

CONTRIBUTION TO THE KNOWLEDGE OF LOUSE FLIES OF CROATIA (DIPTERA: HIPPOBOSCIDAE)

TOMI TRILAR¹ & STJEPAN KRČMAR²

¹Slovenian Museum of Natural History, Prešernova 20,
P.O. Box 290, SI-1001 Ljubljana, Slovenia
(ttrilar@pms-lj.si)

²Department of Biology, Faculty of Philosophy,
J. J. Strossmayer University, L. Jägera 9, HR-31000 Osijek, Croatia
(stjepan@ffos.hr)

Trilar, T. & Krčmar, S.: Contribution to the knowledge of louse flies of Croatia (Diptera: Hippoboscidae), Nat. Croat., Vol. 14, No. 2., 131–140, 2005, Zagreb.

Faunistic research into louse flies (Hippoboscidae) in Croatia during the last two decades has increased the total number of louse flies known from this country to 11 species, of which *Ornithoica turdi*, *Ornithophila metallica*, *Ornithomya avicularia*, *Ornithomya biloba*, *Ornithomya chloropus*, *Ornithomya fringillina*, *Crataerina melbae*, *Stenepteryx hirundinis* and *Icosta minor* are new to Croatia.

Key words: louse flies, Hippoboscidae, faunistics, Croatia

Trilar, T. & Krčmar, S.: Prilog poznavanju faune ušara Hrvatske (Diptera: Hippoboscidae), Nat. Croat., Vol. 14, No. 2., 131–140, 2005, Zagreb.

Faunistička istraživanja ušara (Hippoboscidae) tijekom posljednjih dvadeset godina u Hrvatskoj rezultirala su utvrđivanjem 11 vrsta, od kojih su drozdova ušara (*Ornithoica turdi*), sjajna ušara (*Ornithophila metallica*), velika ptičja ušara (*Ornithomya avicularia*), lastavičja ušara (*Ornithomya biloba*), tamna ptičja ušara (*Ornithomya chloropus*), mala ptičja ušara (*Ornithomya fringillina*), velika čiopina ušara (*Crataerina melbae*), piljkova ušara (*Stenepteryx hirundinis*) i mala čapljna ušara (*Icosta minor*) nove u fauni Hrvatske. Ukupni broj vrsta iz porodice ušara u Hrvatskoj fauni povećan je na 11 vrsta.

Ključne riječi: ušare, Hippoboscidae, fauna, Hrvatska

INTRODUCTION

Louse flies (Hippoboscidae) are bloodsucking obligate ectoparasites of birds and mammals. Reproduction is by adenotrophic viviparity. Larvae develop in the female in a broadening of the oviduct, and the accessory glands produce a nutritional

secretion. The mature larvae (third instar) are usually deposited away from the host and they quickly transform into puparia. The exception is the monotypic genus *Melophagus*, where larvae are deposited and pupate in the host's fur. Host specificity is generally moderately high and varies with different environmental factors and between different species of flies. Some species are often found parasitic on several kinds of unrelated birds that occupy the same habitats (SOÓS & HŪRKA, 1986; GRUNIN, 1988; LEHANE, 1991; LANE & CROSSKEY, 1993; MAA, 1996).

The hippoboscid fauna of Croatia is poorly known. There are published relevant records for only two species (LANGHOFFER, 1928). The present paper provides new faunistic data, which significantly expand the knowledge about the fauna of louse flies in this part of Europe.

MATERIAL AND METHODS

Most of the material was collected in the last two decades. No field trips were made particularly for the collecting of louse flies. Specimens were hand picked or netted on livestock and plants, or hand picked from bird hosts during bird ringing fieldwork. On one occasion they were collected from a bird's nest. Collected louse flies were stored in the field in 70 % alcohol, separately with respect to host individual, survey site, and date. All the material without a citation is kept in the Slovenian Museum of Natural History (PMSL Hippoboscidae Collection). Some specimens are also deposited in the insect collections of the Faculty of Philosophy in Osijek (FPO).

