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# Keys to the gamasid mites (Acari, Parasitiformes, Mesostigmata, Macronyssoidea et Laelaptoidea) parasitizing bats (Mammalia, Chiroptera) from Russia and adjacent countries

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## 1. Introduction

The parasitofauna of bats is of considerable scientific interest in connection with a high degree of its ecological isolation and with a high specificity of the way of life of this numerous order of mammals. One of the most important group of the parasites of Chiroptera are the gamasid mites, which have been very poorly studied for quite a long time – the fact resulted from the hidden way of life of their hosts, as well as from the specific difficulties of catching bats and collecting the material. It's only in the first half of this century that there appeared the first notes on the gamasids of Chiroptera (RUDNICK 1960, EVANS & TILL 1964, RADOVSKY 1967). The representatives of four families of gamasids parasites on bats. Of Spelaeorhynhidae family, only one genus with three species is known to parasite on tropic bats, while of Laelapidae BERLESE, 1892 family, two genus with three species are known. Mites of Spinturnicidae family (10 genera with 91 species in world fauna; DUŠBÁBECK 1969, RADOVSKY 1985) are distributed, together with their hosts, through the whole world. The gamasids of Macronyssidae OUDEMANS, 1936 family, in addition to parasite on Chiroptera, parasite on reptiles, birds and other mammals.

The object of the present work consists in the systematic analysis of the fauna of gamasids of bats distributed in Russia and in adjacent countries, as well as in the compilation of definition keys and generalized data on the areas of gamasid species, i. d., bats without which the considerable part of researches in biology, spreading, the cycles of development, parasite and economy relations will loose their information sense. While analyzing the distribution of the gamasids of bats I used the following works related to the gamasids of bats inhabiting various regions: Finland (MRCIAK & NYHOLM 1967), Czechia and Slovakia (DUŠBÁBEK 1962, 1964 b, 1967 a, b, 1968), Germany (SCHMIDT 1987), Poland (HAITLINGER 1978 a, b, 1987, HAITLINGER & RUPRECHT 1982), Hungary (JUVARA 1967), Spain (DEUNFF 1977), Portugal (DEODALIO 1982), Egypt (KEEGAN 1956), Afghanistan (DUŠBÁBEK 1970), Mongolia (DUŠBÁBEK 1966), China (Teng 1980, 1981; Wang et al. 1986), Japan (UCHIKAWA & WADA 1979, UCHIKAWA & DUŠBÁBEK 1978), India (BHAT 1978, ADVANI & VAZIRANI 1981), Pakistan (ALLRED 1969), the Philippines (DELFINADO & BAKER

Tab. 1. Geographical records of gamasid mites of bats in Russia and adjacent countries. – Conditional means: a – Archangelsk district; b – Vologda district; c – St Peterburg destrict; d – Moscow destrict; e – Penza destrict; f – Voroneg district; g – Nidznyi Novgorod district; h – Tatarstan; i – Saratov district; j – Samara district; k – Volgograd destrict; l – Astrachan district; m – Stavropol district; n – North Osetia; o – Yecatherinburg district; p – Novosibirsk district; q – Krasnoyarsk district; r – Irkutsk district; t – Far East; u – Estonia; v – Latvia; w – Lithuania; x – Belorussia; y – Ukraine; z – Crimea; A – Moldova; B – Georgia; C – Armenia; D – Azerbeijan; E – Kazakhstan; F – Turkmenistan; G – Uzbekistan; H – Tadjikistan; I – Kirgizstan; * – own data; □ – literatur data; + – own and literature data.

| species/pleace of collecting | a | b | c | d | e | f | g | h | i | j | k | l | m | n | o | p | q | r |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. *Spinturnix myoti* | | * | * | * | * | * | * | | * | | * | | | * | * | | * | |
| 2. *S. plecotinus* | | | * | | * | * | | * | | | | | | * | | | * | |
| 3. *S. kolenatii* | | | * | | | | | * | | | * | * | | | | | * | * |
| 4. *S. acuminatus* | | | | | * | * | | | | * | * | | | | | | * | |
| 5. *S. barbastelli* | | | | | | | | | | | | | | | | | | |
| 6. *S. helvetiae* | | | | | | | | | | | | | | | | | | |
| 7. *S. nobleti* | | | | | | | | | | | | | | | | | | |
| 8. *S. psi* | | | | | | | | | | | | | | | | | | |
| 9. *S. mystacinus* | * | | * | | | | | * | | | | | | * | | | * | |
| 10. *S. emarginatus* | | | | | | | | | | | | | | | | | | |
| 11. *S. bakeri* | | | | | | | | | | | | | | | | | | |
| 12. *S. bregetovae* | | | | | | | | | | | | | | | | | | |
| 13. *S. maedai* | | | | | | | | | | | | | | | | | * | |
| 14. *Eyndhovenia euryalis euryalis* | | | | | | | | | | | | | | | | | | |
| 15. *E. e. oudemanis* | | | | | | | | | | | | | | | | | | |
| 16. *Paraperiglischrus rhinolophinus* | | | | | | | | | | | | | | | | | | |
| 17. *Steatonyssus aglaiae* | | | | | | | | | | | | | | | | | | |
| 18. *S. periblepharus* | | | | | * | * | | | | | * | * | | * | | | | * |
| 19. *S. spinosus* | | | | | | | | | | | * | | | | | | | |
| 20. *S. superans* | | | | | | | | | | | * | | | | | * | | |
| 21. *S. occidentalis evansi* | | | | | | | | | | | * | | * | | | | | |
| 22. *S. noctulus* | | | | | * | | | | | | | | | | | | | |
| 23. *S. cavus* | | | | | | | | | | | | | | | | | | |
| 24. *S. desertorus* | | | | | | | | | | | | | | | | | | |
| 25. *S. mongolicus* | | | | | | | | | | | | | | | | | | |
| 26. *Ornithonyssus pipistrelli* | | | | | * | | | | | | | | | * | | | | |
| 27. *O. hoogstraali* | | | | | | | | | | | | | | | | | | |
| 28. *O. flexus* | | | | | | | | | | | | | | | | | | |
| 29. *Macronyssus evansi* | | | | | | | | | | | | | | | | | * | |
| 30. *M. granulosus* | | | | | | * | | | | | | | | | | | * | |
| 31. *M. crosbyi* | | | * | | | | | | | | | | | | | | * | * |
| 32. *M. corethroproctus* | | | * | | * | | | | | | | | * | | | | | |
| 33. *M. flavus* | | | + | | * | | □ | | | * | + | | | | | | | |
| 34. *M. kolenatii* | | | | | * | * | | | | | * | | | | * | | | |
| 35. *M. charusnurensis* | | | | | | | | | | | | | | | | | * | |
| 36. *M. cyclaspis* | | | | | | | | | | | | | | | | | | |
| 37. *M. diversipilis* | | | * | | | | | | | | | | | | | | * | |
| 38. *M. heteromorphus* | | | | | * | * | | | | | | | | | | | * | |
| 39. *M. ellipticus* | | | * | | | | | | | | | | | * | | | | |
| 40. *M. rhinolophus* | | | | | | | | | | | | | | | | | | |
| 41. *M. barbastellinus* | | | | | | | | | | | | | | | | | | |
| 42. *Ichoronyssus scutatus* | | | | | | | | | | | | | | | | | | |

| species/pleace of collecting | s | t | u | v | w | x | y | z | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. *Spinturnix myoti* | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| 2. *S. plecotinus* | * | * | * | * | * | | * | | □ | | * | | | | * | * | |
| 3. *S. kolenatii* | | * | * | * | * | * | | □ | + | * | * | * | * | * | * | | + |
| 4. *S. acuminatus* | | * | * | * | | * | * | □ | □ | | | + | * | | | * | □ |
| 5. *S. barbastelli* | | * | | | * | | | | □ | | * | | | | | | □ |
| 6. *S. helvetiae* | | | | | | * | | * | | | | | | | | | |
| 7. *S. nobleti* | | * | | | | | | | | | | | | | | | |
| 8. *S. psi* | | * | | | | | * | | | * | + | + | | | | | |
| 9. *S. mystacinus* | | | | | | * | | | □ | | | | □ | | * | | |
| 10. *S. emarginatus* | | | | | | | | | | | | | | | * | | |
| 11. *S. bakeri* | | | | | | | | | | | | + | | | | | |
| 12. *S. bregetovae* | | * | | | | | | | | | | | | | | | |
| 13. *S. maedai* | | * | | | | | | | | | | | | | | | |
| 14. *Eyndhovenia euryalis euryalis* | | | | | | | | | | | + | + | | | | | |
| 15. *E. e. oudemanis* | | | | | | | | + | | | * | + | * | | * | * | * |
| 16. *Paraperiglischrus rhinolophinus* | | | | | | | | □ | + | | + | + | | | + | * | + |
| 17. *Steatonyssus aglaiae* | | | | | | | | * | | | | | | | | | |
| 18. *S. periblepharus* | | | * | * | * | | | | □ | * | + | + | * | * | * | * | + |
| 19. *S. spinosus* | | * | * | * | | | * | | + | | + | | | * | | | + |
| 20. *S. superans* | | + | | | | | | | | | | | □ | | * | | |
| 21. *S. occidentalis evansi* | | | | | | * | | | | * | | | * | | | * | + |
| 22. *S. noctulus* | | | | * | | * | * | * | * | | | * | * | | | | + |
| 23. *S. cavus* | | | | | | | | | | | | | | | | | + |
| 24. *S. desertorus* | | | | | | | | | | | | | | | | | + |
| 25. *S. mongolicus* | | | | | | | | | | | | | | | | * | |
| 26. *Ornithonyssus pipistrelli* | | * | | * | | | | | | * | | | | | | | |
| 27. *O. hoogstraali* | | | | | | | | | | | | | | | | | + |
| 28. *O. flexus* | | | | | | | | * | | | | | | | | * | |
| 29. *Macronyssus evansi* | | * | | | | * | | | | | | | | | | | |
| 30. *M. granulosus* | * | * | | | | | * | + | + | * | + | □ | + | | □ | | □ |
| 31. *M. crosbyi* | | * | * | | | | | | | | | | | | * | * | |
| 32. *M. corethroproctus* | | | | * | | | | | + | | | | * | | | | |
| 33. *M. flavus* | | □ | * | * | * | * | + | □ | + | | | □ | + | | | | □ |
| 34. *M. kolenatii* | | | * | * | * | | | * | □ | | + | | * | | * | | |
| 35. *M. charusnurensis* | * | * | | | | | | | | | | | □ | | | | |
| 36. *M. cyclaspis* | | | * | | * | | | | + | | | | | | □ | | □ |
| 37. *M. diversipilis* | | * | * | | | | | | + | | | | | | | | |
| 38. *M. heteromorphus* | * | * | | | | | | | | | | | | | | | |
| 39. *M. ellipticus* | | * | | * | | | | | + | | | | | | | | |
| 40. *M. rhinolophus* | | | | | | | | * | | | + | □ | | | □ | * | □ |
| 41. *M. barbastellinus* | | | | | | | | | □ | | | | | | | | □ |
| 42. *Ichoronyssus scutatus* | | * | | | | | | + | □ | * | + | □ | | | □ | * | □ |

