

## Occurrence of Bat Ectoparasites in Latvia

GUNITA JAUNBAUERE<sup>1</sup>, INETA SALMANE<sup>2</sup>, VOLDEMĀRS SPUNĢIS<sup>3</sup>

<sup>1</sup> - National Diagnostic Center of Food and Veterinary Service of Latvia, 3 Lejupe Str., LV-1076 Rīga, Latvia; e-mail: gunita.jaunbauere@ndc.gov.lv

<sup>2</sup> - Institute of Biology, University of Latvia, 3 Miera Str., LV-2169 Salaspils, Latvia; e-mail: chuskauss@yahoo.com

<sup>3</sup> - Faculty of Biology, University of Latvia, 4 Kronvalda Blvd., LV-1586 Rīga, Latvia; e-mail: adalia@lanet.lv

JAUNBAUERE G., SALMANE I., SPUNĢIS V. 2008. OCCURRENCE OF BAT ECTOPARASITES IN LATVIA. – *Latvijas entomologs* 45: 38-42.

**Abstract:** The bat ectoparasites were studied on bats caught in the five localities in 2007. Ectoparasites were collected using modified method used for study of bird ectoparasites. Twelve ectoparasite species on seven bat species were recorded: eight mite, two flea and two bat fly species. Five parasite species are new for the fauna of Latvia.

**Key words:** Chiroptera, ectoparasites, Latvia.

### Introduction

The fauna of bat ectoparasites are insufficiently studied in Latvia. M.K.Stanyukovich (1990, 1997) presented some data on Parasitiformes mites. She mentioned parasitic mites and ticks for the Baltic States and Leningrad District, but no detailed information was presented particularly for the Latvia. A.Grīnbergs (1966) investigated parasitic Gamasina mites and mentioned *Spinturnix vespertilionis* (= *S. myoti*) found on bats. A.Grīnbergs (1976) mentioned in the flea catalogue four species on bats in Latvia, but no exact data were provided. Bat fly *Nycteribia pedicularia* LATREILLE was mentioned in the key for invertebrates (Tauriņš, Ozols 1957) without adding any collecting data.

Sixteen bat species are recorded in Latvia. The investigation of migration, distribution and behaviour of bats has activated during the last decades, thus promoting also study of their parasites. The aim of investigation is to study the ectoparasite fauna of bats in Latvia and characterise parasite populations.

### Methods

The bats were captured in the five localities in 2007: in Taurene where two bat

species have permanent nursery colonies in an old wooden church; near Kazugrava cave and Līgatne caves where bats have swarming place; near the Daugavpils fortress where bats also have swarming place; in Garkalne where rangy bat *Pipistrellus nathussi* have been caught in the exposed birdcages.

Bats were captured using bird net or gathered in birdcages. The modified method of collecting bird ectoparasites described by Bear (1995) was used for collecting bat ectoparasites. The captured bat was placed inside the plastic bag so that the body is inside the plastic bag and head – outside. A piece of cotton wool soaked with ethylacetate was placed in the plastic bag to kill the parasites. The bat has been hold in plastic bags for three to five minutes. After that bats were examined for visible or stacked ectoparasites on the body, wings and ears. Collected ectoparasites were preserved in 70% ethyl alcohol.

Ectoparasites were determined to the species using light microscopy. Reference collection of parasite species was prepared. Fleas, ticks and mites were dehydrated in a series of ethyl alcohol and mounted on slides in Canada balsam or Berlese media. Flies were dried and pinned. The rest of specimens were investigated in a light microscope directly or temporary slides were prepared. Different

identification keys were used (Dusbabek 1962, Evans, Till 1966, Hillyard 1996, Micherdzinski 1980, Rudnick 1960, Serdjukova 1955, Skalon 1970, Stackelberg 1970, Stanyukovich 1997).

### Results

Altogether 276 alive bats were investigated for parasites. The number of investigated bats from each species, the number of collected parasites, prevalence and mean intensity of parasites are presented in Table 1.