Species identification was made according to GRUNIN (1988) and BÜTTIKER (1994).

Nomenclature of hosts follows HAGEMEIJER & BLAIR (1997) for birds, MITCHELL-JONES *et al.* (1999) for mammals, and ITIS (Integrated Taxonomic Information System, <http://www.itis.usda.gov/index.html>) for livestock.

List of the hosts

- Accipiter gentilis* (Linnaeus, 1758), Northern Goshawk
- Apus melba* (Linnaeus, 1758), Alpine Swift
- Dendrocopos major* (Linnaeus, 1758), Great Spotted Woodpecker
- Hirundo rustica* Linnaeus, 1758, Barn Swallow
- Delichon urbica* (Linnaeus, 1758), House Martin
- Motacilla flava* Linnaeus, 1758, Yellow Wagtail
- Troglodytes troglodytes* (Linnaeus, 1758), Wren
- Prunella modularis* (Linnaeus, 1758), Dunnock
- Erithacus rubecula* (Linnaeus, 1758), Robin
- Turdus merula* Linnaeus, 1758, Blackbird
- Locustella fluviatilis* (Wolf, 1810), River Warbler
- Locustella luscinioides* (Savi, 1824), Savi's Warbler

Acrocephalus arundinaceus (Linnaeus, 1758), Great Reed Warbler
Sylvia borin (Booddaert, 1783), Garden Warbler
Ficedula hypoleuca (Pallas, 1764), Pied Flycatcher
Panurus biarmicus (Linnaeus, 1758), Bearded Tit
Parus caeruleus Linnaeus, 1758, Blue Tit
Parus major Linnaeus, 1758, Great Tit
Lanius collurio Linnaeus, 1758, Red Backed Shrike
Garrulus glandarius (Linnaeus, 1758), Jay
Passer montanus (Linnaeus, 1758), Tree Sparrow
Emberiza schoeniclus (Linnaeus, 1758), Reed Bunting
Miliaria calandra (Linnaeus, 1758), Corn Bunting
Cervus elaphus Linnaeus, 1758, Red Deer
Capreolus capreolus (Linnaeus, 1758), Roe Deer
Bos primigenius taurus Linnaeus, 1758, Cow
Ovis aries Linnaeus, 1758, Sheep
Equus asinus Linnaeus, 1758, Donkey
Equus caballus Linnaeus, 1758, Horse
Homo sapiens Linnaeus, 1758, Man

Survey sites (localities):

Survey sites are identified by a running number referring to the map in Fig. 1 and UTM grid 10x10 km (given in the second column). The major localities (the province, mountain, etc.) are given first, followed in most cases by the survey site. If separated by a comma (,), the exact locality is situated close to the major one (e.g. Buzet, Istarske toplice). If separated by a colon (:), the survey site is situated at or in the major locality or represents a component of it (e.g. Pag Island: Kolan).

1. VK89 Novi Vinodolski
2. VK84 Pag Island: Jakišnica
3. VK92 Pag Island: Kolan
4. VK92 Pag Island: Kolan, Kolansko blato
5. VK92 Pag Island: Novalja, Zrće
6. VK93 Pag Island: Stara Novalja
7. VK97 Sveti Juraj, Razbojište, Lopci
8. VK98 Senj
9. VK98 Senj, below Vratnik
10. VL12 Buzet, Istarske toplice
11. VL74 Gerovo
12. WH96 Vis Island: Žena Glava

