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Annotated checklist of the bat flies (Diptera: Nycteribiidae) of Romania

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Abstract

Bat flies (Diptera: Hippoboscoidea: Nycteribiidae, Streblidae) are obligate, blood-feeding, highly specialized ectoparasites of bats (Chiroptera). Of the 17 nycteribiid species present in Europe, 11 have been recorded in Romania. Here, we present a checklist with all the previously published data and new records from recent years, for a total of 2218 records of bat-bat fly associations. Host-parasite associations are updated for *Basilia italica* Theodor, *B. nana* Theodor, *B. nattererii* (Kolenati), *Nycteribia kolenatii* Theodor & Moscona, *N. latreillii* (Leach), *N. pedicularia* Latreille, *N. schmidlii* Schiner, *N. vexata* Westwood, *Penicillidia conspicua* Speiser, *Pe. dufourii* (Westwood) and *Phthiridium biarticulatum* Hermann.

Key words: bats, Chiroptera, Eastern Europe, host-parasite associations

Introduction

Bat flies (Diptera: Hippoboscoidea: Nycteribiidae, Streblidae) are one of the most conspicuous and highly specialized groups of the diverse ectoparasite fauna of bats. They are obligate blood-sucking, spider-like ectoparasites with reproduction via viviparous puparity (Marshall 1982). They live in the fur of the host (only the female leaves the host to deposit a single 3rd instar larva, which immediately pupates on the walls of the roost), their bullet-shaped body and "fur-swimming" capabilities helping them evade the host's grooming behavior (Marshall 1982). Their lifespan is less than one year, they need to feed every few hours and most of them die within 24 hours of their removal from a host (Marshall 1971).

Initially, bat flies were considered to be host generalists, as bats belonging to different species often roost together and bat flies are highly mobile parasites (Kolenati 1857a). However, they are not just highly specialized on bats in general; they are also highly host-specific, with several monoxenous species (i.e., associated with a single host species) whose specificity is the result of multiple selective pressures throughout their coevolution with bats, involving morphological, behavioral, physiological and immunological factors (Dick & Patterson 2007; Dittmar *et al.* 2015).

There is a growing interest in bat flies due to their importance in the study of parasitic and hyperparasitic relations (Dick & Patterson 2007; Sebastián Tello *et al.* 2008; de Groot *et al.* 2020) as well as their vectorial role in pathogen transfer (Szentiványi *et al.* 2019). They are vectors for bacterial pathogens like *Bartonella* spp. (Corduneanu *et al.* 2018; Sándor *et al.* 2018; McKee *et al.* 2019) or of the malaria-related parasitic protozoa *Polychromophilus* spp. (Megali *et al.* 2011; Sándor *et al.* 2021). Although interest in this group of insects is growing, there are only a few publications on the bat flies of Romania, a country with a diverse chiropteran fauna [32 regularly-occurring species according to Sándor *et al.* (2019)] and with the confirmed presence of 11 bat fly species, all belonging to the family Nycteribiidae (Szentiványi *et al.* 2016; Péter *et al.* 2021). The earliest report on bat flies collected in the current territory of Romania was published in the nineteenth century (Kolenati 1857a), followed by a note on general studies of the cave fauna of the country (Bokor 1921). At the beginning of the twentieth century, a few records were published from Banat and Transylvania (then part of the Austro-Hungarian Empire) in a systematic list of the bat

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flies of Hungary (Dudich 1925). The first list of Romanian bat flies was published more than 50 years ago (Decu-Burghele 1962), followed by several papers usually treating particular species (e.g., Decu-Burghele 1963; Péter *et al.* 2021) or regions (e.g., Burghele-Bălăcescu 1966; Gheorghiu 2006). Recently, several studies targeting bats and their parasites were initiated, with a high number of bat flies collected and analyzed (Hornok *et al.* 2016, 2017; Haelewaters *et al.* 2017; Hornok *et al.* 2019; Sándor *et al.* 2019; Péter *et al.* 2022).

Using published and unpublished data, we here present the first annotated checklist of Nycteribiidae and their hosts from Romania.

Material and methods

We prepared a database of records from published sources. Articles mentioning data about bat flies in Romania were accessed and bat fly related information was extracted. First, a search was performed using keywords such as 'Nycteribiidae', 'bats' and 'Romania' in the Web of Science, Zoological Record and Google Scholar databases. Subsequently, copies of the original publications were obtained and the references cited in those works were traced. This process was repeated until no new references were found.

In addition to published records, we supplemented the checklist with original, unpublished material. Bat flies were collected from live bats during fieldwork from 2017 to 2020 at 36 different locations in Romania. Bats were captured with mist nets or harp traps at various locations regularly transited by bats (natural corridors, above creeks and rivers) or adjacent to roosts (caves, mines, buildings). Each bat was individually screened for ectoparasites, which were removed using fine forceps. Ectoparasites were stored in tubes containing 70% ethanol, with samples from different hosts placed in separate tubes. Bat flies were individually identified using morphological keys (Theodor & Moscona 1954; Theodor 1967).

Data entries in the systematic list are structured according to the following format: locality of collection, date of collection (only in case of examined material), number of female and male flies, host species and, in the case of data from literature, bibliographic source(s). Data are presented in chronological order (published reports) and alphabetical order of sampling site (original data). The list of bat flies is presented according to Szentiványi *et al.* (2016).

Results and discussion

This annotated checklist is based on the published literature up to 2021 and field surveys from 2017 to 2020. Altogether, we found 20 articles containing original data on bat flies from Romania (Kolenati 1857b; Thalhammer 1899; Bokor 1921; Dudich 1925; Decu-Burghele 1962, 1963; Dumitrescu *et al.* 1965; Burghele-Bălăcescu 1966; Negrea *et al.* 1967; Rădulescu & Lustun 1967; Theodor 1967; Blackwell 1980; Gheorghiu 2006; Willemsen & Thomassen 2009; Postawa & Nagy 2016; Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019; Péter *et al.* 2021; Sándor *et al.* 2021), covering more than 170 years in terms of collection dates. In the period 2017–2020, we collected 2975 bat flies (belonging to ten species) from 1196 bats (22 host species). These flies are deposited in the entomological collection of the University of Agricultural Science and Veterinary Medicine of Cluj Napoca, Romania.

Eleven bat fly species (*Basilia italica* Theodor, *B. nana* Theodor, *B. nattererii* (Kolenati), *Nycteribia kolenatii* Theodor & Moscona, *N. latreillii* (Leach), *N. pedicularia* Latreille, *N. schmidlii* Schiner, *N. vexata* Westwood, *Penicillidia conspicua* Speiser, *Pe. dufourii* (Westwood) and *Phthiridium biarticulatum* Hermann) have so far been recorded in Romania, with 80 unique host-parasite associations (Table 1). Based on the population sizes and number of bat species in Romania, we consider that the diversity of bat-bat fly associations is larger than recorded up to date. Moreover, there are two additional bat fly taxa (*Basilia mongolensis* Theodor, 1966 and *Penicillidia monoceros* Speiser, 1900) that have been recorded in neighboring countries (Szentiványi *et al.* 2016) but not yet in Romania. Although the primary host species of *B. mongolensis* is not yet established, all bat hosts utilized by this fly (Szentiványi *et al.* 2016) regularly occur in Romania. The primary hosts of *P. monoceros* are *Myotis daubentonii* (Kuhl) and *Myotis dasycneme* (Boie) (Orlova *et al.* 2014; Szentiványi *et al.* 2016), the first being a medium-sized bat common all over Romania. We suggest that increased sampling (especially for these hosts) will likely increase the number of bat fly species and host-parasite associations for the country.