1963), Australia and New Guinea (DOMROW 1972), USA (WHITAKER 1973, DOOD 1981, DOOD & KURTA 1982), Cuba (DUŠBÁBEK 1968), Mexico (DUŠBÁBEK 1970), Nigeria (DUŠBÁBEK & BERGMANS 1980), Surinam (DUŠBÁBEK & LUKOSCHUS 1971), Panama (FURMAN 1966), Brazil (GATLINGER & GRIBEL 1989), Venezuela (HERRIN et al. 1975), Columbia (MARINKELLE &

GROSE 1981), Zambia (PEIREE 1984), etc. The generalized data on the fauna of gamasids of certain species of bats distributed in various regions can be found in "Catalogie des acariens parasites et commensaux des chiropteres..." (ANCIAUX de FAVEAUX 1976).

## 2. Material and method

The greater part of the material used in the present article is mainly the gamasids kept in the collection of the Zoological Institute of Russian Academy of Sciences (Saint Petersburg). We also used the gamasids collected from bats, which had been kindly offered to us by the zoologists of ex-USSR, as well as our own collections made in Latvia, Estonia and Lithuania, near Saint Petersburg and in Tajikistan. All viewed and processed material, including collection slides, consists in 15.482 mites from 1.937 individuals of bats. The bats were caught either by fine net during their night fly, or were extracted form cracks and slits. To catch animals in late summer and in autumn, bird traps were used, in which the bats were caught during autumn fly. The caught bats were placed, one by one, into small white sacks. The mites were collected from living animals in field. After examination, all the bats were released. The gamasids collected from hair and webs of bats were placed in test-tubs containing 70 % alcohol, which were marked by standard labels. After that, the spirit material was put into For-Berlese liquid.

In general, 52 species of gamasids were studied, including 4 species of gamasids specified up to the genus only (because of deformation, poor brightening, etc.), which had been found on 37 species of bats (the list of bats includes 2 species specific up to the genus and some bats which genus had not been determined). Of investigated 52 species, 46 are specific parasites from bats. Six other species of gamasids are represented either by predators (*Proctolaelaps scolyti* EVANS, 1958), or by the parasites from other mammals (*Laelaps multispinosus* BANKS, 1909, etc.), which were on bats just occasionally. The geographical records of 42 species of gamasid mites from bats are listed in Tab. 1 (see also Tab. 2).

Tab. 2 The part of the gamasid species from bats which are new for the republics of former USSR.

| Country | Species in all | new Species | % of the new Species |
|---|---|---|---|
| Russia | 27 | 26 | 96 |
| Estonia | 11 | 11 | 100 |
| Latvia | 12 | 12 | 100 |
| Lithuania | 8 | 8 | 100 |
| Belorussia | 9 | 9 | 100 |
| Ukraine | 17 | 9 | 53 |
| Moldova | 20 | 2 | 10 |
| Georgia | 8 | 8 | 100 |
| Armenia | 14 | 4 | 29 |
| Azerbadjan | 14 | 1 | 7 |
| Kazachstan | 17 | 8 | 57 |
| Turkmenistan | 4 | 4 | 100 |
| Uzbekistan | 12 | 6 | 50 |
| Tajikistan | 15 | 15 | 100 |
| Kirgizstan | 19 | 1 | 5 |

## 3. Keys including records of hospital and geographical distribution

### 3. 1. Familia of gamasid mites on bats

1 (2) Large sclerotized mites (body length 400–1700 μm). Coxae immovable, smooth and radial. Tritosternum without branches, may be strongly reduced. Palpal trochanter without ridge-like process ..... *Spinturnicidae* OUDEMANS, 1901

2 (1) Mites of medium or small size. Coxae free movable. Tritosternum with branches. Palpal trochanter with ridge-like process ..... *Macronyssidae* OUDEMANS, 1936

### 3. 2. Genera of Spinturnicidae

Females

1 (2) Peritremes short (their length is only 2–3 times larger then their diameter of stigma). Dorsal shield is divided into two lightly sclerotized parts (only several parts of dorsal shields strongly sclerotized) ..... *Paraperiglischrus* RUDNICK, 1960

2 (1) Peritremes long (their length is more then stimes larger then the diameter of stigma). Dorsal shield undivided.

3 (4) Peritremes curved. Between coxae II and III bending from dorsal to ventral surface. Tritosternum small or lacking ..... *Spinturnix* VON HEYDEN, 1826

4 (3) Peritremes are completely dorsal. Tritosternum is large... *Eyndhovenia* RUDNICK, 1690

Males

1 (2) Peritremes are short (their length is only 2–3 times larger then the diameter of stigma). On two dorsal shields, there are few strongly sclerotized parts ..... *Paraperiglischrus* RUDNICK

2 (1) Peritremes long (their length is more then 5 times larger then the diameter of stigma). The single dorsal shield is well sclerotized.

3 (4) Peretremes are completely dorsal. The length of St 1 setae is 1. 5–2 times longer then anal shield ..... *Eyndhovenia* RUDNICK

4 (3) Peretremes are curved. Between coxae II and III bending from dorsal to ventral surface. The length of St 1 setae never exceeds and often 2–3 times less then the length of anal shield ..... ..... *Spinturnix* von HEYDEN

### 3. 2. 1. Genus *Paraperiglischrus* Rudnick, 1960

*Paraperiglischrus rhinolophinus* (KOCH, 1841) (fig. 1–4)

**Hosts**. *Rhinolophus ferrumequinum*, R. *mehelyi*, *R. hipposideros*, *R. clivosus*, *R. blasii*, *R. euryale*, *R. rouxi*, *R. cornutus*, *Eptesicus serotinus*.

**Distribution**. ex-USSR: Moldova, Ukraine (Crimea), Armenia, Azerbaijan, Uzbekistan, Tajikistan, Kirghizstan. England, Ireland, Netherlands, France, Yugoslavia, Romania, Czechia, Slovakia, Bulgaria, Egypt. Kenya. India, Japan.

### 3. 2. 2. Genus *Eyndhovenia* RUDNICK, 1960

Females

1 (2) Tritosternum is massive with 2 vivid projections on the posterior margin. Integument near sternal shield has lanceolate pattern... *E. euryalsi euryalis* (CANESTRINI, 1884)

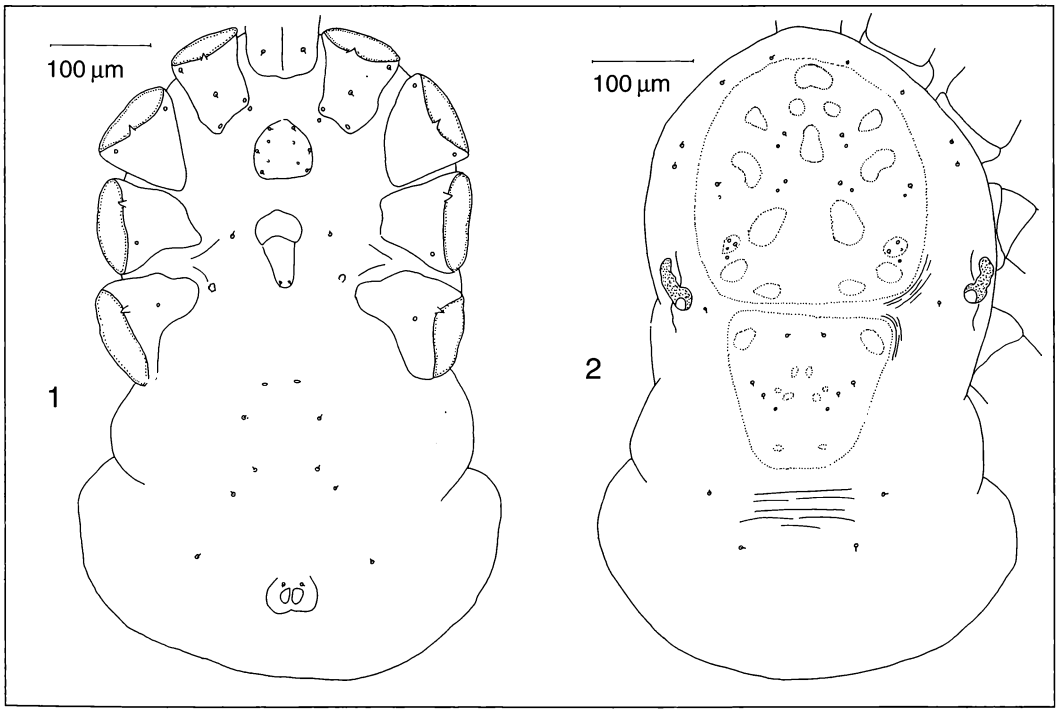



Fig. 1–2. *Paraperiglischrus rhinolophinus* ♀. 1: idiosoma, ventral – 2: dito, dorsal. – del. M. STANYUKOVICH.

