

***Spinturnix helvetiae* DEUNFF & KELLER & AELLEN, 1986 (Acari: Mesostigmata: Spinturnicidae) – a new mite species in the Polish fauna**

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Abstract. *Spinturnix helvetiae* DEUNFF, KELLER, AELLEN, 1986 (Acari: Mesostigmata: Spinturnicidae) is ascertained in the Polish fauna for the first time. The checklist of Spinturnicidae mites observed on bats of Poland is supplemented with the newly discovered species and it contains now 8 species of mites (including one with two subspecies). A number of new morphological features differentiating *Spinturnix helvetiae* infesting *Nyctalus leisleri* from closely related *Spinturnix acuminatus* (KOCH, 1836) infesting *Nyctalus noctula* are described.

Key words: Acari, Mesostigmata, Spinturnicidae, *acuminata*-group, *Spinturnix helvetiae*, Taxonomy, diagnostic features, Chiroptera, Poland.

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I. INTRODUCTION

Mites of the family Spinturnicidae are obligatory permanent ectoparasites occurring on wing membranes, lids and in an anal orifice of bats. Highly advanced adaptations to parasitism and a strongly marked host specificity suggest that spinturnicid mites and their hosts could evolve parallelly (DUSBABEK 1971). The specialization to the conditions existing on the bats' body is expressed in spinturnicid's morphology, behaviour and biology. Spinturnicidae are viviparous, their life cycle is of the binymphal type, protonymph and deutonymph as well as the adult stages are active and parasitic. The family represent a haemato-lymphophagic type of nutrition and the food is sucked by the modified mouth parts of gnathosoma. Good attachment to the skin is realized mainly by means of dorso-ventrally flattened idiosoma, well developed legs equipped with strong claws (subfamily Spinturnicinae) or additionally a significantly expanded opistosoma (subfamily Periglischrinae).

There have been 7 species of Spinturnicidae mites observed in Polish fauna (including one species with two subspecies) till now. All of them belong to the genus *Spinturnix*. Spinturnicidae of Poland have been recorded from 13 species of bats (FERENC & SKORACKI 2000). According to the

publications clearing with European Spinturnicidae and their distribution it can be presumed that further research on the parasites of bats in Poland (especially those infesting rare species of bats and omitted from parasitic investigations) will probably elongate the Polish Spinturnicidae checklist by another 6 species (FERENC & SKORACKI 2000). *Spinturnix helvetiae* (Figs 1,2) found recently is one of this “expected species”.

Like other members of the family, *Spinturnix helvetiae* is a highly host specific parasite and seems to be exclusively restricted to *Nyctalus leisleri* (KUHLE 1817).

II. MATERIALS AND METHODS

Spinturnicidae mites were collected from bats captured in mist nets. They were removed from the wing membranes by the means of tweezers and conserved in vials containing 70% ethyl alcohol. To obtain permanent preparation, an alcohol preserved material was washed in distilled water and directly placed into Błaszak Liquid (BŁASZAK 1980) on microscope slides. Drawings were made under a Nikon microscope.

Material was deposited in the collections of the Department of Animal Morphology at Adam Mickiewicz University in Poznań.

Spinturnix helvetiae DEUNFF & KELLER & AELLEN, 1986

Synonymy: *Spinturnix acuminatus acuminatus* (KOCH, 1836) in PINCZUK (1971)

M a t e r i a l. Slide No 854. Białowiecki National Park, Hwoźna River, 27.06.2000. leg. Hanna FERENC – 1 female ex. *Nyctalus leisleri*; det. Hanna FERENC/2002. Slide No 1045. Silesian Lowland, Łęczysk Reserve, 29.07.2001. leg. Hanna FERENC – 2 females ex. *Nyctalus leisleri*; det. Hanna FERENC/2002.

Recorded distribution: Col de Bretolet, Valais, Switzerland (DEUNFF *et al.* 1986), Moldavia (PINCZUK 1971), ex USSR: Belorussia (STANYUKOVICH, 1997).

New record: Białowiecki National Park, Silesian Lowland, Poland.

Type host: *Nyctalus leisleri* (KUHLE, 1818).

A detailed description of *Spinturnix helvetiae* was published by DEUNFF *et al.* (1986). Hence, only general morphology based on the prime key features is included in this work. The set of diagnostic features was composed on the basis of data given by DEUNFF *et al.* (1986), PINCZUK (1971) and my own observations and morphometrical measurements.

