

Raptorial birds – new hosts for *Trichinella pseudospiralis* in Slovakia

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The non-encapsulated species, *Trichinella pseudospiralis* is considered a cosmopolitan zoonotic parasite. The species is the only of the genus capable of infecting birds as well as mammals, including humans (Pozio and Murrell 2006). Between 1972 and 2019, the species was detected in a variety of domestic and free living host species, including domestic pigs, wild boars, red foxes, racoons, racoon dogs, lynx, badgers, American minks, and nocturnal birds of prey (Pozio 2019; Cybulska et al. 2018; Gławischnig et al. 2016; Hurníková et al. 2014, 2016). In Slovakia, the first focus of *T. pseudospiralis* was documented in pigs, rats, and a domestic cat from a pig breeding farm in 2004 (Hurníková et al. 2005). Molecular analyses revealed distinctive genetic relationship of Slovak isolate with those from Finland and Sweden, suggesting the potential role of migratory birds of prey in transmission of the parasite (Wu et al. 2007). The aim of presented study was to investigate birds of prey and owls in Slovakia for the presence of the parasite.

Individuals of birds of prey were collected during 2006–2018 in co-operation with field zoologists, raptor rescue centres, and bird clinics across Slovakia. As all raptorial birds and owls are strictly protected in Slovakia, the research was conducted under the special permits of the Ministry of Environment of the Slovak Republic No. 6167/2012-2.2. and No. 6874/2017-6.3. All birds examined within this study died naturally or as a result of an injury or disease and were frozen before the parasitological dissection.

In total 360 samples from families Accipitridae (13 species), Falconidae (5 species), Strigidae (2 species), Tytonidae (5 species), and Corvidae (5

species) were obtained. During the autopsy, individual samples of pectoral muscle (5–20 g) were taken and examined for the presence of *Trichinella* larva by artificial digestion according to standard methods (Gamble et al. 2000). LPG value (number of larvae per gram of muscle tissue) was determined according to Kapel and Gamble (2000) and isolated larvae were stored in 70% ethanol until the species differentiation. DNA from larvae was extracted using a DNeasy Blood & Tissue Kit (Qiagen®, Hilden, Germany) according to protocol. For *Trichinella* species/genotype identification the PCR was performed following the standard protocol by Zarlenga et al. (1999).

Out of 360 raptorial, carrion-feeding, and scavenging birds from Slovakia, *Trichinella* muscle larvae were found in four individuals, namely two Common kestrels (*Falco tinnunculus*) (n=76), one Peregrine falcon (*F. peregrinus*) (n=5), and one Golden eagle (*Aquila chrysaetos*) (n=2). The intensity of infection was low in all four specimens, ranging from 0.1 to 0.4. Molecular analyses confirmed the presence of *T. pseudospiralis* in all four samples. The overall prevalence of *Trichinella* infection in sampled group of birds of prey was 1.11%. Common buzzard was the most numerous species examined (n=121), followed by Common kestrel with 76 examined individuals (prevalence 2.63%). Due to the low numbers of sampled individuals, the prevalence was not calculated in Peregrine falcon (1 infected out of 5) or Golden eagle (1/2).

The role of birds of prey in the epidemiology of *T. pseudospiralis* was confirmed in our study. Our findings of four infected birds in Slovakia represent the third confirmed report of the species in birds from Europe. All infected birds originated from

Eastern Slovakia, where *T. pseudospiralis* has already been detected as the agent of epizooty that occurred in a poorly maintained large-scale pig production farm. Based on epidemiological investigation on the farm and in the surrounding wildlife, it was suggested that improper nutrition, cannibalism within the pig herd, lack of sanitary condition, and rat infection all played roles in the spread of the infection. Also birds could potentially feed on infected swine carcasses and introduce the parasite to the farm. The locality of Eastern Slovakia is a major crossing of bird migratory routes across Europe, thus it was supposed that *T. pseudospiralis* could be transmitted by migrating

raptors.

Based on the findings of infected carnivorous or carion-feeding birds in Slovakia and taking into account that's several species of raptorial birds migrate from, to, or through territory of Slovakia, we can support the original hypothesis that *T. pseudospiralis* could be introduced to Slovakia via migrating birds of prey that spread the parasite over great distances leading to the potential for establishment of new foci of infection in areas where the parasite was not present previously.

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References available from the authors.