

# The bat flies of the Balearic Islands (Insecta: Diptera: Nycteribiidae)

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SOCIETAT D'HISTÒRIA  
NATURAL DE LES BALEARS

Kock, D. & Quetglas, J. 2003. The bat flies of the Balearic Islands (Insecta: Diptera: Nycteribiidae). *Boll. Soc. Hist. Nat. Balears*, 46: 79-83. ISSN 0212-260X. Palma de Mallorca.

Confirmed are 4 species of bat flies out of 6 known by published records for the Balearic Archipelago: *Nycteribia pedicularia* (Mallorca, 1st record for Menorca), *N. schmidlii* (Mallorca, Menorca), *N. vexata* (Mallorca), and *Penicillidia dufourii* (Mallorca, 1st record for Menorca). The two species not confirmed for the Balearic Islands (*Basilina mediterranea*, *Penicillidia conspicua*) are revised and included to complete a checklist of Nycteribiidae for this archipelago. Streblidae has never been found in this area.

**Keywords:** *Nycteribiidae*, *Chiroptera*, *Balearic Islands*, *host associations*, *distribution*.

MOSQUES PARÀSITES DE RATES-PINYADES DE LES ILLES BALEARS (INSECTA: DIPTERA: NYCTERIBIIDAE). S'aporten noves cites de 4 de les 6 espècies de mosques paràsites de rates-pinyades conegudes a les Illes Balears: *Nycteribia pedicularia* (Mallorca, primera cita per a Menorca), *N. schmidlii* (Mallorca, Menorca), *N. vexata* (Mallorca) i *Penicillidia dufourii* (Mallorca, primera cita per a Menorca). Es revisen dues espècies sense confirmació recent a les Illes Balears (*Basilina mediterranea* i *Penicillidia conspicua*) per completar la llista patró de la família Nycteribiidae a aquest arxipèlag. No s'ha detectat la presència de la família Streblidae.

**Paraules clau:** *Nycteribiidae*, *Chiroptera*, *Illes Balears*, *associació hoste-paràsit*, *distribució*.

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Recepció del manuscrit: 13-maig-03; revisió acceptada: 30-desembre-03.

## Introduction

The faunal composition, the distribution, and the host associations of the ectoparasitic bat

flies (Streblidae, Nycteribiidae) of the Iberian Peninsula are rather well documented (Balcells, 1968a; Estrada-Peña *et al.*, 1991). However, until present the islands of the Balearic

Archipelago are less intensively studied in respect of their bat fly fauna. The material presented here was collected recently (by JQ) on Mallorca and Menorca. This collection does not augment the number of known nycteribiids, but presents additional locality and new species records for Menorca Island.

## Material and methods

Bats of different species controlled during field work were examined for ectoparasites (JQ) and those two museum collections were checked (DK): ZFMK= Zoologisches Forschungsinstitut und Museum A. Koenig, Bonn, Germany; and SMF: Senckenberg Forschungsinstitut Museum, Senckenberg. Anlage, Germany, where new specimens here reported have been hosted. The data for the fly specimens here presented do not permit to reliably discuss parasite densities or population dynamics of the different species. Nomenclature and synonymies of the Palaearctic bat flies are compiled by Hurka & Soós (1986). The checklist includes published records of species not contained in the present series of bat flies.

## Results

Streblidae Kolenati, 1863

Nycteriboscinae Speiser, 1900

*Brachytarsina* (*B.*) *flavipennis* Macquart, 1851

A single European species of Streblidae family is known to be an ectoparasite preferably of bats of the family Rhinolophidae (Theodor 1954). Nine *Rhinolophus hipposideros* and 43 *R. ferrumequinum* in Menorca, and four *R. ferrumequinum* in Mallorca have been checked for Streblidae with negative results. Carles-Tolrà 2002 listed *B. flavipennis* in the Balearic fauna but the record is not supported by the references so we consider it a misprint.

Nycteribiidae Samouelle, 1819

Nycteribiinae Samouelle, 1819, sensu Maa 1965

*Nycteribia* (*Nycteribia*) *pedicularia* Latreille, 1805

Material: Mallorca: 4 males, 3 females, SMF pD.50.1999, Cova de Son San Martí, Alcudia, Mallorca, 18 III 1998, ex n2 *Myotis capaccinii* (Bonaparte 1837) (on one host associated with 5 *P. dufourii*); Menorca: 1 male, 1 female, SMF pD.42.1999, Cova Polida, Es Migjorn, Menorca, 4 IV 1996, ex *Myotis capaccinii* (associated with 1 *P. dufourii*). - 3 males, SMF pD.43.1999, Cova Polida, Es Migjorn, Menorca, 4 IV 1996, ex *Myotis capaccinii*. - 1 male, SMF pD.44.1999, Cova Polida, Es Migjorn, Menorca, 17 VII 1996, ex *Myotis capaccinii*. - 1 female, SMF pD.45.1999, La Vall, Ciutadella, Menorca, 24 VIII 1996, ex 1 *Myotis capaccinii* (associated with 1 *P. d. dufourii*). - 1 male, SMF pD.46.1999, Cova Polida, Es Migjorn, Menorca, ex *Myotis capaccinii*, 6 III 1998 (associated with 1 *P. dufourii*).