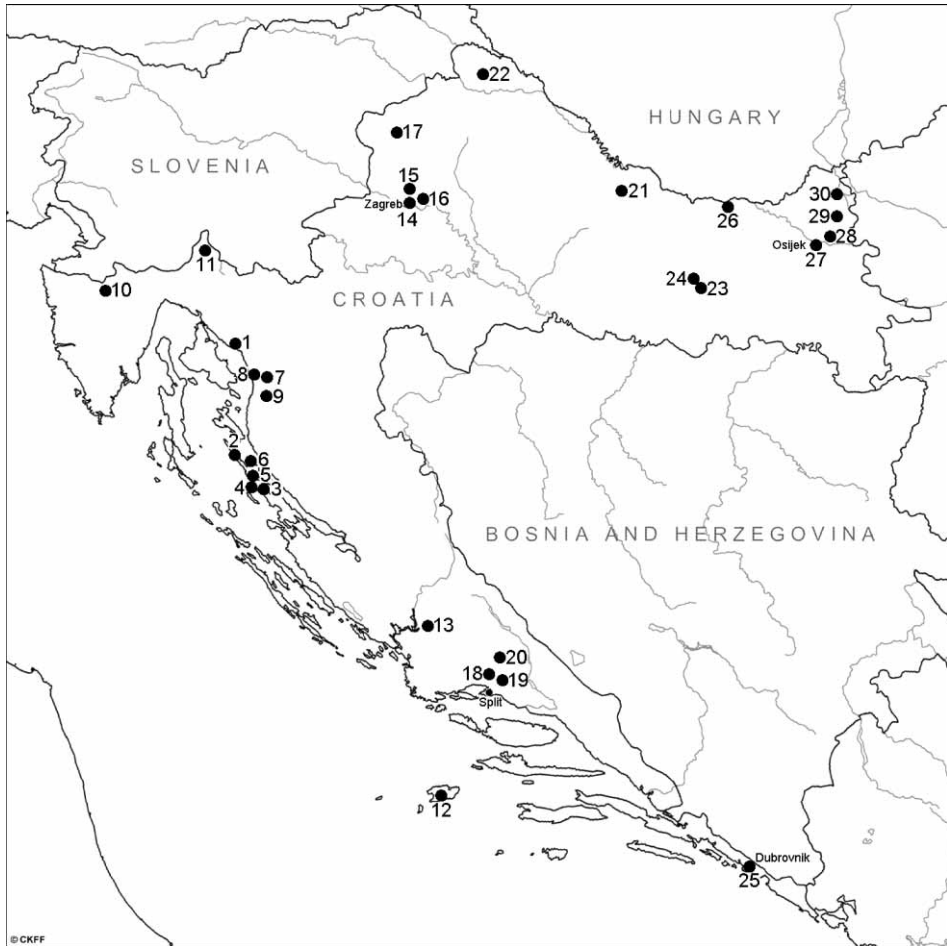


Fig. 1. Survey sites of louse flies (Hippoboscidae) in Croatia.

- 13. WJ85 Drniš, Pakovo Selo
- 14. WL77 Zagreb
- 15. WL79 Kraljičin zdenac
- 16. WL97 Zagreb, Dugo Selo
- 17. WM70 Orehovica
- 18. XJ03 Lečenica, Dugobabe
- 19. XJ22 Klis, Kurtovići
- 20. XJ23 Muć, Neorić
- 21. XL87 Virovitica
- 22. XM13 Čakovec

23. YL22 Kula
24. YL23 Kutjevo
25. BN62 Dubrovnik
26. BR77 Donji Miholjac, Podpanj ornithological reserve
27. CR24 Osijek
28. CR25 Osijek, Kopačevo, Sakadaš
29. CR36 Beli Manastir, Tikveš
30. CR37 Beli Manastir, Zmajevac

RESULTS

Altogether 127 specimens were studied, representing 11 species of louse flies classified in 8 genera (*Crataerina*, *Hippobosca*, *Icosta*, *Lipoptena*, *Ornithoica*, *Ornithomya*, *Ornithophila* and *Stenopteryx*). The majority of specimens belonged to the genus *Hippobosca* (43), followed by the genus *Lipoptena* (35), *Ornithomya* (27), *Stenopteryx* (9), *Ornithoica* (6), *Crataerina* (5), and finally the genera *Icosta* and *Ornithophila* each with only one collected specimen. Nine species of louse flies are new records for the fauna of Croatia: *Ornithoica turdi*, *Ornithophila metallica*, *Ornithomya avicularia*, *Ornithomya biloba*, *Ornithomya chloropus*, *Ornithomya fringillina*, *Crataerina melbae*, *Stenopteryx hirundinis* and *Icosta minor* (for details see below). The louse flies were collected at 30 localities covering 27 10x10 km squares on the UTM grid of Croatia.

