Acrocephalus 25 (123): 213 – 216, 2004

Ticks (Acarina: Ixodidae) on birds in Slovenia

Klopi (Acarina: Ixodidae) na pticah v Sloveniji

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Kongres ornitologov Slovenije ob 25. obletnici DOPPS
Slovene Ornithologists' Congress at the 25th anniversary of DOPPS – BirdLife Slovenia

1. Introduction

There are 16 tick species (Acarina: Ixodidae) distributed across Slovenia (Tovornik 1987a, c, 1988a, b, c, 1989, 1990a & 1991, PMSL–Ixodidae 2004). Nine of these have been found on birds (Tovornik 1990a & 1991, PMSL-Ixodidae 2004).

Ticks in Slovenia were investigated in the second half of the 20th century (around 1950 – 1991) by Dr. Danica Tovornik, with special attention on the medical importance of *Ixodes ricinus* (Linnaeus, 1758) (Rosický *et al.* 1961, Tovornik 1961 & 1987b), the geographical distribution of *Ixodes hexagonus* Leach, 1815 (Tovornik 1987a), *Ixodes trianguliceps* Birula, 1895 (Tovornik 1988a), *Rhipicephalus sanguineus* (Latreille, 1806) complex (Tovornik 1988b, Tovornik & Vesenjak-Hirjan 1988), *Ixodes vespertilionis* Koch, 1844 (Tovornik 1990b), *Ixodes frontalis* (Panzer, 1795) and *Ixodes arboricola* Schultze & Schlottke, 1929 (Tovornik 1991), and the host significance of birds (Tovornik 1990a), lacertids Lacertidae (Tovornik & Brelih 1980), Roe-Deer *Capreolus capreolus* (Tovornik 1988c), Red Squirrel *Sciurus vulgaris* and Fat Dormouse *Glis glis* (Tovornik 1989).

This article is an overview of ticks recorded on birds in Slovenia based on literature and original data (PMSL-Ixodidae 2004).

2. Methods

Most of the material was collected between 1989 and 2005. Ticks were hand picked from bird hosts during bird ringing fieldwork and collected from bird nests. Hand picked ticks were stored in the field in 70% ethanol, separately with respect to host individual, survey site, and date. Those from nests were collected free in nature, from nest boxes, or with suction sampler from the nesting burrows of Sand Martin *Riparia riparia* and Bee-eater *Merops apiaster*. The contents of the nests were transported from the field in airtight plastic bags to prevent the escape of any arthropods. They were placed over Berlese-Tullgren funnels (Southwood 1978) for five days for the collection of the arthropods.

The reference material is deposited in the Slovenian Museum of Natural History in Ljubljana (PMSL–Ixodidae 2004).

3. Results and discussion

Ixodes ricinus is the most abundant and widespread of the tick species recorded in Slovenia (Tovornik 1988c, 1989 & 1990a). Found on 69 bird species (Table 1), it is also the most common tick parasitising birds.

Birds are major hosts for all developmental stages of small *Ixodes lividus, Ixodes frontalis* and *Ixodes arboricola* ticks and for larvae and nymphs of *Hyalomma marginatum*.

Ixodes lividus is specialised on Sand Martin (Hillyard 1996) and was found in the nesting burrows of Sand Martins at almost all the nesting sites surveyed (Figure 1). There were also two occasional findings on the Starling *Sturnus vulgaris* and Blackbird *Turdus merula*. *Ixodes lividus* is a new species recorded for Slovenia.

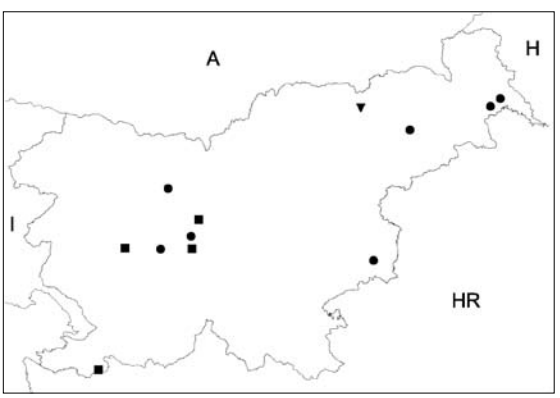

Figure 1: Findings of *Ixodes lividus* (dots), *Ixodes frontalis* (squares) and *Ixodes arboricola* (triangle) ticks in Slovenia

