

Arthropod ectoparasites (Acarina, Heteroptera, Diptera, Siphonaptera) of bats in Slovakia

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Abstract. Records of bat ectoparasites of the groups Acarina (families Argasidae, Ixodidae, Spinturnicidae), Heteroptera (Cimicidae), Diptera (Nycteribiidae), and Siphonaptera (Ischnopsyllidae) from Slovakia are presented. From the family Argasidae we recorded *Carios vespertilionis* (in *Pipistrellus* cf. *pygmaeus*), from the family Ixodidae *Ixodes simplex* (in *Miniopterus schreibersii* and *Myotis alcaethoe*) and *I. vespertilionis* (in *Rhinolophus euryale*, *R. ferrumequinum*, *R. hipposideros* and *M. schreibersii*). Altogether we found 14 species of the family Spinturnicidae with two subspecies belonging to three genera: *Paraperiglischrus*, *Eyndhovenia* and *Spinturnix*. Six new records for the fauna of Slovakia were made, viz. *Spinturnix andegavina* from *M. daubentonii*, *S. bechsteini* from *M. bechsteini*, *S. emarginata* from *M. emarginatus*, *S. punctata* from *B. barbastellus*, *S. plecotina* from *P. auritus*, *P. austriacus* and *S. dasycneme* from *M. dasycneme*. From the family Cimicidae and Nycteribiidae we recorded one and nine species, respectively, among which *Basilisa nattereri* is a new record for Slovakia. We also found seven species of fleas.

Bat hosts, central Europe, fauna

Introduction

Within the group of bat acaridia of Central Europe, Dusbábek (1972) classified the ticks *Carios vespertilionis*, *Ixodes simplex* and *I. vespertilionis* as obligatory haematophagous temporal or periodical ectoparasites. The first data on occurrence of *C. vespertilionis* in Slovakia (Domica cave, Silická planina plateau) together with the host data were published by Rosický & Havlík (1952). Dusbábek (1963) published a list of seven bat species as its hosts. A finding of this argasid on *Myotis blythii* from Harmanec was published by Dusbábek & Rosický (1976). Since that, no new records of *C. vespertilionis* from Slovakia have been published. The tick *I. simplex* was recorded on two bat species in Slovakia (Dusbábek 1963, Černý 1972, Ševčík et al. 2010). Dusbábek (1963) published occurrence of *I. vespertilionis* on seven bat species. Ševčík et al. (2010) completed the faunistic data on ticks in Slovakia by adding three more species of bats, out of the hosts mentioned above. Findings of larvae of this mite on *Myotis myotis* (Borkhausen, 1797) were published by Uhrin et al. (2010) and on *Myotis alcaethoe* von Helversen et Heller, 2001 by Danko et al. (2010).

The Spinturnicid mites are specialized parasites occurring on the flight membranes of bats. In Slovakia, the first more complex data on spinturnicids were published by Dusbábek (1962), who mentioned findings of five species. Later on, further species were found in Slovakia, viz. *Spinturnix myoti* (Uchikawa et al. 1994), *S. helvetiae* from *Nyctalus leisleri* (Kaňuch et al. 2005), *S. acuminata* from *Nyctalus lasiopterus* (Uhrin et al. 2006) and *S. mystacina* from *Myotis alcaethoe* (Danko et al. 2010). Uhrin et al. (2010) studied occurrence of *Spinturnix myoti* on *Myotis myotis*. The first aim of this contribution is to assess species composition and host preference of argasids, ticks and spinturnicids on bats in Slovakia.

The family Cimicidae includes obligatorily somatic ectoparasitic forms of bugs which parasitize on warm-blooded vertebrates. Considering bats in Slovakia, the findings of bugs *Cimex lectularius* Linnaeus, 1758 (Usinger 1966) and *Cimex pipistrelli* (Krištofik & Kaňuch 2006) were published.

Flies of the family Nycteribiidae are facultative parasites of bats. The first complex studies of the occurrence and host preference of seven species of bat flies (*Nycteribia latreillii*, *N. schmidlii*, *Acrocholidia vexata*, *Phthiridium biarticulatum*, *Basilina nana*, *Penicillidia conspicua* and *P. duforii duforii*) in Slovakia were published by Grulich & Povolný (1955, 1956). Distribution, bionomy and ecology of the European bat flies was published by Hürka (1964), who completed the knowledge of the nycteribiid fauna of Slovakia by records of two further species (*Nycteribiia kolenatii*, *Basilina italica*). Findings of bat flies from Slovakia are also included in the papers by Obenberger (1964), Krištofik (1982), Hürka (1984), Kaňuch et al. (2005), Danko et al. (2010) and Uhrin et al. (2010).

Fleas of the family Ischnopsyllidae are obligatory parasites of bats but they can occasionally occur also on other hosts. The first data on fleas (*Rhinolophopsylla unipunctinata unipunctinata*) on bats in Slovakia were published by Rosický (1948, 1950, 1951), while Rosický (1952) mentioned the finding of *Ischnopsyllus elongatus*. Rosický (1957) also published taxonomical, bionomical and faunistic data on fleas in bats, among which he also gave the first findings of *Nycteridopsylla dictena*, and *N. pentactena* from Slovakia. The knowledge of composition of flea fauna on bats in Slovakia and of their host preferences was widened by the extensive studies by Hürka (1957, 1963a, b), focused on morphology, bionomy and systematics of fleas of the Ischnopsyllidae family. In these three papers he published the first findings of *Ischnopsyllus intermedius*, *I. octactenus*, *I. obscurus* Hürka (1957), *I. simplex*, *I. mysticus*, *I. variabilis* (Hürka 1963a), *I. hexactenus* and *Nycteridopsylla eusarca* (Hürka 1963b). Faunistic data on some flea species on bats in Slovakia were published by Jurík (1955, 1966), Hürka (1970), Dudich & Matoušek (1985) and Trpiš (1994).

The second aim of this paper is to assess species composition of bat bugs, flies and fleas and their host preference in Slovakia.

Material and Methods

The parasites were collected in the years 1981, 1983, 1984, 1994, 1997 and 2002–2011 in different localities of Slovakia on 24 bat species, viz.: *Rhinolophus euryale* Blasius, 1853–285, *R. ferrumequinum* (Schreber, 1774)–19, *R. hipposideros* (Borkhausen, 1797)–18, *Miniopterus schreibersii* (Kuhl, 1817)–187, *Myotis alcathoe* von Helversen et Heller, 2001–3, *M. bechsteini* (Kuhl, 1818)–131, *M. blythii* (Tomes, 1857)–1, *M. brandtii* (Eversmann, 1845)–3, *M. dasycneme* (Boie, 1825)–1, *M. daubentonii* (Kuhl, 1817)–105, *M. emarginatus* (Geoffroy, 1806)–3, *M. myotis* (Borkhausen, 1797)–33, *M. mystacinus* (Kuhl, 1817)–22, *M. nattereri* (Kuhl, 1817)–21, *Eptesicus nilssonii* (Keyserling et Blasius, 1839)–5, *E. serotinus* (Schreber, 1774)–2, *Nyctalus lasiopterus* (Schreber, 1780)–2, *N. leisleri* (Kuhl, 1817)–1, *N. noctula* (Schreber, 1774)–249, *Barbastella barbastellus* (Schreber, 1774)–11, *Plecotus auritus* (Linnaeus, 1758)–6, *P. austriacus* (Fischer, 1829)–1, *Vespertilio murinus* Linnaeus, 1758–1, *Pipistrellus pipistrellus* (Schreber, 1774)–2, and *Pipistrellus cf. pygmaeus*–3.

The bats were caught in nets and subsequently the ectoparasites were taken from them. Ticks were found in the hosts' hair and mites were taken from fur and patagia using entomological tweezers. The parasites were deposited in glasses in 70% alcohol. The arthropods were mounted into permanent slides. The material is deposited in the collections of the Institute of Zoology of the Slovak Academy of Sciences in Bratislava.

Results

From 1,115 bat individuals examined, we obtained altogether 7 individuals of one argasid species, 27 individuals of two ixodiid species, 7,499 individuals of 14 spinturnicid species (one of them

being represented by two subspecies), 23 individuals of bugs of the *Cimex pipistrelli* group, 338 individuals of nine batfly species and 6 individuals of seven flea species.

Acarina

Carios vespertilionis Latreille, 1796

RECORD. Hlohovec, high rise building (48° 25' N, 17° 48' E, 177 m a. s. l.), 12 August 2009, 7 larvae from *Pipistrellus* cf. *pygmaeus* (leg. M. Ševčík).

Distribution range of this species extends south of 60° N in the Palaearctic, Afrotropical, Oriental and Australian regions (Filippova 1966, Dusbábek & Rosický 1976, Kolonin 2007). *C. vespertilionis* is a specific parasite of bats, with bats of the genus *Pipistrellus* being its most frequented hosts in Europe (Beaucournu 1966, Dusbábek & Rosický 1976, Estrada-Peña et al. 1990, Haitlinger & Ruprecht 1992, Haitlinger & Walter 1997, Imaz et al. 1999), however, it is found more rarely also on other species: *Barbastella barbastellus*, *Myotis mystacinus*, *Nyctalus leisleri*, *Hypsugo savii* (Estrada-Peña et al. 1990), *Nyctalus noctula*, *Plecotus austriacus* and *Eptesicus serotinus* (Bobkova 2003). Our finding of 7 larvae was made on individuals of the *Pipistrellus pipistrellus* group. Differences in parasitisation between the cryptic species of the *Pipistrellus pipistrellus* group, *P. pipistrellus* and *P. pygmaeus* have not been identified.

Ixodes simplex Neumann, 1906

RECORDS. Jasov, Jasovská jaskyňa cave (48° 41' N, 20° 59' E, 286 m a. s. l.), 13 August 2008, 1 ♀ from *Myotis alcaethoe* (leg. M. Ceľuch); – Nandraž, Bradlo mine (48° 37' N, 20° 12' E, 490 m a. s. l.), 20 May 2011, 4 ♀♀ and 1 larva, 22 May 2011, 1 ♀ and 1 larva, 8 July 2011, 1 ♀ all from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo, D. Lobbová).

Distribution of this species includes the Palaearctic, Afrotropical, Oriental and Australian regions (Filippova 1977). This tick parasitizes mainly the bat *Miniopterus schreibersii* (Estrada-Peña & Sera Cobo 1991, Lourenço & Palmeirim 2008). It also occurs on bats of the genus *Rhinolophus* (Arthur 1956, Kim et al. 2011) and on the species *Myotis myotis* (Walter & Kock 1985, Haitlinger & Ruprecht 1985) and *M. macrodactylus* Temminck, 1840 (Arthur 1956). The species *Ixodes simplex* was recorded in Slovakia on *M. schreibersii* (Dusbábek 1963, Černý 1972, Ševčík et al. 2010). Ševčík et al. (2010) published a finding from *Rhinolophus hipposideros* (Borkhausen, 1797). Our findings of 6 females and 2 larvae come from *M. schreibersii* and one female was found on *M. alcaethoe*, which is a new host of this tick in Slovakia.