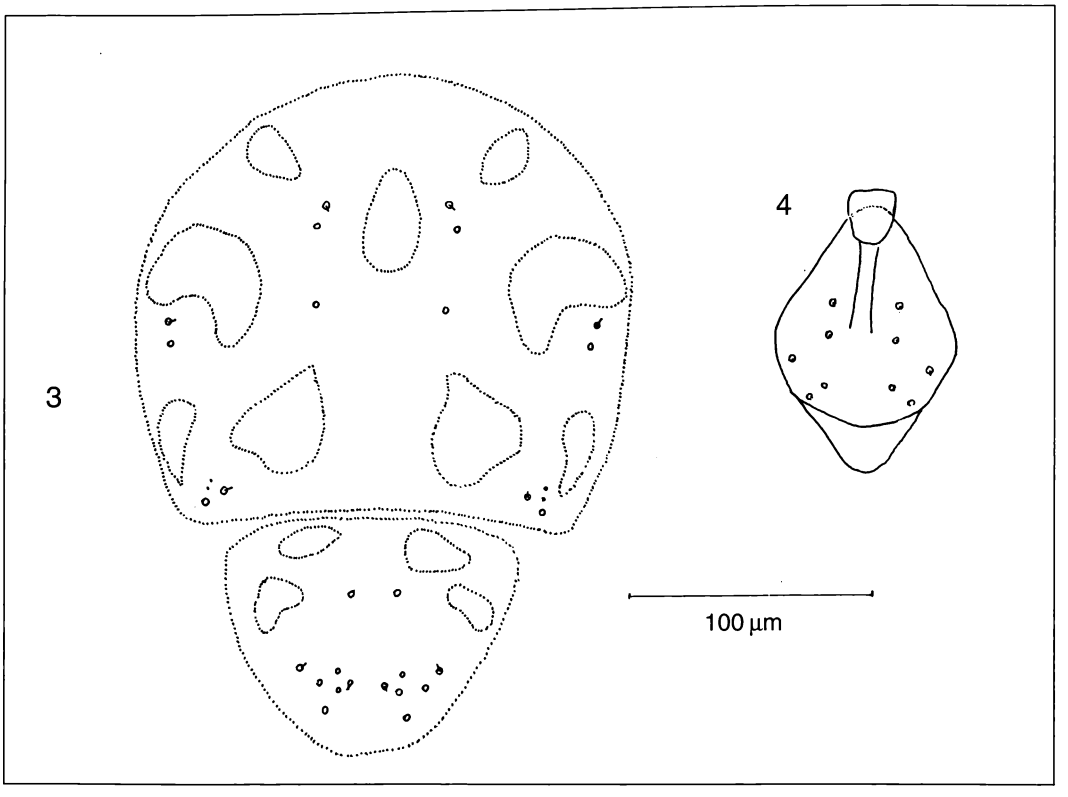



Fig. 3–4. *Paraperiglischrus rhinolophinus* ♂. 3: dorsal plate – 4: sternogenital plate.

2 (1) Tritosternum is not large, without vivid projections. Integument near sternal shield has reticulate pattern. Near the coxae, pattern is lanceolate (fig. 5) ..... *E. euryalis oudemansi* (EYNDHOVEN, 1941)

Males

1 (2) On the dorsal surface uncovered by shield there are 10 pairs of setae. Integument near the sternal shield has lanceolate pattern (fig. 6) ..... *E. euryalis euryalis* (CANESTRINI)

2 (1) On the dorsal surface uncovered by shield there are 11 pairs of setae. Integument near the sternal shield has reticulate pattern ..... *E. euryalis oudemansi* (EYNDHOVEN)

Protonymphs

1 (2) There are 2 setae pairs on the dorsal surface of posterior body end, posterior setae pair is 2 times less then the front pair. Integument near the sternal shield has lanceolate pattern... (fig. 7) ..... *E. euryalis euryalis* (CANESTRINI)

2 (1) On the posterior end of body there are setal pair and the pair of microsetae, setal pair is 3–4 times mor then the microsetae pair. Integument has reticulat pattern (fig. 8) ..... *E. euryalis oudemansi* (EYNDHOVEN)

*Eyndhovenia euryalis euryalis* (CANESTRINI, 1884) (fig. 6–7)
**Hosts**. *Rhinolophus euryale*, *R. mehelyi*, *Miniopterus schreibersii*.
**Distribution**. ex-USSR: Armenia, Azerbaijan. Czechia, Slovakia

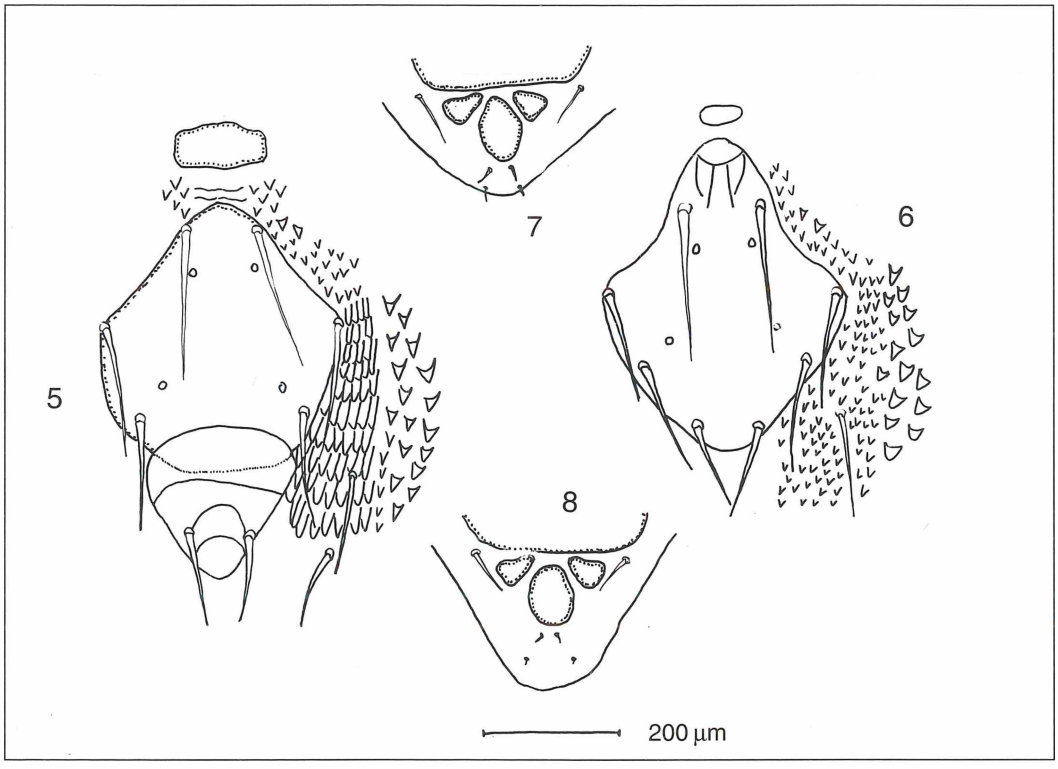



Fig. 5–8. *Eyndhovenia euryalis* sspp. *E. e. oudemansi* 5: sternal plate ♀ – 8: opisthosoma of protonympha, dorsal – *E. e. euryalis* 6: sternogenital plate ♂ – 7: opisthosoma of protonympha, dorsal.

*Eyndhovenia euryalis oudemansi* (EYNDHOVEN, 1941) (fig. 5, 8)
**Hosts**. *Rhinolophus ferrumenquinum*, *R. hipposideros*, *Myotis blythi*, *Pipistrellus pipistrellus*, *Eptesicus serotinus*, *Minioptewrus schreibersii*.
**Distribution**, ex-USSR: Ukraine (Crimea), Armenia, Kazakhstan, Uzbekistan, Tadjikistan, Kirghizstan. France, Czechia, Slovakia, Japan. (fig 5–8)

### 3. 2. 3. Genus *Spinturnix* von HEYDEN, 1826

Females

1 (6) Not more then 7 pairs of setae are on the dorsal opisthosomal surface behind stigmae.
2 (3) There are 6–7 pairs of dorsal opisthosomal setae; lanceolate seta on dorsal tip of tarsi II–IV (fig. 30, 32) ..... *S. plecotinus* (KOCH, 1839)
3 (2) There are 3–4 pairs of dorsal opisthosomal setae; lanceolate seta absent.
4 (5) Two pairs of long setae and 2 pairs of short setae on the end of opisthosoma (fig. 18); tritosternum is disk-rounded (fig. 20) ..... *S. kolenatii* OUDEMANS, 1910
5 (4) Three pairs of the short setae on the dorsal surface of opisthosoma; tritosternum, jar-shaped (fig. 10) ..... *S. bakeri* RUDNICK, 1960
6 (1) Dorsal opisthosomal setae is more then 20.
7 (18) Dorsal opisthosomal setae is not more then 50.
8 (9) Tritosternum is large, mushrom-shaped; some dorsal setae of I–II legs are serrated (fig. 34, 36) ..... *S. psi* (KOLENATI, 1856)

9 (8) Tritosternum has another form or invisible; setae of legs are smooth.
10 (13) Dorsal opisthosomal setae no less then 40 (fig. 15).
11 (12) Sternal shield with large reticulate pattern; on the shield there are 3 pairs of sternal setae; tritosternum is invisible ..... *S. bregetovae* (STANYUKOVICH, 1995)
12 (11) Sternal shield with small reticulate; sternal setae is not on the shield; tritosternum is small and rounded ..... *S. helvetiae* DEUNFF, KELLER & AELLEN, 1986
13 (10) Dorsal opisthosomal setae is less then 40.
14 (15) Dorsal shield is diamond-shaped, rounded; posterior margin of sternal shield is rounded (fig. 29) ..... *S. nobleti* DEUNFF, VOLLETH, KELLER & AELLEN, 1990
15 (14) Dorsal shield is egg-shaped; posterior margin of sternal shield is almost stright.
16 (17) Dorsal shield with 2 large rounded projections at the front and at the back; podosomal setae is about 2 times shorter then opisthosoma ..... *S. acuminatus* (KOCH, 1836)
17 (16) Dorsal shield with one large rounded projection at the front; at the back the shield is smoothly narrowing; the length of podosomal and opisthosomal is nearly equal ..... *S. barbastelli* (KOLENATI, 1856)
18 (7) Dorsal opisthosomal setae is more then 50.
10 (20) Sternal shield is pentagonal ..... *S. maedai* UCHIKAWA & WADA, 1979
20 (19) Sternal shield is rounded or pear-shaped.
21 (22) Genital setae is not on the genital shield; dorsal opisthosomal setae, 90–130 ..... *S. myoti* (KOLENATI, 1856)
22 (21) Genital setae is on the shield; dorsal opisthosomal setae, 70–90.
23 (24) Marginal dorsal opisthosomal setae are longer then other opisthosomal setae; tritosternum is clearly seen (fig. 16) ..... *S. emarginatus* (KOLENATI, 1856)
24 (23) Marginal dorsal opisthosomal setae and other opisthosomal setae are nearly equal (fig. 25) ..... *S. mystacinus* (KOLENATI, 1857)

