

## CONTRIBUTION TO THE KNOWLEDGE OF THE FAMILY NYCTERIBIIDAE (DIPTERA, PUPIPARA) OF PIATRA CRAIULUI NATIONAL PARK

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### Abstract

These data about the Nycteribiidae (ectoparasite Diptera on bats) in Piatra Craiului National Park represents the first recording of their presence in the Romanian Carpathians, east of the Olt Valley. The Northern limit of the *Nycteribia pedicularia* areal is represented by Piatra Craiului National Park. *Nycteribia latreilli*, *N. pedicularia*, *N. schmidlii*, *N. vexata*, *Penicillidia dufourii*, *Stylidia biarticulata* were identified as parasites on *Rhinolophus ferrumequinum*, *Rh. hipposideros*, *Rh. blasii*, *Myotis myotis* and *M. blythii*. The proportion between the investigated bats and those with these ectoparasites is 57%.

**Keywords:** Nycteribiidae, ectoparasite, Diptera, bats, Piatra Craiului National Park.

### Introduction

In the framework of a study on the faunistic biodiversity from karstic habitats with priority protection in the network of protected areas "Natura 2000", we investigated the bat species and colonies from the caves found inside the National Park.

Capturing bats in order to identify them offered us the chance to collect the ectoparasites of each individual. Among them, the Nycteribiidae are hematophagous Diptera, exclusively parasites of bats, with specific adaptations, among which the spider-like body shape and the lack of wings is characteristic. (Figure 1). Depending on the habitat preferences of their host, they may be considered as cavernicoles, for the most part of their lives being phoretic, leaving the cave only with the help of the bat host.

In Romania, the first two species (*Nycteribia vexata*, *Penicillidia dufourii*) were recorded in 1863 by Schmidl (Wolf, 1938). 100 years after this first recording, the sole studies on the presence and distribution of these Diptera was made by Anca Burghele in 1962 and 1966 by investigating the collections of the "Emile Racovitza" Speleological Institute and her own observations. The results emphasized 10 species of Nycteribiidae, belonging to 4 genera found in some caves from the Apuseni Mountains, Banat, Oltenia, Hațeg and Dobrogea.

### Materials and methods

The investigated material was collected by us between the 14<sup>th</sup> and the 18<sup>th</sup> of October 2003 in 4 caves and artificial galleries inside the Piatra Craiului National Park and includes 38 individuals belonging to 5 species of Nycteribiidae from 3 genera. The 2 individuals of *Nycteribia vexata* from *Myotis blythii* were collected by Cristina Capac. The collection was made on each host (24 individuals) found in the prehibernation period and with this occasion we also collected other ectoparasites (acarids and ixodids), which will be the subject of a different paper. The bats were captured in order to identify the species by means of direct observations and measurements on the skull, forearm and weight. All bats were released after these observations and removal of the ectoparasites.

### Results and discussions

Geographically, the collecting sites are found in the Northern part of the Piatra Craiului National Park, the karstic zone "Valea Prăpăștiilor" and the Southern part "Cheile Dâmboviței".

#### Valea Prăpăștiilor

Doranca Cave: length 15 m, at an absolute altitude of 867 m and relative of 59 m. situated in

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the forested zone from the right slope, above the former limestone quarry, on the right side. The cave was discovered in September 2002 by the speologists Anca Munteanu and Dorel Cojocaru.

*Stylidia biarticulata* (Hermann, 1864), 15.X.2003, 1♂, from *Rhinolophus hipposideros*.

Tunelul de la Carieră (artificial gallery): length approx. 250 m, situated in the wall of the former limestone quarry. The entrance, with a 2.5m diameter, is visible from the road at an absolute altitude of 856 m and relative of 50 m. on the right side of the quarry.

*Nycteribia schmidlii* Schiner, 1853, 15.X.2003, 1♂, from *Myotis myotis*.

*Nycteribia vexata* Westwood, 1835, 15.X.2003, 2♂♂ 4♀♀, from *Myotis myotis*, *M. blythii*.

*Penicillidia dufourii* (Westwood, 1835), 15.X.2003, 1♀, from *Myotis myotis*.

*Stylidia biarticulata* (Hermann, 1864), 15.X.2003, 2♂♂ 3♀♀, from *Rhinolophus ferumequinum*, *Rh. Hipposideros*.