Hurka (1970) examined specimens from a cave at Aleudia [= Alcudia], Mallorca, taken in May 1921 mainly (n=10) from *Myotis capaccinii*, a few (n=4) from *Miniopterus schreibersii* (Kuhl 1817) and one from *Eptesicus serotinus* (Schreber 1774). Of this mixture of host species (examined by Bauer 1957), *E. serotinus* is a rather unlikely host and *M. schreibersii* an accidental one. Noblet (1995) found this species in the Parc Natural de s'Albufera Mallorca, parasitising *Myotis capaccinii*. The present material represents only the third record for Mallorca, but the first documentation for Menorca and substantiates that *M. capaccinii* is the preferential host.

*Nycteribia* (*Nycteribia*) *schmidlii schmidlii* Schiner, 1853

Material; Mallorca: 1 female, SMF pD.48.1999, Mallorca, III 1998, ex 1 *Miniopterus schreibersii*; Menorca: 1 male, 4 females, SMF pD.47.1999, Menorca, III 1998, ex 1 *Miniopterus schreibersii*.

*N. schmidlii* is a rather common parasite of its preferred host *Miniopterus schreibersii*, and widely distributed. For Mallorca this fly was recorded by Balcells (1959: Cueva de Can Sion, btw. Pollença and Campanet), and by Hurka (1970: cave near Alcudia; see Bauer 1957), and

for Menorca by Theodor (1967: San Cristobal). All flies were found on *Miniopterus schreibersii*. The occurrence of *N. schmidlii* on Menorca Ild. was accidentally omitted by Hurka & Soós (1986) and Estrada-Peña *et al.* (1991), but confirmed by the present series.

***Nycteribia (Acrocholidia) vexata*** Westwood, 1834

Material: Mallorca: 1 male, SMF pD.49.1999, Mallorca, III 1998, ex *Myotis myotis* (Borkhausen 1794) (associated with 11 *P. dufourii*).

This species is less common. The larger *Myotis* species are the preferred hosts. Only once before was *N. vexata* recorded from Mallorca by Balcells (1968b: Cueva de Sa Guitarreta near Llucmajor, ex *Myotis myotis* [wrongly quoted by Estrada-Peña *et al.* (1991) as from Balcells (1968a)]. The occurrence of *N. vexata* on the Balearic Islands has been largely omitted from several lists detailing the species distribution.

***Basilina (Basilina) mediterranea*** Hurka, 1970

Since its description this bat fly has not been confirmed for Mallorca. Estrada-Peña *et al.* (1991) considered *B. mediterranea* to be apparently a Mallorca endemic and state the parasite host to be unknown. The original description (Hurka, 1970: cave at Alcudia, Mallorca), however, clearly stated *Eptesicus serotinus*, collected in May 1921 by A. von Jordans (see Bauer 1957), to be the host species. Beaucournu & Noblet (1985) doubted that *E. serotinus* represents the preferred host species, and indeed, the bat collection of von Jordans comprised also five *Pipistrellus pipistrellus mediterraneus* Cabrera 1904, which could have been the true hosts, instead of the single *E. serotinus*. We re-examined those alcohol-preserved, most probable original host species of *B. mediterranea* from Alcudia, *Pipistrellus pipistrellus* (*sensu lato*) (ZFMK 77.1030-32, 3 males, Forearm 28.2-30 mm), and *Eptesicus serotinus boscai* (ZFMK 77.1013, male). Two *P. pipistrellus* (*s.l.*) from Arta, Mallorca, collected 22.IV.1913, (ZFMK 77.1022-23, males), were also examined. None of them carried any nycteribid flies.

Presently, *B. mediterranea* is known to occur in peninsular Spain (Gil Collado *et al.*, 1983, Beaucournu & Noblet, 1985), Libya (Hurka, 1982), Algeria (Kock, 1984: distr. Map; unpublished hosts here detailed as *P. kuhlii* and *Miniopterus schreibersii*), Corsica (Beaucournu & Noblet, 1985, 1994), and continental France (Beaucournu & Noblet, 1994, 1996). In most cases recorded *Pipistrellus pipistrellus* (*sensu lato*) is the host species, while *P. nathusii*, *P. kuhlii*, *Hypsugo savii* and *M. schreibersii* were less often parasitized. The references quoted here make it evident that *B. mediterranea* is an West Mediterranean species with *P. pipistrellus* (*sensu lato*) as its preferred host.