In total, 12 parasite species belonging to four families (insects and mites) were found. Eight mite species were identified. Of them *Spinturix myoti* (Spinturnicidae) was collected on six bat species, with exception of *Eptesicus nilssoni*. *Periglischirus* spp. (Spinturnicidae) was found only on *Eptesicus nilssoni*. The highest intensity – 52 individuals of ear ticks Trombiculidae per bat was stated on *Plecotus auritus*. *Steatonyssus cavus* (Macronyssidae) was collected from four bat species and the most numerous it was found on *Pipistrellus nathusii*. *Macronyssus crosbyi* (Macronyssidae) was collected from five bat species. The highest prevalence of *M. crosbyi* (26%) and intensity was on *Myotis dasycneme*. *Ixodes persulcatus* (Ixodidae) was found on five bat species. One individual of unidentified *Ixodes* sp. was found on *Myotis mystacinus*.

Two bat fly species have been collected. *Nycteribia pedicularia* have been found on *Myotis daubentoni* and *M. dasycneme*. The single specimen of *Nycteribia biarticulata* has been collected on *Myotis dasycneme*.

Two bat fleas *Ischnopsyllus hexactenus* and *Myodopsylla trisellis* were recorded. *I. hexactenus* were found on five, but *M. trisellis* – on two bat species.

### Discussion

The highest prevalence of *Spinturnix myoti* (68%) in our investigation was stated on *Myotis daubentoni*. This mite is recorded the most numerous on the bats of genus *Myotis*, but also they are recorded on specimens from genera *Pipistrellus*, *Plecotus* and *Vespertilio* (Stanyukovich 1990). Similar tendency also was found in our investigation (Table 1). A. Rudnick (1960) and R.K. Lučan (2006) noted the wing membranes as the only habitat for the Spinturnicidae mites, where they are spending all of their life cycle, and can survive maximum 48 hours without host. Possibly that is a reason, why exactly this species was recorded as the most numerous on five of seven bat species. M.K. Stanyukovich (1997) has mentioned four species of the genus *Spinturnix* for Latvia, but in this study we recorded only *S. myoti*. M.K. Stanyukovich (1990, 1997) recorded four Spinturnicidae species in Lithuania (one species differs as in Latvia) and four in Estonia, similar as in Latvia.

Three species of the family Macronyssidae were found in our investigation (Table 1). M.K. Stanyukovich (1990, 1997) mentioned four species of the genus *Macronyssus* recorded for fauna of Latvia. M.K. Stanyukovich (1997) mentioned three species from the genus *Steatonyssus* for Latvia excluding *S. cavus*. She mentioned this species from Kirghizstan on bat species, which is not distributed in Latvia. The highest prevalence of *S. cavus* (63%) was found on *Pipistrellus nathusii* – far migrating bat species. M.K. Stanyukovich (1990, 1997) recorded seven *Macronyssus* species from Estonia (two of them are different from Latvian) and three species from Lithuania, and two *Steatonyssus* species from Estonia and one from Lithuania.

Table 1. Species and characteristics of infrapopulations of ectoparasites on bats captured in Latvia in 2007. Remarks: \* - species new to the fauna of Latvia.