#### Valea Dâmboviței

Urșilor Cave (Peștera de la Colțul Surpat): 367 m in length, situated on the right side of the valley on Mt. Arșiței, at an absolute altitude of 770 m and relative of 23 m.

*Nycteribia latreillii* (Leach, 1817), 16.X.2003, 1♀, from *Myotis myotis*.

*Nycteribia schmidlii* Schiner, 1853, 16.X.2003, 1♂, from *Myotis myotis*.

*Penicillidia dufourii* (Westwood, 1835), 16.X.2003, 1♂ 1♀, from *Myotis myotis*, *M. blythii*.

*Stylidia biarticulata* (Hermann, 1864), 16.X.2003, 3♂♂ 2♀♀, from *Rhinolophus ferumequinum*, *M. myotis*.

Tunelul cu Cabluri (artificial gallery): 15 m in length, at an absolute altitude of 749 m and relative of 4 m. situated on the right side of the valley, the entrance is visible from the road, 150 m downstream of Peștera Urșilor.

*Stylidia biarticulata* (Hermann, 1864), 17.X.2003, 1♂, from *Rhinolophus hipposideros*.

Tunelul cu Lilieci (artificial gallery): length approx. 39 m, at an absolute altitude of

759 m and relative of 4 m. situated on the left slope, vis a vis from the Tunelul cu Cabluri, the entrance being visible from the road.

*Stylidia biarticulata* (Hermann, 1864), 17.X.2003, 1♂ 1♀, from *Rhinolophus hipposideros*

#### Valea Dâmbovicioarei

Peștera de la Despicătură: 12 m in length, at an absolute altitude of 800 m, situated on the right slope, the entrance being visible from the road.

*Stylidia biarticulata* (Hermann, 1864), 18.X.2003, 1♀, from *Rhinolophus ferumequinum*.

#### Hornurile Grindului

Avenul de sub Coltii Grindului: denivelation – 540 m, situated at 200 m under the main ridge near the Hornul Mic (South) at an absolute altitude of 2020 m. It is the deepest aven from Romania. In the hibernation period the bats are spread over the entire vertical.

*Nycteribia vexata* Westwood, 1835, 19.V.2002, legit Cristina Capac, 1♂ 1♀, from *Myotis blythii*, collected at –90 m.

#### Bazinul văi Sbârcioarei

Peștera Mare din Satul Peștera (Peștera cu Lilieci): 162 m in length, situated at the edge of the Peștera village, Moeciu, on the right slope of Văii cu Calea, absolute altitude of 950 m.

*Nycteribia pedicularia* Latreille, 1805, 14.X.2003, 1♀, from *Myotis myotis*.

*Nycteribia schmidlii* Schiner, 1853, 14.X.2003, 1♀, from *Myotis myotis*

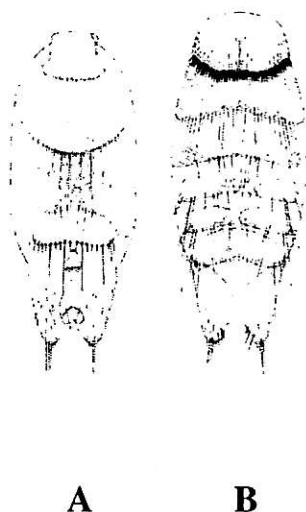
*Nycteribia vexata* Westwood, 1835, 14.X.2003, 2♂♂ 1♀, from *Myotis myotis*, *Myotis blythii*.

*Stylidia biarticulata* (Hermann, 1864), 14.X.2003, 2♂♂ 5♀♀, from *Rhinolophus ferumequinum*, *Rh. hipposideros*, *Rh. blasii*.

*Nycteribia latreillii* (Leach, 1817) (Fig.1) In Romania found on host species like *Myotis myotis* and *Rhinolophus mehelyi*. Other hosts recorded in the literature are: *Miniopterus schreibersi* and other species from the genera *Rhinolophus*, *Myotis*, *Plecotus*, *Eptesicus*. Associated parasites: *Nycteribia schmidlii*, *N. vexata*, *Penicillidia dufourii*.

Distribution: Continental Europe; N. Africa; S. W. Asia to Afganistan of Kirghizia.