TABLE 1. List of bat species with associated bat fly (Diptera: Nycteribiidae) species recorded in Romania, based on both previously published and unpublished records. Bat species are listed according to family in systematic order (Rhinolophidae, Vespertilionidae and Miniopteridae) and in alphabetic order within each family; bat fly species are listed alphabetically.

Bat species	Bat fly species (Nycteribiidae)
Rhinolophidae	
Rhinolophus blasii	*Nycteribia pedicularia*
	Phthiridium biarticulatum
Rhinolophus euryale	*Nycteribia vexata*
	Nycteribia latreillii
	Penicillidia conspicua
	Phthiridium biarticulatum
Rhinolophus ferrumequinum	*Basilia nana*
	Nycteribia latreillii
	Nycteribia schmidlii
	Nycteribia vexata
	Penicillidia conspicua
	Penicillidia dufourii
	Phthiridium biarticulatum
Rhinolophus hipposideros	*Nycteribia schmidlii*
	Penicillidia conspicua
	Phthiridium biarticulatum
Rhinolophus mehelyi	*Nycteribia latreillii*
	Penicillidia conspicua
	Phthiridium biarticulatum
Vespertilionidae	
Barbastella barbastellus	*Basilia italica*
Eptesicus serotinus	*Penicillidia dufourii*
	Phthiridium biarticulatum
Myotis alcathoe	*Basilia nana*
	Phthiridium biarticulatum
Myotis bechsteinii	*Basilia nana*
	Nycteribia kolenatii
	Nycteribia vexata
Myotis blythii	*Basilia nana*
	Nycteribia latreillii
	Nycteribia schmidlii
	Nycteribia vexata
	Penicillidia conspicua
	Penicillidia dufourii
	Phthiridium biarticulatum
Myotis capaccinii	*Nycteribia latreillii*
	Nycteribia pedicularia
	Nycteribia schmidlii
	Nycteribia vexata
	Penicillidia conspicua

.....continued on the next page

TABLE 1. (Continued)

Bat species	Bat fly species (Nycteribiidae)
Myotis capaccinii	*Penicillidia dufourii*
	Phthiridium biarticulatum
Myotis daubentonii	*Nycteribia kolenatii*
	Nycteribia latreillii
	Nycteribia pedicularia
	Nycteribia schmidlii
	Nycteribia vexata
	Penicillidia conspicua
	Penicillidia dufourii
Myotis emarginatus	*Penicillidia dufourii*
Myotis myotis	*Basilia nana*
	Basilia nattererii
	Nycteribia kolenatii
	Nycteribia latreillii
	Nycteribia pedicularia
	Nycteribia schmidlii
	Nycteribia vexata
	Penicillidia conspicua
	Penicillidia dufourii
	Phthiridium biarticulatum
Myotis mystacinus	*Basilia italica*
	Basilia nattererii
Myotis nattereri	*Basilia nana*
	Nycteribia kolenatii
	Nycteribia vexata
	Penicillidia dufourii
Nyctalus noctula	*Basilia nana*
	Nycteribia latreillii
Pipistrellus nathusii	*Nycteribia latreillii*
	Penicillidia dufourii
Plecotus auritus	*Basilia nana*
	Nycteribia pedicularia
	Nycteribia schmidlii
Plecotus austriacus	*Nycteribia schmidlii*
Miniopteridae	
Miniopterus schreibersii	*Nycteribia latreillii*
	Nycteribia pedicularia
	Nycteribia schmidlii
	Nycteribia vexata
	Penicillidia conspicua
	Penicillidia dufourii
	Phthiridium biarticulatum

Systematic list

Class: Insecta

Order: Diptera

Family: Nycteribiidae Samouelle, 1819

Subfamily: Nycteribiinae Samouelle, 1819

Genus *Basilia* Miranda Ribeiro, 1903

***Basilia italica* Theodor, 1954**

Published records. Ic Ponor, 1 female, 1 male, host *Myotis mystacinus* (Kuhl) (Péter *et al.* 2021).

Material examined. Aghireşu, 02.09.2020, 1 female; Peştera Mare de la Mereşti, 02.09.2020, 1 male; host in both cases *Barbastella barbastellus* (Schreber).

Distribution. Southern and Central Europe. Rare in Romania, collected only at three distinct sites.

Remarks. A rare fly species, mostly recorded on forest-dwelling, small-sized bat species. Its primary hosts are *Myotis brandtii* (Eversmann) and *My. mystacinus*, with several records also from *Myotis alcathoe* von Helversen & Heller and six other species (Szentiványi *et al.* 2016).

***Basilia nana* Theodor, 1954**

Published records. Peştera Fuşteica (Burghele-Bălăcescu 1966); Cheile Cuţilor (P. Vacii) (Willemsen & Thomassen 2009); Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Myotis bechsteinii* (Kuhl). Peştera Fuşteica (Burghele-Bălăcescu 1966), host *Myotis myotis* (Borkhausen). Peştera Lazului, Roşia (Sándor *et al.* 2018), host *Myotis nattereri* (Kuhl). Ciutelec/Csehtelek, host *Rhinolophus ferrumequinum* (Schreber) (Theodor 1967).

Material examined. Peştera Mare de la Mereşti, 26.08.2017, 1 male, Peştera Mare de la Mereşti, 24.08.2019, 1 female, host *My. alcathoe*. Peştera Ferice, 29.08.2017, 1 female, 1 male; Peştera Mare de la Mereşti, 26.08.2017, 4 males; Peştera Lócsűr, 25.08.2018, 4 females; Somova, 18.09.2019, 1 male; Peştera cu Apă de la Leşu, 24.09.2020, 3 females, 4 males; Peştera de la Gălăşeni, 23.09.2020, 2 females, 2 males; 2020.09, Peştera de la Întorsuri, 21.09.2020, 2 females, 6 males; Peştera Osoi, 22.09.2020, 2 females, 4 males, host *My. bechsteinii*. Peştera Lócsűr, 25.08.2018, 1 female, host *Myotis blythii* (Tomes). Peştera Mare de la Mereşti, 23.08.2019, 1 male and 02.09.2020, 1 male, host *My. myotis*. Peştera Osoi, 22.09.2020, 5 females, 9 males, Pestera cu Apă de la Leşu, 24.09.2020, 1 female, host *My. nattereri*. Peştera Mare de la Mereşti, 02.09.2020, 1 female, host *Nyctalus noctula* (Schreber). Valea Uzului, 30.05.2020, 1 male, host *Plecotus auritus* (Linnaeus).

Distribution. This is the most common *Basilia* species and is distributed all over Europe. In Romania it has been collected from all historical regions, with 11 distinct geographical records altogether.

Remarks. The primary hosts of this species are *My. bechsteinii* and *My. nattereri*, with accidental occurrences on other species. Here, we report a new host-parasite relationship for this species, which to our knowledge had never been recorded from *My. alcathoe* (Szentiványi *et al.* 2016).

***Basilia nattererii* (Kolenati, 1857b)**

Published records. Avenul nr. 2 din Sohodoale Mici-Motru Sec, host *My. mystacinus* (Decu-Burghele 1962). Peştera Fuşteica, host *My. myotis* (Burghele-Bălăcescu 1966).

Distribution. A common *Basilia* species distributed all over Europe, especially in Southern and Central Europe; rare in Romania, collected only at two distinct sites.

Remarks. The primary host of this species is *My. nattereri*; however, it has been recorded on at least eight other species in Europe (Szentiványi *et al.* 2016). In Romania it has only been recorded on secondary hosts.

