

SHORT COMMUNICATIONS

КРАТКИЕ СООБЩЕНИЯ

A NEW *ORNITHOPHILA* (DIPTERA: HIPPOBOSCIDAE) SPECIES FROM
BAIKAL STATE NATURE RESERVE (RUSSIA)

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The parasitic family Hippoboscidae is distributed around the world and currently includes more than 200 species. These insects are of high veterinary importance both as carriers of dangerous diseases and as transport for other groups of parasites. The genus *Ornithophila* is one of the smallest genera among Hippoboscidae. Currently, the genus *Ornithophila* includes only two species, namely *Ornithophila gestroi* and *O. metallica*. These species are full-winged, widely specialised parasites on birds that inhabit the tropics and subtropics of Asia, Africa, Europe, and Central Asia, including Russia and Kazakhstan. During the annual bird ringing in the Baikal State Nature Reserve (Russia), a new *Ornithophila* (Diptera: Hippoboscidae) species (*Ornithophila baikalica* sp. nov.) was collected and described. *Ornithophila baikalica* sp. nov. was found on *Arundinax aedon*, a bird that breeds in the south of Siberia and the Far East and migrates in winter to Southeast Asia, and sometimes to Egypt, Bhutan, Japan, and Malaysia. *Ornithophila baikalica* sp. nov. differs from the two other known species of the genus by reducing of tergites 3–5 of the female abdomen to the size of points and in the number of prescutellar setae, namely one long dark seta and several short light seta. Additionally, *O. baikalica* differs from *O. metallica* by the wing microtrichia, on which wings they are present, and by the smaller body size, body colour and wing length from *O. gestroi*. A new key for all three known *Ornithophila* species is composed.

Key words: *Arundinax aedon*, louse flies, Palearctic, parasite, two-winged flies

Introduction

The louse flies of the family Hippoboscidae Samouelle, 1819 are spread all over the world (Doszhanov, 1980; Maa & Peterson, 1987). This family of bird and mammal parasites currently includes more than 200 species (Dick, 2018; Oboňa et al., 2019). The Hippoboscidae species, feeding on blood, are carriers of many dangerous diseases (Bequaert, 1954; Doszhanov, 1980; Kučera, 1983; Gancz et al., 2004; Farajollahi et al., 2005; Khametova et al., 2018) and, additionally, transport phoretic mites of the family Epidermoptidae (Fain, 1965; Hill et al., 1967; Philips & Fain, 1991) and Phthiraptera species (Lee et al., 2022).

Species of the genus *Ornithophila* Rondani, 1879 are full-winged, widely specialised parasites of birds (Doszhanov, 1980). It is one of the smallest genera within Hippoboscidae. Currently, the genus is represented by two species, namely *Ornithophila gestroi* (Rondani, 1878) and *O. metallica* (Schiner,

1864) (Dick, 2018). According to Theodor & Oldroyd (1964), *Ornithoza odontoscelis* Speiser 1904 is the third species of this genus. However other authors (e.g. Maa (1969)) consider it only a synonym of the species *Ornithophila metallica*. Therefore, this species is not listed by Dick (2018).

Ornithophila metallica inhabits the tropics and subtropics of Asia and Africa, Europe, Central Asia, Russia and Kazakhstan (Maa, 1969; Doszhanov, 2003). The list of hosts includes representatives of Apodiformes, Charadriiformes, Columbiformes, Coraciiformes, Cuculiformes, Falconiformes, Galliformes, Passeriformes, Piciformes, Psittaciformes, Strigiformes, and Trogoniformes (Maa, 1969). *Ornithophila gestroi* has been noted in the Mediterranean subregion (Maa, 1969; Balgooyen et al., 1999), Romania (Oboňa et al., 2023), Kazakhstan (Doszhanov, 2003), Armenia (Nartshuk & Matyukhin, 2019), and Mongolia (Nartshuk & Matyukhin, 2019; Ganbold et al., 2020; Jentzsch

et al., 2021). It is assumed that its main host belongs to Falconiformes (Maa, 1969), but it has also been found on representatives of Charadriiformes, Galliformes and Otidiformes (Doszhanov, 2003), and Passeriformes (Oboňa et al., 2023). *Ornitheza odontoscelis* inhabits the Balkan coast of the Adriatic Sea. Its host belongs to Turdidae (Maa, 1969).