M a l e s

1 (2) Two setae are on the end of the opisthosoma; lanceolate seta are on dorsal tip of tarsi II–IV (fig. 31, 33) ..... *S. plecotinus* (KOCH)
2 (1) On the end of opisthosoma there are 4–46 setae; lanceolate seta is absent.
3 (6) On the dorsal opisthosomal surface there are 4 setae.
4 (5) Sternogenital shield with sharp processus at the back; the pattern of the shield is small reticulate; 6 setae pairs on ventral integument between II–IV coxae (fig. 11) ..... *S. bakeri* RUDNICK
5 (4) Sternogenital shield is smoothly rounded at the back; the pattern of the shield is large reticulate; 8 setae pairs on ventral integument between II–IV coxea (fig. 21) ..... *S. kolenatii* OUDEMANS
6 (3) Dorsal opisthosomal setae, 14–46.
7 (22) Three setae pairs on sternogenital shield.
8 (15) Sternogenital shield, bottle-shaped.
9 (12) Dorsal opisthosomal setae, 29–38.
10 (11) Dorsal shield is diamond-shaped with rounded corners; pores on border of dorsal shield are with integument absent (fig. 22–23) ..... *S. maedai* UCHIKAWA & WADA
11 (10) Dorsal shield is egg-shaped with 2 projections at the front and at the back, 2 pairs of pores are on the border of dorsal shield with integument .. *S. helvetiae* DEUNFF, KELLER & AELLEN
12 (9) Dorsal opisthosomal setae, 18–20.
13 (14) Dorsal shield with dotting pattern; pair of setae is near the back tip of sternogenital shield ..... 14 (13)
Dorsal shield without dotting pattern; near the back tip of sternogenital shield there are no closely placed setae ..... *S. barbastelli* (KOLENATI)
15 (8) Sternogenital shield is spade-shaped.
16 (17) Pattern of sternogenital shield is small reticulate (fig. 27–28) ..... *S. nobleti* DEUNFF, VOLLETH, KELLER & AELLEN
17 (16) Pattern of sternogenital shield is large reticulate.
18 (19) Sternogenital shield with as if cut on the back (fig. 26) ..... *S. mystacinus* (KOLENATI)

19 (18) Sternogenital shield as if not cut on the back.
20 (21) On dorsal opisthosomal surface are 32–34 setae; tritosernum undiscernible (fig. 12–13) ..... *S. bregetovae* STANYUKOVICH
21 (20) On dorsal opisthosomal surface 6–16 setae; tritosternum is developed (fig. 17) ..... *S. emarginatus* (KOLENATI)
22 (7) On sternogenital shield, 4–5 setae pairs.
23 (24) On sternogenital shield, 4 setae pairs; on dorsal opisthosomal surface, 33–46 setae; tritosternum is small and rounded (fig. 24) ..... *S. myoti* (KOLENATI)
24 (23) On sternogenital shield, 5 setae pairs; on dorsal opisthosomal surface, 16 setae; tritosternum is short and wide (fig. 35) ..... *S. psi* (KOLENATI)

*Spinturnix acuminatus* (KOCH, 1836) (fig. 9)
**Hosts**. *Nyctalus noctula, N. leisleri, Rhinolophus sp., Myotis blythi, M. dasycneme, M. daubentoni, Pipistrellus pipistrellus, P. nathusii, P. savii, Eptesicus serotinus, Murina leucogaster, Scotophilus temminicki wrougthtoni.*
**Distribution**. ex-USSR: Russia, Estonia, Latvia, Belorussia, Moldova, Ukraine, Azerbadjan, Kazachstan, Tajikistan, Kirgizstan. UK, Germany, Czechia, Slovakia.

*Spinturnix bakeri* RUDNICK, 1960 (fig. 10–11)
**Hosts**. *Eptentsicus fuscus bernardi, E. f. pallidus, E. serotinus, Pipistrellus kuhli.*
**Distribution**. Azerbaidjan. Canada, USA, Cuba.

*Spinturnix barbastelli* (KOLENATI, 1856)
**Hosts**. *Barbastella barbastella, B. leucomelas.*
**Distribution**. ex-USSR: Russia (the Far East), Lithuania, Modova, Armenia, Kirgizstan. UK, Netherlands, Poland, Czechia, Slovakia.

*Spinturnix bregetovae* STANYUKOVICH, 1995 (fig. 12–15)
**Hosts**. Bats.
**Distribution**. Russia (the Far East).

*Spinturnix emarginatus* (KOLENATI, 1856) (fig. 16–17)
**Hosts**. *Myotis emarginatus.*
**Distribution**. Tajikistan. Netherlands, Czechia, Slovakia, Bulgaria.

*Spinturnix helvetiae* DEUNFF, KELLER & AELLEN, 1986
**Hosts**. *Nyctalus leisleri.*
**Distribution**. ex-USSR: Belorussia, Moldova. Switzerland.

*Spinturnix kolenatii* OUDEMANS, 1910 (fig. 18–21)
**Hosts**. *Myotis blythi, M. mystacinus, M. daubentoni, M. brandti, Eptesicus serotinus, E. nilssoni, Nyctalus noctula, Plecotus auritus, Pipistrellus nathusii, Pipistrellus* sp., *Vespertilio murinus, Vespertilio* sp., *Murina leucogaster.*
**Distribution**. ex-USSR: Russia, Estonia, Latvia, Lithuania, Belorussia, Moldova, Ukraine, Georgia, Armenia, Azerbaidjan, Kazachstan, Turkmenistan, Uzbekistan, Kirgizstan. UK, Netherlands, Germany, Czechia, Slovakia. USA.

*Spinturnix maedai* UCHIKAWA & WADA, 1979 (fig. 22–23)
**Hosts**. *Murina leucogaster hilgendorfi, M. aurata ussuriensis.*
**Distribution**. Russia (Krasnoyarsky Krai, the Far East). Japan.

*Spinturnix myoti* (KOLENATI, 1856) (fig. 24)
**Hosts**. *Myotis myotis, M. nattereri, M. capaccinii, M. daubentoni, M. dasycneme, M. mystacinus, M. brandti, M. ikonnikovi, M. blythi, M. emarginatus, Rhinolophus ferrumequinum, R. mehelyi, R. euryale, Plecotus auritus, Barbastella barbastella, Pipistrellus pipistrellus, P. nathusii, Nyctalus*

*noctula*, *Eptesicus serotinus*, *E. nilssoni*, *Vespertilio murinus*, *V. superans*, *Otonycteris hemprichi*, *Miniopterus schreibersi*, *Murina leucogaster*.
**Distribution**. ex-USSR: Russia, Estonia, Latvia, Lithuania, Belorussia, Ukraine, Moldova, Georgia, Armenia, Azerbaidjan, Kazachstan, Turkmenistan, Uzbekistan, Tajikistan, Kirgizstan. UK, Netherlands, Berlgium, Germany, France, Italy, Yugoslavia, Hungary, Romania, Czechia, Slovakia, Bulgary. Morocco. Afghanistan, Mongolia, Japan.

*Spinturnix mystacinus* (KOLENATI, 1857) (fig. 25)
**Hosts**. *Myotis mystacinus*, *M. brandti*, *M. dasucneme*, *M. myotis*, *Eptesicus serotinus*, *Vespertilio murinus*, *Nyctalus noctula*, *Plecotus auritus*.
**Distribution**. ex-USSR: Russia, Belorussia, Moldova, Kazachstan, Tajikistan. Great Britain, Netherlands, Germany, France,Czechia, Slovakia.

*Spinturnix nobleti* DEUNFF, VOLLETH, KELLER & AELLEN, 1990 (fig. 27–29)
**Hosts**. *Pipistrellus savii*.
**Distribution**. Russia, Switzerland, France.

*Spinturnix plecotinus* (KOCH, 1839) (fig. 30–33)
**Hosts**: *Plecotus auritus*, *P. austriacus*, *P. wardi wardi*, *Rhinolophus ferrumenquinum*, *Myotis nattereri*, *M. mystacinus*, *M. daubentoni*, *M. brandti*, *Barbastella leucomelas*, *Nyctalus noctula*, *Eptessicus nilssoni*.
**Distribution**. ex-USSR: Russia, Estonia, Latvia, Lithuania, Ukraine, Moldova, Armenia, Uzbekistan, Tajikistan. UK, Ireland, Netherlands, Germany, France, Czechia, Slovakia, Yugoslavia, Bulgary, Afghanistan.

*Spinturnix psi* (KOLENATI, 1856) (fig. 34–36)
**Hosts**. *Miniopterus schreibersii*, *M. majori*, *M. fuliginosus*, *Rhinolophus ferrumequinum*, *Myotis myotis*, *M. blythi*, *M. capaccinii*, *Pipistrellus savii*, *Eptesicus serotinus*, *Vespertilio* sp.
**Distribution**. ex-USSR: Russia, Ukraine, Georgia, Armenia, Azerbaidjan. Netherlands, France, Czechia, Slovakia, Yugoslavia. Japan, Korea, Formosa, India. Madagascar. (fig. 9–36)

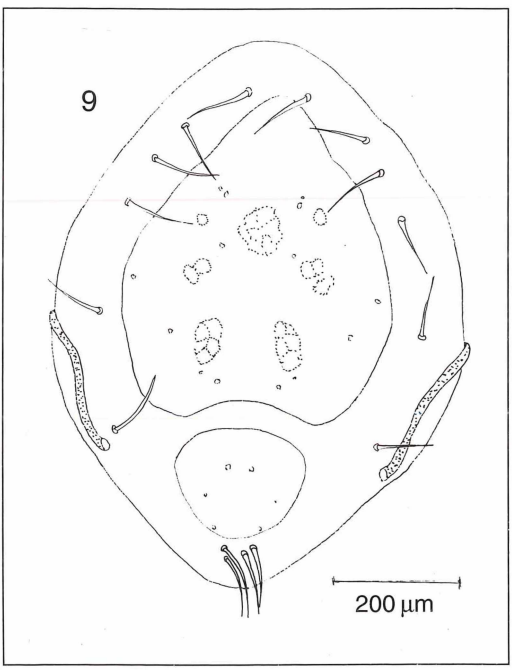



Fig. 9. *Spinturnix acuminatus*, idiosoma of protonympha (dorsal).