Bat species (sample size)	Ectoparasite species	Number of infested bats	Prevalence (%)	Mean intensity
<i>Myotis daubentoni</i> (74)	<i>Spinturix myoti</i> KOLENATI, 1856	50	68	1.5
	<i>Nycteribia pedicularia</i> LATREILLE, 1805	33	45	1.4
	<i>Macronyssus crosbyi</i> (EWING, STOVER, 1915)	9	12	0.3
	<i>Steatonyssus cavus</i> RYBIN, 1992 *	5	7	1.6
	Sp. ind. (nymph)	4	5	1.0
	<i>Ischnopsyllus hexactenus</i> (KOLENATI, 1856)	2	3	2.5
	Trombiculidae	2	3	2.0
<i>Myotis dasycneme</i> (35)	<i>Spinturix myoti</i> KOLENATI, 1856	18	51	1.7
	<i>Macronyssus crosbyi</i> (EWING, STOVER, 1915)	9	26	2.4
	<i>Nycteribia pedicularia</i> LATREILLE, 1805	4	11	1.3
	Sp. ind. (nymph)	4	11	1.8
	<i>Ischnopsyllus hexactenus</i> (KOLENATI, 1856)	2	6	1.5
	Trombiculidae	2	6	3.0
	<i>Steatonyssus cavus</i> RYBIN, 1992	2	6	1.0
	<i>Myodopsylla trisellis</i> JORDAN, 1929 *	1	3	1.0
	<i>Nycteribia biarticulata</i> (HERMANN, 1804) *	1	3	1.0
<i>Myotis brandti</i> (67)	<i>Spinturix myoti</i> KOLENATI, 1856	27	40	1.9
	<i>Steatonyssus cavus</i> RYBIN, 1992	6	9	4.3
	Trombiculidae	6	9	4.2
	<i>Myodopsylla trisellis</i> JORDAN, 1929	5	7	1.4
	<i>Ischnopsyllus hexactenus</i> (KOLENATI, 1856)	4	6	1.5
	Sp. ind. (nymph?)	2	3	1.0
	<i>Macronyssus crosbyi</i> (EWING, STOVER, 1915)	2	3	2.5
<i>Myotis mystacinus</i> (13)	<i>Spinturix myoti</i> KOLENATI, 1856	2	15	1.0
	<i>Ischnopsyllus hexactenus</i> (KOLENATI, 1856)	2	15	1.0
	<i>Ixodes</i> sp.	1	8	1.0
	<i>Myodopsylla trisellis</i> JORDAN, 1929	1	8	1.0
<i>Eptesicus nilssoni</i> (19)	<i>Periglischirus</i> sp. 1 *	3	16	2.7
	<i>Macronyssus</i> sp.	3	16	2.3
	<i>Macronyssus crosbyi</i> (EWING, STOVER, 1915)	2	11	1.0
	<i>Periglischirus</i> sp. 2 *	2	11	1.5
	Trombiculidae	1	5	1.0
<i>Pipistrellus nathusii</i> (56)	<i>Steatonyssus cavus</i> RYBIN, 1992	35	53	2.0
	<i>Macronyssus crosbyi</i> (EWING, STOVER, 1915)	12	21	1.6
	<i>Ischnopsyllus hexactenus</i> (KOLENATI, 1856)	9	16	1.0
	Sp. ind. (nymph)	7	13	1.7
	<i>Spinturix myoti</i> KOLENATI, 1856	5	9	1.0
<i>Plecotus auritus</i> (7)	<i>Spinturix myoti</i> KOLENATI, 1856	2	29	2.0
	<i>Ischnopsyllus hexactenus</i> (KOLENATI, 1856)	2	29	1.5
	Trombiculidae	2	29	26.0
	Sp. ind. (nymph)	1	14	1.0

Bat fly *Nycteribia pedicularia* was found only on *Myotis daubentoni* and *M. dasycneme*. The highest prevalence (45%) was stated on *M. daubentoni*. The maximum four bat flies were caught on one bat. Only one individual of *Nycteribia biarticulata* were caught directly on

*Myotis dasycneme*. Mostly these flies have been caught free walking in the box where bats were holed or on researchers. *N. biarticulata* is larger than *N. pedicularia*. Due to this *N. biarticulata* tend to congregate on the body areas protected from the host grooming activities – between

shoulder blades, under the chin or in the axilla of roosting hosts or in flying hosts, in the tail region (Lehane 2005). The legs of nycteribiids are elongate and bear claws, which allow moving rapidly over the host's surface. These large in body size species often leave the host if disturbed. Nycteribiids are associated with hibernating bats on which, although they continue to feed, reproduction is greatly slowed or ceases altogether, so population size falls to its lowest levels in the winter months (Lehane 2005).

Spinturnicidae and Macronyssidae mites and Nycteribiidae flies were recorded by A.Zahn and D.Rupp (2004) to be the most frequent ectoparasites of *Myotis daubentonii* in Bavaria (Germany). The similar observations were made in our investigation.

A.Grīnbergs (1976) mentioned four flea species, but only *Ischnopsyllus hexactenus* was detected in this study. The prevalence of *Myodopsylla trisellis* varied from 3% to 7%. This flea has been collected only on adults of *Myotis brandtii* and *M. dasycneme*. *Ischnopsyllus hexactenus* was common bat flea species and has been found mostly on adult bat males, but few – on juveniles.

### Acknowledgements

The authors thank Latvian chiropterologists for assistance in capturing bats, namely to G.Pētersons, V.Vintulis, J.Šuba and numerous other chiropterologists. Also authors are grateful P. Mašán (Institute of Zoology, Slovak Academy of Sciences, Bratislava) for the comments on determination of Gamasina species.

### Kopsavilkums

2007. gadā piecās vietās – Taurenē, Kazu gravā, Līgatnē, Daugavpils cietoksnī un Galkalnē tika ķerti sikspārņi, lai noteiktu to ektoparazītu faunu. Ektoparazītu ievākšanai no sikspārņiem tika izmantota modificēta putnu ektoparazītu ievākšanas metode vai tie ievākti putnu būrīšos. Kopā tika apsekotas septiņas sikspārņu sugas un konstatētas 12 ektoparazītu sugas, tai skaitā astoņas ērcu, divas blusu un

divas sikspārņmušu sugas. Piecas no konstatētajām sugām ir jaunas Latvijas faunai.