Ornithomyia metallica has quite a lot of synonyms, namely *Olfersia noumeana* Bigot 1885, *Ornitheza pallipes* Speiser 1904, *Ornitheza submetallica* Speiser 1904, *Ornithobia capensis* Walker 1849, *Ornithomyia aenescens* Bigot 1885, *Ornithomyia andajensis* Rondani 1878, *Ornithomyia butalis* Coquillett 1899, *Ornithophila vagans* Rondani 1879 (Maa, 1963). According to Maa (1969), *Ornitheza odontoscelis*, determined as a distinct species, could have acquired its distinctive feature, namely «toothed leg», the sharp, right-angled ventral edge near the knee of midleg, due to mechanical damage, and it can be a synonym of *Ornithophila metallica*. In any case, *Ornitheza odontoscelis* differs noticeably from other species and is easily recognised (Theodor & Oldroyd, 1964; Maa, 1969).

Material and Methods

The material was collected in June 2022 in the Baikal Bird Ringing Station of the Baikalsky State Nature Reserve (Russia) during the annual bird ringing. Birds were caught and examined. The Baikal Bird Ringing Station is located on the southeastern coast of Lake Baikal 1.5 km to the southwest of the mouth of the River Mishikha (51.6435° N, 105.5223° E). It is located on the Pribaykalskaya Plain, near the coastline, on one of the migration routes (bounded by the shore of Lake Baikal on one side and the Khamar-Daban Mountains on the other). There are wide open areas (meadows and edges) around the station, which are mixed with bushes, copses, and forests, forming a mosaic of small contours. The birds were caught using a Rybachy trap and mist nets, which are installed in the same places every year. The Rybachy trap is installed in a wide open meadow. The mist nets are located around, within a radius of 200 m, mainly between the boundaries of habitats. During June 2022, in total, 626 individuals of 46 bird species were captured and examined.

The new species (one individual) was collected on *Arundinax aedon* (Pallas, 1776). The habitat of *A. aedon* in Russia is distributed in the south of Siberia and the Far East. It migrates to spend the winter in Southeast Asia, sometimes to Egypt, Bhutan, Japan, and Malaysia. During the spring migration

(30 May – 16 June), 145 individuals of *A. aedon* were caught. No nesting individuals of *A. aedon* were recorded in the vicinity of the Baikal Bird Ringing Station in 2022. Morphological terminology follows Hutson (1984).

Results and Discussion

Order Diptera

Family Hippoboscidae

Genus *Ornithophila* Rondani, 1879

Diagnosis. The head is transversely elliptic, located between the prominent humeral tubercles. The eyes are large. Ocellus is developed. Humeral tubercles are large. Wings are fully developed and functional. Vein R_{2+3} is adjacent to costa at the apex half. Tarsal claws are bifid (Doszhanov, 1980, 2003).

Description of the new species

Ornithophila baikalica Yatsuk, Matyukhin & Nartshuk sp. nov. (Fig. 1).

Type material. Holotype: female. The holotype in alcohol is inserted in the collection of the Zoological Institute RAS. Inventory number: INS_DIP_0001107.

Type locality, hosts and habitats. Baikal State Nature Reserve, Republic of Buryatia, Russia. Samples were collected on 07.06.2022 on *Arundinax aedon* (Pallas, 1776) by E.V. Bukas.

Etymology. The specific epithet comes from the name of Lake Baikal, an environment, in which the new species was found.

Description. Body size (head + thorax) is 2.3–2.5 mm. Head is dark. Every eye is almost one quarter of head width. Parafrontals in widest part are approximately one half of mediovertex. Postvertex is triangular, with three well-differentiated ocelli near anterior angle. Among 5–6 yellow orbital setae, two are dark at row edges. Antennas are two-coloured with light apex. Palps are equal to lunula length.