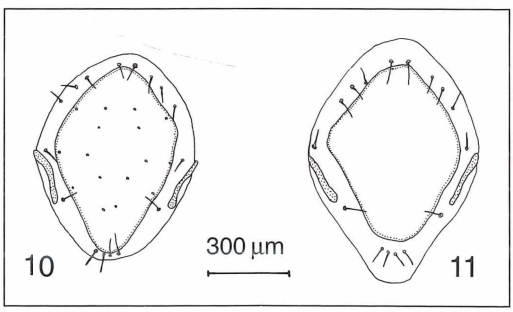



Fig. 10–11. *Spinturnix bakeri*, dorsal. 10: idiosoma ♀ – 11: dito ♂.

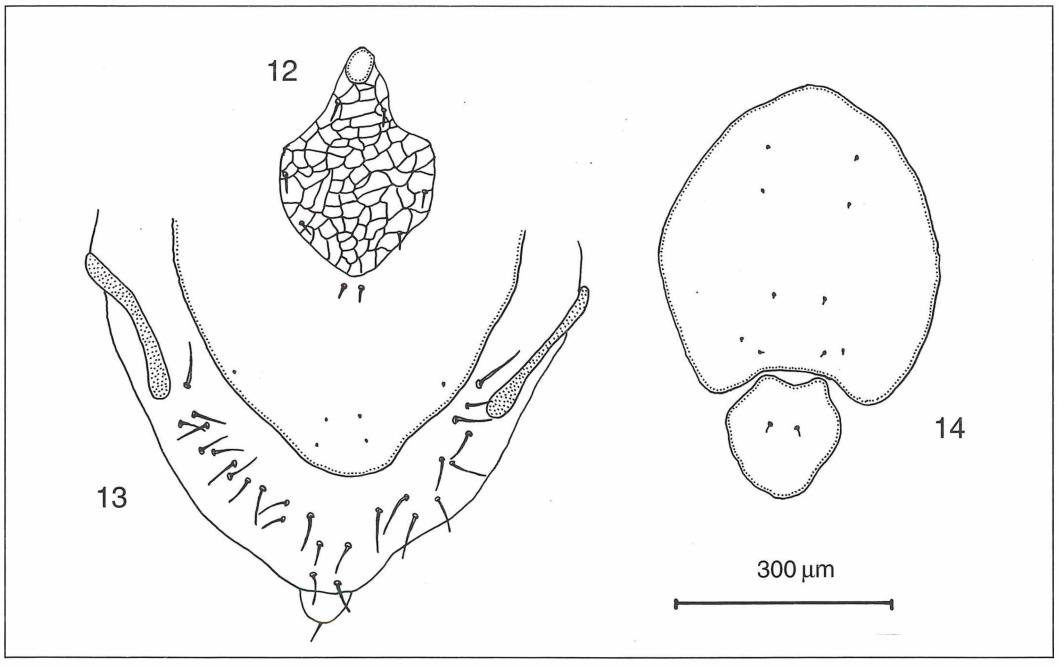



Fig. 12–14. *Spinturnix bregetovae*. 12: sternogenital plate ♂ – 13: opisthosoma ♂, dorsal – 14: dorsal plate of protonympha.

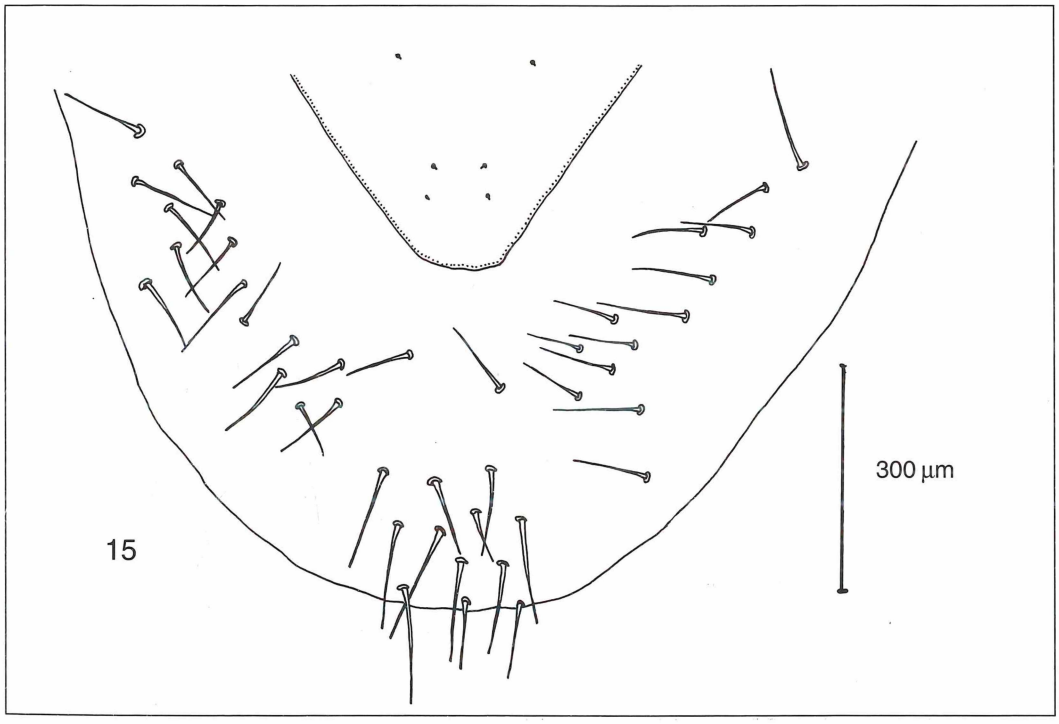



Fig. 15. *Spinturnix bregetovae* ♀, opisthosoma (dorsal).

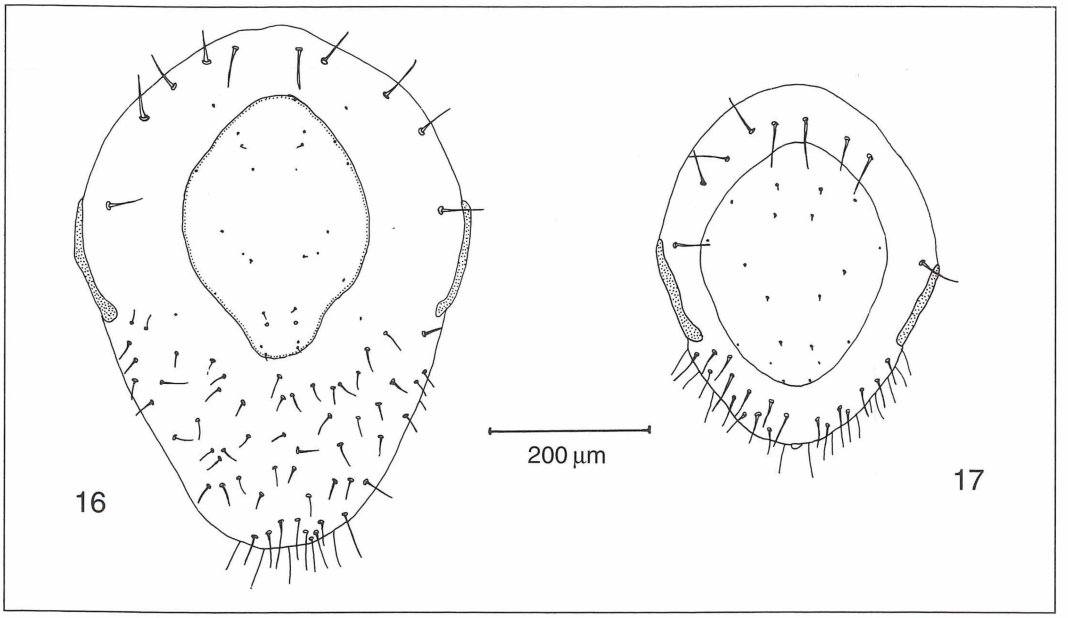



Fig. 16–17. *Spinturnix emarginatus*, dorsal. 16: idiosoma ♀ – 17: dito ♂.

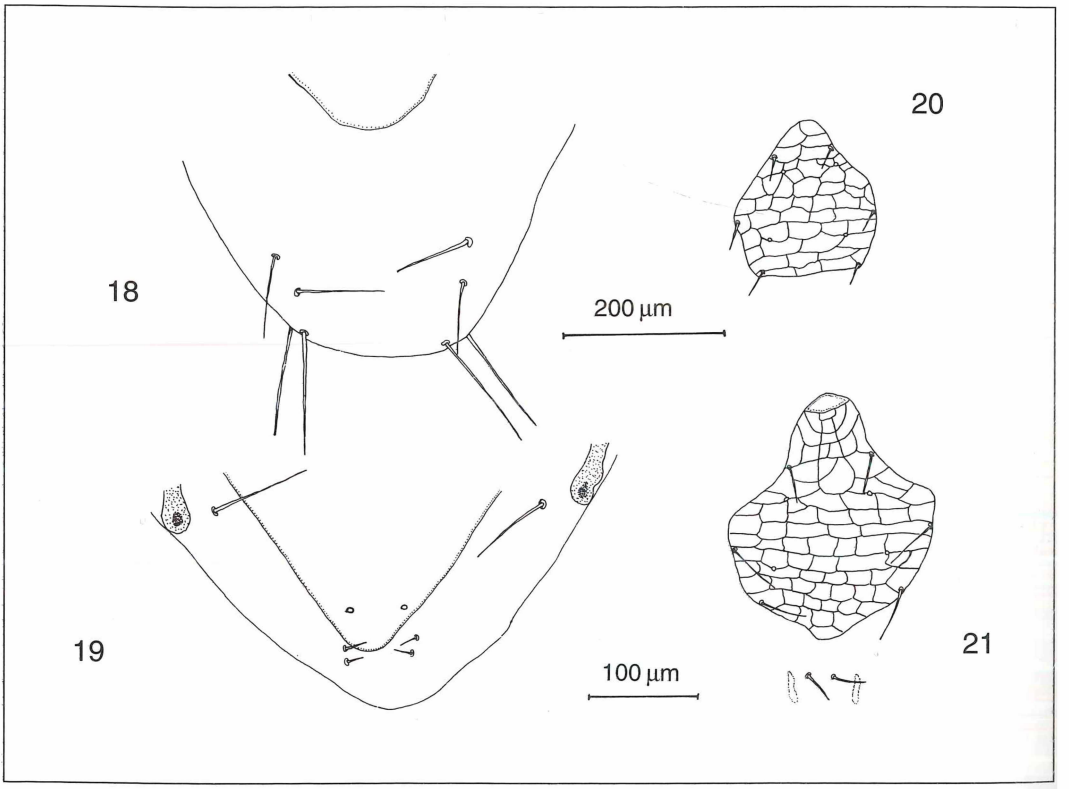



Fig. 18–21. *Spinturnix kolenatii*. 18: opisthosoma ♀, dorsal – 19: dito ♂ – 20: sternal plate ♀ – 21: dito ♂.