Survey of the recorded species

Hippobosca equina Linnaeus, 1758

- Zagreb, Senj, Orehovica, Kula, Osijek (LANGHOFFER, 1928)
- 2♂ 4♀ Novi Vinodolski, 20 m, 20. VII. 1996, from *Equus caballus*, leg. S. Krčmar
- 4♂ 6♀ Sveti Juraj, Razbojište, Lopci, 1040 m, 12. VIII. 2000, from *Equus caballus*, leg. S. Krčmar
- 3♀ Vis Island: Žena Glava, 180 m, 9. VI. 2003, from *Equus asinus*, leg. S. Krčmar (FPO)
- 3♀ Drniš, Pakovo Selo, 258 m, 6. VII. 2003, from *Bos primigenius taurus*, leg. S. Krčmar (FPO)
- 1♂ 4♀ Lečenica, Dugobabe, 430 m, 17. X. 2000, from 2 individuals of *Bos primigenius taurus*, leg. T. Trilar
- 6♀ ibidem, 4. V. 2001, from 2 individuals of *Bos primigenius taurus*, leg. T. Trilar, V. Punda-Polič
- 1♀ Klis, Kurtovići, 380 m, 4. V. 2001, from *Ovis aries*, leg. T. Trilar, V. Punda-Polič
- 2♂ 1♀ ibidem, from 2 individuals of *Bos primigenius taurus*, leg. T. Trilar, V. Punda-Polič

- 2♂ 1♀ Muć, Neorić, 480 m, 17. X. 2000, from *Bos primigenius taurus*, leg. T. Trilar
 1♂ 1♀ Kutjevo, 230 m, 17. V. 1997, from *Bos primigenius taurus*, leg. S. Krčmar
 1♀ Osijek, Kopačevo, Sakadaš, 80 m, 29. V. 2004, from *Equus caballus*, leg. S. Krčmar (FPO)

The major host of this monoxene species is *E. caballus*. It is quite often found on *B. p. taurus* and *E. asinus* and it can also bite humans.

***Ornithoica turdi* (Olivier, 1811)**

- 1♂ Pag Island: Kolan, Kolansko blato, 10 m, 17. VIII. 1997, from *Sylvia borin*, leg. D. Šere
 1♂ ibidem, 20. VIII. 1998, from *Lanius collurio*
 1♀ ibidem, 26. VIII. 2001, leg. T. Trilar, D. Šere, K. Prosenec
 1♀ ibidem, 1. IX. 2004, from *Acrocephalus scirpaceus*, leg. D. Šere
 1♂ Pag Island: Stara Novalja, 30 m, 1. XII. 2000, from *Parus caeruleus*, leg. D. Šere
 1♀ Donji Miholjac, Podpanj ornithological reserve, 2. IX. 1999, from *Passer montanus*, leg. Z. Tadić

Non-specialised species, parasitizing mainly small Passeriformes.

***Ornithophila metallica* (Schiner, 1864)**

- 1♀ Pag Island: Kolan, 40 m, 4. VI. 1999, from *Miliaria calandra*, leg. D. Šere

Parasitizing a wide range of Passeriformes, Coraciiformes and Piciformes.