Mesonotum is dark-brown with light sides. Humeral tubercles are bicoloured with light apex and dark base. Three setae are humeral, nine are mesopleural, one is long and black, and two are short yellow postalar, one is long and dark and several short light prescutellar. On posterior mesonotum margin behind postalar setae, there is a group of short dark setae. Scutellum is brown with a light stripe at base and a row of four setae at the apex. At posterior margin of scutellum, there is a fringe of thin yellow setae, interrupted in the middle. Ventral side of thorax is light, with two dark spots. Wing length is 4 mm. There are no microtrichia on the wing membrane. Halteres are black. Fore legs are yellow; femora of middle and hind legs are partly black.

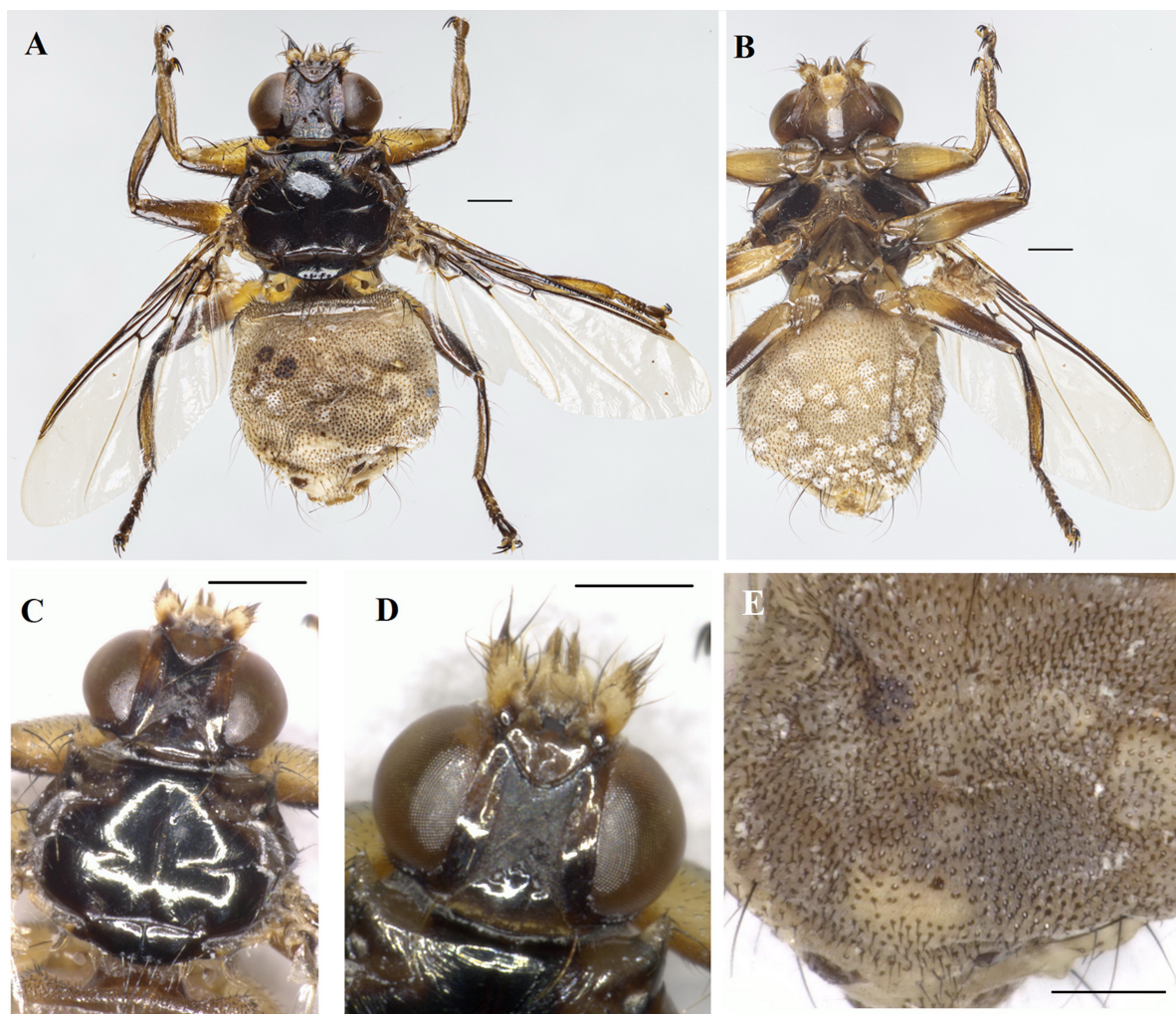


Fig. 1. Female of *Ornithophila baikalica* sp. nov., holotype. Designations: A – general view, dorsal side; B – general view, ventral side; C – mesonotum, dorsal side; D – head, dorsal side; E – abdomen, dorsal side. Scale bars: 0.5 mm.

Female abdomen is light, dorsally and ventrally entirely covered with short setae. There are some long setae on abdomen sides. Tergite 1+2 has a straight posterior margin, and longer and thicker 5–7 setae on lateral posterior corners. In the middle, there is a row of six long setae, located less frequently than the short setae. Tergites 3–5 are reduced to size of points. Tergite 6 is represented by two sclerites with 5–7 setae. Tergite 7 is divided into two semicircular sclerites on anus sides and covered with long setae.

Differential diagnosis