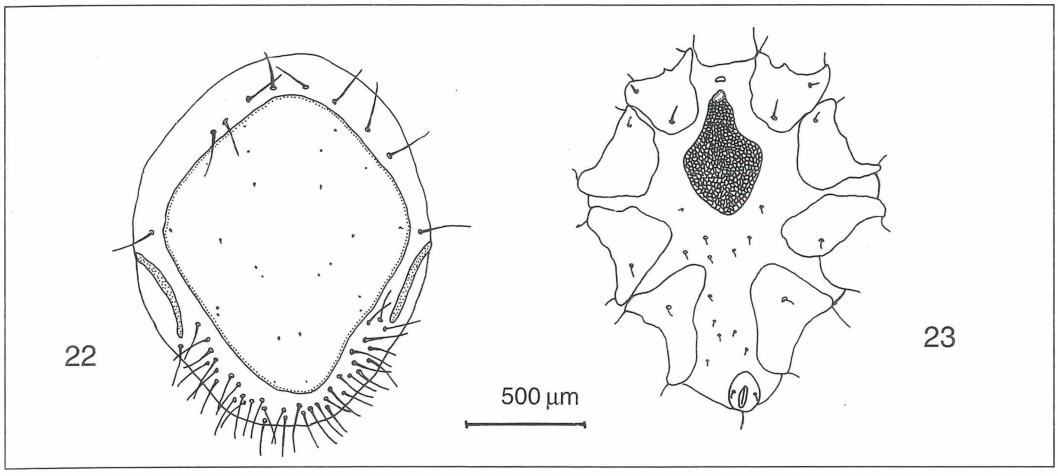



Fig. 22–23. *Spinturnix maedai* ♂. 22: idiosoma, dorsal – 23: idiosoma, ventral.

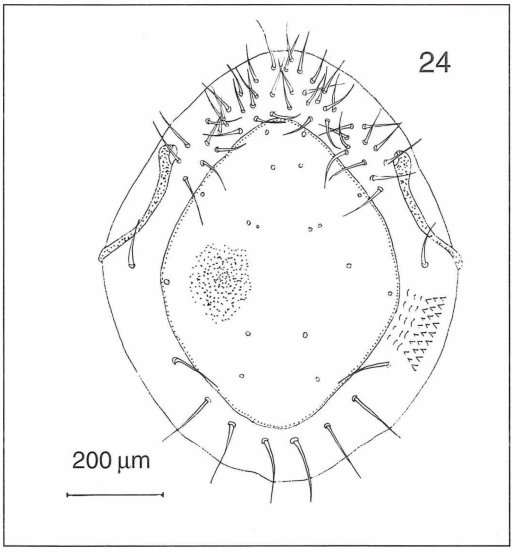
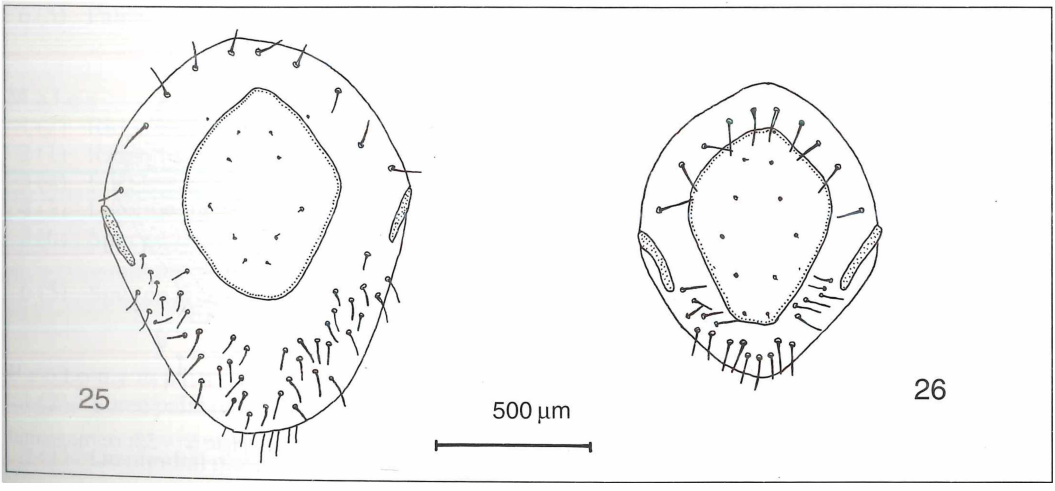



Fig. 24. *Spinturnix myoti* ♂, idiosoma (dorsal).

Fig. 25–26. *Spinturnix mystacinus*. 25: idiosoma ♂, dorsal – 26: idiosoma ♂, dorsal.



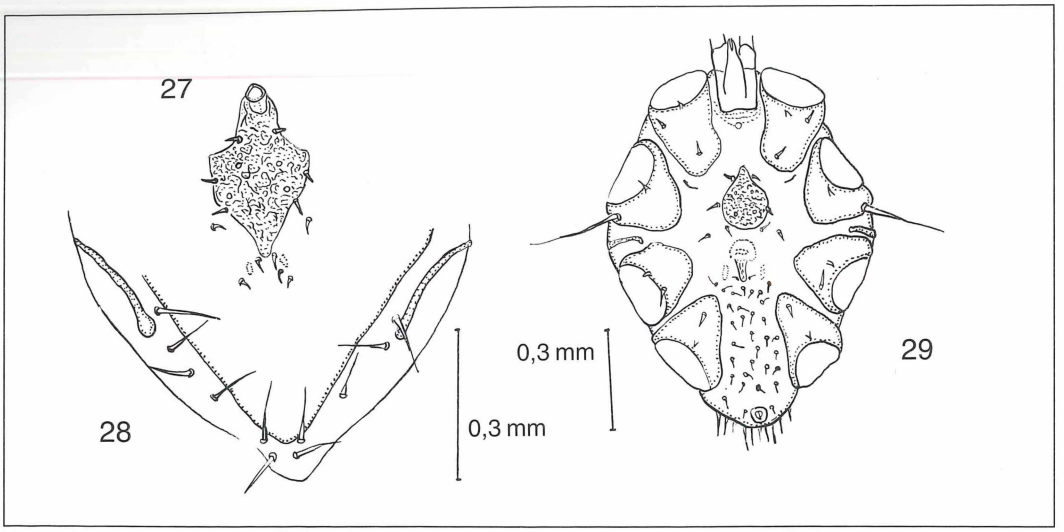



Fig. 27–29. *Spinturnix nobleti*. 27: sternogenital plate ♂ – 28: opisthosoma ♂, dorsal – 29: idiosoma ♀, ventral.

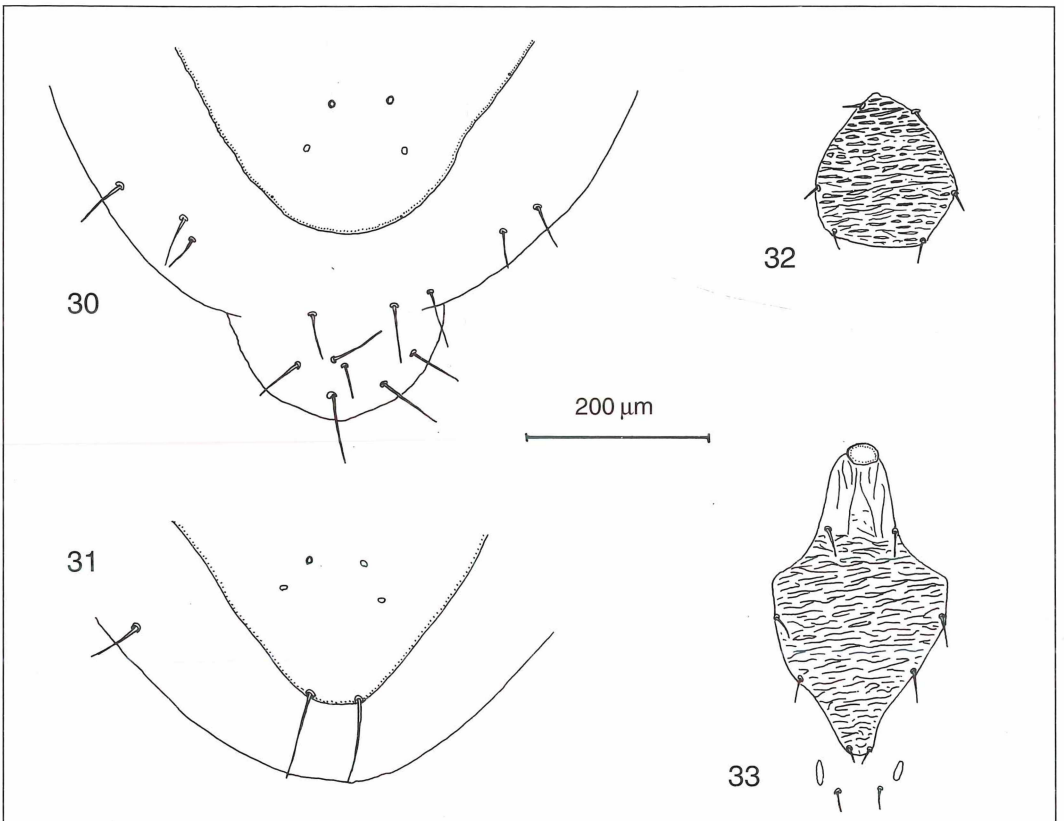



Fig. 30–33. *Spinturnix plecotinus*. 30: opisthosoma ♀, dorsal – 31: dito ♂ – 32: sternal plate ♀ – 33: sternogenital plate ♂.

