FAUNISTIC RECORDS AND NEW PARASITE-HOST ASSOCIATIONS OF LOUSE FLIES (DIPTERA: HIPPOBOSCIDAE) FROM SABINOV, SLOVAKIA

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ABSTRACT

A faunistic overview of louse flies (Diptera: Hippoboscidae) from the Sabinov district, especially the Sabinov Bird Ringing Station, is presented. Five hippoboscid fly species (15 samples) were captured on five host bird species. Records of Ornithomya avicularia *on* Hirundo rustica *represent a new host record for Slovakia. Records of* Lipoptena fortisetosa *on bird species (namely:* Cyanistes caeruleus, Erithacus rubecula, Hirundo rustica, Delichon urbicum, *and* Parus major*) represent new host records for Slovakia, and there are probably no other records on this association known in the world.*

KEY WORDS

Ectoparasites, hippoboscid, birds, new host-parasite associations

INTRODUCTION

Louse flies of the family Hippoboscidae are obligate ectoparasites of birds and mammals (e.g. THEODOR & OLDROYD, 1964; MAA, 1969). Searching for and collecting these parasites from mammals (especially from livestock and humans) is relatively simple (see KOČIŠOVÁ et al., 2007; OBOŇA et al., 2019b). However, their collection from bird hosts can be complicated (they are extremely mobile and often escape). Ideal places for bird ectoparasites research are bird ringing stations or directly in bird nests (e.g. SYCHRA et al., 2008; OBOŇA et al., 2019a; GAPONOV et al., 2020). However, such studies are relatively rare at this time due to the complicated logistics (e.g. OBOŇA et al., 2019a; DAVYDOVA et al., 2020; NARTSHUK et al., 2020).

This paper aims to present information on the louse flies collected from birds from the Sabinov Bird Ringing Station and its surroundings.

MATERIAL AND METHODS

The louse flies were collected at 3 sites in the Sabinov district (see Study sites). Hippoboscid specimens were collected by hand on birds caught in the nets by SG. Birds were mist-netted in a standardized way (for more information, see OLEKŠÁK et al., 2007).

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The collected hippoboscids were placed in Eppendorf tubes, fixed in ethanol (96%) and subsequently identified in the laboratory (JO) using the determination key by POVOLNÝ & ROSICKÝ (1955), THEODOR & OLDROYD (1964) and PETERSEN et al. (2007). We focused on the local primary hosts (see OBOŇA et al., 2019a,b).

Study sites (see Figure 1)
Area: Slovakia. Sabinov district.
1) 49°06'18.7"N 21°05'49.0"E, garden of the second author's (S.G.) family house, 331 m a.s.l.
2) 49°06'02.7"N 21°04'26.8"E, Sabinov Bird Ringing Station, 370 m a.s.l.
3) 49°05'34.8"N 21°04'00.4"E, Uzovský Šalgov, around a pond, 366 m a.s.l.

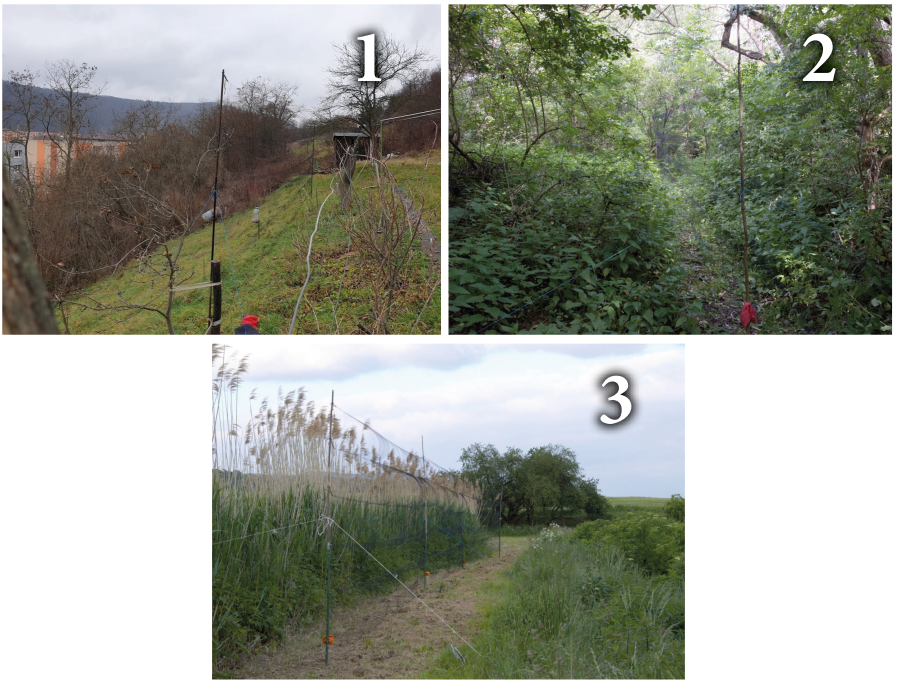

FIGURE 1. Study sites 1) garden, 2) Sabinov Bird Ringing Station, 3) Uzovský Šalgov.

RESULTS AND DISCUSSION

A total of 5 species (15 specimens) of the family Hippoboscidae were recorded on 5 host species (namely: *Cyanistes caeruleus* (Linnaeus, 1758), *Erithacus rubecula* (Linnaeus, 1758), *Hirundo rustica* Linnaeus, 1758, *Delichon urbicum* (Linnaeus, 1758), and *Parus major* Linnaeus, 1758).

Faunistics

***Lipoptena fortisetosa* Maa, 1965**

Published records: Kočišová et al. (2007); Oboňa et al. (2019b).

