

First record of *Steatonyssus noctulus* Rybin, 1992 in Central Europe

(Acari, Mesostigmata, Macronyssidae)

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The bat parasitizing mite *Steatonyssus noctulus* is recorded for the first time in Germany. The mite was found in Bavaria on its specific host *Nyctalus noctula*. This is the first record outside of the former USSR. A brief redescription of *S. noctulus* is given, which makes it possible to distinguish this species from *S. spinosus* and *S. periblepharus*, the two other common species of the genus *Steatonyssus* frequently found on bats in Germany. Further *S. noctulus* appears together with *Macronyssus flavus* on *Nyctalus noctula*. Females of *Steatonyssus* can be characterised according to the length of M11, which in *S. noctulus* is as long as D5-7, in *S. spinosus* a little bit shorter than D5-7 and in *S. periblepharus* very short. All collected mites have been deposited in the collection of the Zoologische Staatssammlung München (ZSM).

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Introduction

Steatonyssus Kolenati, 1858 is the most speciose genus of the family Macronyssidae. The genus is widely distributed throughout the world, occupying all zoogeographical regions. These mites are parasites of small mammals, especially bats (Micherdzinski 1980). Many of the bat parasitizing species are host specific, but others appear to parasitize multiple hosts (Radovsky 1967, Micherdzinski 1980, Schmidt 1987, Kulzer 1998). An example is *Steatonyssus spinosus*, which is reported to live on 16 species of bats, including *Nyctalus noctula* (Radovsky 1967, Schmidt 1987, Stanyukovich 1997).

The present study did not locate *S. spinosus* on *Nyctalus noctula* in Germany. However, the closely related species *S. noctulus* was located. This finding represents the first record of *S. noctulus* outside of the former USSR (Russia, Latvia, Belorussia, Moldava, Ukraine, Azerbaidjan, Kazachstan, Kirgizstan) (Stanyukovich 1997). As the name implies, *S. noctulus* is strongly associated with the bat *Nyctalus noctula*, but also described from *Miniopterus schreibersi* (Stanyukovich 1997). In the present communication scanning electron microscopic illustrations and a diagnosis together with *S. spinosus* is presented to facilitate its determination.

Materials and methods

Parasites were collected from living bats with the help of authorised persons. After inspection, all bats were returned to their roosts. Dead, injured or exhausted bats living in the care of humans were also examined. The fur and patagium of more than 1122 bats (more than 780 living and 342 dead bats) of 23 species was investigated thoroughly on the occurrence of parasites. The collected mites were

preserved in 70 % ETOH. The investigated bats belonged to the following species (number of individuals in brackets): *Myotis myotis* (467)- *M. blythii* (1)- *M. bechsteinii* (6) – *M. nattereri* (42) – *M. daubentonii* (87) – *M. emarginatus* (9) – *M. mystacinus* (79) – *M. brandtii* (20) – *Pipistrellus pipistrellus* (127) – *P. nathusii* (6) – *P. savii* (1) – *Eptesicus serotinus* (6) – *E. nilsonii* (10) – *Nyctalus noctula* (114) – *N. leisleri* (3) – *Vespertilio murinus* (16) – *Plecotus auritus* (45) – *P. austriacus* (17) – *Barbastellus barbastellus* (7) – *Rhinolophus ferrumequinum* (2) – *R. hipposideros* (2) – *R. mehelyi* (5) – *Miniopterus schreibersii* (>50). For light microscopy, they were cleared in warm 50% lactic acid. For scanning electron microscopy (SEM) specimens were dehydrated in a graded ETOH series, critical – point dried in a Polaron E3000 CP, sputtered in a Bio-Rad SC 510 sputter coater and studied under a Philips XL 20 SEM. Only adult females of the genus *Steatonyssus* were determined.

The terminology for the characters and the setal notation is based on Radovsky (1967).