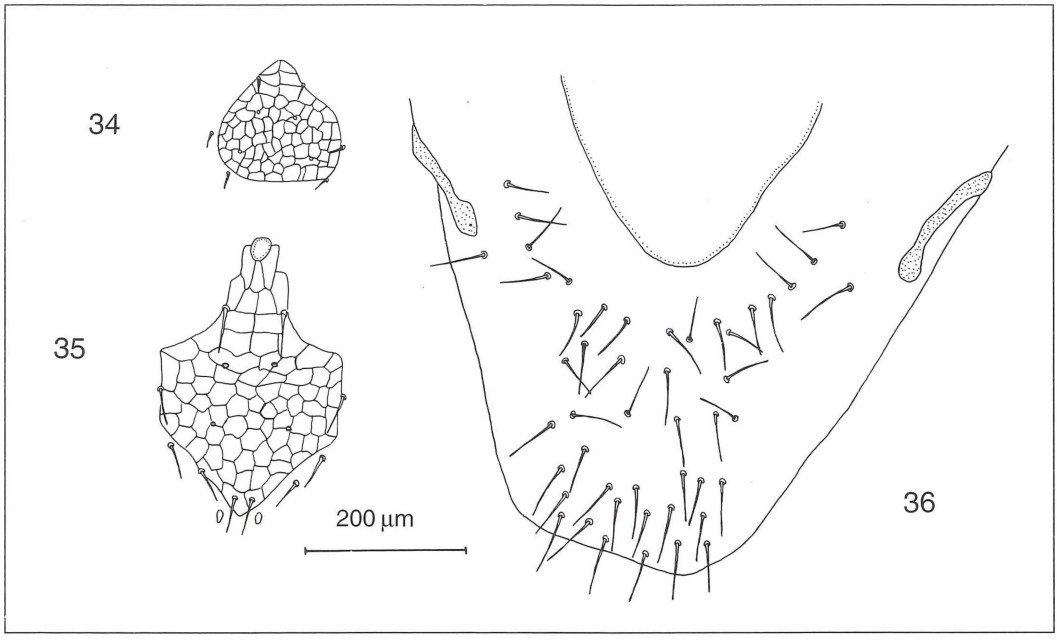



Fig. 34–36. *Spinturnix psi*. 34: sternal plate ♀ – 35: sternogenital plate ♂ – 36: opisthosoma ♀, dorsal.

### 3. 3. Genera of Macronyssidae

Females

1 (2) Two dorsal plates; sternal plate with differentiated band on posterior margin ..... ..... *Steatonyssus* KOLENATI, 1858
2 (1) Single dorsal plate; sternal plate without sclerotized band on posterior margin.
3 (4) Legs I is stout and short; legs IV are longer then other... *Ichoronyssus* KOLENATI, 1858
4 (3) Four pairs of legs almost similar.
5 (6) Ventral process of palpal trochanter is ridge-like; sternal plate with pattern in two anterior corners ..... *Macronyssus* KOLENATI, 1858
6 (5) Palpal trochanter without ridge-like process; sternal plate without sculpturing ..... ..... *Ornithonyssus* SAMBON, 1928

Males

1 (2) Ridge-like process on palps is well developed ..... *Macronyssus* KOLENATI
2 (1) Ridge-like process on palps is absent.
3 (4) I–III legs are short and thick; IV legs are long and thin ..... *Ichoronyssus* KOLENATI
4 (3) Legs not thick, long.
5 (6) Spur on II coxa are well developed; dorsal plate narrowing to the back ..... ..... *Steatonyssus* Kolenati
6 (5) Spur on II coxa are small; dorsal plate is wide at the front and at the back ..... ..... *Ornithonyssus* SAMBON

Protonymphs

1 (2) Three pairs of long setae and a pair of microsetae are on pigidial plate ..... ..... *Steatonyssus* KOLENATI
2 (1) On pigidial plate, 4–7 setae pairs.

3 (4) First pair of legs are thicker then three other pairs ..... *Ichoronyssus* KOLENATI
4 (3) First pair of legs are similar with other pairs.
5 (6) Setae S 8 are absent; ridge-like process on palps is hardly discerniable ..... *Ornithonyssus* SAMBON
6 (5) Setae S 8 are present; ridge-like process on palps is well developed ..... *Macronyssus* KOLENATI

### 3. 3. 1. Genus *Ichoronyssus* KOLENATI, 1858

*Ichoronyssus scutatus* (KOLENATI, 1856) (fig. 37–39)
**Hosts**. *Miniopterus schreibersii*, *Myotis myotis*, *M. blythi*, *M. macrodactylus*, *Vespertilio murinus*, *Rhinolophus euryale*, *R. ferrumequinum*.
**Distribution**. ex-USSR: Russia, Moldova, Georgia, Armenia, Azerbaidjan, Uzbekistan, Kirgizstan. France, Czechia, Slovakia. Lebanon. Japan. (fig. 37–39)

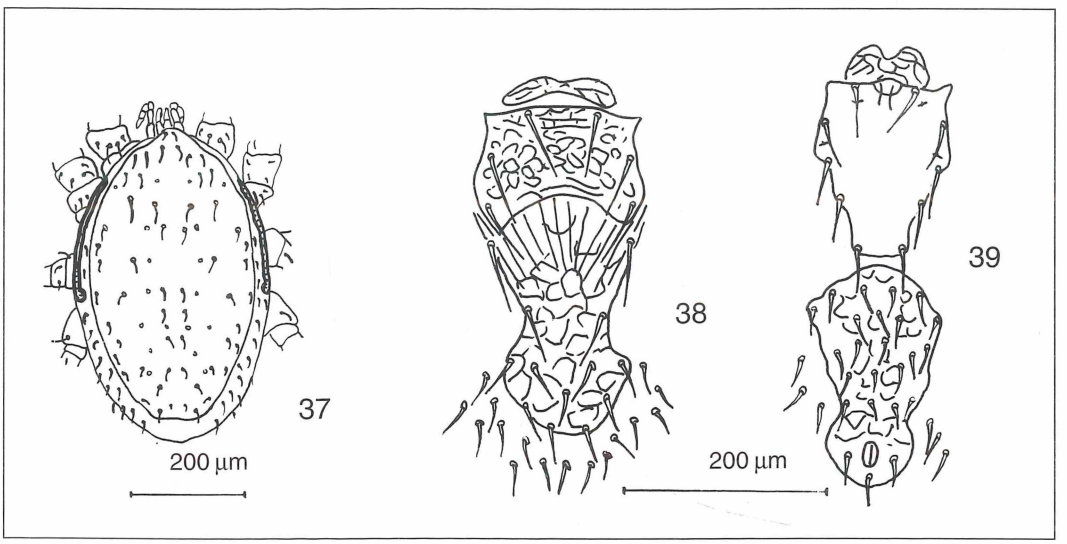



Fig. 37–39. *Ichoronyssus scutatus*. 37: dorsal plate ♀ – 38: sternal and genital plate ♀ – 39: sternogenital and ventro-anal plates ♂.

### 3. 3. 2. Genus *Macronyssus* KOLENATI, 1858

Females
1 (2) Dorsal plate with 30 setae pairs (fig. 51–52) ..... *M. hosonoi* UCHIKAWA, 1979
2 (1) On dorsal plate there are no more then 28 setae pairs.
3 (10) Setae St 1 does not reach the posterior margin of the sternal plate.
4 (7) Dorsal plate with 28 setae pairs.
5 (6) Sternal setae and most of the other ventral idiosomal setae are with marked subbasal inflations. Sternal glands are with striae enclosed in a regular elliptical zone (fig. 46) ..... *M. kolenatii* (OUDEMANS, 1902)
6 (5) Sternal setae, ordinary. Sternal glands with 5–6 cells (fig. 50) . *M. flavus* (KOLENATI, 1856)
7 (4) Dorsal plate with 20–24 setae pairs.
8 (9) Dorsal plate with 20 setae pairs; setae M 11, long; sternal glands with striae as finger-print (fig. 47) ..... *M. ellipticus* (KOLENATI, 1856)
9 (8) Dorsal plate with 22–24 setae pairs; setae M 11 are not long; sternal glands with a lot wavy striae (fig. 45) ..... *M. cyclaspis* (OUDEMANS, 1906)

10 (3) Setae St 1 reach the posterior margin of the sternogenital plate.
11 (18) Dorsal plate with 28 setae pairs.
12 (15) The posterior margin of the sternal plate concaved to the level of setae St 2 base.
13 (14) Sternal glands are with striae and crosspieces in an oval zone ..... *M. charusnurensis* DUŠBÁBEK, 1962
14 (13) Sternal glands are with vague irregular striae ..... *M. corethroproctus* (OUDEMANS, 1902)
15 (12) The posterior margin of the sternal plate is vaguely concaved.
16 (17) Sternal glands look like cells, some of them with dot-and-dash lines; ten deutosternal teeth with one denticle in a row (in low rows could be 2 denticles) (fig. 53) ..... *M. heteromorphus* DUŠBÁBEK & RADOVSKY, 1972
17 (16) Sternal glands with V-shaped striae; six deutosternal teeth with one denticle in a row ..... *M. barbastellinus* DUŠBÁBEK & PINTSCHUK, 1971
18 (11) Dorsal plate with 25–27 setae pairs.
19 (20) Dorsal plate with 25 setal pairs; setae D 7 is absent (fig. 49) ..... *M. rhinolophi* (OUDEMANS, 1902)
20 (19) Dorsal plate with 27 setal pairs; setae D 7 is present.
21 (22) Sternal glands are composed of four curved granular lines of regular pattern; setae D-seria are as short as microsetae (fig. 44) ..... *M. granulosus* (KOLENATI, 1856)
22 (21) Sternal glands are small and oval; length of setae D-seria increases from D 1 to D 7 (fig. 43) ..... *M. diversipilis* (VITZTHUM, 1920)