Ornithophila baikalica sp. nov. differs from both other known species of this genus. It differs from *Ornithophila gestroi* in body size (3.0–4.2 mm in *Ornithophila gestroi*), wing length (5.5–7.2 mm in *Ornithophila gestroi*). In addition, *Ornithophila gestroi* antennae are light, mesonotum is dark, with a wide yellow margin, including the entire humeral tubercles, the notopleura and the narrow margin of the postalar processes. Scutellum has a wide yellow stripe at the base and a preapical yellow spot. In *Or-*

nithophila gestroi, there are 4–6 long and 9–11 short humeral, 16–18 mesopleural and 7–8 light prescutellar setae. A group of short dark setae is absent on the posterior margin of the mesonotum behind the postalar setae. Among the pale orbital setae, long black setae are located anteriorly (Doszhanov, 1980, 2003). On the female abdomen, tergites 3–5 are very small, but not reduced, bean-shaped (Doszhanov, 1980). On the sclerites of tergite 6, there are 12–14 long setae (Doszhanov, 2003). The new species differs from *Ornithophila metallica* with presence of microtrichia on the wings (Doszhanov, 1980), small but not reduced tergites 3–5 on the female abdomen (Doszhanov, 1980, 2003), only one postalar and one prescutellar setae (Theodor & Oldroyd, 1964). Additionally, in *Ornithophila metallica*, both eyes are almost one third of the width of the head. Among the 4–5 light orbital setae, two are dark, being located in front and in the centre of the row (Doszhanov, 1980, 2003). In this paper, we provide a new dichotomous key of all three *Ornithophila* species, based on keys from Maa (1963, 1969) and Doszhanov (2003).

A new key to the *Ornithophila* species

1. Body size is more than 3 mm. Wing length is more than 5 mm *O. gestroi*
 – Body size is less than 3 mm. Wing length is less than 5 mm 2
 2. Tergites 3–5 are reduced to size of points. Wing membrane is without microtrichia *O. baikalica* sp. nov.
 – Tergites 3–5 are larger. Wing membrane is with microtrichia *O. metallica*