Slika 1: Najdbe breguljkinega *Ixodes lividus* (pike), ptičjega *Ixodes frontalis* (kvadrati) in duplarskega klopa *Ixodes arboricola* (trikotniki) v Sloveniji

Table1: Ticks (Acarina: Ixodidae) found on birds in Slovenia (Source: # Tovornik 1990, • Tovornik 1991, * PMSL Ixodidae 2004)

Tabela 1: Klopi (Acarina: Ixodidae), najdeni na pticah v Sloveniji (Vir: # Tovornik 1990, • Tovornik 1991, * PMSL Ixodidae 2004)

Tick species / vrsta klopa	Bird host species / ptičji gostitelj
Ixodes ricinus (Linnaeus, 1758)	*Acrocephalus palustris*#, A. schoenobaenus*, A. scirpaceus*, Alectoris graeca#, Anthus pratensis*, A. spinoletta#, A. trivialis*#, Apus apus#, Asio otus*, Bonasa bonasia#, Buteo buteo#, Carduelis carduelis*#, C. chloris*#, Ciconia ciconia#, Coccothraustes coccothraustes*, Columba oenas#, C. livia domestica*, Corvus corone cornix#, Cuculus canorus#, Emberiza cia#, Erithacus rubecula*#, Fringilla coelebs*, F. montifringilla*#, Garrulus glandarius#, Hippolais icterina*, Hirundo rustica*, Jynx torquilla*, Lanius collurio*#, Locustella fluviatillis*, Lullua arborea*, Luscinia luscinia*, L. megarhynchos*#, Milvus milvus#, Motacilla cinerea#, Nucifraga caryocatactes#, Numenius arquata#, Oenanthe oenanthe#, Parus cristatus*, P. major*, P. montanus*, P. caeruleus*, Passer domesticus*, P. montanus*, Phasianus colchicus*#, Phoenicurus ochruros*, P. phoenicurus*, Phylloscopus collybita*#, P. trochilus*, Pica pica#, Prunella modularis*#, Pyrrhula pyrrhula*#, Regulus regulus*, Riparia riparia*, Saxicola rubetra#, S. torquata*, Sitta europaea*, Strix aluco*, Sturnus vulgaris*#, Sylvia atricapilla*, S. borin#, S. communis*#, S. curruca*#, S. nisoria*, Tetrao tetrix*, T. urogallus#, Troglodytes troglodytes*, Turdus merula*, T. philomelos*, Vanellus vanellus*
Ixodes lividus Koch, 1844	*Riparia riparia*, Sturnus vulgaris*, Turdus merula**
Ixodes frontalis (Panzer, 1795)	*Acrocephalus scirpaceus*#•, Carduelis chloris*#•, Dendrocopos major#•, Emberiza leucocephala#, Garrulus glandarius#*
Ixodes arboricola Schultze & Schlottke, 1929	*Parus caeruleus**
Ixodes hexagonus Leach, 1815	*Merops apiaster**
Ixodes canisuga Johnston, 1849	*Sitta europaea**
Ixodes acuminatus Neumann, 1901	*Turdus merula**
Hyalomma marginatum Koch, 1844	*Acrocephalus palustris*, A. scirpaceus*, Erithacus rubecula#, Falco tinnunculus#, Ficedula hypoleuca#, Gallinago gallinago#, Phoenicurus phoenicurus#, Sylvia communis*, Upupa epops#*

Ixodes frontalis occurs on birds and in their nests (Hillyard 1996). In Slovenia it was found on five bird species (Figure 1, Table 1). *Ixodes arboricola* occurs on birds nesting in tree hollows (Hillyard 1996). It is a new species recorded for Slovenia (Figure 1, Table 1).