No *Eptesicus serotinus* was captured for this work, but 31 *Pipistrellus kuhlii* and 20 *P. pipistrellus* (*sensu lato*), none of them carrying a bat fly.

***Penicillidia dufourii dufourii*** (Westwood, 1934)

Material: Mallorca: 6 male, 5 females, SMF pD.52.1999, "Mallorca", III 1998, ex *Myotis myotis* (associated with 1 *N. vexata*). - 3 males, 3 females, SMF pD.51.1999, Cova de Son San Martí, Alcudia, Mallorca, 18 III 1998, ex 2 *Myotis capaccinii* (on one host together with 5 *N. pedicularia*).

Menorca: 1 male, 1 female gravid, SMF pD.38.1999, Cova Polida, Es Migjorn, 4 IV 1996, ex 1 *Miniopterus schreibersii*. - 1 female, SMF pD.39.1999, Cova Polida, Es Migjorn, 4 IV 1996, ex 1 *Myotis capaccinii* (associated with 2 *N. pedicularia*). - 1 male, SMF pD.40.1999, La Vall, 24 VIII 1996, ex 1 *Myotis capaccinii* (associated with 1 *N. pedicularia*). - 1 male, SMF pD.41.1999, Cova Polida, Es Migjorn, 6 III 1998, ex *Myotis capaccinii* (associated with 1 *N. pedicularia*).

First recorded for Mallorca by Balcells (1968b) (Cueva de Sa Guitarreta, Llucmajor [Lluchmajor], ex *M. myotis*) and confirmed by Hurka (1970) (cave near Alcudia, ex *Eptesicus serotinus*, *Miniopterus schreibersii*, *Myotis capaccinii* and *M. blythii*; see Bauer 1957). The latter host species is here corrected to *Myotis myotis*, which is the one of these sibling species known from Mallorca (Castella *et al.*, 2000). The

unusual range of host species most likely resulted from lumping bat flies of several hosts in one sampling tube. The rather unusual find on *Eptesicus serotinus* reported by Hurka (1970) could be due to straggling in the roosting site used by several bat species. Finally, Noblet (1995) records *P. dufourii* for the Parc Natural de s'Albufera. Mallorca, where it was found on *Myotis capaccinii* and *M. myotis*. Menorca is an additional occurrence of *P. dufourii* in the Balearic Archipelago.

#### *Penicillidia conspicua* Speiser, 1901

Until present only once recorded for Mallorca by Hurka (1970) (cave near Alcudia, ex *Miniopterus schreibersii*; see Bauer 1957). Though not confirmed by the present material, the record is in no way unusual.

### Discussion

As far as data are available, it appears that the smaller Mediterranean islands have a less diverse fauna of bat flies (see Kock, 1974; 1989, for Aegean islands and Lampedusa) than the large ones (Corsica, Sardinia and Sicily). It can be assumed that this is a direct dependence from the fauna of host bat species, which could survive or immigrate into the reduced variety of habitats usually available on smaller islands, lacking the climax vegetation of the Mediterranean region. The islands of Mallorca (6 species: *Nycteribia pedicularia*, *N. schmidlii*, *Basilisa mediterranea*, *Penicillidia dufourii*, *P. conspicua* by Hurka, 1970; *N. vexata* by Estrada-Peña *et al.*, 1991) and Menorca (3 species: *N. pedicularia*, *N. schmidlii*, *P. dufourii*) are comparable to the much larger island of Crete (3 species: *N. schmidlii*, *N. pedicularia*, *Phthiridium biarticulatum*; Kock 1974; Hurka & Soós 1986); Sicily (5 species: *N. schmidlii*, *N. latreillii*, *N. vexata*, *P. biarticulatum*, *Penicillidia conspicua*; Hurka 1964), Sardinia (8 species: *Brachytarsina flavipennis*, *N. latreillii*, *N. pedicularia*, *N. schmidlii*, *N. vexata*, *P. biarticulatum*, *P. dufourii*, *P. conspicua*; Hurka & Soós, 1986), and Corsica (6 species: *N. pedicularia*, *N. schmidlii*, *P. biarticulatum*, *P. dufourii*, *P. conspicua*, fide Hurka &

Soós 1986; *B. mediterranea*, Beaucournu & Noblet 1985). However, considering the bat fauna known for the Balearic Archipelago (Quetglas, 1997), it is evident, that several additional bat fly species may be discovered living on host species less often available for sampling of their ectoparasites. All *Rhinolophus* sp. as well as *Vespertilionidae* roosting in hollow trees, crevices of rocks or in walls of houses are known to be parasitised by flies often specific to the host species in other parts of their range.

### Acknowledgements

The collection of the ectoparasites by one of the authors (JQ) has been possible thanks to a grant by the *Institut Menorquí d'Estudis, Maó*. Thanks also must be given to the many people from Menorca and Mallorca who in a one way or another helped in the field work. We thank Dr. R. Hutterer to the permission to examine several bats for nycteribiid flies.

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