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

- 1♂ Pag Island: Jakišnica, 20 m, 25. V. 2002, from *Emberiza melanocephala*, leg. D. Šere
 1♀ Pag Island: Kolan, Kolansko blato, 10 m, 12. VIII. 1997, from *Acrocephalus arundinaceus*, leg. D. Šere
 1♀ ibidem, 25. VIII. 1999
 1♀ ibidem, 30. VIII. 2004
 1♀ ibidem, 26. VIII. 2002, from *Acrocephalus scirpaceus*
 1♀ Senj, below Vratnik, ~ 350 m, 1. VII. 1960, from *Dendrocopos major*, leg. A. Lesinger
 1♀ ibidem, from *Garrulus glandarius*
 1♀ Gerovo, 585 m, 6. VIII. 1964, from *Accipiter gentilis*, leg. S. Breljih
 1♀ Donji Miholjac, Podpanj ornithological reserve, 24. VIII. 1999, from *Locustella fluviatilis*, leg. Z. Tadić
 1♀ Beli Manastir, Zmajevac, 125 m, 28. VIII. 2003, from *Homo sapiens*, leg. S. Krčmar (FPO)

Very abundant species with a wide range of bird hosts.

***Ornithomya biloba* (Dufour, 1827)**

- 1♀ Zagreb, Dugo Selo, 100 m, 22. VI. 1956, from the nest of *Turdus merula*, leg. S. Breljih
- 1♀ Donji Miholjac, Podpanj ornithological reserve, 15. IX. 1998, from *Passer montanus*, leg. Z. Tadić
- 1♀ ibidem, 15. IX. 1998, from *Locustella luscinioides*
- 1♂ ibidem, 22. VIII. 1999, from *Hirundo rustica*
- 1♀ ibidem, 24. VIII. 1999, from *Passer montanus*
- 1♀ ibidem, 25. VIII. 1999, from *Hirundo rustica*
- 1♂ 1♀ ibidem, 3. IX. 1999, from *Ficedula hypoleuca*
- 1♀ ibidem, 9. IX. 1999, from *Delichon urbica*
- 2♀ ibidem, 11. IX. 1999, from *Hirundo rustica*
- 1♀ ibidem, 21. IX. 1999, from *Erithacus rubecula*

The major host is *H. rustica*, on which the species is found very often and very abundantly. It is occasionally found on other small birds.

***Ornithomya chloropus* (Bergroth, 1901)**

- 1♀ Donji Miholjac, Podpanj ornithological reserve, 2. X. 1998, from *Parus major*, leg. Z. Tadić

The species occurs mainly on Passeriformes and it is most probably polyxene.

***Ornithomya fringillina* (Curtis, 1863)**

- 1♀ Pag Island: Kolan, Kolansko blato, 10 m, 24. X. 1998, from *Prunella modularis*, leg. D. Šere
- 1♀ Pag Island: Novalja, Zrće, 10 m, 28. X. 1998, from *Parus caeruleus*, leg. D. Šere
- 1♀ Donji Miholjac, Podpanj ornithological reserve, 13. IX. 1998, from *Motacilla flava*, leg. Z. Tadić
- 1♀ ibidem, 23. IX. 1999, from *Parus major*

Polyxene species occurring on small birds.

***Crataerina melbae* (Rondani, 1879)**

- 1♂ 2♀ Buzet, Istarske toplice, 50 m, 26. VII. 1994, from *Apus melba*, leg. D. Šere
- 1♀ Dubrovnik, 15 m, 10. VIII. 1964, from *Apus melba*, leg. A. Lesinger
- 1♀ ibidem, 1. VIII. 1976

The major host is *Apus melba*.

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

- 3♂ 6♀ Buzet, Istarske toplice, 50 m, 15. VIII. 1992, from *Delichon urbica*, leg. D. Šere

The species is highly specialised on *Delichon urbica* and is only occasionally found on other birds.

***Icosta minor* (Bigot, 1858)**

1♀ Pag Island: Kolan, 40 m, 18. VIII. 1996, from *Sylvia borin*, leg. D. Šere

The species is specialised on Ciconiiformes and is only occasionally found on other birds.