Genus *Nycteribia* Latreille, 1797

Nycteribia kolenatii Theodor & Moscona, 1954

Published records. Peştera Liliecilor de la Gura Dobrogei (Burghele-Bălăcescu 1966), host unknown; Avenul Betfia, Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019; Sándor *et al.* 2021), host *Miniopterus schreibersii* (Kuhl). Canaraua Fetii, Peştera Tunel de la Hagieni, Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019) host *My. bechsteinii.* Avenul Betfia*,* Peştera Liliecilor de la Gura Dobrogei (Haelewaters *et al.* 2017; Sándor *et al.* 2018), host *My. blythii.* Canaraua Fetii, Peştera Tunel de la Hagieni, Peştera Liliecilor de la Gura Dobrogei, Canaraua Fetii, Roşia, Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. daubentonii.* Avenul Betfia, Cepari, Prundu Bârgăului*,* Şanţ*,* Peştera Gaura cu Muscă (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019) host *My. myotis.* 'Banat' [likely Peştera Gaura cu Muscă] (Kolenati 1857b), host *R. ferrumequinum*.

Material examined. Muntele Puciosu, 21.09.2017, 2 males, host *My. bechsteinii.* Peştera Limanu, 01.05.2017, 1 female; Peştera Tunel de la Hagieni, 20.05.2017, 1 female, 1 male; Canaraua Fetii, 22.05.2017, 1 male; 02.08.2018, 2 males; 20.09.2019, 1 male; Peştera Mare de la Mereşti, 26.08.2017, 1 female, 1 male; 03.09.2020, 3 females, 7 males; Peştera Lócsűr (Cheile Vârghişului), 23.08.2018, 1 female; Somova, 19.09.2019, 42 females, 44 males; Cheile Corcoaia, 24.08.2020, 1 female, 1 male; Peştera de la Întorsuri 21.09.2020, 2 females, 6 males; Peştera Osoi, 22.09.2020, 2 males; 2020.09.24, Peştera cu Apă, de la Leşu, 4 males, host *My. daubentonii.* Peştera Osoi, 22.09.2020, 1 male, host *My. nattereri*.

Distribution. One of the most widespread nycteribiid species in Europe (Szentiványi *et al.* 2016). Common in Romania, collected from all historical regions with 16 distinct geographical records altogether.

Remarks. The typical ectoparasite of *My. daubentonii*, present in most screened host populations, with a few odd records on other forest-dwelling species.

Nycteribia latreillii (Leach, 1817)

Published records. Avenul Betfia, Peştera Gaura cu Muscă (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Mi. schreibersii.* Peştera Buhui (Burghele-Bălăcescu 1966; Negrea *et al.* 1967); Rosia (Willemsen & Thomassen 2009); Peştera cu Apă din Valea Leşului (Postawa & Nagy 2016), Canaraua Fetii, Leghia, Peştera Gaura cu Muscă, Peştera Liliecilor de la Gura Dobrogei (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019) host *My. blythii.* Peştera Fuşteica, Peştera de la Izverna, Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1962); Peştera de la Izvorul Tăuşoarelor, Peştera de la Izverna, Peştera Comarnic, Peştera Fuşteica, Peştera Liliecilor-Carașova (Burghele-Bălăcescu 1966); Peştera Comarnic, Peştera Liliecilor (Negrea *et al.* 1967); Peştera Urşilor (Gheorghiu 2006); Rosia, Cheile Cuţilor, Cheile Albioarei, Doline (Willemsen & Thomassen 2009); Peştera cu Apă din Valea Leşului (Postawa & Nagy 2016); Avenul Betfia, Peştera Gaura cu Muscă (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. myotis.* Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1962), host *Rhinolophus mehelyi* Matschie. Peştera Liliecilor de la Mănăstirea Bistriţa (Decu-Burghele 1963); Peştera Liliecilor de la Mănăstirea Bistriţa (Burghele-Bălăcescu 1966); Peştera Fuşteica (Burghele-Bălăcescu 1966), host unknown.

Material examined. Avenul Betfia, 07.05.2019, 4 females, 1 male; Mocrea, 08.05.2019, 1 female; 18.09.2020, 1 female; Peştera de la Gura CetăţiiParoş, 13.09.2019, 1 female, 1 male, host *Mi. schreibersii.* Avenul Betfia, 07.05.2019, 2 females, 2 males; Canaraua Fetii, 22.05.2017, 2 females; 02.08.2018, 11 females, 13 males; 20.09.2019, 2 females; 21.05.2020.21, 4 females, 4 males; Leghia, 04.05.2018, 1 female, 3 males; Peştera Liliecilor de la Gura Dobrogei, 14.05.2017, 1 female; Peştera Lócsűr (Cheile Vârghişului), 02.09.2020, 1 female, 1 male; Peştera Mare de la Mereşti, 03.09.2020, 2M; Peştera Gaura Ungurului de la Pecinişca, 2017.09.05, 1 female, host *My. blythii.* Canaraua Fetii, 02.08.2018, 1 female, 6 males, host *Myotis capaccinii* (Bonaparte). Canaraua Fetii, 31.07.2018, 1 female; 02.08.2018, 10 females, 12 males; Peştera Liliecilor de la Gura Dobrogei, 24.04.2019, 2 females, 1 male;

Peştera Lócsűr (Cheile Vârghişului), 23.08.2018, 2 males; Somova, 21.09.2019, 3 males, host *My. daubentonii*. Avenul Betfia, 07.05.2019, 15 females, 25 males; Canaraua Fetii, 02.08.2018, 1 female, 5 males, 21.09.2019, 1 male; 2019.08.24, 6 females, 2 males; Peştera Mare de la Mereşti, 21.04.2020, 2 females, 1 male; 02.09.2020, 1 female, 1 male; Peştera de la Întorsuri, 21.09.2020, 1 female; Peştera Osoi, 22.09.2020, 1 female; Ţifra, 28.05.2020, 1 female, host *My. myotis*. Peştera Mare de la Mereşti, 24.08.2019, 2 females, 2 males, host *N. noctula*. Canaraua Fetii, 01.08.2018, 1 female, host *Pipistrellus nathusii* (Keyserling & Blasius). Canaraua Fetii, 27.05.2019, 1 male, host *Rhinolophus euryale* Blasius. Canaraua Fetii, 31.07.2018, 3 females, 4 males; Gilău, 04.05.2017, 1 female, host *R. ferrumequinum*.

Distribution. One of the most widespread nycteribiid species in Europe, Asia, and North Africa (Szentiványi *et al.* 2016). Common in Romania, collected from all historical regions with 36 distinct geographical records altogether.

Remarks. One of the typical ectoparasites of the two largest *Myotis* Kaup species in Europe (*My. blythii* and *My. myotis*), also frequently collected from other cave-dwelling species present in the same roosts as its primary hosts. Here, we report a new host-parasite association for this species (on *R. mehelyi*).

Nycteribia pedicularia Latreille, 1805

Published records. Peştera Fuşteica (Burghele-Bălăcescu 1966); Peştera Liliecilor (Negrea *et al.* 1967); Peştera Gaura cu Muscă, Peştera Lazului (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Mi. schreibersii*. Peştera Topolniţa (Decu-Burghele 1962), Peştera Liliecilor-Caraşova, Peştera Fuşteica (Burghele-Bălăcescu 1966); Peştera Gaura cu Muscă, Peştera Hoţilor, Peştera Lazului (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. capaccinii*. Peştera de la Izverna, Peştera Fuşteica (Burghele-Bălăcescu 1966); Peştera Mare din Satul Peştera (Gheorghiu 2006), host *My. myotis*. Peştera Fuşteica (Decu-Burghele 1962), host *Rhinolophus blasii* Peters. Peştera Topolnita (Decu-Burghele 1962), host *P. auritus*.