Ixodes vespertilionis Koch, 1844

RECORDS. Kečovo, Čertova diera cave (48° 29' N, 20° 28' E, 375 m a. s. l.), 21 October 1983, 1 ♀ from *Rhinolophus ferrumequinum*; – Kečovo, Domicia cave (48° 29' N, 20° 28' E, 339 m a. s. l.), 21 October 1983, 3 larvae from *Rhinolophus euryale* and 1 ♀ from *Rhinolophus ferrumequinum*; – Silica, Majkova jaskyňa cave (48° 33' N, 20° 33' E, 490 m a. s. l.), 26 January 1984, 4 ♀♀ and 1 larva from *Rhinolophus hipposideros*; – Ardovo, Ardovská jaskyňa cave (48° 31' N, 20° 25' E, 320 m a. s. l.), 27 January 1984, 1 ♀ and 5 larvae from *Rhinolophus hipposideros*; – Silická Brezová, Milada cave (48° 32' N, 20° 29' E, 420 m a. s. l.), 27 January 1984, 2 ♀♀ from *Rhinolophus hipposideros* (leg. J. Krištofik); – Nandraž, Bradlo mine, 20 May 2011, 1 larva from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo, D. Lobbová).

This mite is distributed in Eurasia, Africa and Australia (Kolonin 2007). It parasitizes many bat species of the families Rhinolophidae and Vespertilionidae (Filippova 1977). Out findings include

three larvae from *Rhinolophus euryale*, two females from *R. ferrumequinum*, seven females and six larvae from *R. hipposideros* and one larva from *Miniopterus schreibersii*.

***Eyndhovenia euryalis* (Canestrini, 1884)**

Occurrence of this species was recorded in England, the Netherlands, Italy (Dusbábek (1962), France, Algeria (Deunff 1957), Spain (Peribañez-Lopez et al. 1989), Bulgaria (Beron & Kolebinova 1964), Romania (Beron & Kolebinova 1964, Juvara 1967), Hungary (Beron 1965), Armenia, Azerbaijan (Stanyukovich 1997), Kirghizstan (Ribin 1983), China (Pan & Teng 1973) and Australia (Halliday 1998). Based on measurements of different forms and morphological characters, Uchikawa & Dusbábek (1978) revised the related species and included two subspecies into *Eyndhovenia euryalis*, viz. *E. e. euryalis* (parasitizing mainly *Rhinolophus euryale*) and *E. e. oudemansi* (parasitizing mainly *R. ferrumequinum*). The subspecies *Eyndhovenia euryalis ahi* described by Baker & Delfinado (1964) based on the specimens from *R. ferrumequinum* from Korea is a junior synonym of *E. e. oudemansi* (Uchikawa & Dusbábek 1978).

***Eyndhovenia euryalis euryalis* (Canestrini, 1884)**

RECORDS. Rákoš, Baňa I mine (48° 36' N, 20° 09' E, 428 m a. s. l.), 14 July 2007, 24 ♂♂, 63 ♀♀ and 3 nymphs, 4 July 2010, 41 ♂♂, 30 ♀♀ and 6 nymphs, 29 July 2010, 11 ♂♂, 58 ♀♀ and 7 nymphs (leg. M. Ševčík), 21 April 2009, 50 ♂♂, 20 ♀♀ and 6 nymphs, 16 May 2009, 12 ♂♂ and 7 ♀♀ all from *Rhinolophus euryale* (leg. M. Ševčík & P. Hohti), 4 July 2010, 2 ♂♂ and 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík); – Rákoš, Baňa II mine (48° 36' N, 20° 09' E, 454 m a. s. l.), 14 July 2007, 43 ♂♂, 37 ♀♀ and 24 nymphs (leg. P. Kaňuch), 21 April 2009, 5 ♂♂ (leg. M. Ševčík & P. Hohti), 24 August 2009, 11 ♂♂, 8 ♀♀ and 1 nymph, 25 August 2009, 16 ♂♂, 22 ♀♀ and 7 nymphs from *Rhinolophus euryale* (leg. M. Ševčík, L. Naďo, P. Klimant & A. Tóthová); – Jasov, Jasovská jaskyňa cave, 13 August 2008, 52 ♂♂ and 36 ♀♀ (leg. M. Ceľuch), 22 April 2009, 11 ♂♂, 2 ♀♀ and 1 nymph, 13 June 2009, 121 ♂♂, 111 ♀♀ and 7 nymphs (leg. M. Ševčík, P. Hohti), 2 September 2010, 69 ♂♂, 47 ♀♀ and 15 nymphs from *Rhinolophus euryale* (leg. M. Ševčík, E. Miková & M. Uhrin); Nandraž, Bradlo mine, 12 May 2009, 118 ♂♂, 126 ♀♀ and 11 nymphs, 20 June 2009, 90 ♂♂, 27 ♀♀ and 14 nymphs, 21 June 2009, 34 ♂♂, 13 ♀♀ and 2 nymphs, 11 July 2009, 380 ♂♂, 280 ♀♀ and 62 nymphs (leg. M. Ševčík & P. Hohti), 6 August 2009, 340 ♂♂, 210 ♀♀ and 59 nymphs (leg. M. Ševčík & L. Naďo), 24 August 2009, 151 ♂♂, 80 ♀♀ and 56 nymphs (leg. M. Ševčík, L. Naďo, P. Klimant & A. Tóthová), 3 July 2010, 207 ♂♂, 88 ♀♀ and 38 nymphs (leg. M. Ševčík), 28. July 2010, 44 ♂♂, 13 ♀♀ and 17 nymphs (leg. M. Ševčík & E. Miková), 20 May 2011, 15 ♂♂ and 7 ♀♀, 22 May 2001, 55 ♂♂, 13 ♀♀ and 5 nymphs, 8 July 2011, 112 ♂♂, 13 ♀♀ and 5 nymphs (leg. M. Ševčík, L. Naďo & D. Lobbová) from *Rhinolophus euryale*, 20 June 2009, 2 ♀♀, 11 July 2009, 3 ♂♂ and 1 ♀, 24 August 2009, 2 ♀♀ (leg. M. Ševčík, P. Klimant & A. Tóthová), 3 July 2010, 2 ♂♂ and 3 nymphs (leg. M. Ševčík), 28 July 2010, 9 ♂♂, 2 ♀♀ and 2 nymphs (leg. M. Ševčík & E. Miková), 20 May 2011, 2 ♀♀, 22 May 2011, 1 ♂ and 1 ♀, 8 July 2011, 2 ♂♂ and 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo & D. Lobbová); – Drienčany, Veľká Drienčanská jaskyňa cave (48° 30' N, 20° 04' E, 246 m a. s. l.), 22 June 2009, 31 ♂♂, 11 ♀♀ and 6 nymphs from *Rhinolophus euryale* (leg. M. Ševčík & P. Hohti); – Chvalová, Chvalovská jaskyňa cave (48° 31' N, 20° 09' E, 270 m a. s. l.), 31 July 2009, 78 ♂♂, 63 ♀♀ and 11 nymphs (leg. M. Ševčík & M. Uhrin), 6 September 2010, 97 ♂♂, 73 ♀♀ and 12 nymphs (leg. M. Uhrin & E. Miková), 21 May 2011, 57 ♂♂, 27 ♀♀ and 16 nymphs (leg. M. Ševčík, L. Naďo & D. Lobbová) from *Rhinolophus euryale* and 1 ♂ from *Rhinolophus hipposideros*, 6 September 2010, 6 ♂♂ (leg. M. Uhrin & E. Miková), 21 May 2011, 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo & D. Lobbová); – Jasov, monastery (48° 41' N, 20° 58' E, 267 m a. s. l.), 1 September 2009, 1 ♂ and 1 ♀ from *Rhinolophus euryale* (leg. M. Ševčík); – Drienovec, Drienovecká jaskyňa cave (48° 38' N, 20° 57' E, 245 m a. s. l.), 9 May 2010, 2 ♂♂ from *Rhinolophus euryale* (leg. M. Ševčík & M. Uhrin).

Occurrence of this species was recorded in Slovakia and Italy (Uchikawa & Dusbábek 1978), Spain (Peribañez-Lopez et al. 1989), and Transcaucasia (Stanyukovich 1997). The following bats

are known to be its hosts: *Rhinolophus ferrumequinum* (Estrada-Peña et al. 1990), *R. euryale*, *R. mehelyi* Matschie, 1901 and *Miniopterus schreibersii* (Stanyukovich 1997). The finding of this spinturnicide on *R. euryale* was published by Uchikawa & Dusbábek (1978). Our material consists of 4,012 individuals of this species collected from *R. euryale*, 7 individuals collected from *M. schreibersii* and one individual from *R. hipposideros*.

***Eyndhovenia euryalis oudemansi* (Eyndhoven, 1941)**

RECORD. Jasov, Jasovská jaskyňa cave, 23 May 2011, 6 ♂♂, 14 ♀♀ and 1 nymph from *Rhinolophus ferrumequinum* (leg. M. Ševčík & M. Andreas).

This subspecies is distributed in France, Japan, the Netherlands, Slovakia (Uchikawa & Dusbábek 1978), Korea (Baker & Delfinado 1964), Ukraine (Crimea), Armenia and Central Asia (Stanyukovich 1997), Spain and North Africa (Estrada-Peña et al. 1991). The subspecies was first recorded on *Rhinolophus ferrumequinum* and later also on *R. euryale* (Estrada-Peña et al. 1990), *R. hipposideros*, *Myotis blythii*, *Pipistrellus pipistrellus*, *Eptesicus serotinus* and *Miniopterus schreibersii* (Stanyukovich 1997). In Slovakia this subspecies was found on *R. ferrumequinum* in the karstic area of Slovenský kras (Uchikawa & Dusbábek 1978). Our material consists of 21 individuals of this subspecies collected from *R. ferrumequinum*.

***Paraperiglischrus rhinolophinus* (Koch, 1841)**

RECORDS. Jasov, Jasovská jaskyňa cave, 13 June 2009, 2 ♀♀ (leg. M. Ševčík), 2 September 2010, 3 ♀♀ from *Rhinolophus euryale* (leg. M. Ševčík, E. Miková & M. Uhrin); – Nandraž, Bradlo mine, 11 July 2009, 4 ♀♀ (leg. M. Ševčík & P. Hohti), 3 July 2010, 3 ♂♂, 4 ♀♀ and 1 nymph (leg. M. Ševčík), 28 July 2010, 3 ♂♂ and 9 ♀♀ (leg. M. Ševčík & E. Miková), 21 May 2011, 1 ♂ and 2 ♀♀, 22 May 2011, 5 ♂♂ and 3 ♀♀, 8 July 2011, 2 ♂♂ and 1 ♀ from *Rhinolophus euryale* (leg. M. Ševčík, L. Naďo & D. Lobbová) and 3 July 2010, 1 ♂ and 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík); – Jasov, monastery, 1 September 2009, 1 ♂ from *Rhinolophus euryale* (leg. M. Ševčík); – Rákoš, Baňa I mine, 4 July 2010, 2 ♀♀, 29 July 2010, 1 ♀ from *Rhinolophus euryale* (leg. M. Ševčík); – Chvalová, Chvalovská jaskyňa cave, 6 September 2010, 5 ♂♂ and 8 ♀♀ (leg. M. Uhrin & E. Miková), 21 May 2011, 3 ♀♀ from *Rhinolophus euryale*, 21 May 2011, 1 ♀ from *Rhinolophus hipposideros* (leg. M. Ševčík, L. Naďo & D. Lobbová) and 6 September 2010, 1 ♂ from *Miniopterus schreibersii* (leg. M. Uhrin & E. Miková).

Distribution range of this species includes the Palaearctic, Afrotropical and Oriental regions (Stanyukovich 1997), and the Australian region (Dombrow 1972). The hosts of this ectoparasite are mainly representatives of the genus *Rhinolophus*; viz. *R. ferrumequinum*, *R. hipposideros*, *R. clivosus* Cretzschmar, 1828, *R. blasii* Peters, 1866, *R. euryale*, *R. rouxi* Temminck, 1835, *R. cornutus* Temminck, 1834, as well as *Eptesicus serotinus* (Stanyukovich 1997) and *R. megaphyllus* Gray, 1834 (Dombrow 1972). Our material consists of 63 individuals collected from *R. euryale*, 3 individuals from *M. schreibersii* and one individual from *R. hipposideros*.

