

Nycteribiidae

Tamara Szentiványi (1998 Checklist: Villy Aellen)

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Diagnosis: Small or medium (1.5-5.0 mm), spider like ectoparasites of bats. Body colour is generally yellowish to light brown. Bat flies show highly modified morphology as species are wingless, have reduced or missing eyes and ocelli are absent. Halteres are present. In some species (e.g. *Basilia* spp.), eyes are on pigmented base. Body is dorsoventrally flattened and head is folded back to the thorax at rest. Thoracic and abdominal ctenidia are present in most species. Strong sexual dimorphism is present between sexes. Egg fertilisation and larval development entirely occur inside the female therefore distinguishing species based on these life-stages is not possible. Puparium is dark brown, oval-shaped with smooth surface and formed from the third larval skin. Pupae, which are glued to the host roost wall, usually can be found in the near vicinity of bat hosts.

Biology: Obligate hematophagous ectoparasites of bats. Bat flies have a unique reproduction strategy, so-called obligate pseudo-placental unilarviparity (previously «Pupipara»). Eggs are fertilised internally and one single larva develops within female feeding on the so-called «milk-glands». Females deposit the third instar larva on the surface of the host roost (e.g. cave wall), which immediately pupates. Generally, only females leave their hosts during larviposition. After emergence, imagoes search for bat hosts immediately. Most bat flies show high host specificity towards one or two closely related bat species. They are known and suspected vectors of bat-associated pathogens, such as *Polychromophilus* spp. (Haemospororida: Plasmodiidae) and *Bartonella* spp. (Rhizobiales: Bartonellaceae), respectively. Bat flies occasionally host highly specific entomopathogenic fungi, belonging to the order Laboulbeniales (Fungi: Ascomycota).

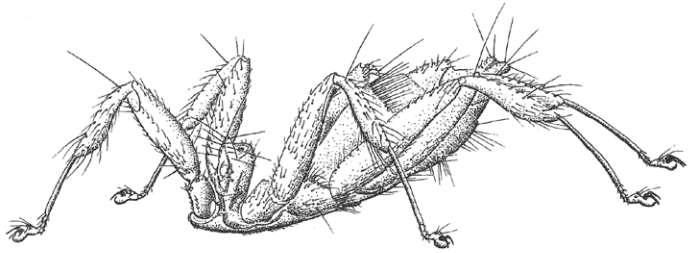
Nomenclature and classification: Bat flies are currently divided into two families, family Nycteribiidae and Streblidae. Both bat fly families belong to the superfamily Hippoboscoidea, along with family Hippoboscidae (louse flies, ked flies) and family Glossinidae (tsetse flies).

Number of species: CH: 11 (1998 Checklist: 11),

AL: 11 AT: 7, BA: 7 BE: 3, BG: 9, CY: 5, CZ: 8, DE: 8, DK: 2, EE: 1, ES: 10, FI: 2, FR: 12, GB: 3, GR: 8, HR: 8, HU: 12 IE: 2, IT: 10, LV: 2, MK: 7, ME: 6; NL: 4, NO: 2, PL: 7, PT: 7, RO: 11, RS: 7 SI: 4, SE: 3, SK: 10, UA: 6 Europe: 16, World: ~280.

Level of faunistic knowledge in Switzerland: Good. Two species are potentially present in the Swiss fauna, based on their current known distribution and host spectrum: *Basilia mongolensis nudior* Hurka, 1972 and *Penicillidia monoceros* Speiser, 1900.

General references: Beaucournu (1962) [french fauna], Theodor (1967) [catalogue and keys to species], Marshall (1982) [ecology], Gardner & Molyneux (1988) [vectorial role in bat malaria], Beaucournu & Noblet (1996) [french fauna], Hurka (1998) [key to genera], Dick & Patterson (2006) [biology and ecology], Lourenço & Palmeirim (2008) [reproduction], Dick & Dittmar (2013) [host specificity, vectorial potential], Pape et al. (2015) [Fauna Europea],



Phthiridium biarticulatum,
female (CMPD3, p. 829).

Witsenburg et al. (2015) [vector ecology], Dittmar et al. (2015) [evolution], Szentiványi et al. (2016, 2018, 2019, 2020), Haelewaters et al. (2017, 2018) [microparasite and Laboulbeniales infection], Burazerović et al. (2018) [balkan fauna] Sándor et al. (2018) [vector ecology].

References to the Swiss fauna: Aellen (1955, 1963, 1998), Szentiványi et al. (2016).

Checklist

Basilia Miranda Ribeiro, 1903

- *italica* Theodor, 1954 !
- *nana* Theodor & Moscona, 1954 !
- *nattereri* (Kolenati, 1857) !

Nycteribia Latreille, 1796

(*Acrocholidia* Kolenati, 1857)

- *vexata* Westwood, 1835 !

(*Nycteribia* s.str.)

- *kolenatii* Theodor & Moscona, 1954 !
- *latreillii* (Leach, 1817) !
- *pedicularia* Latreille, 1805 !
- *schmidlii* Schiner, 1853 !

Penicillidia Kolenati, 1863

- *conspicua* Speiser, 1901 !
- *dufourii* (Westwood, 1835) !

Phthiridium Hermann, 1804

- *biarticulatum* Hermann, 1804 !

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