### References

- Bear A. 1995. An improved method for collecting bird ectoparasites. – *Journal of Field Ornithology* **66**, No. 2: 212-214.
- Dusbabek F., 1962. Parasitische Fledermausmilben der Tschechoslowakei I. Fam. Spinturnicidae Oudemans, 1901 (Acarina, Gamasides). – *Časopis Československe Společnosti Entomologicke* **59**, No. 4: 357-381.
- Evans G.O., Till W.M. 1966. Studies on the British Dermanyssidae (Acari: Mesostigmata). Part II Classification. – *Bulletin of the British Museum (Natural History), Zoology* **14**, No. 5: 370 pp.
- Grīnbergs A. 1976. Katalog der Flöhe (Siphonaptera) Lettlands. – *Latvijas entomologs* **18**: 5-26 (in Latvian, German summary).
- Grīnbergs A.R. 1966. [The characteristics of parasitic gamasin mites in Latvian SSR]. – In: B.E.Bihovskij (ed.). *The 1<sup>st</sup> acarological symposium*. Moscow-Leningrad, Nauka: 71-72 (in Russian).
- Hillyard, P.D., 1996. *Ticks of North-West Europe*. The Natural History Museum, London: 1-178 pp.
- Lehane M. 2005. *The Biology of Blood-Sucking in Insects*. 2<sup>nd</sup> ed. Cambridge University Press, Cambridge: 336 pp.
- Lučan, R.K., 2006. Relationships between the parasitic mite *Spinturnix andegavinus* (Acari: Spinturnicidae) and its bat host, *Myotis daubentonii* (Chiroptera: Vespertilionidae): seasonal, sex- and age-related variation in infestation and possible impact of the parasite on the host condition and roosting behavior. – *Folia Parasitologica* **53**: 147-152.
- Micherdzinski W. 1980. *Eine taxonomische analyse der familie Macronyssidae Oudemans, 1936. 1. Subfamilie Ornithonyssinae Lange, 1958 (Acarina, Mesostigmata)*. Panstwowe Wydawnictwo Naukowe, Warszawa, Krakow: 264 pp.
- Ozols E. 1957. Diptera. – In: E.Tauriņš, E.Ozols (eds.) [*Identification key of Latvian*

- animals. I. Invertebrates*]. Rīga, LVI: 634-655 (in Latvian).
- Rudnick A., 1960. A revision of the mites of the Family Spinturnicidae (Acarina). – *Berkley and Los Angeles University of California publications in entomology* **17**, No. 2: 157-284.
- Serdjukova G.V. 1955. Mites of the family Ixodidae Murrey. In: E.N. Pavlovskii (ed.) *Parasitic mites of rodents in USSR*. Izdatel'jstvo Akademii Nauk SSSR, Moscow-Leningrad: 376-415.
- Skalon O.I. 1970. [Order Siphonaptera (Aphaniptera, Suctoria) – fleas]. – In: G.Y.Bei-Bienko (ed.) *Identification key to the insects of the European part of the USSR*. **5**, part 2. Diptera, Siphonaptera. Nauka, Leningrad: 799-844 (in Russian).
- Stackelberg A.A. 1970. Nycteribiidae. – In: G.Y.Bei-Bienko (ed.) *Identification key to the insects of the European part of the USSR*. **5**, part 2. Diptera, Siphonaptera. Nauka, Leningrad: 603-607 (in Russian).
- Stanyukovich M.K. 1990. [The gamasid mites and argasid ticks of bats from Baltic States and Leningrad district]. – *Parasitologiya* **24**, No. 3: 193-199 (in Russian).
- Stanyukovich M.K. 1997. Keys to gamasid mites (Acari, Parasitiformes, Mesostigmata, Macronysoidea et Laelaptoidae) parasitizing bats (Mammalia, Chiroptera) from Russia and adjacent countries. – *Rudolstadter naturhistorische Schriften* **7**: 13-46.
- Zahn, A., Rupp, D., 2004. Ectoparasite load in European vespertilionid bats. – *Journal of Zoology* **262**: 383-391.

Received: February 18, 2008.