Occurrence and distribution

Steatonyssus noctulus was frequently found on *N. noctula* in Bavaria in the following districts: AÖ, FFB, FS, LA, M, MÜ and PAN (registration numbers). The parasite occurs in association with *Macronyssus flavus*, a specific mite on *N. noctula* (Radovsky 1967, Schmidt 1987, Stanyukovich 1997). Nearly all individuals of *N. noctula* examined were infested by *M. flavus*. *S. noctulus* was not found as frequently as *M. flavus*, but always in association with it. The number of *S. noctulus* parasitizing a given bat was always less than that of *M. flavus*. Although all bats examined during winter were either dead or living in human care, the degree of infestation with mites appears to be higher than in summer. This is true for *S. noctulus* as well as for *M. flavus*. *S. noctulus* was never found on another bat species other than *N. noctula*. Two other species of the genus *Steatonyssus* were frequently found on bavarian bats, *S. spinosus* and *S. periblepharus*. These species seem to be less host specific than *S. noctulus*. *S. spinosus* was recorded mainly on bats of the genus *Myotis*, especially *Myotis myotis*, whereas *S. periblepharus* was found especially on members of the genus *Pipistrellus*. In this study both species were never observed on *Nyctalus noctula*.

Morphological characters for determination

Females of the genera *Macronyssus* and *Steatonyssus* can be distinguished according to the following characters:

- *Steatonyssus*: Females with dorsal plate divided in two parts (Fig. A) and differentiated band on the posterior margin of the sternal plate (Fig. C).
- *Macronyssus flavus*: Dorsal plate single and undivided (Fig. B).

Protonymphs have two dorsal plates in both genera, but the pygidial plate of the protonymphs is much smaller than the opisthosomal plate of adult females in *Steatonyssus* (Figs A, D).

The main character to distinguish the three most common species of *Steatonyssus* in Bavaria is the length of the setae on the opisthosomal plate:

- *S. noctulus*: M11 is as long or even longer than D 5-7 (Fig. E). Measurement: average 51 (44-63) μm (Rybin 1992).
- *S. spinosus*: M 11 is a little bit shorter than D 5-7 (Fig. F). Measurement: 40 μm (Micherdzinski 1980), respectively 42-45 μm according to Radovsky (1967).
- *S. periblepharus*: Length of M11 is very much shorter than D 5-7 (Fig. G). Measurement: 11-15 μm (Radovsky 1967).

Sternal shield:

- *S. periblepharus*: Length of the sternal setae St 1 is not more than one half of the length of St 2.
- *S. noctulus* and *S. spinosus*: Length of St 1 is not shorter than St 2.

Relation between the length and the breadth of the podosomal plate according to the literature:

- *S. noctulus*: 1-1.11 (Rybin, 1992).
- *S. spinosus*: 1.15-1.2 in animals collected from *M. blythii* in Osch (Kirgizstan) (Rybin 1992), respectively 1.12-1.22 in animals collected from *Vespertilio superans* from Korea (Till & Evans 1964).