***Lipoptena cervi* (Linnaeus, 1758)**

Kraljičin zdenac, (LANGHOFFER, 1928)

- 3♂ Zagreb, Dugo Selo, 100 m, 9. X. 1964, from *Capreolus capreolus*, leg. K. Igalffy
- 1♂ 3♀ 4P Virovitica, 120 m, 28. X. 1966, from *Cervus elaphus*, leg. K. Igalffy
- 2♂ 2♀ 1P Čakovec, 165 m, 1. II. 1977, from *Capreolus capreolus*, leg. A. Lesinger
- 1♂ Donji Miholjac, Podpanj ornithological reserve, 6. X. 1998, from *Prunella modularis*, leg. Z. Tadić
- 1♂ ibidem, 16. X. 1998, from *Emberiza schoeniclus*
- 1♀ ibidem, 21. IX. 1999, from *Troglodytes troglodytes*
- 1♀ ibidem, 15. X. 1999, from *Panurus biarmicus*
- 1♀ ibidem, 21. X. 1999, from *Troglodytes troglodytes*
- 1♂ ibidem, 21. X. 1999, from *Panurus biarmicus*
- 1♀ ibidem, 23. X. 1999, from *Parus caeruleus*
- 1♀ ibidem, 24. X. 1999, from *Emberiza schoeniclus*
- 8♀ Beli Manastir, Tikveš, 80 m, 30. X. 2003, from vegetation, leg. S. Krčmar (FPO)
- 3♀ ibidem, 31. X. 2003

An oligoxene species parasitizing on Cervidae. Individuals of the autumn generation in particular often alight on many different warm-blooded vertebrates. Our material shows that on both the major hosts, *Cervus elaphus* and *Capreolus capreolus*, puparia are also often found, which is not the case on occasional hosts.

DISCUSSION

The louse fly (Hippoboscidae) fauna of Croatia has not yet been sufficiently researched. Previously, LANGHOFFER (1928) published records for only two species (*H. equina* and *L. cervi*), but without any further data (i.e. neither date, locality, number of specimens, sex, nor name of collectors). Also in a book dealing with the diseases of horses BABIĆ *et al.* (1953) mentioned the louse fly species *H. equina* and *H. camelina* Leach, 1817. In our opinion this citation is irrelevant from the faunistic point of view and the second species could have been misidentified or simply uncritically cited from another literature source. During the last two decades we have been able

to obtain some additional material collected more or less sporadically during bird-ringing fieldwork and from various entomological field collecting (mainly horse flies [Tabanidae]), which has resulted in the recording of 9 species of louse flies new to the fauna of Croatia: *Ornithoica turdi*, *Ornithophila metallica*, *Ornithomya avicularia*, *Ornithomya biloba*, *Ornithomya chloropus*, *Ornithomya fringillina*, *Crataerina melbae*, *Stenepteryx hirundinis* and *Icosta minor*. The present knowledge is not the final status of Croatian hippoboscids fauna. We can expect some species that are already known in neighbouring countries (Slovenia, Hungary). We can also expect some specialised louse fly species, the hosts of which occur in Croatia, i.e. *Melophagus ovinus* (Linnaeus, 1758) parasitizing on *Ovis aries*; *Ornithophila gestroi* (Rondani, 1878) highly specialised on *Falco eleonorae* Gén , 1839 or *Olfersia fumipennis* (Sahlberg, 1886) known from *Pandion haliaetus* (Linnaeus, 1758).

ACKNOWLEDGEMENTS

We would like to thank Mr. Zdravko Tadi  and Mr. Dare  ere for donations of material.

