





Checklist of Hippoboscidae (Diptera) from Romania

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Abstract: The checklist of louse flies or keds from the family Hippoboscidae in Romania with 14 species is given. Among them, six species have been newly recorded from Romania, from Natura 2000 site “Dunele Marine de la Agigea” Natural Reserve; namely: *Icosta minor* (Bigot in Thomson, 1858), *Ornithoica turdi* (Olivier in Latreille, 1812), *Ornithomya chloropus* Bergroth, 1901, *Ornithomya fringillina* Curtis, 1836, *Ornithophila gestroi* (Rondani, 1878), and *Ornithophila metallica* (Schiner, 1864). Out of the total, seven species are autochthonous, while the other seven are probably non-native species, either spreading invasively or only occasionally being imported to Romania or migrating to the country along with their hosts. Three new host-parasite associations have been reported for the first time. Specifically, the eastern olivaceous warbler *Iduna pallida* (Hemprich & Ehrenberg, 1833) represents new host species for *I. minor* and *O. turdi*, while the willow warbler *Phylloscopus trochilus* (Linnaeus, 1758) represents a new host species for *O. gestroi*.

Keywords: faunistic, invasive species, keds, literature review, louse flies, parasite-host associations

Introduction

Flies in the family Hippoboscidae, known as ‘louse flies’ or ‘keds’, parasitising birds or mammals, belong to the Diptera and are a group of obligate parasites (Rahola et al., 2011). Hippoboscids are divided into several tribes, in particular Lipoptenini and Hippoboscini, which exclusively affect mammals, while species of the tribes Olfersiini and Ornithomyini parasitise primarily birds (Reeves & Lloyd, 2019). Thirteen genera, with more than 210 species, have already been described within Hippoboscidae worldwide, out of which 31 species were found in Europe (Pape et al., 2015; Dick, 2018; Nartshuk et al., 2019; Oboňa et al.,

2019b, 2022; Le Guillou & Chapelin-Viscardi, 2022; Yatsuk et al., 2023).

Adults of both sexes are hematophagous insects and are recognised as vectors for numerous infectious agents, including protozoa, bacteria, helminths, and possibly also viruses (e.g. Kosoy et al., 2016; Liu et al., 2016; Buss et al., 2016; Skvarla & Machtinger, 2019; Boularias et al., 2020; Zhao et al., 2020; Bezerra-Santos & Otranto, 2020; Santolíkova et al., 2022; Čisovská Bazsalovicsová et al., 2023; Tiawsirisup et al., 2023). While some species exhibit host-specificity, others feed on a wide range of hosts (e.g. Maa, 1969; Ibáñez-Bernal et al., 2015; Mehlhorn, 2016; Veiga et al., 2018).

The primary objective of this work is to provide new faunistic records and summarise the checklist of the family Hippoboscidae of Romania.

Material and methods

The studied material was collected at two sampling sites in Romania: Agigea Bird Observatory by A.-M. Pintilioaie and L.-E. Topală, except one specimen, collected by V. D. Gavril in Abrud (Constanța County, 44°08'43.4"N 27°58'41.5"E, 60 m a.s.l.).

Agigea Bird Observatory is the first permanent Romanian ringing station (Pintilioaie et al., 2022), being located at Marine Research Station “Prof. Dr. Ioan Borcea” in Agigea, Constanța County, 44°05'11.2"N 28°38'28.2"E, 10 m a.s.l. The mist-nets used to trap, especially Passeriformes for ringing, measure 500 m and are set up in the Natura 2000 site “Dunele Marine de la Agigea” Natural Reserve (permit: ORDIN nr. 1.380 from 8 July 2020). The fly specimens were collected directly from the birds (in this case, the host was mentioned in the paper), or were found inside the bird ringing room (in this case we couldn't assign with certainty the host of the fly).

Collected hippoboscids were placed in the Eppendorf tubes, fixed in ethanol (96 %) and subsequently identified in the laboratory using a determination key by Povolný & Rosický (1955), Theodor & Oldroyd (1964) and Oboňa et al. (2022). The material is deposited in the ethanol collection at the Department of Ecology, Faculty of Humanities and Natural Sciences, University of Prešov, Slovakia.

The primary focus on the hosts is given after Maa (1969); the European distribution follows Petersen (2004).

Results and discussion

Family Hippoboscidae Samouelle, 1819

Subfamily Hippoboscinae Samouelle, 1819

Tribe Hippoboscini Samouelle, 1819

Hippobosca equina Linnaeus, 1758

Published records: Thalhammer (1896), Fleck (1904), Pârvu & Chimișliu (1982), Ursu & Pavel (1993).

Material examined: Abrud, 29.09.2022, 1 ♀, host: horse (*Equus ferus* f. *caballus* Linnaeus, 1758).

Comment: An ectoparasite of livestock (preferably horses and donkeys) and dogs, but has also been reported from humans. Known from Afro-tropical, Australian, Western Palaearctic and Oriental regions (Krištofik, 1998; Soliman et al., 2022; Mašlanko et al., 2022).

