *T. canis* for canids. Small mammals are suspected as contributing to the dissemination of *T. canis* and helping with the survival of the parasite during periods when there is a temporary absence of suitable definitive hosts. They can also play a role as an indicator of environmental contamination with *Toxocara*. While the primary aim of the current study was the assessment of seroprevalence of *Toxocara* spp. infections in wild rodents in Poland, we also explored the role of intrinsic (sex, age) and extrinsic factors (study site, year of study) influencing the dynamics of this infection. We trapped 577 rodents belonging to four species (*Myodes glareolus*, *Microtus arvalis*, *Microtus agrestis*, *Alexandromys oeconomicus*) in northern eastern Poland. Blood was collected during parasitological examination, and serum was frozen at -72°C until further analyses. A bespoke enzyme-linked immunosorbent assay was used to detect antibodies against *T. canis*. We found *T. canis* antibodies in the sera of all four rodent species with an overall seroprevalence of 2.8% [1.9-4.1]. There was a significant difference in seroprevalence between vole species ($\chi^2_3 = 29.4; p = 0.001$) with the grassland species (*M. arvalis*, *M. agrestis*, and *A. oeconomicus*) showing 16-fold higher seroprevalence (15.7% [8.7-25.9]) than the forest dwelling, *M. glareolus* (0.98% [0.5-1.8]). We hypothesise that seroprevalence of *T. canis* differs between forest and grassland rodents because of higher contamination of grasslands by domestic dogs and wild canids. Our results underline the need for wide biomonitoring of both types of ecosystems to assess the role of rodents in spreading zoonotic nematodes.

This research was funded through the 2018–2019 BiodivERsA joint call for research proposals, under the BiodivERsA3 ERA-Net COFUND program; the funding organizations ANR (France), DFG (Germany), EPA (Ireland), FWO (Belgium), and NCN (Poland). JN, MG and AG were supported by

the National Science Centre, Poland, under the BiodivERsA3 programme (2019/31/Z/NZ8/04028).
MK was supported by the National Science Centre, Poland, under the Preludium BIS programme (2020/39/O/NZ6/01777).