Received October 8, 2004

REFERENCES

- BABIĆ, I., DELAK, M. & MIKAČIĆ, D., 1953: Nametnici i nametni ke bolesti konja. – Zagreb, 305 pp.
- B TTIKER, W., 1994: Die Lausfliegen der Schweiz (Diptera, Hippoboscidae) mit Bestimmungsschl ssel. – Documenta Faunistica Helvetiae, Schweizerisches Zentrum f r die kartographische Erfassung der Fauna, Neuch tel, 117 pp.
- GRUNIN, K. Y., 1988: Family Hippoboscidae. – In: BEI-BIENKO, G.Y., STEYSKAL, G.C., (Editors): Key to the Insects of the European part of the USSR. Vol. 5, Diptera and Siphonaptera, part II. – Institute of Zoology, Academy of Sciences, USSR, Leningrad, 979–986 pp. [English translation of the original Russian version from 1969.]
- HAGEMEIJER, E. J. M. & BLAIR, M. J. (Eds), 1997: The EBCC Atlas of European Breeding Birds: Their Distribution and Abundance. – T. & A. D. Poyser, London, 903 pp.
- LANGHOFFER, A., 1928: Beitr ge zur Dipteren Fauna Kroatiens. – Glasnik Hrvatskog prirodoslovnoga dru tva **39–40**, 242–251.
- LANE, R. P. & CROSSKEY, R. W., 1993: Medical insects and arachnids. Chapman & Hall, London, 722 pp.
- LEHANE, M. 1991. Biology of blood sucking insects. Chapman & Hall, London, 226 pp.
- ITIS (Integrated Taxonomic Information System, <http://www.itis.usda.gov/index.html>) 2004.
- MAA, T. C., 1989: Family Hippoboscidae. – In: EVENHUIS, N. L., (Ed): Web version of the »Catalog of the Diptera of the Australasian and Oceanian Regions« – <http://hbs.bishopmuseum.org/aocat/aocathome.html>, Bishop Museum, Honolulu, Hawaii 96817, USA.

MITCHELL-JONES, A. G., AMORI, G., BOGDANOWICZ, W., KRYŠTUFEK, B., REIJNDERS, P. J. H., SPI-TZENBERGER, F., STUBBE, M., THISSEN, J. B. M., VOHRALÍK, V. & ZIMA, J., 1999: Atlas of European Mammals. – The Academic Press, London, 496 pp.

SOÓS, Á. & HŪRKA, K., 1986: Family Hippoboscidae. – In: SOÓS, Á., PAPP, L., (Editors): Catalogue of Palearctic Diptera. Volume 11: Scathophagidae – Hypodermatidae. – Akadémiai Kiadó, Budapest, 215–227 pp.

SAŽETAK

Prilog poznavanju faune ušara Hrvatske (Diptera: Hippoboscidae)

T. Trilar & S. Krčmar

Pregledom radova objavljenih u entomološkim časopisima za Hrvatsku faunu navode se samo 2 vrste ušara (Hippoboscidae) (LANGHOFFER, 1928). U posljednjih dvadeset godina uspjeli smo uzorkovati nekoliko jedinki, više ili manje usput, pri prstenovanju ptica ili pri uzorkovanju drugih skupina kukaca. Ušare su pronađene na 30 lokaliteta koji pokrivaju 27 polja na UTM mreži Hrvatske. U skupljenom uzorku utvrđeno je 11 vrsta od kojih su konjska ušara (*Hippobosca equina*) i jelenska ušara (*Lipoptena cervi*) već poznate iz literature, a ostale su nove u fauni Hrvatske: drozdova ušara (*Ornithoica turdi*), sjajna ušara (*Ornithophila metallica*), velika ptičja ušara (*Ornithomya avicularia*), lastavičja ušara (*Ornithomya biloba*), tamna ptičja ušara (*Ornithomya chloropus*), mala ptičja ušara (*Ornithomya fringillina*), velika čiopina ušara (*Crataerina melbae*), piljkova ušara (*Stenepteryx hirundinis*) i mala čapljina ušara (*Icosta minor*). Na temelju literaturnih podataka i obavljenih uzorkovanja u fauni Hrvatske utvrđeno je ukupno 11 vrsta ušara svrstanih u 8 rodova.