Hippobosca longipennis Fabricius, 1805

Published record: Ursu & Pavel (1993), Mihalca et al. (2019).

Comment: A rare and non-native species in Europe, distributed in the Mediterranean and Afrotropical regions. It is an ectoparasite of dogs; occasionally it can also occur on other predatory mammals or ungulates (Chalupský, 1980; Oboňa et al., 2016, 2019b; Zerek et al., 2020).

Melophagus ovinus (Linnaeus, 1758)

Published record: Ursu & Pavel (1993).

Comment: It is a native ectoparasite of Bovidae, especially sheep (e.g. Chalupský, 1980).

Tribe Lipoptenini Speiser, 1908

Lipoptena fortisetosa Maa, 1965

Published records: Pârvu (2005), Lazăr et al. (2017), Salvetti et al. (2020).

Note: According to Salvetti et al. (2020), *L. fortisetosa* from Romania (see Lazăr et al., 2017) was wrongly identified as *L. cervi* (Linnaeus, 1758) on *Capreolus capreolus* (Linnaeus, 1758).

Comment: It is a common invasive and non-native deer ked in Europe (Andreani et al., 2019, 2021; Kurina et al., 2019; Oboňa et al., 2022).

Tribe Olfersiini Maa, 1969

Crataerina pallida (Olivier in Latreille, 1811)

Published record: Petersen (2004).

Comment: A common ectoparasite of the bird



Fig. 1. *Icosta minor* (Bigot in Thomson, 1858) ♀, “Dunele Marine de la Agigea” Natural Reserve, 30.06.2022.

species *Apus apus* (Linnaeus, 1758) and *Delichon urbicum* (Linnaeus, 1758) (Krištofik, 1998; Walker & Rotherham, 2010; Petersen et al., 2018).

Icosta ardeae (Macquart, 1835)

Published record: Thalhammer (1896; as syn.: *Olfersia ardea* from host *Nycticorax nycticorax* (Linnaeus, 1758); Thalhammer used terms “plumis Nyctiardeae nycticoracis”).

Comment: A not common and non-native species in Europe, widespread in the tropics and subtropics of the Old World (e.g. Chalupský, 1980).

Icosta minor (Bigot in Thomson, 1858)

Material examined: “Dunele Marine de la Agigea” Natural Reserve, 30.06.2022, 1 ♀ (Fig. 1), host: *Iduna pallida* (Hemprich & Ehrenberg, 1833); “Dunele Marine de la Agigea” Natural Reserve, 23.08.2022, 1 ♀, host: unknown.



Fig. 2. *Ornithoica turdi* (Olivier in Latreille, 1811) ♀, “Dunele Marine de la Agigea” Natural Reserve, 20.07.2022.

Comment: A relatively small, rare, and non-native species in Europe, distributed in the Afrotropical region and the Mediterranean Basin (Trilar & Krčmar, 2005; Sychra et al., 2020; Jentzsch et al., 2021a). *Iduna pallida* represents a new host species for *Icosta minor*. New for Romania.

Ornithoica turdi (Olivier in Latreille, 1811)

Material examined: “Dunele Marine de la Agigea” Natural Reserve, 20.07.2022, 1 ♀ (Fig. 2), host: *Iduna pallida* (Hemprich & Ehrenberg, 1833); “Dunele Marine de la Agigea” Natural Reserve, 8.11.2022, 1 ♀, host: unknown.

Comments: A non-native species in Europe, distributed in the Afrotropical region and southern Palearctic, with a recent increase in records in Europe (Droz & Haenni, 2011; Zittra et al., 2020; Gaponov & Tewelde, 2020; Kock, 2000). *Iduna pallida* represents a new host species for *O. turdi*. New for Romania.



Fig. 3. *Ornithophila gestroi* (Rondani, 1878) ♀, “Dunele Marine de la Agigea” Natural Reserve, 2.05.2022.

Ornithophila gestroi (Rondani, 1878)

Material examined: “Dunele Marine de la Agigea” Natural Reserve, 2.05.2022, 1 ♀ (Fig. 3), host: *Phylloscopus trochilus* (Linnaeus, 1758).

Comment: Not common and non-native (in Europe) parasite species of Falconidae and Accipitridae (Nartshuk & Matyukhin, 2019; Balgooyen et al., 1999; Ganbold et al., 2020; Jentzsch et al., 2021b). *P. trochilus* from the family Phylloscopidae represents a new host species (including the family). New for Romania.

Ornithophila metallica (Schiner, 1864)

Material examined: “Dunele Marine de la Agigea” Natural Reserve, 20.02.2023, 1 ♀ (Fig. 4), host: *Parus major* Linnaeus, 1758.

Comment: A non-native polyphagous bird parasites species in Europa, distributed in southern parts of the Palaearctic, Afrotropical, Oriental, and Australian regions (Krištofik, 1998; Nartshuk & Matyukhin, 2019; Lehikoinen et al., 2021; Lee et al., 2022). New for Romania.