***Spinturnix acuminata* (Koch, 1836)**

RECORDS. Sliach, spa (48° 37' N, 19° 10' E, 380 m a. s. l.), 29 January 2002, 1 ♂ and 3 ♀♀, 19 May 2003, 16 ♂♂, 21 ♀♀ and 23 nymphs, 8 July 2003, 1 ♂, 1 ♀ and 1 nymph, 18 July 2003, 4 ♂♂, 1 ♀ and 1 nymph, 12 May 2004, 2 ♂♂, 3 ♀♀ and 7 nymphs, 12 June 2004, 4 ♂♂, 2 ♀♀ and 4 nymphs, 2 August 2004, 4 ♀♀ from *Nyctalus noctula*; – Kirť (48° 07' N, 19° 29' E), 12 August 2004, 2 ♂♂ and 3 ♀♀ from *Nyctalus noctula*; – Beladice (48° 21' N, 18° 18' E, 166 m a. s. l.), 17 June 2006, 1 ♂ from *Nyctalus noctula* (all leg. P. Kaňuch); – Nitra, Veľká Hajnócka park (48° 19' N, 18° 05' E, 140 m a. s. l.), 27 June 2006, 6 ♂♂ and 3 ♀♀, 12 August 2006, 1 ♂, 19 August 2006, 19 ♂♂, 26 ♀♀ and 2 nymphs, 1 September 2008, 18 ♂♂,

14 ♀♀ and 11 nymphs, 9 September 2008, 2 ♂♂, 6 ♀♀ and 4 nymphs from *Nyctalus noctula*; – Nitra, Sihot park (48° 19' N, 18° 05' E, 140 m a. s. l.), 21 August 2006, 19 ♂♂, 3 ♀♀ and 2 nymphs, 2 September 2006, 3 ♂♂, 4 September 2006, 4 ♂♂ and 2 ♀♀, 13 September 2006, 9 ♂♂ and 3 ♀♀, 21 October 2006, 4 ♂♂ and 9 ♀♀, 12 April 2007, 3 ♂♂ and 1 ♀, 19 April 2007, 9 ♂♂ and 18 ♀♀, 25 May 2007, 3 ♂♂ and 1 ♀, 24 June 2007, 1 ♀, 27 June 2007, 2 ♂♂, 3 ♀♀ and 3 nymphs, 9 September 2008, 7 ♂♂, 12 ♀♀ and 4 nymphs, 23 September 2008, 3 ♂♂, 14 ♀♀ and 3 nymphs, 5 April 2009, 5 ♂♂ and 4 ♀♀, 18 April 2009, 5 ♂♂ and 7 ♀♀, 6 June 2009, 1 ♂ and 2 ♀♀, 3 August 2009, 5 ♂♂ 9 ♀♀ and 4 nymphs from *Nyctalus noctula*; – Nitra, Podzámska street (48° 19' N, 18° 05' E, 141 m a. s. l.), 27 June 2007, 8 ♀♀, 14 May 2008, 5 ♂♂, 2 ♀♀ and 1 nymph from *Nyctalus noctula*; – Nitra, at viaduct (48° 19' N, 18° 03' E, 144 m a. s. l.), 8 April 2009, 2 ♀♀ from *Nyctalus noctula*; – Nitra, Svätoplukove square (48° 19' N, 18° 05' E, 145 m a. s. l.), 2 June 2009, 1 ♂, 2 ♀♀ and 3 nymphs from *Nyctalus noctula*; – Val'kovňa-Zlatno, Za Havraník valley (48° 49' N, 20° 04' E, 755 m a. s. l.), 13 July 2007, 10 ♂♂, 4 ♀♀ and 5 nymphs from *Nyctalus lasiopterus* (all leg. M. Ševčík).

The species is distributed in the Palaearctic and Oriental regions (Rudnick 1960, Uchikawa & Wada 1979, Haitlinger & Walter 1997). It parasitizes mainly *Nyctalus noctula*, but it was also observed as an ectoparasite of *Pipistrellus pipistrellus*, *P. nathusii*, *Hypsugo savii*, *Nyctalus lasiopterus*, *N. leisleri*, *Eptesicus serotinus*, *Myotis blythii*, *M. daubentonii*, *M. dasycneme*, *M. myotis* and *Murina leucogaster* Milne-Edwards, 1872, as well as of bats of the genus *Scotophilus* (Rudnick 1960, Stanyukovich 1997). Our material consists of 424 individuals of *S. acuminata* collected from *Nyctalus noctula* and 19 individuals collected from *N. lasiopterus*.

***Spinturnix andegavina* Deunff, 1977**

RECORDS. Kirt', 18 May 2003, 4 ♂♂, 2 ♀♀ and 4 nymphs, 19 May 2003, 35 ♂♂, 23 ♀♀ and 46 nymphs, 20 June 2003, 18 ♂♂ and 6 nymphs, 21 June 2003, 2 ♂♂ and 2 nymphs, 8 July 2003, 16 ♂♂, 24 ♀♀ and 15 nymphs, 17 July 2003, 17 ♂♂, 17 ♀♀ and 14 nymphs, 18 July 2003, 7 ♂♂, 13 ♀♀ and 8 nymphs, 1 August 2003, 3 ♀♀ and 1 nymph, 11 May 2004, 1 ♂, 1 ♀ and 1 nymph, 12 May 2004, 3 ♂♂ and 4 ♀♀, 28 June 2004, 3 ♂♂, 4 ♀♀, 29 June 2004, 3 ♂♂ and 1 ♀, 9 July 2004, 2 ♀♀ and 4 nymphs, 15 July 2004, 4 ♂♂ 12 ♀♀ and 3 nymphs, 1 August 2004, 3 ♂♂ and 4 ♀♀, 11 August 2004, 1 ♂ and 3 ♀♀, 12 August 2004, 4 ♂♂ and 2 ♀♀ from *Myotis daubentonii* (leg. P. Kaňuch); – Hriňová (48° 34' N, 19° 31' E, 470 m a. s. l.), 29 July 2005, 3 ♂♂ and 1 ♀ from *Myotis daubentonii*; – Hriňová, Bátková settlement (48° 34' N, 19° 30' E, 454 m a. s. l.), 2 August 2005, 1 ♂ and 3 nymphs from *Myotis daubentonii* (leg. P. Kaňuch & J. Boshamer); – Nitra, Veľká Hangócka park, 21 July 2006, 4 ♂♂, 3 ♀♀ and 6 nymphs, 19 August 2006, 1 ♂ and 1 ♀ from *Myotis daubentonii*; – Úľany nad Žitavou, Veľký les NR (48° 07' N, 18° 13' E, 131 m a. s. l.), 26 August 2006, 4 ♂♂ and 3 nymphs from *Myotis daubentonii* (leg. M. Ševčík); – Borinka, Zbojnická jaskyňa cave (48° 16' N, 17° 07' E, 327 m a. s. l.), 14 September 2007, 2 ♂♂ and 2 ♀♀ from *Myotis daubentonii* (leg. M. Noga).

The species is probably distributed in the whole of Europe (Deunff 1957). It occurs primarily on the bat *Myotis daubentonii* and was also recorded on *M. dasycneme* and *M. nattereri* (Haitlinger & Walter 1997). Our material consists of 374 individuals of *Spinturnix andegavina* from *M. daubentonii*. It is the first record for the fauna of Slovakia.

***Spinturnix bechsteini* Deunff, Gottfried, Bellido et Volleth, 2004**

RECORDS. Dobrá Niva, Gavurky NR (48° 28' N, 19° 08' E, 449 m a. s. l.), 19 July 2004, 5 ♂♂, 6 ♀♀ and 2 nymphs from *Myotis bechsteini* (leg. P. Kaňuch); – Čaklov-Hámre, oak forest (48° 53' N, 21° 36' E, 200 m a. s. l.), 21 May 2007, 1 ♂, 2 ♀♀ and 1 nymph, 5 June 2007, 3 ♂♂ and 1 ♀ from *Myotis bechsteini*; – Brezina-Torkoš, oak-beech forest (48° 34' N, 21° 31' E, 336 m a. s. l.), 9 July 2007, 3 ♂♂, 3 ♀♀ and 7 nymphs from *Myotis bechsteini*; – Byšta, oak-beech forest (48° 32' N, 21° 32' E; 380 m a. s. l.), 14 July 2007, 2 ♂♂ and 2 nymphs from *Myotis bechsteini*; – Strážske, beech-oak forest (48° 52' N, 21° 48' E, 182 m a. s. l.),

18 July 2007, 1 ♂, 2 ♀♀ and 3 nymphs, 19 July 2007, 8 ♂♂, 8 ♀♀ and 15 nymphs, 21 July 2009, 2 ♂♂, 3 ♀♀ and 3 nymphs from *Myotis bechsteinii*; – Ďurkov, oak-beech forest (48° 42' N, 21° 29' E, 450 m a. s. l.), 23 July 2009, 20 ♂♂, 14 ♀♀ and 3 nymphs from *Myotis bechsteinii*; – Boťany, oak forest with admixed ashes (48° 28' N, 21° 06' E, 100 m a. s. l.), 22 July 2007, 3 ♂♂, 1 ♀♀ and 1 nymphs, 24 July 2007, 2 ♂♂, 2 ♀♀ and 4 nymphs, 2 August 2007, 2 ♂♂, 1 ♀ and 3 nymphs from *Myotis bechsteinii*; – Chlmec, fishpond (48° 54' N, 21° 57' E, 202 m a. s. l.), 29 July 2007, 2 ♂♂, 1 ♀ and 2 nymphs from *Myotis bechsteinii* (all leg. Š. Danko); – Jovsa, oak-hornbeam forest (48° 50' N, 22° 05' E, 210 m a. s. l.), 8 July 2009, 2 ♂♂ and 2 nymphs, 9 July 2009, 47 ♂♂, 35 ♀♀ and 61 nymphs, 2 August 2009, 8 ♂♂, 9 ♀♀ and 6 nymphs from *Myotis bechsteinii* (leg. Š. Danko, M. Ševčík & P. Hohti).

Distribution of this species is west-Palaeartic (Deunff et al. 2004). It has been found only on the bat *M. bechsteinii*. Our material includes 314 individuals of *S. bechsteini* collected from *M. bechsteinii*. It is the first record for the fauna of Slovakia.

***Spinturnix dasyncemi* (Kolenati, 1856)**

RECORD. Nitra, Veľká Hangócka park, 9 September 2008, 1 ♂ from *Myotis dasynceme* (leg. M. Ševčík).

The species is distributed in Europe (Rudnick 1960). It has been found only on the bat *M. dasynceme*. The species was redescribed by Estrada-Peña & Sanchez (1989). Our record is the first for the fauna of Slovakia.

***Spinturnix emarginata* (Kolenati, 1856)**

RECORDS. Sliach, spa, 1 July 2003, 2 ♂♂, 5 ♀♀ and 4 nymphs from *Myotis emarginatus*, – Lipovce, Zlá diera cave (49° 04' N, 20° 57' E, 780 m a. s. l.), 3 September 2005, 1 ♂ and 2 ♀♀ from *Myotis emarginatus* (leg. P. Kaňuch).

The species redescribed by Dusbábek (1964) is an ectoparasite of *Myotis emarginatus*. It is probably distributed in the western Palaeartic. It has been found only on the bat *M. emarginatus*. Our material includes 17 individuals of the ectoparasite *S. emarginata* from the bat *M. emarginatus*. It is the first record for the fauna of Slovakia.