**Figure 1.** *Nycteribia latreillii* (Leach) ♀. Abdomen A. dorsal and B. ventral view (According Theodor, 1967)

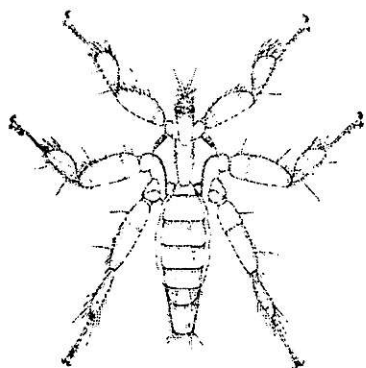


*Nycteribia pedicularia* Latreille, 1805 (Fig. 2)

Frequently found in Romania on *Myotis capaccinii*, but also on *Miniopterus schreibersii* and *Rhinolophus blasii*. Other hosts recorded in the literature are: *Pipistrellus* and *Plecotus*, and other species from the genera *Myotis* și *Rhinolophus*. Associated parasites: *Nycteribia latreillii*, *N. schmidlii*, *N. vexata*, *Penicillidia dufourii*.

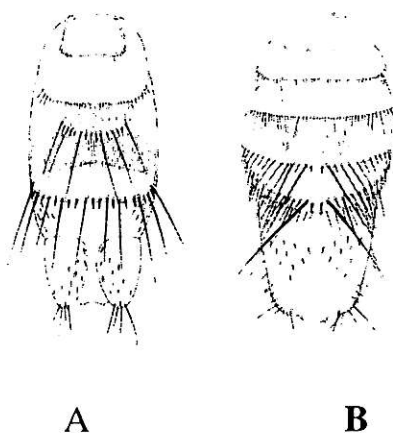
Distribution: Continental Europe; N. Africa; S. W. Asia. The Northern limit of the *Nycteribia pedicularia* areal is extended up to the Piatra Craiului Massif.

**Figure 2.** *Nycteribia pedicularia* Latreille, ♂ (According Soós, 1955)



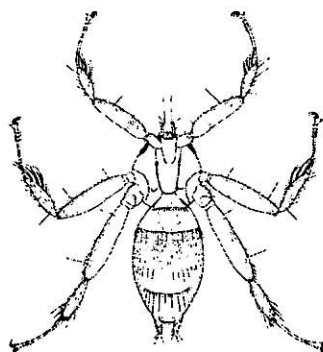
*Nycteribia schmidlii* Schiner, 1853 (Fig. 3)  
Specific parasite of *Miniopterus schreibersii*, rarely *Myotis myotis*, *M. blythii*, *Rhinolophus mehelyi* and *Plecotus*. Associated parasites: *Nycteribia latreillii*, *N. schmidlii*, *N. vexata*, *Penicillidia dufourii*. Distribution: Continental Europe; N. Africa; S. W. Asia.

**Figure 3.** *Nycteribia schmidlii* Schiner. Abdomen dorsal view: A ♂, B ♀ (According Theodor, 1967)



*Nycteribia vexata* Westwood, 1835 (Fig. 4).  
In Romania found on host species like *Myotis myotis*, rarely *M. blythii*, *M. capaccinii* and *Miniopterus schreibersii*. Other hosts recorded in the literature are: *Rhinolophus* and *Plecotus*. Associated parasites: *Nycteribia latreillii*, *N. pedicularia*, *N. vexata*, *Penicillidia conspicua*, *P. dufourii*. Distribution: Continental Europe; N. Africa; S. W. Asia.

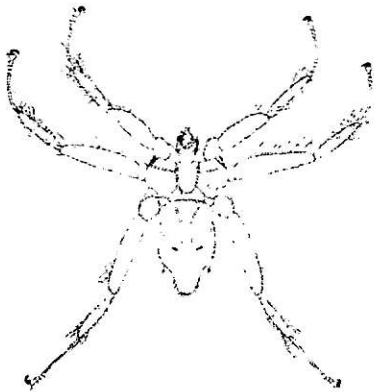
**Figure 4.** *Nycteribia vexata* Westwood ♀ (According Soós, 1955)



*Penicillidia dufourii* (Westwood, 1835) (Fig. 5)  
In Romania, the preferred hosts are *Myotis myotis* and *Miniopterus schreibersi*, but it is

recorded also on species from the genera *Rhinolophus* and *Pipistrellus*. Associated parasites: *Nycteribia latreilli*, *N. pedicularia*, *N. vexata*, *Penicillidia conspicua*, *Stylidia biarticulata*. Distribution: Continental Europe; N. Africa; S. W. Asia to W. the Himalayas.