Material examined. Peştera Gaura cu Muscă, 08.05.2017, 1 male, host *Mi. schreibersii*. Peştera Gaura Ungurului de la Pecinişca, 26.09.2017, 1 female, 2 males, host *My. capaccinii*. Peştera Mare de la Mereşti, 05.05.2017, 2 females, 1 male, host *My. daubentonii*.

Distribution. A relatively common nycteribiid species with a southerly distribution, mainly in the Balkans, Apennines and Iberian Peninsula, with scattered records in Central Europe (Szentiványi *et al.* 2016). It has been primarily recorded in the southwestern part of Romania, with 10 distinct geographical records altogether.

Remarks. The typical ectoparasite of *My. capaccinii* in Europe and North Africa, also collected from other cave-dwelling species present in the same roosts as its primary host. Here, we report two new host-parasite relationships for this species, which to our knowledge had never been recorded from *R. blasii* and *P. auritus* (Szentiványi *et al.* 2016).

Nycteribia schmidlii Schiner, 1853

Published records. 'Banat'—likely Peştera Gaura cu Muscă (Kolenati 1857b, as *Nycteribia blasii*), Munţii Bihor ("Bihar") [Dudich 1925, as *Nycteribia blasii* (Kolenati, 1863)], Peştera Fuşteica, Peştera Liliecilor din Mănăstirea BistriţaPeştera (Decu-Burghele 1962); Peştera Liliecilor de la Gura Dobrogei (Rădulescu & Lustun 1964); Peştera Topolnita, Peştera de la Apa Spânzurată, Peştera Liliecilor de la Gura Dobrogei, Peştera de la Românești, Peştera Fuşteica, Peştera Lazului, Peştera Şura Mare, Peştera Liliecilor-Caraşova, PeşteraPeştera BulbaPeştera (Burghele-Bălăcescu 1966); Peştera Gaura cu Muscă, Peştera Românești, Peştera Liliecilor (Negrea *et al.* 1967); Peştera Meziad (Willemsen & Thomassen 2009); Avenul Betfia, Canaraua Fetii, Peştera Tunel de la Hagieni, Peştera Hoţilor, Peştera Gaura cu Muscă, Peştera Gaura Ungurului de la Pecinişca, Peştera Hoţilor, Peştera Lazului, Peştera Liliecilor de la Gura Dobrogei, Peştera Tunel de la Hagieni, Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Mi. schreibersii*. Peştera Liliecilor de la Gura Dobrogei (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. blythii*.Peştera Gaura cu Muscă (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. capaccinii*. Peştera Liliecilor de la Peştera Liliecilor de la Gura Dobrogei, Peştera Gaura Haiducească (Decu-Burghele 1962); Peştera Gaura cu Muscă (Negrea *et al.* 1967); Peştera Liliecilor-Caraşova

(Burghele-Bălăcescu 1966); Peştera Liliecilor (Negrea *et al.* 1967); Tunelul de la Carieră, Peştera Urşilor, Peştera Mare din Satul Peştera (Gheorghiu 2006), host *My. myotis*. Peştera Despicătură (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Rhinolophus hipposideros* (Bechstein). Peştera Liliecilor de la PeşteraGura Dobrogei (Decu-Burghele 1962), Malcoci (Theodor 1967), host *P. auritus*. Peştera Limanu (Dumitrescu *et. al.* 1965); Peştera Vacilor din Ştеiul Orzeştilor (Decu-Burghele 1963); Peştera Liliecilor de la Mănăstirea Bistriţa, Peştera Fuşteica, Peştera Bulba (Burghele-Bălăcescu 1966), host unknown.

Material examined. Avenul Betfia, 07.05.2019, 12 females, 4 males; 07.09.2019, 21 females, 8 males; Bánffy Castle (Bontida), 20.10.2017, 18 females, 11 males; Canaraua Fetii, 27.04.2019, 6 females, 3 males; 21.09.2019, 26 females, 18 males; 21.04.2020, 8 females, 9 males; Gilău, 14.08.2017, 2 females, 1 male; Peştera Liliecilor de la Gura Dobrogei, 19.05.2017, 7 females, 2 males; 24.04.2019, 2 females, 3 males; 27.04.2019, 17 females, 17 males; Peştera Tunel de la Hagieni, 20.09.2019, 52 females, 44 males; Mocrea, 08.05.2019, 19 females, 12 males; 08.09.2019, 30 females, 15 males; 16.10.2019, 97 females, 79 males; 18.09.2020, 112 females, 71 males; Peştera Gaura cu Muscă, 08.05.2017, 3 females, 1 male; Peştera Măgurici, 02.05.2017, 15 females, 3 males; 02.08.2018, 9 females, 1 male; Sasca Montană, 04.09.2017, 20 females, 13 males; Somova, 18.09.2019, 5 females, 3 males; Ţifra, 13.05.2019, 3 females, 1 male; 28.04.2020, 21 females, female22 males, host *Mi. schreibersii*. Canaraua Fetii, 02.08.2018, 1 male, host *My. blythii*. Somova, 18.09.2019, 1 male, host *My. daubentonii*. Sasca Montana, 04.09.2017, 1 female, 1 male, host *R. ferrumequinum*. Sitorman, 25.05.2019, 1 male, host *Plecotus austriacus* (Fischer).

Distribution. A relatively common nycteribiid with a southerly distribution, mainly in the Balkans, Apennines and Iberian Peninsula, with scattered records in Central Europe (Szentiványi *et al.* 2016) and common also in Africa. In Romania it has been recorded all over the country, with 31 distinct geographical records altogether.

Remarks. One of the typical ectoparasites of *Mi. schreibersii* and other *Miniopterus* Bonaparte spp. in Europe and North Africa, also collected from other cave-dwelling species present in the same roosts as its primary hosts. Here, we report a new host-parasite relationship for this species, which to our knowledge had never been recorded from *P. austriacus* (Szentiványi *et al.* 2016).

Nycteribia vexata Westwood, 1835

Published records. Peştera Gaura cu Muscă (Kolenati 1857b), Peştera Liliecilor de la Gura Dobrogei (Burghele-Bălăcescu 1966); Canaraua Fetii, Avenul Betfia (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Mi. schreibersii*. Peştera Liliecilor de la Gura Dobrogei (Burghele-Bălăcescu 1966), Peştera de la Despicătură (Gheorghiu 2006); Peştera cu Apă din Valea Leşului (Postawa & Nagy 2016); Canaraua Fetii, Peştera Gaura cu Muscă, Peştera Liliecilor de la Gura Dobrogei, Leghia, Sasca Montană (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. blythii*. Peştera Fuşteica (Burghele-Bălăcescu 1966), host *My. capaccinii*. Peştera Fuşteica, Peştera de la Izverna, Peştera Dracului de la Paroşeni, Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1962); Peştera de la Izvorul Tăuşoarelor, Peştera Topolnita, Peştera lui Duţu, Peştera de la Izverna, Peştera Fuşteica, Peştera Gaura lui Cocolbea (Burghele-Bălăcescu 1966); Peştera Mare din Satul Peştera, Tunelul de la Carieră (Peştera) (Gheorghiu 2006); Peştera cu Apă din Valea Leşului (Postawa & Nagy 2016); Avenul Betfia, Canaraua Fetii, Peştera Gaura cu Muscă, Peştera Mare de la Mereşti (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. myotis*. Geoagiu (Roman baths), Peştera Gaura cu Muscă (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *R. euryale*. Peştera Mare de la Mereşti, Gilău (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *R. ferrumequinum*. Băile Herculane/Herculesbad (Theodor 1967); Peştera Meziad/Mézesdi barlang (Thalhammer 1899, Bokor 1921, Dudich 1925); Peştera Liliecilor de la Mănăstirea Bistrita (Burghele-Bălăcescu 1966), no host recorded.