***Spinturnix helvetiae* Deunff, Keller et Allen, 1986**

RECORD. Kirt', 1 August 2004, 1 ♀ and 2 nymphs from *Myotis daubentonii* (leg. P. Kaňuch).

The species is probably distributed in the whole of Central Europe (Deunff et al. 1986), in Belarus and Moldova (Stanyukovich 1997). So far it has been found only on the bat *Nyctalus leisleri*. Our material includes 3 individuals collected on *Myotis daubentonii*.

***Spinturnix kolenatii* Oudemans, 1910**

RECORDS. Železná Breznica, Podjavor cottage (48° 38' N, 19° 02' E, 638 m a. s. l.), 29 July 2004, 3 ♂♂ and 1 ♀ from *Eptesicus nilssonii*; – Závadka nad Hronom, Hronec valley (48° 49' N, 19° 56' E, 768 m a. s. l.), 18 May 2005, 1 ♀ from *Eptesicus nilssonii* (leg. P. Kaňuch); – Látky, Bradkovic settlement (48° 36' N, 19° 37' E, 809 m a. s. l.), 30 July 2005, 7 ♀♀ from *Eptesicus nilssonii*; – Hriňová, Bát'ková settlement, 2 August 2005, 1 ♂ and 4 ♀♀ from *Eptesicus nilssonii* (leg. P. Kaňuch & J. Boshamer); – Nitra, Nitrianska hradná jaskyňa cave (48° 19' N, 18° 05' E, 153 m a. s. l.), 27 September 2006, 2 ♀♀ from *Eptesicus serotinus* (leg. M. Ševčík).

The species is distributed in Europe (Rudnick 1960, Dusbábek 1962, Haitlinger & Walter 1997), Transcaucasia and Central Asia (Stanyukovich 1997), Mongolia (Dusbábek 1966), Afghanistan

(Dusbábek 1970), Japan (Uchikawa & Wada 1979) and Taiwan (Prasad 1969). *Spinturnix kolenatii* occurs mainly on the bats *Eptesicus nilssonii*, *E. serotinus*, but it was also found on *E. parvus*, *Pipistrellus pipistrellus*, *P. nathusii*, *Myotis blythii*, *M. mystacinus*, *M. brandtii*, *M. daubentonii*, *Plecotus auritus*, *Vespertilio murinus* and *Nyctalus noctula* (Stanyukovich 1997). Our material contains 17 individuals from *E. nilssonii* and two individuals from *E. serotinus*.

Spinturnix myoti (Kolenati, 1856)

RECORDS. Silica, Majkova jaskyňa cave (48° 33' N, 20° 33' E, 490 m a. s. l.), 26 January 1984, 1 ♂ and 6 ♀♀ from *Myotis myotis*; – Borský Mikuláš, bakery (48° 37' N, 17° 12' E, 198 m a. s. l.), 29 September 1994, 14 ♂♂, 19 ♀♀ and 9 nymphs from *Myotis myotis* (leg. J. Krištofik); – Sliac, spa, 17 May 2003, 4 ♂♂, 4 ♀♀ and 10 nymphs, 1 July 2003, 5 ♂♂, 11 ♀♀ and 12 nymphs from *Myotis myotis*; – Badín, Badínsky primeval forest (48° 41' N, 19° 03' E, 750 m a. s. l.), 25 June 2003, 2 ♂♂ and 2 nymphs from *Myotis myotis*; – Dobrá Niva, Gavurky NR, 16 June 2003, 2 ♂♂ and 2 ♀♀ from *Myotis myotis*; – Limbach, Krkavec cottage (48° 16' N, 17° 12' E, 340 m a. s. l.), 6 May 2005, 2 ♂♂, 5 ♀♀ and 4 nymphs from *Myotis myotis*; – Detva (48° 33' N, 19° 24' E, 507 m a. s. l.), 2 June 2005, 12 ♂♂, 19 ♀♀ and 24 nymphs from *Myotis myotis*; – Kirt', 17 July 2003, 2 ♂♂, 18 July 2003, 4 ♀♀, 15 August 2003, 1 ♀ and 1 nymph from *Myotis nattereri*; – Hriňová, Blato settlement (48° 35' N, 19° 28' E, 454 m a. s. l.), 26 June 2003, 1 ♂ and 1 ♀ from *Myotis nattereri*; – Dobrá Niva, Gavurky NR, 13 August 2004, 4 ♂♂, 5 ♀♀ and 1 nymph from *Myotis nattereri*; – Hriňová (48° 34' N, 19° 31' E, 458 m a. s. l.), 27 June 2004, 1 ♂ and 1 nymph from *Myotis mystacinus* (all leg. P. Kaňuch), 29 July 2005, 5 ♀♀ from *M. myotis* and 29 May 2005, 2 nymphs *Myotis blythii* (leg. P. Kaňuch & J. Boshamer); – Látky (48° 34' N, 19° 36' E, 855 m a. s. l.), 28 July 2005, 4 ♂♂, 8 ♀♀ and 6 nymphs from *Myotis myotis* and 28 July 2005, 1 ♂, 1 ♀ and 3 nymphs from *Myotis nattereri*; – Jasov, Jasovská jaskyňa cave, 13 August 2008, 2 ♂♂, 2 ♀♀ and 5 nymphs from *Myotis myotis* (leg. M. Čelúch); – Nadraž, Bradlo mine 11 July 2009, 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík).

The species is distributed in Europe (Rudnick 1960, Haitlinger & Walter 1997), Transcaucasia, Central Asia and Afghanistan (Stanyukovich 1997), Mongolia (Dusbábek 1966), Japan (Uchikawa & Wada 1979), and North Africa (Dusbábek 1962, Bruyndonckx et al. 2010). It occurs primarily on the bat *Myotis myotis* (Deunff 1977), sporadically also on some species of the genera *Myotis*, *Rhinolophus*, *Pipistrellus*, *Eptesicus* and *Vespertilio* and on the species *Barbastella barbastellus*, *Nyctalus noctula* and *Plecotus auritus* (Stanyukovich 1997). Our material includes 201 individuals of this spinturnicid from the bat *M. myotis*, 25 individuals from *M. nattereri*, 2 individuals from *M. mystacinus* and one female from *M. schreibersii*.

Spinturnix mystacina (Kolenati, 1857)

RECORDS. Hriňová, Bystré water fall (48° 37' N, 19° 29' E, 983 m a. s. l.), 18 June 2003, 3 ♂♂, 1 ♀ and 2 nymphs from *Myotis mystacinus*; – Kirt', 20 June 2003, 1 ♂ and 1 nymph from *Myotis mystacinus*; – Badín, Badínsky primeval forest 25 June 2003, 2 ♂♂ from *Myotis mystacinus*; – Dobrá Niva, Gavurky NR, 11 July 2003, 4 ♂♂, 5 ♀♀ and 2 nymphs, 21 July 2003, 3 ♂♂, 1 ♀ and 2 nymphs from *Myotis mystacinus*; – Hriňová, 12 July 2003, 1 ♀ from *Myotis mystacinus*; – Budča, Sietno valley (48° 34' N, 19° 03' E, 309 m a. s. l.), 14 July 2003, 1 ♀ from *Myotis mystacinus*; – Hriňová, Poľana hotel (48° 38' N, 19° 28' E, 1253 m a. s. l.), 5 August 2003, 1 ♂ and 2 ♀♀ from *Myotis mystacinus*, 5 August 2003, 2 ♂♂ from *Myotis brandtii*; – Hriňová, Zadná Poľana NR (48° 38' N, 19° 28' E, 1268 m. a. s. l.), 3 June 2005, 1 ♂, 3 ♀♀ and 3 nymphs from *Myotis brandtii* (leg. P. Kaňuch); – Jasov, Jasovská jaskyňa cave, 2 September 2010, 1 ♂ and 1 ♀, 11 July 2011, 2 ♂♂ from *Myotis alcaethoe*, 12 July 2011, 1 ♀ from *Myotis brandtii* (leg. M. Ševčík & M. Andreas).

This species is distributed in Europe (Haitlinger & Walter 1997), Kazakhstan, Tajikistan (Stanyukovich 1997), Mongolia (Dusbábek 1966) and Japan (Uchikawa & Wada 1979). It parasitizes above all *M. mystacinus*, but it was also found on *Myotis brandtii*, *M. nattereri*, *M. dasycneme*, *M.*

myotis, *Eptesicus serotinus*, *Vespertilio murinus*, *Nyctalus noctula*, *Plecotus auritus* (Stanyukovich 1997) and *M. alcaethoe* (Danko et al. 2010). Our material includes 32 individuals from the bat *M. mystacinus*, 9 individuals from *M. brandtii* and 4 individuals from *M. alcaethoe*.

***Spinturnix plecotina* (Koch, 1839)**

RECORDS. Hriňová, Poľana hotel, 5 June 2003, 3 ♂♂ and 2 ♀♀ from *Plecotus auritus*; – Kirt', 13 July 2004, 1 ♂ and 1 nymphs from *Plecotus auritus*; – Biel (48° 27' N, 22° 03' E, 99 m a. s. l.), 13 July 2004, 1 ♀ and 1 nymph from *Plecotus auritus* (leg. P. Kaňuch); – Látky, 27 July 2005, 1 ♂, 28 July 2005, 1 ♂ from *Plecotus auritus*, 28 July 2005, 2 nymphs from *P. austriacus* (leg. P. Kaňuch & J. Boshamer).

This species is distributed in Europe (Haitlinger & Walter 1997), Armenia, Uzbekistan, Tajikistan, Afghanistan (Stanyukovich 1997) and Japan (Uchikawa & Wada 1979). It occurs mainly on the bat *Plecotus auritus*, but also on *P. tenerifae* (Estrada-Peña et al. 1990), *P. austriacus*, *Rhinolophus ferrumequinum*, *Eptesicus nilssonii*, *E. serotinus*, *Barbastella barbastellus* and *Nyctalus noctula* (Stanyukovich 1997). Our material includes 11 individuals of *S. plecotina* from *P. auritus* and 2 individuals from *P. austriacus*. It is a new record for the Slovakian fauna.