Material examined: Site 2, 1 ♀, on *Cyanistes caeruleus* Figure. 2 (bird ring number – S514355), 17.5.2020; the same, 1 ♂ on *Parus major* Figure 2 (P126910), 27.6.2020; the same, 2 ♀, both on *Erithacus rubecula* Figure 2 (S546508, S546510), 27.6.2020; the same, 1 ♀, on *Parus major* (P126912), 27.6.2020. Site 3, 1 ♂, 3 ♀, all on *Hirundo rustica* (♂- U61109, ♀ – U51935, U61066, U61102), 27.6.2020.

Comments: A relatively common species in Slovakia, distributed in the eastern Palaearctic region. It is an ectoparasite of Cervidae, and also attacks humans beings (Oboňa et al., 2019b).

Note: Interestingly, these parasites were found on birds. All captured individuals were winged. Birds are unlikely to be the primary prey for this ectoparasite, but from the number of captured individuals, it is clear that they can also attack birds caught in a net (it is questionable if these birds were parasitized before they were caught in the net). A total of host 5 species (namely: *Cyanistes caeruleus*, *Erithacus rubecula*, *Hirundo rustica*, *Delichon urbicum,* and *Parus major*) are recorded here as a new host of *Lipoptena fortisetosa*. We are not aware of any other records of these host-parasite associations known in the world.

Figure 2. Hosts of *Lipoptena fortisetosa*: *Cyanistes caeruleus, Parus major,* and *Erithacus rubecula* (documentary photos).

***Ornithomya avicularia* (Linnaeus, 1758)**

Published records: Povolný & Rosický (1955); Čepelák (1974, 1982); Krištofík & Štefan (1980); Chalupský & Povolný (1983); Chalupský (1986); Čepelák & Čepelák (1991); Roháček (1995); Krištofík (1998); Straka & Majzlán (2010); Oboňa et al., (2019a, b).

Material examined: Site 3, 1 ♀, on *Hirundo rustica* Figure 3 (no ring), 23.7.2020.

Comments: A common louse fly species in Central Europe, widespread in the Palaearctic region. A common ectoparasite of birds from the order Passeriformes and other orders (namely: Accipitriformes, Anseriformes, Falconiformes, Passeriformes, and Strigiformes) (Krištofík, 1998; Oboňa et al., 2019b).

Note: *Hirundo rustica* is recorded herein as a new host species for *O. avicularia* in Slovakia.

FIGURE 3. Host of *Ornithomya avicularia* – *Hirundo rustica.*

***Ornithomya biloba* Dufour, 1827**

Published records: BRANCSIK (1910); KRIŠTOFÍK & ŠTEFAN (1980); CHALUPSKÝ & POVOLNÝ (1983); CHALUPSKÝ (1986); KRIŠTOFÍK (1998); OBOŇA et al. (2019a, b).

Material examined: Site 3, 1 ♀, on *Hirundo rustica*, (no ring), 23.6.2020, the same, 1 ♀, on *Hirundo rustica*, (no ring), 27.6.2020.

Comments: A Palaearctic species, common in Central Europe. It is an ectoparasite mainly of *Delichon urbicum*, *Hirundo rustica*, *Riparia riparia* (Linnaeus, 1758), and, less often, other birds of order Passeriformes (KRIŠTOFÍK, 1998).

***Ornithomya fringillina* Curtis, 1836**

Published records: KRIŠTOFÍK & ŠTEFAN (1980); CHALUPSKÝ & POVOLNÝ (1983); CHALUPSKÝ (1986); KRIŠTOFÍK (1998); STRAKA (2005); STRAKA & MAJZLÁN (2008, 2014); OBOŇA et al. (2019a).

Material examined: Site 1, 1 ♀, on *Parus major* (no ring), 7.11.2019.

Comments: A Palaearctic species distributed in the northern and middle belts of the region. It is an ectoparasite mainly of Passeriformes but also parasitizes species of orders Passeriformes and Pelecaniformes (KRIŠTOFÍK, 1998).

***Stenepteryx hirundinis* (Linnaeus, 1758) (Figure 4)**

Published records: THALHAMMER (1899); BRANCSIK (1910); POVOLNÝ & ROSICKÝ (1955); CHALUPSKÝ (1986); KRIŠTOFÍK (1998).

Material examined: Site 1, 1 ♂, 1 ♀ (Figure 4), both on *Delichon urbicum* – juveniles fallen out of the nest (♂ – S447902, ♀ – S447903) Figure 4, 18.6.2020.

Comments: A common Central European species, widespread in the Palaearctic region. A common ectoparasite of the bird species *Delichon urbicum*, *Hirundo rustica*, *Ptyonoprogne rupestris* (Scopoli, 1769) and *Riparia riparia* (KRIŠTOFÍK, 1998).

Figure 4. *Stenepteryx hirundinis* and host *Delichon urbicum.*

Conclusions

In the present study, five Diptera species from family Hippoboscidae collected from five bird's host species were studied in detail: *Lipoptena fortisetosa* (9 individuals), *Ornithomya avicularia* (1 ind.), *O. biloba* (2 ind.), *O. fringillina* (1 ind.), and *Stenepteryx hirundinis* (2 ind.).

Hirundo rustica is here recorded as a new host of *O. avicularia* in Slovakia. The following bird species: *Cyanistes caeruleus*, *Erithacus rubecula, Hirundo rustica*, *Delichon urbicum,* and *Parus major* are recorded herein as a new hosts of *Lipoptena fortisetosa*. There are most likely no other records on this host-parasite association known in the world.

Acknowledgements

We thank the editor and anonymous reviewers for their valuable and constructive comments on the first version of the manuscript. The study was supported by the Slovak Research and Development Agency under contract No. APVV-16-0411 and by the grant agency KEGA, Project No. 005PU-4/2019.

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