M o r p h o l o g y. Female (Figs 1,2): idiosoma 960-1200µm long, 730-865µm wide, 1-3 pairs sternal setae located outside sternal shield, sternal shield 130-168µm long, 78-121µm wide, 21-33 opisthventral setae, endopodal shields placed exclusively between coxae I and II, 17-27µm* long, postanal seta 29-34µm* long, dorsal shield 739-835µm long, 403-475µm wide, 33-61 opisth-dorsal setae, the first pair of podonotal setae 38-67µm long, distance between them 53-58µm*, gnatosoma 120-136µm* wide, distance between gnatosomal setae 50-53µm*, femora I wide 140-178µm*, postero-ventral seta of coxae II 250-259µm* long, postero-ventral seta of genua II 206-225µm* long, ventral seta of coxae IV 19-23µm* long, proximal-ventral seta of trochanters IV 19-23µm* long, antero-distal-dorsal seta of femora IV 346-370µm* long.

Male: idiosoma 915-1050µm long, 690-780µm wide, 3 pairs of sternal setae located on the sternal shield, 1 pair outside the shield, sternal shield 282-330µm long, 144-178µm wide, 14-18 opisthventral setae, dorsal shield 725-800µm long, 485-530µm wide, the surface of dorsal shield pitted, 24-41 opisth-dorsal setae.

* – new diagnostic features differentiating *Spinturnix helvetiae* from *Spinturnix acuminatus*.



Fig. 1. *Spinturnix helvetiae*, female, ventral view of the body.

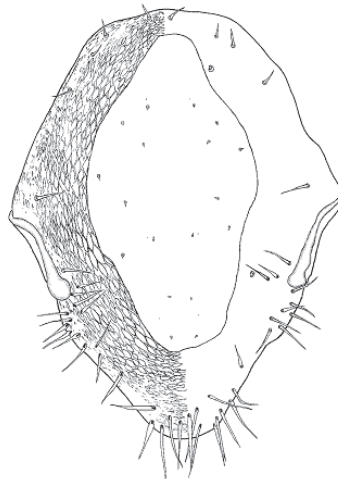


Fig. 2. *Spinturnix helvetiae*, female, dorsal view of idiosoma.

III. DISCUSSION

Spinturnix helvetiae is closely related to other species distributed in Europe like: *Spinturnix acuminatus* (KOCH, 1836) infesting *Nyctalus noctula* (SCHREBER, 1774), *Spinturnix punctata* (SUNDEVALL, 1833) infesting *Barbastella barbastellus* (SCHREBER, 1774) and *Spinturnix noblei* DEUNFF, VOLLETH, KELLER, AELLEN, 1990 infesting *Pipisterillus savii* (BONAPARTE, 1837). All parasites mentioned above belong to the *acuminata* group (DEUNFF *et al.* 1986), (UCHIKAWA 1994) which was composed on the basis of the following common characters: 6 pairs of podonotal setae, 4 macrochaets on the dorsal side of femora II, irregular sculpture of the sternal shield, lack of endopodal shields between coxae II and III. Inside the group morphological variability can be observed and some species seem to share more features than the others. *Spinturnix helvetiae* and *Spinturnix acuminatus* have the most in common and this fact let UCHIKAWA (1996) make suggestion that *Spinturnix helvetiae* should be degraded to the subspecies of *Spinturnix acuminatus* while the rest of European *acuminata* group members should retain their species rank.

The initial attempt to work out and split composed *Spinturnix acuminatus* (re-described by RUDNICK 1960) was made by DUSBABEK (1962). The first taxone separated and raised to the subspecies level was *Spinturnix acuminatus bohemicus* (*Spinturnix punctata*) infesting *Barbastella barbastellus* which was differentiated from *Spinturnix acuminatus* mainly because of its unique shape and sculpture of dorsal shield and length of the podonotal and opistodorsal setae. *Spinturnix punctata* became re-described and regarded as a valid species in 1997 (DEUNFF *et al.*). PINCZUK (1971) made another study of *Spinturnix acuminatus* and confirmed its composed character. She proved once again its difference from *Barbastella barbastellus* parasite (named there *Spinturnix acuminatus barbastelli*) and additionally focused her attention on spinturnicid mites infesting *Nyctalus leisleri*. She pointed at the variety in size and number of endopodal shields and size of sternal and genital shields between mites infesting *Nyctalus noctula* and *Nyctalus leisleri*. The problematic systematic position of spinturnicid from *Nyctalus leisleri* remained unsolved till DEUNFF *et al.* (1986) re-examined their external morphology and pointed at its high specificity to the host and eventually described them in the species rank as *Spinturnix helvetiae*. In 1995 *Spinturnix helvetiae* appeared in the keys to the gamasid mites parasitizing bats (STANYUKOVICH 1995, 1997) but correct species marking seems to be problematic because of too narrow range of number of opistodorsal setae used in these keys.