Material examined. Avenul Betfia, 20.04.2019, 3 females, 1 male, host *Mi. schreibersii*. Peştera Mare de la Mereşti, 23.08.2019, 2 females, host *My. bechsteinii*. Avenul Betfia, 07.05.2019, 1 male; Canaraua Fetii, 22.05.2017, 1 male; 02.08.2018, 7 females, 11 males; 27.04.2019, 1 female, 2 males; 20.09.2019, 1 male; 21.04.2020, 11 females, female12 males; Peştera Liliecilor de la Gura Dobrogei, 19.04.2017, 1 female, 1 male; Leghia, 04.05.2018, 5 females; Peştera de la Întorsuri, 21.09.2020, 1 female, Peştera Lócsűr (Cheile Vârghişului), 02.09.2020, 2 females; Peştera Măgurici, 02.05.2017, 3 females, 2 males, host *My. blythii*. Canaraua Fetii, 02.08.2018, 1 female, 2 males, host *My. daubentonii*. Avenul Betfia, 07.05.2019, 39 females, 29 males; Canaraua Fetii, 02.08.2018, 4 females, 6

males; 21.04.2020, 6 females, 1 male; Gilău, 04.05.2017, 1 female, 1 male; 14.08.2017, 1 female; Peştera de la Gălăşeni, 23.09.2020, 10 females, 3 males; Peştera de la Întorsuri, 21.09.2020, 4 females, 3 males; Peştera Măgurici, 02.05.2017, 1 male; Peştera Mare de la Mereşti, 23.08.2019, 1 male; 02.09.2020, 3 females, 2 males; Peştera Osoi, 22.09.2020, 1 female, 1 male; Ţifra, 28.04.2020, 2 females, 2 males, host *My. myotis*. Canaraua Fetii, 20.09.2019, 3 females, 3 males; Peştera Mare de la Mereşti, 02.09.2020, 2 females, 2 males, host *My. nattereri*.

Distribution. One of the most widespread nycteribiid species in Europe, western Asia and North Africa (Szentiványi *et al.* 2016). Common in Romania, collected from all historical regions with 27 distinct geographical records altogether.

Remarks. One of the typical ectoparasites of the two largest *Myotis* in Europe (*My. blythii* and *My. myotis*), also frequently collected from other cave-dwelling species present in the same roosts as its primary hosts. Here, we report two new host-parasite relationships for this species, which to our knowledge had never been recorded from *My. capaccinii* and *My. nattereri* (Szentiványi *et al.* 2016).

Genus *Penicillidia* Kolenati, 1863

Penicillidia conspicua Speiser, 1901

Published records. Peştera Fuşteica, Peştera Liliecilor din Mănăstirea Bistriţa, Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1962); Peştera Liliecilor de la Gura Dobrogei, Peştera Cioclovina cu Apă, Peştera Lazului, Peştera Liliecilor-Caraşova (Negrea *et al.* 1967); Peştera Meziad (Willemsen & Thomassen 2009); Avenul Betfia, Canaraua Fetii, Peştera Tunel de la Hagieni, Peştera Gaura cu Muscă, Peştera Gaura Ungurului de la Pecinişca, Peştera Lazului, Peştera Liliecilor de la Gura Dobrogei, Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Mi. schreibersii*. Peştera Liliecilor de la Gura Dobrogei (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. blythii*. Peştera Gaura cu Muscă, Peştera Lazului (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. capaccinii*. Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1962), host *My. myotis*. Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1962); Peştera Liliecilor de la Mănăstirea Bistriţa, Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1963); Peştera Limanu (Dumitrescu *et al.* 1965); Peştera Limanu, Peştera Liliecilor de la Gura Dobrogei, Peştera Sineşii (Burghele-Bălăcescu 1966), host unknown. Location unknown, host *R. ferrumequinum* (Blackwell 1980). Peştera Topolniţa (Burghele-Bălăcescu 1966), host *R. hipposideros*. Canaraua Fetii (Haelewaters *et al.* 2017, Sándor *et al.* 2018, McKee *et al.* 2019), host *R. mehelyi*.

Material examined. Avenul Betfia, 07.05.2019, 3 females, 3 males; 07.09.2019, 10 females, 7 males; Bonţida, 20.10.2017, 1 female; Canaraua Fetii, 30.04.2017, 3 females, 2 males; 22.05.2017, 1 female; 02.08.2018, 5 females, 2 males; 27.04.2019, 1 female; 21.09.2019, 10 females, 13 males; 21.04.2020, 1 female; Peştera Tunel de la Hagieni, 27.05.2019, 11 females, 5 males; 20.09.2019, 15 females, 17 males; Mocrea, 08.05.2019, 5 females, 2 males; 08.09.2019, 14 females, 8 males; 16.10.2019, 21 females, 20 males; 18.09.2020, 14 females, 9 males; Peştera Gaura cu Muscă, 08.05.2017, 6 females, 1 male; Peştera Gaura Ungurului de la Pecinişca, 05.09.2017, 1 male; Peştera Măgurici, 02.05.2017, 1 female, 8 males; Peştera Liliecilor de la Gura Dobrogei, 19.04.2017, 8 females, 2 males; 24.04.2019, 5 females, 4 males; Peştera Lócsűr (Cheile Vârghişului), 23.08.2018, 2 females; Sasca Montană, 04.09.2017, 8 females, 3 males; Somova, 18.09.2019, 2 females, 1 male; Ţifra, 28.04.2020, 1 female, 2 males, host *Mi. schreibersii*. Peştera Liliecilor de la Gura Dobrogei, 24.04.2019, 1 male; Somova, 18.09.2019, 1 female, host *My. daubentonii.* Sasca Montană, 04.05.2017, 1 male, host *R. euryale*.

Distribution. A relatively common nycteribiid species with a southerly distribution, mainly in the Balkans, Apennines and Iberian Peninsula, with scattered records in Central Europe (Szentiványi *et al.* 2016) and common also in Africa. In Romania it has been recorded all over the country, with 25 distinct geographical records altogether.

Remarks. One of the typical ectoparasites of *Mi. schreibersii* in Europe and North Africa and other *Miniopterus* spp. in Africa, also collected from other cave-dwelling species present in the same roosts as its primary hosts. Here, we report two new host-parasite relationships for this species, which to our knowledge had never been recorded from *My. daubentonii* and *R. mehelyi* (Szentiványi *et al.* 2016).