***Spinturnix psi* (Kolenati, 1856)**

RECORDS. Rákoš, Baňa I mine, 14 July 2007, 4 ♂♂, 6 ♀♀ and 1 nymph, 4 July 2010, 14 ♂♂, 12 ♀♀ and 10 nymphs (leg. M. Ševčík), 16 May 2009, 25 ♂♂ and 20 ♀♀ from *Miniopterus schreibersii* (leg. M. Ševčík & P. Hohti); – Jasov, Jasovská jaskyňa cave, 13 August 2008, 2 ♂♂ and 1 ♀ from *Miniopterus schreibersii* (leg. M. Cel'uch); – Rákoš, Baňa II mine, 21 April 2009, 33 ♂♂, 41 ♀♀ and 28 nymphs (leg. M. Ševčík & P. Hohti), 25 August 2009, 14 ♂♂, 12 ♀♀ and 29 nymphs from *Miniopterus schreibersii* (leg. M. Ševčík, P. Klimant & A. Tóthová); – Nadraž, Bradlo mine, 15 May 2009, 80 ♂♂, 104 ♀♀ and 92 nymphs, 12 June 2009, 15 ♂♂, 24 ♀♀ and 23 nymphs, 20 June 2009, 26 ♂♂, 7 ♀♀ and 17 nymphs, 11 July 2009, 62 ♂♂, 49 ♀♀ and 41 nymphs (leg. M. Ševčík & P. Hohti), 24 August 2009, 30 ♂♂, 35 ♀♀ and 48 nymphs (leg. M. Ševčík, P. Klimant & A. Tóthová), 19 ♂♂, 11 ♀♀ and 17 nymphs, 3 July 2010, 19 ♂♂, 11 ♀♀ and 17 nymphs (leg. M. Ševčík), 28 July 2010, 24 ♂♂, 37 ♀♀ and 15 nymphs (leg. M. Ševčík & E. Miková), 20 May 2011, 70 ♂♂, 78 ♀♀ and 78 nymphs, 22 May 2011, 60 ♂♂, 67 ♀♀ and 89 nymphs, 8 July 2011, 33 ♂♂, 11 ♀♀ and 53 nymphs from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo & D. Lobbová); – Drienovec, Drienovecká jaskyňa cave, 9 May 2010, 19 ♂♂, 12 ♀♀, 17 nymphs (leg. M. Ševčík & M. Uhrin), 6 September 2010, 7 ♂♂, 12 ♀♀ and 6 nymphs (leg. M. Ševčík & M. Andreas), 30 May 2011, 50 ♂♂, 68 ♀♀ and 70 nymphs from *Miniopterus schreibersii* (leg. M. Uhrin & E. Miková); – Chvalová, Chvalovská jaskyňa cave, 6 September 2010, 11 ♂♂, 14 ♀♀ and 14 nymphs (leg. M. Uhrin & E. Miková), 21 May 2011, 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo & D. Lobbová).

The species is distributed in the Palaearctic, Oriental and Australasian regions and Madagascar. It occurs first of all on different species of the genus *Miniopterus* and more rarely also on *Myotis longiceps*, *M. nattereri*, *Vespertilio murinus* (Uchikawa et al. 1994). On other bats it is found only sporadically. Our material consists of 1,915 individuals of *S. psi*, which were found only on the bat *M. schreibersii*.

***Spinturnix punctata* (Sundevall, 1833)**

RECORDS. Staré Hory, Piesky mine (48° 47' N, 19° 07' E, 700 m a. s. l.), 6 October 2004, 1 ♂ from *Barbastella barbastellus*; – Hriňová, Zadná Poľana NR, 3 June 2005, 1 ♂ and 1 ♀ from *Barbastella barbastellus* (leg. P. Kaňuch); – Látky, 28 July 2005, 2 ♂♂, 2 ♀♀ and 1 nymph from *Barbastella barbastellus*; – Sihla, Kamenistá valley (48° 42' N, 19° 32' E, 675 m a. s. l.), 31 July 2005, 2 ♂♂ from *Barbastella barbastellus*; – Hriňová, Blato settlement, 5 August 2005, 4 nymphs from *Barbastella barbastellus* (leg. P. Kaňuch & J.

Boshamer); – Borinka, Zbojnická jaskyňa cave, 14 September 2007, 3 ♂♂ and 2 ♀♀ from *B. barbastellus* (leg. M. Noga).

The species is distributed in the western Palaearctic (Deunff et al. 1997) and the Far East of Russia (Stanyukovich 1997). It was found to parasitize the bats *Barbastella barbastellus* and *B. darjelingensis* Hodgson, 1855 (Stanyukovich 1997). Our material consists of 19 individuals of *Spinturnix punctata* obtained from *B. barbastellus*. It is a new species for the fauna of Slovakia.

Heteroptera

Cimex pipistrelli Jenyns, 1839

RECORDS. Beladice (48° 20' N, 18° 18' E, 166 m a. s. l.), 17 June 2006, 2 ♂♂ and 1 ♀ from *Nyctalus noctula* (leg. P. Kaňuch); – Očová, church (48° 36' N, 19° 17' E, 394 m a. s. l.), 5 August 2006, 2 ♂♂ and 4 ♀♀ (leg. M. Ševčík), 13 August 2008, 1 ♂ and 2 ♀♀ from *Myotis myotis* (leg. M. Ceľuch); – Nitra, Sihot' park (48° 19' N, 18° 05' E, 140 m a. s. l.), 21 August 2006, 2 ♀♀, 19 April 2007, 1 ♂ and 1 ♀, 25 May 2007, 2 ♀♀, 18 April 2009, 1 ♀ from *Nyctalus noctula* (leg. M. Ševčík); – Boľany, oak forest with admixed ashes (48° 28' N, 21° 06' E, 100 m a. s. l.), 24 July 2007, 1 ♂ from *Nyctalus leisleri*; – Brezina, Torkoš, oak-beech forest (48° 34' N, 21° 31' E, 336 m a. s. l.), 9 July 2007, 1 ♀ from *Nyctalus noctula* (leg. Š. Danko); – Nitra, at viaduct (48° 19' N, 18° 03' E, 144 m a. s. l.), 14 May 2008, 1 ♂ and 1 ♀ from *Nyctalus noctula* (leg. M. Ševčík).

The species is distributed in the Palaearctic region (Balvín 2008). It parasitizes first mainly the bats of the genus *Pipistrellus* and *Nyctalus noctula* (Povolný 1957, Southwood & Leston 1959, Usinger 1966, Heise 1988, Bartonička 2007), but it also occurs on those bat species, which inhabit fissures in buildings, tree cavities or bat boxes. Up to now, this species has been recorded on *Vespertilio murinus* (Horváth 1935), *Myotis myotis* (Lederer 1950, Usinger 1966), *Eptesicus serotinus* (Southwood & Leston 1959, Heise 1988), *M. dasycneme* (van Rooij et al. 1982, Walter 2004), *Pipistrellus nathusii*, *Myotis brandtii* (Heise 1988), *M. daubentonii*, *M. mystacinus* (Kerzhner 1989), *Nyctalus leisleri* (Nelson & Smiddy 1997, Morkel 1999), *M. bechsteinii* (Morkel 1999) and in the mixed colonies of *M. emarginatus* with *Rhinolopus ferrumequinum* (Protić & Paunović 2006) or with *Pipistrellus pygmaeus* (Bartonička 2007). Three males and six females from our material were found on *Myotis myotis*, one male on *Nyctalus leisleri* and four males and nine females on *N. noctula*.

Diptera

Nycteribia kolenatii Theodor et Moscona, 1954

RECORDS. Rimavský Hámor, Rimavica river (48° 32' N, 19° 52' E, 307 m a. s. l.), 17 July 1981, 1 ♀ from *Myotis daubentonii* (leg. J. Darola); – Gemerský Milhost', Gemerskoteplická jaskyňa cave (48° 36' N, 20° 18' E, 242 m a. s. l.), 19 September 1995, 1 ♀ from *Myotis daubentonii* (leg. M. Uhrin); – Kirt' (48° 07' N, 19° 29' E, 161 m a. s. l.), 20 June 2003, 2 ♂♂ and 1 ♀, 8 July 2003, 1 ♀, 17 July 2003, 5 ♂♂, 18 July 2003, 1 ♂, 1 August 2004, 2 ♂♂ and 2 ♀♀, 11 August 2004, 1 ♀, 12 August 2004, 1 ♂ from *Myotis daubentonii* (leg. P. Kaňuch); – Ťľany nad Žitavou, Veľký les NR (48° 07' N, 18° 13' E, 131 m a. s. l.), 28 August 2006, 2 ♀♀ from *Myotis daubentonii* (leg. M. Ševčík); – Nitra, Veľká Hangócka park (48° 16' N, 17° 07' E, 327 m a. s. l.), 19 August 2006, 2 ♂♂ from *Myotis daubentonii* (leg. M. Ševčík); – Borinka, Zbojnická jaskyňa cave (48° 16' N, 17° 07' E, 327 m a. s. l.), 14 September 2007, 7 ♂♂ and 3 ♀♀ from *Myotis daubentonii* (leg. M. Noga).

The species is distributed in Europe (Hůrka & Soós 1986) and Kazakhstan (Polkanov & Medvedev 1997). It occurs primarily on the bat *Myotis daubentonii*, however, it was also found on *M.*

bechsteinii, *M. dasycneme*, *M. myotis*, *M. mystacinus*, *M. nattereri*, *Eptesicus serotinus*, *Plecotus auritus* and *Rhinolophus hipposideros* (Hürka 1964), *Barbastella barbastellus* (Haitlinger 1978), *Myotis brandtii*, *Nyctalus noctula*, *N. leisleri* and *Pipistrellus pipistrellus* (Walter 2004). Our material consists of 20 males and 12 females from *Myotis daubentonii*.

***Nycteribia latreillii* (Leach, 1817)**

RECORDS. Borský Mikuláš, bakery (48° 38' N, 17° 12' E, 198 m a. s. l.), 29 September 1994, 1 ♀ from *Myotis myotis* (leg. J. Krištofik); – Jasov, Jasovská jaskyňa cave (48° 41' N, 20° 59' E, 286 m a. s. l.), 13 August 2008, 1 ♀ from *Myotis myotis* (leg. M. Cefuch).

The species is distributed over the continental Europe, North Africa, in southwestern and central Asia to Kazakhstan (Hürka & Soós 1986). This bat fly occurs first of all on *Myotis myotis* and *M. blythii*, occasionally also on other bat species – *Miniopterus schreibersii* (Hürka 1964, 1980), *M. nattereri* (Beaucournu 1961), *Rhinolophus ferrumequinum*, *R. hipposideros*, *Myotis capaccinii*, *Vespertilio murinus* (Theodor 1967), *Myotis punicus* (Hürka 1982) and *M. daubentonii* (Walter 2004). Our material is represented by two females collected from *M. myotis*.

***Nycteribia schmidlii* Schiner, 1853**

RECORDS. Rákoš, Baňa II mine (48° 36' N, 20° 09' E, 454 m a. s. l.), 21 April 2009, 1 ♂ and 16 ♀♀ (leg. M. Ševčík & P. Hohti), 25 August 2009, 1 ♂ and 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík, L. Nad'o, P. Klimant & A. Tóthová); – Rákoš, Baňa I mine (48° 36' N, 20° 09' E, 428 m a. s. l.), 16 May 2009, 1 ♂ from *Miniopterus schreibersii* (leg. M. Ševčík & P. Hohti); – Nandraž, Bradlo mine (48° 37' N, 20° 12' E, 490 m a. s. l.), 15 May 2009, 1 ♂ and 5 ♀♀, 20 June 2009, 1 ♂ and 10 ♀♀, 11 July 2009, 12 ♂♂ and 19 ♀♀ (leg. M. Ševčík & P. Hohti), 24 August 2009, 6 ♂♂ and 5 ♀♀ (leg. M. Ševčík, L. Nad'o, P. Klimant & A. Tóthová), 3 July 2010, 1 ♂ and 3 ♀♀ (leg. M. Ševčík), 28 July 2010, 6 ♂♂ and 22 ♀♀ (leg. M. Ševčík, E. Miková), 20 May 2011, 6 ♂♂ and 11 ♀♀, 22 May 2011, 1 ♂ and 1 ♀, 8 July 2011, 2 ♂♂ and 11 ♀♀ from *Miniopterus schreibersii* (leg. M. Ševčík, L. Nad'o & D. Lobbová); – Drienovec, Drienovecká jaskyňa cave (48° 38' N, 20° 57' E, 245 m a. s. l.), 9 May 2010, 1 ♀ (leg. M. Ševčík & M. Uhrin), 30 May 2011, 2 ♀♀ from *Miniopterus schreibersii* (leg. M. Uhrin & E. Miková).