New differentiating features (*) mentioned in this paper can be useful for correct identification of females of *Spinturnix helvetiae* and *Spinturnix acuminatus* and they indicate that the evolutionary branches of both populations diverged. In this place it is necessary to provide the condition that according to a statistically insufficient sample of measurements (only 3) taken from *Spinturnix helvetiae*, further studies and relevant discrimination analysis will be in needed to evaluate the diagnostic utility of these features.

The high level of similarity between both species suggests that the speciation took place more recently than that of *Spinturnix punctata* or *Spinturnix noblei*. The fact that the morphological differentiation of *acuminata* group fits in with phylogenetic relations of their hosts (genus *Nyctalus* is infested by the most related species) implicates the parallel progress of evolution which was already suggested by DUSBABEK (1971). The reproductive isolation under the conditions of sympatric distribution of hosts could be guaranteed by the high host specificity and this way the speciation of alloxic type (COMBES 1999) could be possible.

REFERENCES

- BŁASZAK C. 1980. Badania metodyczne nad określeniem mikrośrodków roztoczy z podrzędu Mesostigmata (Acari) podłoża boru sosnowego Wielkopolskiego Parku Narodowego. *Polskie Towarzystwo Gleboznawcze. Prace Komisji Naukowej*, 3(24): 5-10.

- COMBES C. 1999. Ekologia i ewolucja pasożytnictwa. Długotrwałe wzajemne oddziaływania. Polskie Wydawnictwo Naukowe. Warszawa, **6**: 158-164.
- DEUNFF J., KELLER A., AELLEN V. 1986. Decouverte en Suisse d'un parasite nouveau, *Spinturnix helvetiae* n. sp. (Acarina, Mesostigmata, Spinturnicidae) spécifique de *Nyctalus leisleri* (Chiroptera, Vespertilionidae). *Revue suisse de Zoologie*, **93**: 803-812.
- DEUNFF J., KELLER A., AELLEN V. 1997. Redescription of *Spinturnix punctata* (Sundevall, 1833) (Acari, Mesostigmata, Spinturnicidae), a specific parasite of *Barbastella barbastellus* (Chiroptera, Vespertilionidae). *Revue suisse de Zoologie*, **104**(1): 199-206.
- DEUNFF J., VOLLETH M., KELLER A. 1990. Description de *Spinturnix nobleti* (Acari: Mesostigmata: Spinturnicidae) parasite spécifique de *Pipistrellus savii* (Chiroptera, Vespertilionidae). *Revue suisse de Zoologie*, **97**(2): 477-488.
- DUSBABEK F. 1971. Phylogeny of mites of the family *Spinturnicidae* Oudms (Acarina). *Proceedings of XIII th. International Congress of Entomology*, **1**(1): 241-242.
- DUSBABEK F. 1962. Parasitische Fledermausmilben der Tschechoslowakei I. Fam. Spinturnicidae Oudems, 1901 (Acarina, Gamasides). *Acta Societatis Entomologicae Czechoslovaniae*, **59**(4): 357-379.
- FERENC H., SKORACKI M. 2000. Stan zbadania roztoczy z rodziny Spinturnicidae (Acari: Mesostigmata) w Polsce. *Wiadomości Parazytologiczne*, **46**(4): 433-438.
- PINCZUK L.M. 1971. Paraziticheskiye kleszczy semejstwa Spinturnicidae (Parasitiformes: Gamasoidea) ot letuschykh myszej Moldawii. *Parasity zywotnych i rastenii. Kiszyniew*, **7**: 93-110.
- RUDNICK A. 1960. A Revision of Mites of the Family Spinturnicidae (Acarina). *University of California Publications in Entomology*, **17**: 157-284.
- STANYUKOVICH M. K. 1995. *Spinturnix bregetovae* sp. n. (Gamasina: Spinturnicidae), a new species of parasitic mites from the bats. *Acarina*, **3**: 105-112.
- STANYUKOVICH M. K. 1997. Keys to the gamasid mites (Acari, Parasitiformes, Mesostigmata, Macronyssoida et Laelaptoidea) parasitizing bats (Mammalia, Chiroptera) from Russia and adjacent countries. *Rudolstaedter Naturhistorische Schriften*, **7**: 13-46.
- UCHIKAWA K. 1994. Contribution to the taxonomy of the genus *Spinturnix* with the erection of a new genus *Emballonuria*. *Folia Parasitologica*, **41**: 287-304.