***Penicillidia dufourii* (Westwood, 1835)**

Published records. Canaraua Fetii (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Eptesicus serotinus* (Schreber). Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1962); Peştera Bulba, Peştera Fuşteica, Peştera Liliecilor-Carașova, Peştera Liliecilor de la Gura Dobrogei, Peştera de la Românești (Burghele-Bălăcescu 1966); Peştera Gaura cu Muscă, Peştera Liliecilor, Peştera Românești (Negrea *et al.* 1967); Peştera Meziad (Willemsen & Thomassen 2009); Avenul Betfia, Canaraua Fetii, Peştera Gaura cu Muscă, Peştera Lazului (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *Mi. schreibersii*. Peştera Buhui, Peştera Topolnita (Burghele-Bălăcescu 1966); Cheile Cuților (P. Vaci) (Willemsen & Thomassen 2009); Peştera cu Apă din Valea Leşului (Postawa & Nagy 2016); Avenul Betfia, Canaraua Fetii, Leghia, Peştera Gaura cu Muscă (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. blythii*. Peştera Liliecilor-Carașova (Burghele-Bălăcescu 1966); Peştera Gaura cu Muscă, Peştera Lazului (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. capaccinii*. Peştera Liliecilor de la Gura Dobrogei, Peştera de la Izverna, Peştera Fuşteica, Peştera Liliecilor din Mănăstirea Bistrița (Decu-Burghele 1962); Peştera Bulba, Peştera Comarnic, Peştera Fuşteica, Peştera de la Izverna, Peştera de la Izvorul Tăușoarelor, Peştera Liliecilor-Carașova, Peştera Topolnița (Burghele-Bălăcescu 1966); Peştera Comarnic, Peştera Gaura cu Muscă, Peştera Liliecilor (Negrea *et al.* 1967); Tunelul de la Carieră, Peştera Urșilor (Gheorghiu 2006); Cheile Albioarei, Cheile Cuților, Șuncuiuș, Roșia (Willemsen & Thomassen 2009); Peştera cu Apă din Valea Leşului (Postawa & Nagy 2016); Avenul Betfia, Canaraua Fetii, Cepari, Leghia, Peştera Gaura cu Muscă, Peştera Lazului, Peştera Mare de la Merești, Prundu Bârgăului, Șanț (Haelewaters *et al.* 2017, Sándor *et al.* 2018; McKee *et al.* 2019), host *My. myotis*. Munții Bihor ("Bihar") (Dudich 1925), Peştera Meziad/Mézesdi barlang (Thalhammer 1899; Dudich 1925); Peştera Liliecilor de la Gura Dobrogei, Peştera Liliecilor de la Mănăstirea Bistrița, Peştera Vacilor din Șteiul Orzeștilor (Decu-Burghele 1963); Peştera Fuşteica, Peştera Liliecilor de la Gura Dobrogei, Peştera Sinesii (Burghele-Bălăcescu 1966); Canaraua Fetii (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), unknown host.

Material examined. Avenul Betfia, 07.05.2019, 2 females, 1 male; 07.09.2019, 1 male; Canaraua Fetii, 27.04.2019, 2 males; 21.04.2020, 1 female, 1 male; Gilău, 14.08.2017, 1 female, 1 male; Peştera Tunel de la Hagieni, 20.04.2017, 1 female, 1 male; Mocrea, 08.05.2019, 4 females, 2 males; Peştera de la Gura Cetății, Paroș, 13.09.2019, 1 male; Peştera Gaura cu Muscă, 08.05.2017, 2 females, 1 male; Peştera Liliecilor de la Gura Dobrogei, 19.04.2017, 2 females, 5 males; 24.04.2019, 3 females, 11 males; Peştera Măgurici, 02.05.2017, 9 females, 9 males; Peştera Ungurului de la Pecinișca, 05.09.2017, 1 female; Sasca Montană, 04.09.2017, 1 female; Țifra, 13.05.2019, 3 females, 1 male; 28.04.2020, 4 females, 6 males, host *Mi. schreibersii*. Avenul Betfia, 07.05.2019, 1 male; 07.09.2019, 1 female, 1 male; Canaraua Fetii, 22.04.2017, 4 females, 1 male; 01.08.2018, 21 females, 13 males; 27.04.2019, 2 females, 5 males; 20.09.2019, 1 female; 21.04.2020, 3 females, 3 males; Gilău, 14.08.2017, 2 females, 3 males; Leghia, 04.05.2018, 8 females, 4 males; Peştera Gaura cu Muscă, 08.05.2017, 1 female, 1 male; Peştera Liliecilor de la Gura Dobrogei, 19.04.2017, 1 female; 24.04.2019, 1 female, 2 males; Peştera Lócsűr (Cheile Vârghișului), 23.08.2018, 1 male; 02.09.2020, 3 females, 2 males; Peştera Măgurici, 02.05.2017, 4 females, 7 males; Peştera Mare de la Merești, 24.08.2019, 3 females, 2 males; 03.09.2020, 5 females, 8 males, host *My. blythii*. Canaraua Fetii, 02.08.2018, 1 female, 2 males; Peştera Ungurului de la Pecinișca, 05.09.2017, 1 female, 1 male, host *My. capaccinii*. Canaraua Fetii, 22.04.2017, 2 females; 31.07.2018., 2 females, 1 male; 27.04.2019, 2 males; 22.04.2020, 3 females, 1 male; Peştera Tunel de la Hagieni, 20.04.2017, 1 female, 1 male, host *My. daubentonii*. Gilău, 06.08.2019, 1 male, host *Myotis emarginatus* (Geoffroy). Avenul Betfia, 07.05.2019, 6 females, 2 males; 07.09.2019, 2 females; Canaraua Fetii, 22.04.2017, 4 females, 2 males; 01.08.2018, 5 females, 4 males; 27.04.2019, 4 females, 4 males; 22.04.2020, 2 females; Gilău, 14.05.2017, 4 females, 3 males; Leghia, 04.05.2018, 3 females, 1 male; Peştera cu Apă de la Leşu, 24.09.2020, 1 female; Peştera de la Gălășeni, 23.09.2020, 1 female; Peştera de la Întorsuri, 21.09.2020, 2 females, 3 males; Peştera Gaura cu Muscă, 08.05.2017, 2 females; Peştera Măgurici, 02.05.2017, 3 females, 1 male; Peştera Mare de la Merești, 24.08.2019, 11 female, 9 males; 02.09.2020, 9 females, 11 males; Peştera Osoi, 22.09.2020, 4 females, 3 males; Țifra, 28.04.2020, 3 females, 1 male, host *My. myotis*. Canaraua Fetii, 20.09.2019, 1 male, host *My. nattereri*. Canaraua Fetii, 01.08.2018, 1 male, host *Pi. nathusii*. Gilău, 04.05.2017, 1 female, Canaraua Fetii, 31.07.2018, 3 females, 4 males, host *R. ferrumequinum*.

Distribution. By far the most common nycteribiid species in Europe, western Asia and Africa (Szentiványi *et al.* 2016). Common in Romania, collected from all historical regions with 40 distinct geographical records altogether.

Remarks. One of the typical ectoparasites of the two largest *Myotis* in Europe (*My. blythii* and *My. myotis*), also frequently collected from other cave-dwelling species present in the same roosts as its primary hosts.

