Urban and forest-living blackbirds *Turdus merula* as hosts of *Borreliella* spp. infected ticks

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**ABSTRACT**

The effect of urbanisation on parasite prevalence, especially these associated with human diseases, such as Lyme borreliosis, is of high interest. The blackbird *Turdus merula* is a ground-feeding species particularly predisposed to constitute a *Borreliella* spp. (Lyme borreliosis causative agent) reservoir. So, the aim of the study was to examine if the tick infestation level and their *Borreliella* spp. infection prevalence differs in blackbirds resident in two disparate habitats in Poland – one highly urbanized (in Warsaw agglomeration) and the other forested (in Mazurian Lake region). The infection in ticks feeding on blackbirds was ascertained based on detection of bacterium DNA (PCR). The prevalence of tick infestation in urban and forest-living blackbirds was similar (90 and 91.7%, respectively) but the mean number of parasites per bird was markedly greater in the forest (4.0 ind.) than in the urban populations (1.5 ind.). Even though, the *Borreliella* spp. infection of the ticks was significantly greater in the urban (46.7%) than in forest habitat (35.4%). Additionally, in the urban site more birds carry at least one infected tick than in the forest. The results of the study seem to confirm the role of blackbirds in establishing *Borreliella* spp. reservoir. Special regard should be given to highly urbanized areas, where the relative increase in the relevance of birds as tick hosts and pathogen transmitters may pose high risk to public health. Thus, the study constitutes a small-scale but an important contribution to our understanding of the role of birds in maintenance of *Borreliella* spp. foci in urban habitats.

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Many passerine bird species are capable of acting as tick hosts and constitute a group of vertebrate reservoirs of different tick-borne pathogens worldwide. Birds’ advantage over mammals in spreading diseases transmitted by ticks mainly consists of their ability to transport not only infected ticks but also pathogens over long distances and across geographical barriers (e.g. mountains, deserts, oceans) or within anthropogenic infrastructure (e.g. buildings, roads network) which hinders mammals (Palomar *et al.* 2012, Hasle 2013). Consequently, among passerines, species exhibiting migratory or ground-feeding behaviour are involved in maintaining and circulating pathogens in the environment with the greatest efficiency (Marsot *et al.* 2012, Lommano *et al.* 2014).

The blackbird *Turdus merula* L. is a species showing said activities and often mentioned as a competent reservoir for *Borreliella* spp. (formerly *Borrelia burgdorferi* sensu lato complex) (Taragel’ ová *et al.* 2008, Norte *et al.* 2013, Gryczyńska and Welc-Fałęciak 2016). These spirochete bacteria are considered as a causative agent of a dangerous human multisystem tick-borne zoonosis – Lyme borreliosis (Lyme disease). Blackbirds’ behaviour, typical