Fig. 4. *Ornithophila metallica* (Schiner, 1864) ♀, “Dunele Marine de la Agigea” Natural Reserve, 20.02.2023.

Stenepteryx hirundinis (Linnaeus, 1758)

Published records: Thalhammer (1896), Petersen (2004).

Comment: A frequent European species, widespread in the Palaearctic region. A common ectoparasite of the bird species *Delichon urbicum*, *Hirundo rustica* Linnaeus, 1758, *Ptyonoprogne rupestris* (Scopoli, 1769), *Riparia riparia* (Linnaeus, 1758), most frequently found in nests (Thalhammer, 1896; Krištofik, 1998; Oboňa et al., 2021).

Tribe Ornithomyini Costa, 1846

Ornithomya avicularia (Linnaeus, 1758)

Published records: Thalhammer (1896), Pârvu (2003), Petersen (2004).

Material examined: “Dunele Marine de la Agigea” Natural Reserve, 3.07.2022, 1 ♂, host: *Corvus cornix* Linnaeus, 1758.

Comment: A frequent louse fly species in Europe, widespread in the Palaearctic region. A common ectoparasite of birds from the order Passeriformes and

other orders (Krištofik, 1998; Oboňa et al., 2019a, b, 2021, 2022).

Ornithomya chloropus (Bergroth, 1901)

Material examined: “Dunele Marine de la Agigea” Natural Reserve, 18.09.2022, 1 ♀, host: *Anthus trivialis* (Linnaeus, 1758).

Comment: A Palaearctic species distributed in the northern and middle belts of the region. It is an ectoparasite mainly of Passeriformes, but also of species of other bird orders (Povolný & Rosický, 1955; Petersen et al., 2007; Vastveit, 2013; Matyukhin et al., 2021). New for Romania.

Ornithomya fringillina Curtis, 1836

Material examined: “Dunele Marine de la Agigea” Natural Reserve, 26.09.2022, 1 ♀, host: *Lanius collurio* Linnaeus, 1758; “Dunele Marine de la Agigea” Natural Reserve, 6.11.2022, 1 ♀, host: *Erithacus rubecula* (Linnaeus, 1758).

Comment: A Palaearctic species distributed in the northern and middle belts of the region. It is an ectoparasite mainly of Passeriformes, but also parasitises species in other bird orders (Krištofik, 1998; Oboňa et al., 2019b; Yoshino & Asakawa, 2020; Tomás et al., 2021; Rekecki & Rajkovic, 2023). New for Romania.

Currently, we have found that 14 species were recorded so far from the country. Out of them, seven species are native to Romania (*H. equina*, *M. ovinus*, *C. pallida*, *S. hirundinis*, *O. avicularia*, *O. chloropus*, and *O. fringillina*). The remaining seven species (*H. longipennis*, *L. fortisetosa*, *I. ardeae*, *I. minor*, *O. turdi*, *O. gestroi*, *O. metallica*) have been probably introduced naturally due to migrating hosts (*I. ardeae*, *I. minor*; *O. turdi*, *O. gestroi*, *O. metallica*), or imported together with domestic or wild animals (e.g. *H. longipennis*, *L. fortisetosa*).

Note: The status of some non-native species is still open to question in Romania (especially in *O. turdi* and *O. gestroi*). The northern limit of their native distribution is likely found in this region. Therefore, it is necessary to know the distribution of these species in more detail.



Fig. 5. The eastern olivaceous warbler *Iduna pallida* (Hemprich & Ehrenberg, 1833) a new host species for *Icosta minor* (Bigot in Thomson, 1858) and *Ornithoica turdi* (Olivier in Latreille, 1812).



Fig. 6. The willow warbler *Phylloscopus trochilus* (Linnaeus, 1758) a new host species for *Ornithophila gestroi* (Rondani, 1878).

Lipoptena fortisetosa, in particular, is an aggressive and invasive species that has established a significant population in countries where it has been present for a long time. This species threatens mammals, including humans and even birds (e.g., Oboňa et al., 2019a, b, 2021, 2022).

Furthermore, new host-parasite associations have been documented. The eastern olivaceous warbler *I. pallida* (Fig. 5) represents a new host species for *Icosta minor* and *Ornithoica turdi*, while the willow warbler *P. trochilus* (Fig. 6) represents a new host species for *Ornithophila gestroi*. Interestingly, *O. gestroi* was known only from hosts belonging to the families Falconidae and Accipitridae until now (Jentsch et al., 2021b).

Considering the occurrences of Hippoboscidae in other European countries, it is evident that the list of species in Romania is still incomplete, despite its richness. At least the following three species can be expected to be found in Romania: *Lipoptena cervi* (Linnaeus, 1758), *Ornithomya biloba* Dufour, 1827, *Pseudolynchia canariensis* (Macquart in Webb & Berthelot, 1839), and possibly others.

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