Two subspecies have been described. The nominotypical subspecies occurs in the southern part of Europe (the northern border runs through central France, Baden (Germany) and southern Slovakia), in North Africa and South-West Asia. This bat fly parasitizes mainly *Miniopterus schreibersii*, occasionally bats of the genus *Rhinolophus* and also other bat species – *Myotis myotis* (Hürka 1980), *M. capaccinii*, *Plecotus auritus*, *Vespertilio murinus* (Theodor 1967) and *Pipistrellus pipistrellus* (Novosad et al. 1987). Our material of 39 males and 107 females comes from *Miniopterus schreibersii*.

***Phthiridium biarticulatum* Hermann, 1804**

RECORDS. Jasov, Jasovská jaskyňa cave, 25 January 1984, 2 ♀♀ from *Rhinolophus ferrumequinum*; – Kečovo, Čertova diera cave (48° 29' N, 20° 28' E, 375 m a. s. l.), 21 October 1983, 1 ♀ from *Rhinolophus ferrumequinum* (leg. J. Krištofik).

A west-Palaeartic species distributed in the southern part of Europe, North Africa and South-West Asia up to Kirghizstan. It occurs mainly on bats of the genus *Rhinolophus*, sporadically it also parasitizes *Miniopterus schreibersii*, *Myotis myotis* (Hürka 1980), *M. daubentonii*, *M. emarginatus* and *Pipistrellus pipistrellus* (Theodor 1967). Our material consists of three females from *Rhinolophus ferrumequinum*.

***Basila italica* Theodor, 1954**

RECORD. Kirt', 11 May 2004, 1 ♂ and 1 ♀ from *Myotis mystacinus* (leg. P. Kaňuch).

The species occurs in Europe (Hůrka 1980). Its distribution is not known sufficiently, it was recorded in Italy, France, Switzerland, Slovakia, Poland (Hůrka & Soós 1986) and in Hungary (Czuppon & Molnár 2001). This bat fly occurs first of all on *Myotis mystacinus* and *M. brandtii*, it was also found on *M. emarginatus* (Hůrka 1980) and *M. alcaethoe* (Danko et al. 2010). Our material consists of one male and one female from *Myotis mystacinus*.

***Basilia nana* Theodor et Moscona, 1954**

RECORDS. Radvaň nad Dunajom, Mašan NR (47° 46' N, 18° 20' E, 116 m a. s. l.), 21 July 2003, 1 ♂ from *Myotis bechsteinii*; – Badín, Badínsky primeval forest (48° 41' N, 19° 03' E, 750 m a. s. l.), 25 June 2003, 1 ♂ from *Myotis bechsteinii*; – Kováčová, Kováčovská dolina valley (48° 37' N, 19° 05' E, 372 m a. s. l.), 17 July 2004, 1 ♂ from *Myotis bechsteinii*; – Budča, Boky NR (48° 34' N, 19° 02' E, 565 m a. s. l.), 13 June 2005, 2 ♂♂ from *Myotis bechsteinii* (leg. P. Kaňuch); – Jovsa, hornbeam-oak forest (48° 50' N, 22° 05' E, 210 m a. s. l.), 14 May 2005, 1 ♂ and 3 ♀♀, 28 June 2007, 1 ♂, 21 July 2007, 7 ♂♂ and 6 ♀♀ (leg. Š. Danko), 5 July 2009, 2 ♂♂ and 5 ♀♀, 8 July 2009, 2 ♀♀, 9 July 2009, 3 ♂♂ and 8 ♀♀, 2 August 2009, 1 ♂ and 6 ♀♀ from *Myotis bechsteinii* (leg. Š. Danko, M. Ševčík & P. Hohti); – Čaklov-Hámre, oak forest (48° 53' N, 21° 36' E, 200 m a. s. l.), 21 May 2007, 3 ♂♂ and 1 ♀, 27 June 2007, 2 ♂♂ and 1 ♀ from *Myotis bechsteinii*; – Brezina, Torkoš, oak-beech forest, 9 July 2007, 1 ♂ and 2 ♀♀ from *Myotis bechsteinii*; – Byšta, oak-beech forest (48° 32' N, 21° 32' E, 380 m a. s. l.), 14 July 2007, 3 ♂♂ and 2 ♀♀ from *Myotis bechsteinii*; – Ďurkov (48° 42' N, 21° 29' E, 450 m a. s. l.), 19 July 2007, 1 ♂ and 5 ♀♀, 23 July 2009, 2 ♂♂ and 5 ♀♀ from *Myotis bechsteinii*; – Chlmec, on fishpond (48° 54' N, 21° 57' E, 202 m a. s. l.), 29 July 2007, 2 ♀♀ from *Myotis bechsteinii* (leg. Š. Danko); – Borinka, Zbojnická jaskyňa cave, 14 September 2007, 3 ♂♂ and 3 ♀♀ from *Myotis bechsteinii* (leg. M. Noga).

The species has been found in Europe and Israel. It occurs first of all on *Myotis bechsteinii*. It was, however, regularly found also on *Myotis nattereri*, *M. myotis* and *M. blythii* (Hůrka 1980), *Plecotus auritus* (Beaucornu 1961, Walter 2004), *Myotis dasycneme*, *M. emarginatus*, *M. mystacinus* (Theodor 1967) and *M. daubentonii* (Haitlinger 1978). Our material represents 35 males and 51 females from *Myotis bechsteinii*.

***Basila nattereri* (Kolenati, 1857)**

RECORDS. Kirt', 18 May 2003, 1 ♂ and 2 ♀♀, 16 August 2003, 2 ♂♂, 11 May 2004, 1 ♂ and 1 ♀, 28 June 2004, 1 ♂, 1 August 2004, 2 ♂♂, 2 August 2004, 1 ♂ and 1 ♀ from *Myotis nattereri*, 11 May 2004, 1 ♂ and 3 ♀♀ from *Myotis daubentonii*; – Dobrá Niva, Gavurky NR (48° 28' N, 19° 08' E, 449 m a. s. l.), 16 June 2003, 1 ♀, 8 July 2004, 1 ♂ from *Myotis nattereri* (leg. P. Kaňuch).

The species occurs in Europe, it was reported from Spain, France, Switzerland, Romania, Ukraine (Hůrka & Soós 1986), Moravia (Hůrka 1997) and Hungary (Czuppon & Molnár 2001). This bat fly occurs first of all on *Myotis nattereri*, but it was also found on other bat species – *Myotis mystacinus*, *M. myotis*, *Plecotus auritus* and *Eptesicus serotinus* (Hůrka 1980). In our material, 9 males and 5 females were collected on *Myotis nattereri*, while one male and 3 females come from *M. daubentonii*.

***Pennicillidia conspicua* Speisen, 1901**

RECORDS. Nandraž, Bradlo mine, 15 May 2009, 1 ♀, 20 June 2009, 1 ♂ and 1 ♀, 11 July 2009, 1 ♂ (leg. M. Ševčík & P. Hohti), 24 August 2009, 1 ♂ (leg. M. Ševčík, L. Naďo, P. Klimant & A. Tóthová), 22 May

2011, 1 ♀, 8 July 2011, 2 ♀♀ from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo & D. Lobbová); – Rákoš, Baňa II mine, 25 August 2009, 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo, P. Klimant & A. Tóthová); – Rákoš, Baňa I mine, 29 July 2010, 1 ♂ and 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík); – Chvalová, Chvalovská jaskyňa cave (48° 31' N, 20° 09' E, 270 m a. s. l.), 6 September 2010, 1 ♀ from *Miniopterus schreibersii* (leg. M. Uhrin & E. Miková); – Drienovec, Drienovecká jaskyňa cave, 6 September 2010, 1 ♂ and 3 ♀♀ (leg. M. Ševčík & M. Andreas), 30 May 2011, 1 ♂ and 1 ♀ from *Miniopterus schreibersii* (leg. M. Uhrin & E. Miková).

The species is distributed in the southern part of Europe, North Africa and South-West Asia, where it reaches to Turkmenistan and Afghanistan (Húrka & Soós 1986). It occurs first of all on *Miniopterus schreibersii*, rarely also on bats of the genus *Rhinolophus* (Húrka 1980), *Myotis capaccinii*, *Plecotus auritus*, *Vespertilio murinus* (Theodor 1967) and *Myotis blythii* (Novosad et al. 1987). Our material of 5 males and 13 females comes from *Miniopterus schreibersii*.

***Penicillidia dufouri* (Westwood, 1825)**

RECORDS. Ďurkov, oak-beech forest, 14 August 2007, 1 ♀ from *Myotis myotis* (leg. Š. Danko); – Jasov, Jasojská jaskyňa cave, 13 August 2008, 3 ♂♂ and 3 ♀♀ from *Myotis myotis* (leg. M. Čeluch); – Rákoš, Baňa II mine, 21 April 2008, 1 ♀ from *Miniopterus schreibersii* (leg. M. Ševčík & P. Hohti); – Nandraž, Bradlo mine, 15 May 2008, 3 ♂♂ and 4 ♀♀, 11 July 2008, 2 ♂♂ and 3 ♀♀ (leg. M. Ševčík & P. Hohti), 24 August 2008, 2 ♂♂ (leg. M. Ševčík, L. Naďo, P. Klimant & A. Tóthová), 3 July 2010, 1 ♂ (leg. M. Ševčík), 28 July 2010, 1 ♂ (leg. M. Ševčík & E. Miková), 8 July 2011, 1 ♂ from *Miniopterus schreibersii* (leg. M. Ševčík, L. Naďo & D. Lobbová); – Chvalová, Chvalovská jaskyňa cave, 6 September 2010, 1 ♂ and 2 ♀♀ from *Miniopterus schreibersii* (leg. M. Uhrin & E. Miková); – Drienovec, Drienovecká jaskyňa cave, 6 September 2010, 3 ♂♂ from *Miniopterus schreibersii* (leg. M. Ševčík & M. Andreas).

The species is distributed in the Palaearctic region. The nominotypical subspecies occurs in continental Europe, North Africa and Asia, reaching to India (West Himalaya) and East Kazakhstan. It parasitizes first of all *Myotis myotis* and *M. blythii*, but it also occurs on other bats, such as *Miniopterus schreibersii*, *Rhinolophus euryale*, *Myotis emarginatus* (Húrka 1980), *Vespertilio murinus*, *Plecotus auritus* (Theodor 1967), *Myotis capaccinii* (Novosad et al. 1987) and *M. dasycneme* (Walter 2004). In our material, 14 males and 10 females come from *Miniopterus schreibersii*, while 3 males and 4 females were collected from *Myotis myotis*.

Siphonaptera

***Ischnopsyllus elongatus* (Curtis, 1832)**

RECORDS. Bratislava, Jamnického street (48° 09' N, 17° 03' E, 201 m a. s. l.), 9 December 1997, 1 ♂ from *Nyctalus noctula* (leg. R. Lehotský); – Nitra, Veľká Hangôcka park, 27 June 2006, 2 ♀♀ from *Nyctalus noctula*; – Nitra, Podzámska street (48° 19' N, 18° 05' E, 141 m a. s. l.), 27 June 2007, 1 ♂ and 6 ♀♀ from *Nyctalus noctula* (leg. M. Ševčík); Nitra, at viaduct, 8 April 2009, 1 ♀ from *Nyctalus noctula* (leg. M. Ševčík & L. Naďo); – Nitra, Svätoplukovo square (48° 19' N, 18° 05' E, 145 m a. s. l.), 2 June 2009, 1 ♂ from *Nyctalus noctula* (leg. M. Ševčík & M. Kováč); – Nitra, Sihoľ park, 6 June 2009, 1 ♀ and 3 ♀♀, August 2009, 2 ♀♀ from *Nyctalus noctula* (leg. M. Ševčík & L. Naďo).