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References

- Balگوoyen T.G., Hallmann B., Vaughn S.E. 1999. A new host record of *Ornithophila gestroi* (Diptera: Hippoboscidae) on the Lesser kestrel (*Falco naumanni* Fleischer) in Galaxidi, Greece. *Pan-Pacific Entomologist* 75(1): 60.
- Bequaert J.C. 1954. The Hippoboscidae or louse-flies (Diptera) of mammals and birds. 2. Taxonomy, evolution and revision of America genera and species. *Entomologica Americana* 34: 1–232.
- Dick C.W. 2018. *Checklist of World Hippoboscidae (Diptera: Hippoboscoidea)*. Chicago: Field Museum of Natural History. 7 p.
- Doszhanov T.N. 1980. *Louse flies (Diptera, Hippoboscidae) in Kazakhstan*. Alma-Ata: Nauka KazSSR. 280 p. [In Russian]
- Doszhanov T.N. 2003. *Louse flies (Diptera, Hippoboscidae) of the Palearctic region*. Alma-Ata: Nauka KazSSR. 277 p. [In Russian]
- Fain A. 1965. A review of the family Epidermoptidae Trouessart parasitic on the skin of birds (Acarina: Sarcoptiformes). Part 1. Text. *Verhandelingen van de Koninklijke Vlaamse Academie voor Wetenschappen, Letteren en Schone Kunsten van Bergie* 84: 1–176.
- Farajollahi A., Crans V.J., Nickerson D., Bryant P., Wolf B., Glaser F., Andreadis T.G. 2005. Detection of West Nile virus RNA from the louse fly *Icosta americana* (Diptera: Hippoboscidae). *Journal of the American Mosquito Control Association* 21(4): 474–476. DOI: 10.2987/8756-971X(2006)21[474:DOWNVR]2.0.CO;2
- Ganbold O., Azua J., Munkhbayar M., Khuderchuluun O., Paek W.K., Purevee E., Chuluunbat S., Reading R.P. 2020. First records of the parasitic flies *Carnus hemapterus* and *Ornithophila gestroi* on lesser kestrels (*Falco naumanni*) in Mongolia. *Journal of Raptor Research* 54(1): 66–73. DOI: 10.3356/0892-1016-54.1.66
- Gancz A.Y., Barker I.K., Lindsay R., Dibernardo A., McKeever K., Hunter B. 2004. West Nile virus outbreak in North American owls, Ontario, 2002. *Emerging Infectious Diseases* 10(12): 2135–2142. DOI: 10.3201/eid1012.040167
- Hill D.S., Wilson N., Corbet G.B. 1967. Mites associated with British species of *Ornithomya* (Diptera: Hippoboscidae). *Journal of Medical Entomology* 4(2): 102–122. DOI: 10.1093/jmedent/4.2.102
- Hutson A.M. 1984. *Diptera – Handbooks for the Identification of British Insects. Vol. 10. Part 7: Hippoboscidae and Nycteribiidae (Keds, Flat-Flies and Bat-Flies)*. London: Royal Entomological Society of London. 43 p.
- Jentzsch M., Meissner B., Batsaikhan N., Stubbe A., Stubbe M. 2021. Records of Hippoboscidae from mongolian birds of prey with checklist, update. *Erforschung biologischer Ressourcen der Mongolei (Halle/Saale)* 14: 301–309.
- Khametova A.P., Pichurina N.L., Zabashta M.V., Romanova L.V., Orekhov I.V., Borodina T.N., Adamenko V.I., Zabashta A.V. 2018. Biocenotic structure of natural focus of borreliosis in the Rostov region. *Medical Parasitology and Parasitic Diseases* 4: 33–39. DOI:10.33092/0025-8326mp2018.4.33-39 [In Russian]
- Kučera J. 1983. Incidence and some ecological aspects of avian trypanosomes in Czechoslovakia. *Folia Parasitologica* 30(3): 209–222.
- Lee L., Tan D.J.X., Oboňa J., Gustafsson D.R., Ang Y., Meier R. 2022. Hitchhiking into the future on a fly: toward a better understanding of phoresy and avian louse evolution (Phthiraptera) by screening bird carcasses for phoretic lice on hippoboscid flies (Diptera). *Systematic Entomology* 47(3): 420–429. DOI: 10.1111/syen.12539
- Maa T.C. 1963. Genera and species of Hippoboscidae (Diptera): types, synonymy, habitats and natural groupings. *Pacific Insects Monograph* 6: 1–186.
- Maa T.C. 1969. Synopses of the genera *Ornithophila* and *Ornithoctona* with remarks on their habitat diversification (Diptera: Hippoboscidae). *Pacific Insects Monograph* 20: 1–23.
- Maa T.C., Peterson B.V. 1987. Hippoboscidae. In: J.F. McAlpine, B.V. Peterson, G.E. Shewell, H.J. Teskey, J.R. Vockeroth, D.M. Wood (Eds.): *Manual of Nearctic Diptera, vol. 2*. Ottawa: Agriculture Canada Monograph No. 28. P. 1271–1281.