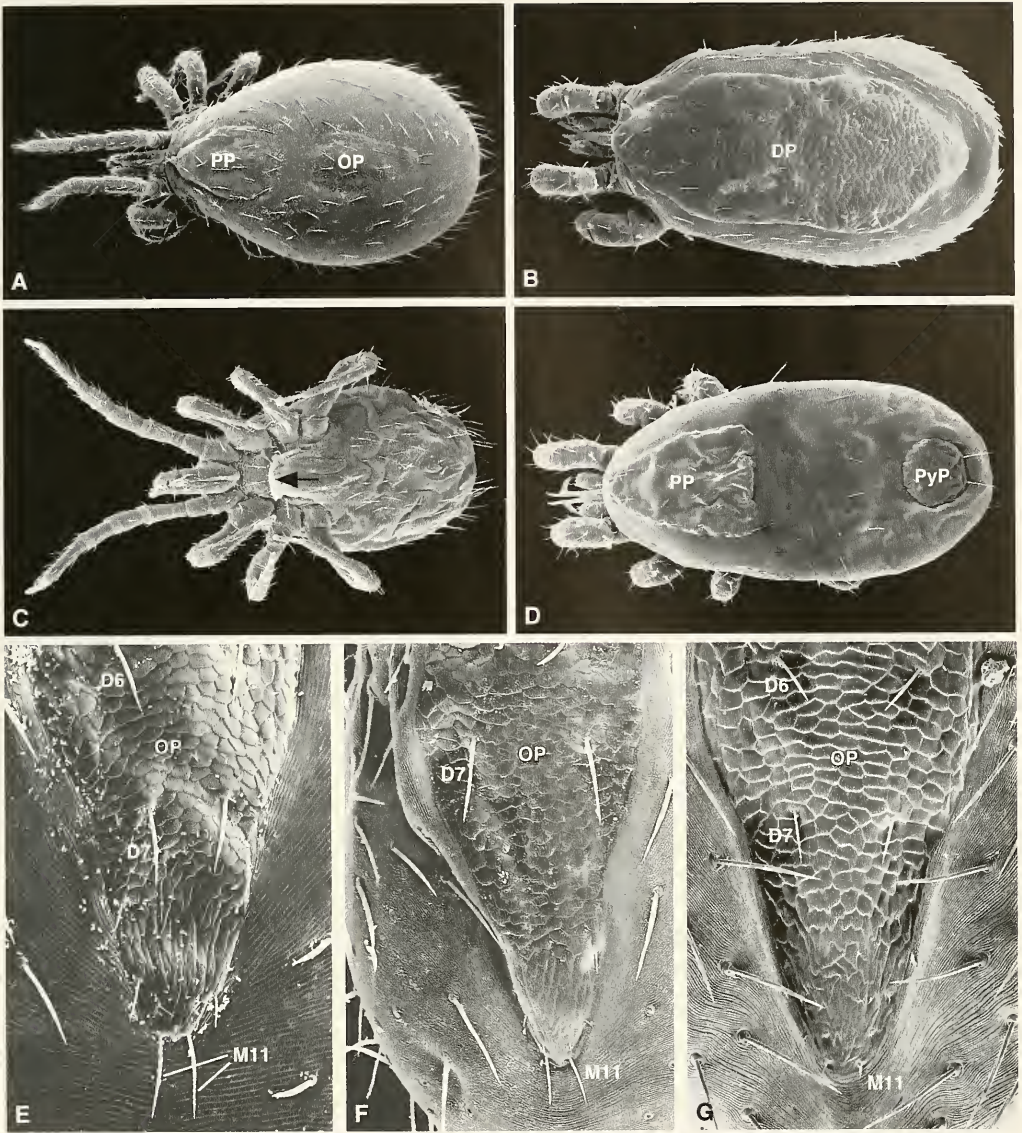


Fig. 1. A. Dorsal view of a female of *Steatonyssus noctulus* showing the separate podosomal (PP) and opisthosomal plate (OP), 320 μm . B. Dorsal view of a female of *Macronyssus flavus* with an undivided dorsal plate (DP), 180 μm . C. Ventral view of a female of *St. noctulus*. The arrow shows the differentiated band on the posterior margin of the sternal plate, which is typical for this genus, 290 μm . D. Dorsal view of a protonymph of *Macronyssus flavus*, 160 μm . Abbreviations: PP, podosomal plate; PYP, pygidial plate. E-G. Dorsal view of the posterior part of the opisthosomal plate (OP) of females of the genus *Steatonyssus* with its typical setae. E. *St. noctulus*, 80 μm . F. *St. spinosus*, 90 μm . G. *St. periblepharus*, 70 μm .

Relation between the length of tarsi 1 and tarsi 2 according to the literature:

- *S. noctulus*: 1.23-1.67 (Rybin 1992).
- *S. spinosus*: 1.14-1.18 (Rybin 1992).

Discussion

Steatonyssus noctulus appears to have just one host in Bavaria, *Nyctalus noctula*. Stanyukovich (1997) reported this mite also from *Miniopterus schreibersi* (Kuhl, 1819), but this bat does not occur in Bavaria. In contrast to our observations, some records of *S. spinosus* on *N. noctula* are known from Central Europe (Dusbabek 1964, Radovsky 1967, Schmidt 1987). Because *S. noctulus* was first described by Rybin only in 1992, we suggest, that these records are likely to be of *S. noctulus* instead of *S. spinosus*. Further, typical characters of different specimens of *S. spinosus* collected from different hosts by different authors show high levels of variation (see Morphological characters for determination). This and the fact, that many of the known bat parasites are very host specific (e.g. Spinturnicidae) confirm the presumption, that new species of the genus *Steatonyssus* remain to be described. Consequently as well careful reidentifications of collected mites as well as new studies should be done.

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