The species is distributed from Europe to Japan (Beaucournu & Launay 1990) and parasitizes mostly *Nyctalus noctula* (Hopkins & Rothschild 1956, Húrka 1957, Rosický 1957, Beaucournu & Launay 1990), but it also occurs on other species such as *Myotis myotis*, *Eptesicus serotinus*, *Pipistrellus pipistrellus* and *Vespertilio murinus* (Húrka 1957). Our material of three males and twelve females comes from *Nyctalus noctula*.

***Ischnopsyllus intermedius* (Rothschild, 1898)**

RECORDS. Látky (48° 34' N, 19° 36' E, 855 m a. s. l.), 28 July 2005, 1 ♂ from *Eptesicus nilssonii*; – Hriňová, under the Bratkovský bridge (48° 36' N, 19° 34' E, 590 m a. s. l.), 27 July 2005, 1 ♂ from *Vespertilio murinus* (leg. P. Kaňuch).

The species is distributed in the Palaearctic region up to Ural (Beaucournu & Launay 1990). It parasitizes the bats *Eptesicus serotinus*, *Myotis dasycneme*, *M. daubentonii*, *M. myotis*, *M. nattereri*, *Nyctalus azoreum*, *N. leisleri*, *N. noctula*, *Vespertilio murinus*, *Rhinolophus ferrumequinum* (Hopkins & Rothschild 1956), *Plecotus auritus*, *Myotis blythii*, *Eptesicus nilssonii*, *Barbastella barbastellus*, *Pipistrellus pipistrellus* and *Rhinolophus hipposideros* (Hůrka 1957). Our material of 2 males comes from *E. nilssonii* and *V. murinus*.

***Ischnopsyllus octactenus* (Kolenati, 1856)**

RECORDS. Sečovská Polianka (48° 47' N, 21° 41' E, 127 m a. s. l.), 29 May 2006, 4 ♀♀ from *Pipistrellus pipistrellus*; – Slanská Huta (48° 35' N, 21° 29' E, 492 m a. s. l.), 30 May 2006, 2 ♀♀ from *Pipistrellus pipistrellus* (leg. P. Kaňuch); – Hlohovec, building (48° 25' N, 17° 48' E, 177 m a. s. l.), 12 August 2009, 2 ♀♀ from *Pipistrellus* cf. *pygmaeus* (leg. M. Ševčík).

A West Palaearctic species, ranging from Morocco, Spain and Great Britain to Middle Asia and Afghanistan (Hůrka 1997). It parasitizes first of all bats of the genus *Pipistrellus* (Hopkins & Rothschild 1956, Hůrka 1957, Rosický 1957, Beaucournu & Launay 1990), but it was also found on other species such as *Myotis mystacinus*, *M. nattereri*, *Nyctalus leisleri*, *N. noctula* (Hopkins & Rothschild 1956), *Myotis daubentonii*, *M. emarginatus*, *M. myotis*, *Eptesicus serotinus*, *E. nilssonii*, *Plecotus auritus*, *Barbastella barbastellus*, *Vespertilio murinus*, *R. hipposideros* (Hůrka 1957), and *Miniopterus schreibersii* (Beaucournu & Launay 1990). We recorded 6 females from *Pipistrellus pipistrellus* and two males from *P. cf. pygmaeus*.

***Ischnopsyllus simplex* Rothschild, 1906**

RECORDS. Badín, Badínský primeval forest, 25 July 2003, 1 ♀ from *Myotis mystacinus*; – Biel (48° 27' N, 22° 03' E, 99 m a. s. l.), 13 July 2005, 2 ♀♀ from *Myotis mystacinus*; – Kirt', 28 June 2004, 1 ♀ from *Myotis daubentonii*, 28 June 2004, 1 ♀ and 30 June 2004, 1 ♀ from *Myotis nattereri* (leg. P. Kaňuch).

The species is distributed in Europe (Beaucournu & Launay 1990) including Georgia (Hůrka 1976). It parasitizes mainly *Myotis nattereri*, *M. mystacinus* (Hopkins & Rothschild 1956, Hůrka 1957, Beaucournu & Launay 1990) and *M. brandtii* (Beaucournu & Launay 1990), sporadically also other bat species – *Myotis daubentonii*, *M. emarginatus*, *Plecotus auritus*, *Pipistrellus pipistrellus* (Hopkins & Rothschild 1956), *Myotis bechsteinii*, *M. dasycneme*, *M. myotis*, *Barbastella barbastellus*, *Eptesicus nilssonii*, *Vespertilio murinus* (Hůrka 1957, 1963a) and *Rhinolophus hipposideros* (Hůrka 1976). Our material consists of four females from *Myotis mystacinus* and two females from *Myotis daubentonii* and *M. nattereri*.

***Ischnopsyllus variabilis* (Wagner, 1898)**

RECORD. Nitra, Veľká Hangočka park, 31 May 2006, 1 ♀ from *Pipistrellus nathusii* (leg. M. Ševčík).

The species is distributed in continental Europe eastwards to the Ural and Volga rivers, Turkey, Ciscaucasia, Northern Caucasus and Transcaucasia (Hůrka 1997). It parasitizes mainly *Pipistrellus nathusii* and other species of the genus *Pipistrellus* (Hopkins & Rothschild 1956, Hůrka 1963a,

Beaucournu & Launay 1990), but this flea was also collected from *Myotis nattereri*, *Eptesicus serotinus*, *Nyctalus noctula*, *Barbastella barbastellus* (Hopkins & Rothschild 1956), *Myotis mystacinus*, *M. daubentonii*, *Nyctalus leisleri*, *Eptesicus nilssonii*, *Plecotus auritus* and *Vespertilio murinus* (Hůrka 1963a). Our material of one female comes from *Pipistrellus nathusii*.

***Rhinolophosylla unipectinata* (Taschenberg, 1880)**

RECORDS. Jasov, Jasovská jaskyňa cave, 6 May 2011, 2 ♂♂, 23 May 2011, 1 ♀ from *Rhinolophus ferrumequinum* (leg. M. Ševčík & M. Andreas).

The species is distributed in western, southern and southeastern Europe, South-West Asia and Afghanistan (Hůrka 1997). It parasitizes mainly bats of the genus *Rhinolophus* (Hopkins & Rothschild 1956, Hůrka 1957, Beaucournu & Launay 1990), but the flea was also found on *Miniopterus schreibersii*, *Pipistrellus nathusii*, *Myotis myotis* (Hopkins & Rothschild 1956), *Myotis capaccinii* (Hůrka 1957), *Myotis emarginatus* (Hůrka 1963b), *Pipistrellus pipistrellus* (Beaucournu & Launay 1990). Our material of two males and one female comes from *Rhinolophus ferrumequinum*.

***Nycteridopsylla eusarca* Dampf, 1908**

RECORDS. Bratislava, Jamnického street (48° 09' N, 17° 03' E, 380 m a. s. l.), 9 December 1997, 1 ♂ and 1 ♀ from *Nyctalus noctula* (leg. R. Lehotský); – Sliač, spa (48° 37' N, 19° 10' E, 203 m a. s. l.), 29 January 2002, 8 ♂♂ and 21 ♀♀ from *Nyctalus noctula* (leg. P. Kaňuch).

The species is distributed in Europe up to the Caucasus (Beaucournu & Launay 1990). It parasitizes mostly *N. noctula* (Hopkins & Rothschild 1956, Beaucournu & Launay 1990), rarely also other bat species – *Pipistrellus pipistrellus* (Hopkins & Rothschild 1956), *Myotis myotis*, *Pipistrellus kuhlii*, *Vespertilio murinus* (Rosický 1957), *Plecotus auritus* and *Myotis blythii* (Hůrka 1963b). Our material of 9 males and 22 females comes from *Nyctalus noctula*.

Discussion

The argasid species *Carios vespertilionis* was found in a wide spectrum of bats of the family Vespertilionidae in Europe (Rupp et al. 2004, Suida et al. 2009, Piksa et al. 2011). In Slovakia this species is known to occur on the bats *Miniopterus schreibersii*, *Myotis blythii*, *M. myotis*, *M. mystacinus*, *Pipistrellus pipistrellus*, *Plecotus auritus* and *Vespertilio murinus*. High prevalence of 39–90% was recorded, however, only in *P. pipistrellus*, while in other bat species its prevalence was lower than 5% and its mean intensity was 1–2 larvae per host (Dusbábek 1963, 1972).

The tick *Ixodes simplex* was recorded on two bat species in Slovakia, namely *Miniopterus schreibersii* (Dusbábek 1963, Ševčík et al. 2010) and *R. hipposideros* (Ševčík et al. 2010). It occurs most frequently on *M. schreibersii*, and only occasionally on other bat species (Dusbábek 1972). The available findings of this tick in Slovakia indicate that its occurrence is sporadic (Dusbábek 1963, Ševčík et al. 2010). In our study, only 8 parasitized individuals of *M. schreibersii* were recorded in spite of the fact that we examined 157 individuals in the years 2010 and 2011 (5.1% prevalence, mean intensity 0.1). In Slovakia, *Ixodes vespertilionis* was found on the bats *Rhinolophus euryale*, *R. ferrumequinum*, *R. hipposideros*, *Miniopterus schreibersii*, *Myotis myotis*, *M. blythii* and *Plecotus auritus* (Dusbábek 1963). The host list of this tick has been recently enriched by the bats *M. alcaethoe* (Danko et al. 2010) and *M. mystacinus*, *Nyctalus noctula*, *Pipistrellus* cf. *pygmaeus* (Ševčík et al. 2010). Our findings come mostly from three bat species of the genus *Pipistrellus* and in one case from *M. schreibersii*.

In Europe, altogether 15 spinturnicid mite species have been recorded on bats, one species of the genus *Paraperiglischrus* Rudnick, 1960, one species with two subspecies of the genus *Eyndhovenia* Rudnick, 1960 and 13 species of the genus *Spinturnix* von Heyden, 1826 (Deunff 1977, Uchikawa & Dusbábek 1978, Deunff et al. 1986, 1990, 1997, 2004).

In Slovakia, findings of the spinturnicid *E. e. euryalis* from the bat *Rhinolophus euryale* are known from the karstic area of Slovenský kras (Uchikawa & Dusbábek 1978). In our extensive material from the karstic areas of Slovenský kras and Drienčanský kras we recorded an abundant occurrence of this species on *R. euryale* and sporadic occurrence on *M. schreibersii* and *R. hipposideros*. We did not record occurrence of the spinturnicid *Eyndhovenia hipposideros* Baker et Delfinado, 1964 on *Rhinolophus hipposideros*. Occurrence of the subspecies *E. e. oudemansi* on the bat *R. ferrumequinum* from Slovenský kras was published by Uchikawa & Dusbábek (1978). Our material also comes from this territory and from the same host.

