

The occurrence of *Toxoplasma gondii* in the red fox (*Vulpes vulpes*) population in the Pomerania Voivodeship, northern Poland

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Toxoplasma gondii is a worldwide distributed protozoan parasite that can infect humans as well as all warm-blooded animals. Infection can be acquired mainly via the oral route through consumption of raw meat of infected animals containing cysts filled with parasites and through the ingestion of oocysts that can be present in environmental matrices. Toxoplasmosis is one of the most prevalent parasitic infections in humans; higher seroprevalence is found in Latin America, parts of Eastern/Central Europe, the Middle East, parts of southeast Asia, and Africa. In Poland, according to serological investigations, about 50% of human population can be infected with this parasite. *Toxoplasma* infections are also frequently reported in livestock. However, there is currently a gap in the knowledge about the occurrence of the parasite in wildlife. Red fox (*Vulpes vulpes*) is one of the most abundant species of wild carnivores in Europe. As predators and scavengers, foxes represent a potentially sensitive indicator of the circulation of *T. gondii* in environments where humans co-exist.

The main aim of this study was to estimate the prevalence of *T. gondii* in the red fox population living in the area of northern Poland.

Foxes hunted in two sites of Pomorskie Voivodeship: Rzucewo (Puck County and community) and Pażęce (Kartuzy County, Stężyca community) during hunting season 2022 were investigated. Fox carcasses were dissected at the veterinary hygiene facility in Gdańsk and samples of brain and diaphragm muscles were collected from a total of 179 animals (96 from Rzucewo and 83 from Pażęce). Prior to DNA extraction, the tissue samples were prepared using ten freeze-thaw cycles (using a -70°C freezer and a water bath) to destroy the tissue cysts and improve the efficiency of DNA extraction. Afterwards, DNA extraction was performed using a commercial DNeasy Blood & Tissue Kit, Qiagen (Germany) according to the manufacturer's instructions. For the specific detection of *Toxoplasma gondii* DNA, real-time PCR was performed with the use of a pair of primers (ToxB-41F, ToxB-169R) targeting a 129-bp fragment of the 35-fold repetitive B1 gene and the fluorescent-labelled TaqMan probe (ToxB 69P).

Out of a total of 179 examined red foxes, *Toxoplasma* DNA was detected in 12 (6.7 %, +/- 95% CL 3.3-12.9) foxes, 4 (4.2 %, +/- 95% CL 0.9-13.6) in Rzucewo and 8 (9.6 %, +/- 95% CL 4.2-19.8) in Pażęce. Positive results were obtained in 7 diaphragm muscles and 5 brain samples. However, simultaneous positive samples from the brain and diaphragm muscles in the same individual were not detected.

The *Toxoplasma* infection in red foxes presumably is the result of eating infected prey or infected carcasses left on the hunting grounds after the evisceration of shot animals. In addition, contamination of the surroundings with *T. gondii* oocysts and their possible transfer to other animals are also probable. Studies are to be continued taking into account a greater number of foxes and the area of other voivodships.

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