Genus *Phthiridium* Hermann, 1804

***Phthiridium biarticulatum* Hermann, 1804**

Published records. Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *E. serotinus*. Peştera Gaura cu Muscă (Negrea *et al.* 1967), host *Mi. schreibersii*. Peştera Gaura cu Muscă (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *My. capaccinii*. Peştera de la Cloşani, Peştera Fuşteica (Decu-Burghele 1962); Peştera Cloşani, Peştera Gaura cu Muscă, Peştera cu Războaie, Peştera Vacilor din Ştеiul Orzeştilor (Burghele-Bălăcescu 1966). Peştera din Valea Ceuca, Peştera Gaura cu Muscă (Negrea *et al.* 1967); Peştera Hoţilor, Peştera Gaura Ungurului de la Pecinişca (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *R. blasii*. Geoagiu (Roman Bath), Peştera Lazului, Peştera Gaura cu Muscă, Peştera Gaura Ungurului de la Pecinişca (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *R. euryale*. Băile Herculane/Herculesbad (Theodor 1967); Peştera de la Cloşani, Peştera din Cioaca Brebeneilor, Peştera de la Padina Matei, Peştera nr. 11 din Valea Lupşei-Motru Sec, Peştera de la Mănăstirea Tismana, Peştera din Valea Peşterii, Peştera Fuşteica (Decu-Burghele 1962); Peştera Liliecilor de la Gura Dobrogei (Rădulescu & Lustun 1964); Peştera Bulba, Peştera cu apă din Cheile Gârliştei, Peştera Cloşani, Peştera de la Pătrunsa, Peştera din Dealul Crucea, Peştera Gaura Pârşului de la Capu Baciului, Peştera Gramei, Peştera Lazului, Peştera Mare de la Balta, Peştera Topolniţa (Burghele-Bălăcescu 1966); Peştera Gaura Pârşului de la Capu Baciului (Negrea *et al.* 1967); Peştera Mare din Satul Peştera, Peştera Urşilor (Gheorghiu 2006); Geoagiu (Roman Bath), Peştera Lazului, Peştera Gaura cu Muscă, Peştera Gaura Ungurului de la Pecinişca, Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *R. ferrumequinum*. Peştera Fânaţe/Fonáca barlang (Dudich 1925), Moldova Nouă/Új Moldova (Theodor 1967); Peştera de la Cloşani, Peştera de la Mănăstirea Tismana, Peştera din Valea Ponorului-Orzeşti, Peştera Muieriilor, Peştera nr. 11 din Valea Lupşei-Motru Sec, Peştera Vacilor din Ştеiul Orzeştilor, Peştera Tunel Cloşani (Decu-Burghele 1962); Peştera Ieşkinia (Negrea *et al.* 1967); Peştera Ieşkinia, Peştera lui Duţu, Peştera Topolniţa (Burghele-Bălăcescu 1966); Peştera Doranca, Tunelul de la Carieră, Tunelul cu Lilieci (Gheorghiu 2006), host *R. hipposideros*. Peştera Liliecilor de la Gura Dobrogei (Decu-Burghele 1962); Peştera Limanu (Burghele-Bălăcescu 1966); Canaraua Fetii, Somova (Haelewaters *et al.* 2017; Sándor *et al.* 2018; McKee *et al.* 2019), host *R. mehelyi*. Peştera Vacilor din Ştеiul Orzeştilor (Decu-Burghele 1963); Peştera Limanu (Dumitrescu *et al.* 1965), no host recorded.

Material examined. Căpuşu Mic (Lonka), 26.08.2017, 2 females, 1 male; Muntele Puciosu, 21.08.2018, 1 male, host *My. alcathoe*. Canaraua Fetii, 02.08.2018, 1 male, host *My. blythii*. Peştera Osoi, 22.09.2020, 1 male; Peştera Gaura Ungurului de la Pecinişca, 05.09.2017, 10 females, 7 males, host *R. blasii*. Canaraua Fetii, 28.04.2019, 3 females, 1 male; Peştera Gaura cu Muscă, 08.05.2017, 10 females, 8 males; Peştera Osoi, 22.09.2020, 4 females, 4 males; Peştera Gaura Ungurului de la Pecinişca, 05.09.2017, 19 females, 17 males; Sasca Montană, 07.05.2017, 7 females, 8 males; 04.09.2017, 12 females, 10 males, host *R. euryale*. Canaraua Fetii, 31.08.2018, 6 females, 6 males; 28.04.2019, 3 females; 20.04.2020, 1 male; Gilău, 04.05.2017, 1 female, 1 male; 14.08.2017, 5 females, 3 males; 12.05.2019, 1 male; 06.08.2019, 16 females, 16 males; Mocrea, 18.09.2020, 1 male; Peştera de la Gălăşeni, 23.09.2020, 1 female; Peştera Osoi, 22.09.2020, 8 females, 4 males; Sasca Montană, 07.05.2017, 2 females, 1 male; Somova, 21.04.2019, 1 male; 18.09.2019, 4 females, 10 males, host *R. ferrumequinum*. Peştera Despicătură, 05.09.2017, 1 female; Peştera Mare de la Mereşti, 01.08.2019, 1 female; Peştera Kőlyuk, Ojdula, 01.09.2018, 1 female, host *R. hipposideros*. Canaraua Fetii, 22.04.2017, 2 females, 4 males; 02.08.2018, 1 male; Somova, 21.04.2019, 1 male; 19.09.2019, 1 female, 1 male, host *R. mehelyi*.

Distribution. This is the most widespread and common bat ectoparasite in Europe, North Africa and the Middle East (Szentiványi *et al.* 2016). It is the most common also in Romania, where it has been collected from all historical regions with 57 distinct geographical records altogether.

Remarks. The typical ectoparasite of bats belonging to the genus *Rhinolophus* Lacépède, with all horseshoe bat species as regular hosts. It is also frequently collected from other cave-dwelling host species as well as from forest-specialist bats during the swarming period. Here, we report two new host-parasite relationships for this species, which to our knowledge had never been recorded from *My. alcathoe* and *E. serotinus* (Szentiványi *et al.* 2016).

TABLE 2. Gazetteer with the names and geographical coordinates of the sampling localities listed in the text (coordinates in decimal degrees).

Collection site	Region	Coordinates (N, E)	
Aghireşu	Transylvania	46.888	23.286
Avenul nr. 2 din Sohodoale Mici-Motru Sec	Oltenia	45.067	22.751
Băile Herculane	Banat	44.864	22.405
Betfia	Transylvania	46.982	22.019
Bonțida	Transylvania	46.91	23.811
Canaraua Fetii	Dobrogea	44.085	27.639
Căpuşu Mic (Lonka)	Transylvania	46.791	23.235
Cepari	Transylvania	47.242	24.428
Cheile Albioarei	Transylvania	46.853	22.381
Cheile Corcoaia	Banat	45.133	22.693
Cheile Cuților (P. Vacii)	Transylvania	46.834	22.396
Doline	Banat	45.196	22.268
Dumbrava	Transylvania	46.826	23.22
Gilău	Transylvania	46.753	23.358
Ic Ponor	Transylvania	46.63	22.806
Leghia	Transylvania	46.854	23.209
Malcoci	Dobrogea	45.139	28.888
Mocrea	Transylvania	46.399	21.816
Moldova Nouă	Banat	44.735	21.665
Muntele Puciosu	Transylvania	46.123	25.951
Peştera Buhui	Banat	45.087	21.886
Peştera Bulba	Oltenia	44.994	22.783
Peştera Cioclovina cu Apă	Transylvania	45.586	23.133
Peştera Cloşani	Oltenia	45.071	22.8
Peştera Comarnic	Banat	45.18	21.946
Peştera cu apă din Cheile Gârliştei	Banat	45.165	21.853
Peştera cu Apă din Valea Leşului	Transylvania	46.825	22.558
Peştera cu Războaie	Oltenia	45.057	22.878
Peştera de la Apa Spânzurată	Oltenia	45.07	22.863
Peştera de la Gălăşeni	Transylvania	46.583	22.253
Peştera de la Gura Cetății, Paroş	Transylvania	45.475	22.967
Peştera de la Întorsuri	Transylvania	46.846	22.492
Peştera de la Izverna	Oltenia	44.981	22.62
Peştera de la Izvorul Tăuşoarelor	Transylvania	47.444	24.529
Peştera de la Mănăstirea Tismana	Oltenia	45.078	22.926
Peştera de la Padina Matei	Oltenia	44.728	21.715
Peştera de la Pătrunsa	Oltenia	44.871	23.501
Peştera de la Românești	Transylvania	45.798	22.35
Peştera Despicătura	Banat	44.895	22.428
Peştera din Cioaca Brebeneilor	Oltenia	45.102	22.792
Peştera din Dealul Crucea	Transylvania	47.909	23.881
Peştera din Valea Ceuca	Banat	44.702	21.731
Peştera din Valea Peşterii	Transylvania	46.837	22.7

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TABLE 2. (Continued)