The spinturnicid *Paraperiglischrus rhinolophinus* was collected from *Rhinolophus euryale* and *R. hipposideros*, also from Slovenský kras (Dusbábek 1962). Our findings of this spinturnicid come, out of the bat species mentioned above, sporadically also from *M. schreibersii* from the karstic areas of Slovenský kras and Drienčanský kras. On six bats *N. lasiopterus* caught in Central Slovakia (Uhrin et al. 2006) we found 57 individuals of *Spinturnix acuminata*. Our extensive material of this species was collected from *Nyctalus noctula* and a smaller number of individuals also from *N. lasiopterus*. Findings of *S. myotis* from the former Czechoslovakia come from the bats *R. euryale*, *M. myotis*, *M. daubentonii*, *M. blythii*, *M. nattereri*, *M. emarginatus*, *P. auritus* and *E. serotinus* (Dusbábek 1962). In the colonies of *M. myotis* in the Drienovská jaskyňa cave, the dominance of this mite species reached 66.2%, while in the church in the Rochovce village even 97.8% (Uhrin et al. 2010). Our findings of this spinturnicid come predominantly from *M. myotis*, but we also recorded it on *N. nattereri* and sporadically on *M. mystacinus* and *M. schreibersii*. During the study of phenology, food and ectoparasites of *N. leisleri* (n=177) in Central Slovakia, the frequency of *S. helvetiae* was 55.4% (Kaňuch et al. 2005). We observed sporadic and occasional occurrence of this spinturnicid on *M. daubentonii*. Findings of the species *S. kolenatii* from *Eptesicus nilssonii* and *E. serotinus* in Slovakia were published by Dusbábek (1962). Our material also comes from these bat species. In eastern Slovakia, 14 specimens of *S. mystacina* were found on 11 individuals of *M. alcaethoe* (Danko et al. 2010). Our records come from the bats *M. mystacinus*, *M. brandtii*, as well as from *M. alcaethoe*. The species *Spinturnix psi* was abundantly represented in our material. It was collected in the karstic areas of Slovenský kras and Drienčanský kras. Occurrence of this mite species on the bats *M. schreibersii* and *M. myotis* in Slovenský kras was recorded by Dusbábek (1962).

Among six species of spinturnicid mites newly recorded for the fauna of Slovakia, abundant occurrence in our material was recorded in *Spinturnix andegavina* from *Myotis daubentonii* and *S. bechsteini* from *M. bechsteinii*, whereas low abundance or sporadic occurrence was recorded in *S. emarginata* from the bat *M. emarginatus*, *S. punctata* from *Barbastella barbastellus*, *S. plecotina* from *Plecotus auritus* and *P. austriacus*, and *S. dasycnemi* from *Myotis dasycneme*. It can be assumed that due to the recently recorded occurrence of the bat *Hypsugo savii* in Slovakia, its specific parasite *Spinturnix nobleti* (Deunff et al. 1990) will also be found.

Bats in Central Europe are parasitized first of all by *Cimex pipistrelli* Jenyns, 1839 which, however, represents a group of taxa with definitely unresolved taxonomic status (Balvín 2008). Occurrence of the bugs of the *C. pipistrelli* group in Slovakia was published only from *N. noctula* (Krištofik & Kaňuch 2006), therefore the findings from the bats *M. myotis* and *N. leisleri* are new for this territory. Finding of *Cimex lectularius* published by Usinger (1996) comes from *Myotis blythii* and *M. myotis* collected in Chľaba in southern Slovakia by Povolný (1957).

From the family Nycteribiidae, nine species were recorded in bats in Slovakia: three species of the genus *Nycteribia*, one species from each of the genera *Acrocholidia* and *Phthiridium* and two species from each of the genera *Basilina* and *Penicillidia*. The species *Nycteribia kolenatii* was sporadically found on the bats *Myotis daubentonii* and *M. myotis* (Hürka 1964). Hürka (1980) considered it to be a rare species in Slovakia. Our findings give evidence that it is a relatively frequent bat fly on *M. daubentonii* also in Slovakia. *Nycteribia latreillii* was abundantly recorded on *Myotis myotis* (Grulich & Povolný 1955, Hürka 1964, Krištofik 1982, Uhrin et al. 2010) and *M. blythii* (Hürka 1964), sporadically on *Miniopterus schreibersii* (Grulich & Povolný 1955, Krištofik 1982), *Myotis emarginatus* (Krištofik 1982) and *Nyctalus leisleri* (Kaňuch et al. 2005). Our findings of this bat fly come only from *M. myotis*. The typical cave species *Nycteribia schmidlii* was found mainly on *Miniopterus schreibersii* (Grulich & Povolný 1955, Hürka 1964, Krištofik 1982), however, it was sporadically found also on *Myotis myotis* (Grulich & Povolný 1955, Hürka 1964, Krištofik 1982), *Rhinolophus hipposideros*, *Myotis bechsteinii* (Grulich & Povolný 1955), *M. blythii* and *Plecotus auritus* (Krištofik 1982), which also corresponds with our findings. Occurrence of *Penicillidia biarticulatum* was recorded mostly on *Rhinolophus ferrumequinum*, *R. hipposideros* (Grulich & Povolný 1955, Hürka 1964, Krištofik 1982) and *R. euryale* (Grulich & Povolný 1955, Hürka 1964), sporadic findings come from *Myotis myotis* (Grulich & Povolný 1955, Krištofik 1982) and *Barbastella barbastellus* (Krištofik 1982). Our individuals were collected from *Rhinolophus ferrumequinum*. Up to now, *Basilina italica* has been sporadically found in Slovakia on *Myotis mystacinus* (Hürka 1964), from which also our individuals were taken, and on *M. alcaethoe* (Danko et al. 2010). So far, only sporadic findings of *Basilina nana* have been made in Slovakia on *Myotis myotis* (Grulich & Povolný 1955, Hürka 1964, Krištofik 1982), *Barbastella barbastellus* (Grulich & Povolný 1955) and *Myotis blythii* (Hürka 1964). Our abundant findings of this species on the bat *Myotis bechsteinii* come from the broadleaved forests in eastern Slovakia. From our material, the new record for the fauna of Slovakia is the bat fly *Basilina nattereri*. The Mediterranean bat fly *Penicillidia conspicua* was recorded predominantly on the bat *Miniopterus schreibersii* (Grulich & Povolný 1955, Hürka 1964, Krištofik 1982), similarly as in our material. Sporadically it was also found on *Rhinolophus euryale* and *R. ferrumequinum* (Grulich & Povolný 1955). The subspecies *Penicillidia dufouri* occurs mainly on *Myotis myotis* (Grulich & Povolný 1955, Hürka 1964, Krištofik 1982) and *M. blythii* (Hürka 1964), occasionally also on *Rhinolophus euryale* (Grulich & Povolný 1955) and *Miniopterus schreibersii* (Grulich & Povolný 1955, Krištofik 1982). Our material comes from *Myotis myotis* and *Miniopterus schreibersii*. *Acrocholidia vexata* Westwood, 1835 is missing in our material, it is known mainly from *Myotis myotis* (Grulich & Povolný 1955, Hürka 1964, Krištofik 1982, Uhrin et al. 2010) and *M. blythii* (Hürka 1964) and sporadically also from *Miniopterus schreibersii* (Grulich & Povolný 1955, Krištofik 1982), *Nyctalus leisleri* (Kaňuch et al. 2005) and from an unknown host (Obenberger 1964). It can be assumed that the occurrence of the bat flies *Penicillidia monoceros* Speiser, 1900 and *Basilina mediterranea* Hürka, 1970 will be also confirmed. The former one parasitizes mainly *Myotis daubentonii*, while the latter one *Eptesicus serotinus* and *Pipistrellus pipistrellus*.

Up to now, 12 species of fleas of the family Ischnopsyllidae have been recorded on bats in Slovakia, among which 8 species belong to the genus *Ischnopsyllus*, one species to the genus *Rhinolophopsylla* and 3 species to the genus *Nycteridopsylla*. *Ischnopsyllus elongatus* was recorded on the bat *Nyctalus noctula* (Rosický 1952), in accordance with our material, and on *N. lasiopterus* (Uhrin et al. 2006). The species *Ischnopsyllus intermedius* was found on several bat species, viz. *Myotis myotis*, *M. blythii*, *Eptesicus serotinus* (Hürka 1957, 1963a, Dudich & Matoušek 1985, Trpiš 1994), *Vespertilio murinus* (Hürka 1957, 1963a), *Eptesicus nilssonii*, *Rhinolophus hipposideros* (Hürka 1963a, Dudich & Matoušek 1985, Trpiš 1994), *Myotis myotis* (Jurík 1966), *M.*

mystacinus (Trpiš 1994) and *Nyctalus leisleri* (Kaňuch et al. 2005). We recorded its occurrence on *Eptesicus nilssonii* and *Vespertilio murinus*. In accordance with our material, the flea *Ischnopsyllus octactenus* was collected by Hůrka (1957, 1963a) from the bat *Pipistrellus pipistrellus*, but Dudich & Matoušek (1985) and Trpiš (1994) collected it also from *Myotis mystacinus*, *Eptesicus nilssonii*, *Plecotus auritus*, *Myotis myotis*, *Rhinolophus ferrumequinum* and Dudich & Matoušek (1985) from *Barbastella barbastellus*. Our collections of the flea *Ischnopsyllus simplex* come from the bats *Myotis daubentonii*, *M. mystacinus* and *M. nattereri*. Hůrka (1963b) published findings from the bats *Myotis mystacinus* and *Barbastella barbastellus*, but Dudich & Matoušek (1985) and Trpiš (1994) give a wider specter of host bats for this flea (*Myotis mystacinus*, *Plecotus auritus* and *Myotis myotis*), Dudich & Matoušek (1985) *Eptesicus nilssonii* and Trpiš (1994) *Rhinolophus hipposideros*. Findings of the flea *Ischnopsyllus variabilis* on the bats *Barbastella barbastellus* and *Vespertilio murinus* were reported by Hůrka (1963a), while Kaňuch et al. (2005) recorded it from the bat *Nyctalus leisleri*. Our individual was collected on the bat *Pipistrellus nathusii*. The first data on the flea *Rhinolophopsylla unipectinata* from *Rhinolophus euryale* were published by Rosický (1948, 1950, 1951), and later by Jurik (1955, 1966) and Hůrka (1963b). Findings of this flea on the bat *Rhinolophus ferrumequinum* and *R. hipposideros* are given by Hůrka (1963b), Jurik (1966), Dudich & Matoušek (1985), Trpiš (1994), on *Miniopterus schreibersii* by Hůrka (1963b) and on *Myotis mystacinus* and *Plecotus auritus* by Dudich & Matoušek (1985), Trpiš (1994). Our material was collected on *Rhinolophus ferrumequinum*. Sporadic findings of the flea *Nycteridopsylla eusarca* from *Myotis blythii* were published by Hůrka (1963b), while our abundant material comes from *Nyctalus noctula*. Out of the species mentioned above, the flea *Ischnopsyllus hexactenus* (Kolenati, 1856) was recorded in Slovakia on several bat species *Myotis myotis*, *M. blythii*, *Eptesicus nilssonii*, *Plecotus auritus* and *Barbastella barbastellus* (Hůrka 1963b, Dudich & Matoušek 1985, Trpiš 1994), *Eptesicus serotinus* (Hůrka 1963b), *Rhinolophus ferrumequinum*, *Myotis myotis* (Jurik 1966) and *Myotis mystacinus* (Dudich & Matoušek 1985, Trpiš 1994). Other flea species were recorded sporadically: *Ischnopsyllus mysticus* Jordan, 1942 found on *Myotis mystacinus* (Hůrka 1963a, 1970) and *Eptesicus nilssonii* (Hůrka 1963a, Trpiš 1994), *Ischnopsyllus obscurus* (Wagner, 1898) from *Vespertilio murinus* (Hůrka 1957, 1963a), *Nycteridopsylla pentactena* (Kolenati, 1856), in which in one case only the locality is known, without specification of the host (Rosický 1957), and also recorded from the bats *Plecotus auritus*, *Barbastella barbastellus*, *Eptesicus serotinus* (Hůrka 1963b), as well as *Plecotus austriacus* (Hůrka 1970) and from *Myotis mystacinus* (Dudich & Matoušek 1985, Trpiš 1994) and *Nycteridopsylla dictena* (Kolenati, 1856), in which only the locality is known, without specification of the host (Rosický 1957).

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