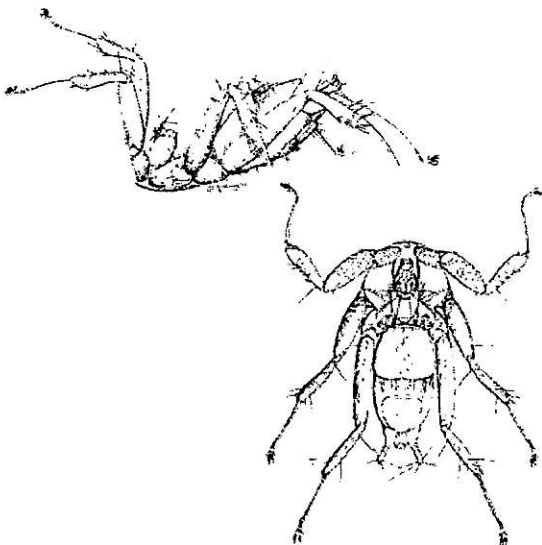
Figure 5. *Penicillidia dufouri* Westw. Female (According Soós,1955)



*Stylidia biarticulata* (Hermann, 1864) (Fig. 6)

It prefers the species of *Rhinolophus* and especially *Rhinolophus ferrumequinum*, rarely species of the genus *Myotis* or on *Miniopterus schreibersi*. Associated parasites: *Nycteribia latreilli*, *N. schmidlii*, *Penicillidia conspicua*, *P. dufourii*. Distribution: Europe, including the British Isles; N. Africa, S. W. Asia to Afganistan of Kirghizia.

Figure 6. *Stylidia biarticulata* (Hermann) ♀. side (According Theodor,1967) and dorsal view. (According Decu et al.,2003)



## Conclusions

Identifying the Nycteribiidae from the Chiroptera of Piatra Craiului National Park represents their first recording in the caves of the Romanian Carpathians, east of the Olt Valley. Also, the Northern limit of the *Nycteribia pedicularia* areal is extended up to the Piatra Craiului Massif. We collected 38 individuals belonging to 5 species from the genera *Nycteribia*, *Penicillidia* of *Stylidia*, from 24 bat individuals from the species *Rhinolophus ferrumequinum*, *Rh. hipposideros*, *Rh. blasii*, *Myotis myotis* and *M. blythii* among a number of 67 bats captured for observations. The proportion between the investigated bats and those found infested by the Nycteribiidae is nearly 75% for the parasited bats. Numerically, the *Myotis* species had a higher degree of infestation than the *Rhinolophidae* species. However, in order to have a more precise percentage of infestation of the bats with these hematophagous diptera and in order to extend the observations on other bat species, it will be necessary to extend our study by observations made in the periods June – October/ November and the end of March – the beginning of April when our observation will not disturb the birth and hibernating colonies. Also, for the diversification of the observations it is necessary to collect the puparia of the Nycteribiidae from the cave walls. This will allow to identify bat species found only occasionally in the cave.

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**CONTRIBUȚII LA CUNOAȘTEREA FAMILIEI NYCTERIBIIDAE (DIPTERA, PUIPIPARA) DIN PARCUL NAȚIONAL PIATRA CRAIULUI**

**Rezumat**

În cadrul unor studii asupra chiropterelor din Parcul Național Piatra Craiului au fost colectate de pe *Rhinolophus ferrumequinum*, *Rh. hipposideros*, *Rh. blasii*, *Myotis myotis* și *M. blythii* un număr de 38 indivizi de nycteribiide din speciile *Nycteribiia latreilli*, *N. pedicularia*, *N. schmidlii*, *N. vexata*, *Penicillidia dufourii*, *Stylidia biarticulata*. Procentul de parazitare cu aceste diptere hematofage, a celor 67 de lilieci capturați pentru observații a fost de 57%. Prin identificarea nycteribiidelor în peșterile din Masivul Piatra Craiului, prezența acestora este extinsă în Carpați și la est de Valea Oltului, iar specia *Nycteribiia pedicularia* are ca limită nordică a arealului Parcul Național Piatra Craiului.

**Cuvinte cheie:** Nycteribiidae, ectoparaziți, Diptera, lilieci, Parcul Național Piatra Craiului.