Hyalomma marginatum is an exception, as its development takes place on only two different hosts instead of three for other tick species in Slovenia (Hillyard 1996). The hosts of both larvae and nymphs are birds, while adults parasitise cattle. On metamorphosis nymphs remain on the host individual at the larval stage. *H. marginatum* is most probably extinct within its natural distribution range in Slovenia because of the complete abandonment of cattle grazing under the Kraški rob area. Larvae and nymphs of *H. marginatum* are introduced each spring to this area and to continental Slovenia by migrating birds (Table 1, Figure 2) from Mediterranean and North Africa.

There were also occasional findings of *Ixodes hexagonus, Ixodes canisuga* and *Ixodes acuminatus* (Table 1).

Acknowledgements: I would like to thank Katarina Aleš, Andrej Bibič, Franc Bračko, Igor Brajnik, Janez

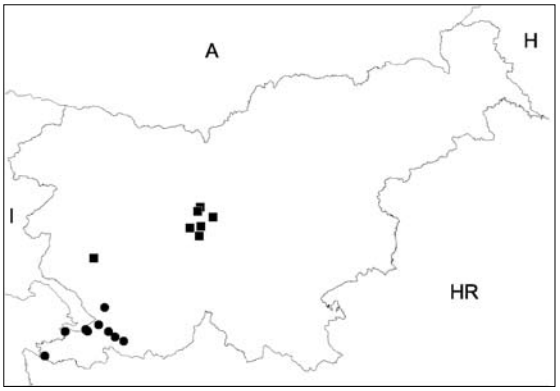

Figure 2: Distribution of *Hyalomma marginatum* in Slovenia. Dots – natural distribution area (according to Tovornik 1990a), squares – introduced to the territory of central Slovenia by spring migrating birds.

Slika 2: Razširjenost dvogostiteljskega klopa *Hyalomma marginatum* v Sloveniji. Pike – naravni areal razširjenosti (po Tovornik 1990a), kvadrati – vnosi v osrednjo Slovenijo prek selečih se ptic.

Dovič, Dare Fekonja, Jože Gračner, Vesna Grobelnik, Peter Grošelj, Franc Janžekovič, Leon Kebe, Rajko Koražija, Brane Koren, Ivan Kos, Boris Kozinc, Brane Lapanja, Helena Lesar, Slavko Polak, Katarina Prosenc Trilar, Jasna Šen, Dare Šere, Rudi Tekavčič, Bogdan Vidic and Vili Žgavec for the collected material and to the Centre for Cartography of Fauna and Flora for geocoding localities and production of distributional maps. Special thanks goes to Petra Pavlovčič for English improvements.

Povzetek

V Sloveniji je razširjenih 16 vrst klopov (Acarina: Ixodidae); devet smo jih našli tudi na pticah. Najpogostejša in splošno razširjena vrsta je gozdni klop *Ixodes ricinus*, ki je bil doslej najden na 69 vrstah ptic in je najpogostejša vrsta klopa, ki se pojavlja na pticah. Ptice so glavni gostitelji za breguljkinega *Ixodes lividus*, ptičjega *Ixodes frontalis*, duplarskega *Ixodes arboricola* in dvogostiteljskega klopa *Hyalomma marginatum*. Za ježevega *Ixodes hexagonus*, rdečega ovčjega *Haemaphysalis punctata*, lisičjega *Ixodes canisuga* in glodalčjega klopa *Ixodes acuminatus* pa so ptice zgolj naključni gostitelji. Breguljkin klop je prvič omenjen za Slovenijo.

Summary

There are 16 tick species distributed across Slovenia. Nine of these were found on birds. The most abundant and widespread is *Ixodes ricinus*, which was found on 69 bird species and is the most common tick species parasitising birds. Birds are major hosts of *Ixodes lividus, Ixodes frontalis, Ixodes arboricola* and *Hyalomma marginatum*, and occasional hosts of *Ixodes hexagonus*, *Haemaphysalis punctata*, *Ixodes canisuga* and *Ixodes acuminatus*. *Ixodes lividus* is a new species recorded for Slovenia.

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Arrived / Prispelo: 23.12.2004
Accepted / Sprejeto: 9.5.2005