Collection site	Region	Coordinates (N, E)	
Peştera din Valea Ponorului-Orzeşti	Oltenia	45.021	22.703
Peştera Doranca	Transylvania	45.495	25.229
Peştera Dracului de la Paroşeni	Transylvania	45.37	23.273
Peştera Fânaţe	Transylvania	46.497	22.572
Peştera Ferice	Transylvania	46.845	22.495
Peştera Fuşteica	Oltenia	45.038	22.904
Peştera Gaura cu Muscă	Banat	44.665	21.699
Peştera Gaura Haiducească	Banat	44.881	22.411
Peştera Gaura lui Cocolbea	Transylvania	45.509	23.13
Peştera Gaura Pârşului de la Capu Baciului	Transylvania	45.502	23.124
Peştera Gaura Ungurului de la Pecinişca	Banat	44.857	22.414
Peştera Gramei	Banat	44.837	22.573
Peştera Hoţilor	Banat	44.896	22.428
Peştera Ieşkinia	Banat	44.762	21.791
Peştera Kőlyuk, Ojdula	Transylvania	45.963	26.318
Peştera Lazului	Oltenia	45.071	22.764
Peştera Liliecilor	Oltenia	45.128	23.149
Peştera Liliecilor de la Gura Dobrogei	Dobrogea	44.468	28.483
Peştera Liliecilor de la Mănăstirea Bistriţa	Oltenia	45.189	24.039
Peştera Liliecilor-Caraşova	Banat	45.201	21.867
Peştera Limanu	Dobrogea	43.81	28.524
Peştera Lócsűr, Cheile Vârghişului	Transylvania	46.221	25.545
Peştera lui Duţu	Transylvania	45.984	22.279
Peştera Măgurici	Transylvania	47.36	23.552
Peştera Mare de la Balta	Banat	44.857	22.603
Peştera Mare de la Mereşti	Transylvania	46.219	25.545
Peştera Mare din Satul Peştera	Transylvania	45.508	25.283
Peştera Meziad	Transylvania	46.762	22.479
Peştera Muieriilor	Oltenia	45.192	23.754
Peştera nr. 11 din Valea Lupşei-Motru Sec	Banat	45.07	22.769
Pestera Oşoi	Transylvania	46.57	22.222
Peştera Sineşii	Banat	45.044	22.808
Peştera Şura Mare	Transylvania	45.529	23.147
Peştera Topolniţa	Banat	44.638	22.7
Peştera Tunel Cloşani	Banat	45.073	22.817
Peştera Tunel de la Hagieni	Dobrogea	43.807	28.469
Peştera Urşilor	Transylvania	46.554	22.57
Peştera Vacilor din Şteiul Orzeştilor	Banat	45.05	22.808
Prundu Bârgăului	Transylvania	47.214	24.725
Roşia	Transylvania	46.854	22.375
Şanţ	Transylvania	47.436	24.908
Sasca Montană	Banat	44.866	21.732
Sitorman	Dobrogea	44.423	28.516

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TABLE 2. (Continued)

Collection site	Region	Coordinates (N, E)	
Somova	Dobrogea	45.168	28.654
Şuncuiuş	Transylvania	46.94	22.546
Termele Romane, Geoagiu	Transylvania	45.935	23.162
Ţifra	Transylvania	46.272	23.698
Tunelul cu Lilieci	Transylvania	45.484	25.228
Tunelul de la Carieră	Transylvania	45.528	25.267
Valea Uzului	Transylvania	46.342	26.246

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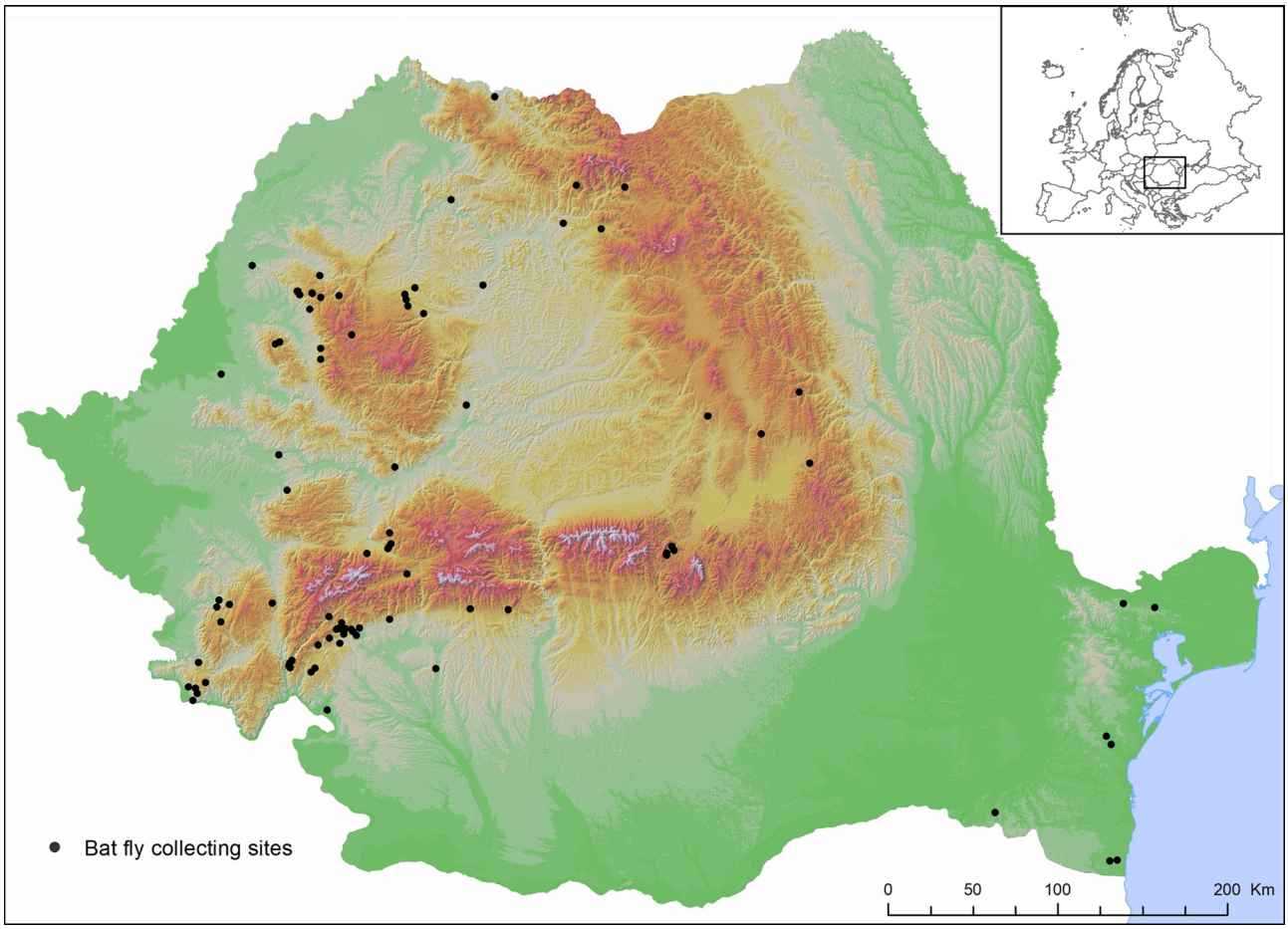

FIGURE 1. Map of Romania showing the bat fly (Diptera: Nycteribiidae) recording sites mentioned in the text.

Author contributions

ÁP and ADS initiated the study, participated in the sample collection and wrote the manuscript. ADM contributed to the study design and manuscript preparation. All authors read and approved the final version of the manuscript.

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