- Nartshuk E.P., Matyukhin A.V. 2019. The louse flies *Ornithophila metallica* (Schiner, 1864) and *O. gestroi* (Rondani, 1878) (Diptera, Hippoboscidae): distribution and association with birds in the Palaearctic. *Entomological Review* 99(4): 504–507. DOI: 10.1134/S0013873819040092
- Oboňa J., Sychra O., Greš S., Heřman P., Manko P., Roháček J., Šestáková A., Šlapák, J., Hromada M. 2019. A revised annotated checklist of louse flies (Diptera, Hippoboscidae) from Slovakia. *ZooKeys* 862: 129–152. DOI: 10.3897/zookeys.862.25992
- Oboňa J., Čisovská Bazsalovicsová E., Pintilioaie A.M., Gavril V.D., Vasiliu O.C., Topală L.E., Manko P. 2023. Checklist of Hippoboscidae (Diptera) from Romania. *Historia naturalis bulgarica* 45(9): 229–238. DOI:10.48027/hnb.45.092
- Philips J.R., Fain A. 1991. Acarine symbionts of louseflies (Diptera, Hippoboscidae). *Acarologia* 32(4): 377–384.
- Theodor O., Oldroyd H. 1964. Hippoboscidae. In: E. Lindner (Ed.): *Die Fliegen der Palaearktischen Region*. Vol. 12. Stuttgart, Germany: Schweizerbart. P. 1–70.

НОВЫЙ ВИД РОДА *ORNITHOPHILA* (DIPTERA: HIPPOBOSCIDAE) ИЗ БАЙКАЛЬСКОГО ГОСУДАРСТВЕННОГО ЗАПОВЕДНИКА (РОССИЯ)

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Фауна семейства паразитов Hippoboscidae распространена по всему миру и в настоящее время насчитывает более 200 видов. Эти мухи имеют большое ветеринарное значение как переносчики опасных заболеваний, так и переносчики других групп паразитов. Род *Ornithophila* – один из самых мелких родов семейства Hippoboscidae, включающий в настоящее время два вида (*Ornithophila gestroi* и *O. metallica*). Представители рода *Ornithophila* – полнокрылые, широко специализированные паразиты птиц, населяющие тропики и субтропики Азии, Африки, Европы и Средней Азии, включая Россию и Казахстан. Во время ежегодного кольцевания птиц в Байкальском государственном природном заповеднике (Россия) собран и описан новый вид из рода *Ornithophila* (Diptera: Hippoboscidae): *Ornithophila baikalica* sp. nov. *Ornithophila baikalica* sp. nov. был обнаружен на *Arundinax aedon*, виде птиц, гнездящемся на юге Сибири и Дальнего Востока и зимующем в Юго-Восточной Азии, а иногда в Египте, Бутане, Японии и Малайзии. *Ornithophila baikalica* sp. nov. отличается от всех известных видов рода редукцией тергитов 3–5 брюшка самки до размеров точек и количеством прескутеллярных щетинок, а именно: одна длинная темная и несколько коротких светлых. Кроме того, новый вид отличается от *Ornithophila metallica* наличием микротрихий на крыльях, а от *Ornithophila gestroi* – меньшими размерами тела, окраской тела и длиной крыльев.

Ключевые слова: *Arundinax aedon*, двукрылые мухи, мухи-кровососки, Палеарктика, паразит