M a l e s

1 (2) Dorsal plate with 29 setal pairs ..... *M. hosonoi* UCHIKAWA
2 (1) On dorsal plate are no more then 27 setal pairs.
3 (4) Spermatodactyl are greatly enlarged as long as second segment of chelicerae ..... *M. ellipticus* (KOLENATI)
4 (3) Spermatodactyl is clearly shorter then the second segment of chelicerae.
5 (6) Three setal pairs are very long and spur-like, flanking dorsal plate about middle of idiosoma ..... *M. rhinolophi* (OUDEMANS)
6 (5) Spines are absent.
7 (8) Setae M 10 and M 11 are on four cylindrical processes; two clusters of long and thick caudal setae are on the end of opisthosoma with a small hollow . *M. corethroproctus* (OUDEMANS)
8 (7) Cylindrical processes is absent; not long caudal setae at the end of opisthosoma without a hollow.
9 (12) Dorsal plate with 26–27 setal pairs.
10 (11) Peritreme ending over coxa II; dorsal plate narrowing between ventral and anal parts ..... *M. granulosusus* (OUDEMANS)
11 (10) Peritreme reaching posterior half coxa II; dorsal plate without narrowing ..... *M. cyclaspis* (OUDEMANS)
12 (9) Dorsal plate with 28–29 setal pairs.
13 (16) Peritreme reaching front margin or middle coxa I.
14 (15) Ventral setae with marked subbasal inflation; ventral part of dorsal plate is broad and armed with 13–22 setae ..... *M. kolenatii* (OUDEMANS)
15 (14) Ventral setae without inflation; ventral part of dorsal plate is not enlarged and armed with 13–15 setae ..... *M. flavus* (KOLENATI)
16 (13) Peritreme reaching a middle or a front margin of coxa II.
17 (20) Dorsal plate with 28 setal pairs.
18 (19) Ten thick and long setal pairs on opisthosoma with a hollow (fig. 42); base of tritorsternum is thickened ..... *M. charusnurensis* DUŠBÁBEK
19 (18) Opisthosoma without hollow, armed by ordinary setae; base of tritosternum is not thickened ..... *M. diversipilis* (VITZTHUM)
20 (17) Dorsal plate with 27 setal pairs.
21 (22) Three pairs of rather long spine-liked setae on posterior tip of dorsal plate (fig. 55) ..... *M. heteromorphus* DUŠBÁBEK & RADOVSKY
22 (21) Setae of dorsal plate are ordinary ..... *M. barbastellinus* DUŠBÁBEK & PINTSCHUK

Protonymphs

1 (2) Pygidial plate with 5 setal pairs ..... *M. ellipticus* (KOLENATI)
2 (1) Pygidial plate with 6–7 setal pairs.
3 (10) Pygidial plate with 6 setal pairs.
4 (5) Setae D 7 absent; anterior margin of pygidial plate is convex but without projection ..... ..... *M. rhinolophi* (OUDEMANS)
5 (4) Setae D7 are present; anterior margin of pygidial plate with small projection.
6 (7) Podosomal plate with dot pattern (fig. 41) ..... *M. charusnurensis* DUŠBÁBEK
7 (6) Podosomal plate without dot pattern.
8 (9) Coxal ridges are absent ..... *M. diversipilis* (VITZTHUM)
9 (8) Coxal ridges are present ..... *M. granulosus* (KOLENATI)
10 (3) Pygidial plate with 7 setal pairs.
11 (12) Pygidial plate with 4 microsetal pairs (fig. 54) .. *M. heteromorphus* DUŠBÁBEK & RADOVSKY
12 (11) Pygidial plate with 1–3 microsetal pairs.
13 (14) Coxal ridges are absent ..... *M. cyclaspis* (OUDEMANS)
14 (13) Some coxae with ridges.
15 (16) Length of pygidial setae is slightly mor then a half length of setae M 11 ..... ..... *M. hosonoi* UCHIKAWA
16 (15) Length of pygidial setae is not more then a half length of setae M 11.
17 (18) Four pairs of setae between sternal and anal plates; opisthosomal setae are not numerous .... ..... *M. kolenatii* (OUDEMANS)
18 (17) Three pairs of setae between sternal and anal plates; opisthosomal setae are numerous ..... ..... *M. flavus* (KOLENATI)

*Macronyssus barbastellinus* DUŠBÁBEK & PINTSCHUK, 1971
**Host**. *Barbastella barbastella*.
**Distribution**. Moldova, Kirgizstan. Czechia, Slovakia, Poland.

*Macronyssus charusnurensis* DUŠBÁBEK, 1962 (fig. 40–42)
**Hosts**. *Myotis daubentoni*, *M. mystacinus*, *Plecotus auritus*.
**Distribution**. Russia (Krasnoyarskii Krai, the Far East), Kazachstan. Mongolia.

*Macronyssus corethroproctus* (OUDEMANS, 1902)
**Hosts**. *Myotis dasycneme*, *M. mystacinus*, *M. blythi*, *Pipistrellus nathusii*, *Vespertilio murinus*.
**Distribution**. ex-USSR: Russia, Latvia, Moldova, Kazachstan. Netherlands, Hungary, Poland.

*Macronyssus cyclaspis* (OUDEMANS, 1906) (fig. 45)
**Hosts**. *Pipistrellus pipistrellus*, *P. kuhli*, *Barbastella barbastella*, *Plecotus auritus*, *P. austriacus*, *Myotis nattereri*, *M. daubentoni*, *M. brandti*, *M. frater*, *M. myotis*, *Eptesicus serotinus*, *E. nillsoni*, *Murina leucogaster*.
**Distribution**. ex-USSR: Russia, Estonia, Lithuania, Moldova, Azerbaidjan, Uzbekistan, Kirgizstan, Netherlands, Czechia, Slovakia, Poland, Bulgaria.

*Macronyssus diversipilis* (VITZTHUM, 1920) (fig. 43)
**Hosts**. *Pipistrellus pipistrellus*, *Myotis nattereri*, *M. daubentoni*, *M. myotis*, *M. dasycneme*, *M. brandti*, *Vespertilio murinus*, *Plecotus auritus*, *Eptesicus nillsoni*, *E. serotinus*, *Murina leucogaster*.
**Distribution**. ex-USSR: Russia, Estonia, Moldova. Netherlands, Germany, Hungary.

*Macronyssus ellipticus* (KOLENATI, 1856) (fig. 47)
**Hosts**. *Myotis nattereri*, *M. myotis*, *M. blythi*, *M. mystacinus*, *M. dasycneme*, M. daubentoni, M. brandti, Rhinolophus ferrumequinum, R. hipposideros, Plecotus auritus, Murina leucogaster.
**Distribution**. ex-USSR: Russia, Latvia, Ukraine, Moldova, Armenia, Azerbaidjan, Uzbekistan, Tajikistan, Kirgizstan. Portugal, Germany, Hungary, Czechia, Slovakia, Poland, Bulgaria.

*Macronyssus hosonoi* (UCHIKAWA, 1979) (fig. 51–52)
**Hosts**. *Myotis brandti*, *M. hosonia*, *M. mystacinus*, *M. ikonnikovi*, *Barbastella leucomelas darjeligensis*, *Plecotus auritus*.
**Distribution**. Russia (Krasnoyarskii Krai, Kamchatka). Japan.

*Macronyssus flavus* (KOLENATI, 1856) (fig. 50)
**Hosts**. *Nyctalus noctula*, *N. leisleri*, *N. lasiopterus*, *Myotis myotis*, *M. mystacinus*, *M. daubentoni*, *M. blythi*, *M. nattereri*, *Pipistrellus pipistellus*, *P. nathusii*, *Verspertilio murinus*, *Eptesicus nillsoni*.
**Distribution**. ex-USSR: Russia, Estonia, Latvia, Lithuania, Ukraine, Moldova, Azerbeidjan, Kazachstan, Kirgizstan. UK, Germany, Czechia, Slovakia, Romania, Hungary, Bulgaria, Mongolia.

*Macronyssus granulosus* (KOLENATI, 1856) (fig. 44)
**Hosts**. *Rhinolophus euryale*, *R. clivosus brachygnathus*, *Myotis myotis*, *Myotis blythi*, *M. macrodactylus*, *M. nattereri*, *M. dasycneme*, *M. daubentoni*, *M. brandti*, *M. mystacinus*, *M. tricolor*, *M. cappaccinii*, *Miniopterus schreibersii*, *M. fraterculus*, *M. minor newtoni*, *Barbastella barbastella*, *Plecotus auritus*, *Murina leucogaster*, *Nyctalus leisleri*, *Triaenops persicus afer*, *Rousettus aegypticus*.
**Distribution**. ex-USSR: Russia, Moldova, Ukraine, Georgia, Armenia, Azerbaidjan, Kazachstan, Uzbekistan, Kirgizstan. Czechia, Slovakia, Hungary, Romania, Yugoslavia, Bulgaria, Portugal, Italy. Turkey, Lebanon. Japan. Congo, Zair, Kenia. Mexico.

*Macronyssus heteromorphus* DUŠBÁBEK & RADOVSKY, 1972) (fig. 53–55)
**Hosts**. [*Rattus norvegicus*], *Myotis daubentoni*, *M. brandti*, *M. mystacinus*, *Plecotus auritus*, *Eptesicus nillsoni*, *Murina leucogaster*.
**Distribution**. Russia.

*Macronyssus kolenatii* (OUDEMANS, 1902) (fig. 46)
**Hosts**. *Pipistrellus pipistrellus*, *P. nathusii*, *P. kuhli*, *Myothis dasycneme*, *M. brandti*, *M. mystacinus*, *Vespertilio murinus*, *Eptesicus nillsoni*.
**Distribution**. ex-USSR: Russia, Estonia, Latvia, Lithaunia, Moldava, Ukraine, Armenia, Kazachstan, Uzbekistan, Great Britain, Germany, Hungary, Egypt.

*Macronyssus rhinolophi* (OUDEMANS, 1902) (fig. 49)
**Hosts**. *Rhinolophus ferrumequinum*, *R. clivosus brachygnathus*, *R. hipposideros*, *R. euryale*, *R. mehelyi*, *Myotis myotis*, *M. blythi*, *M. emarginatus*, *M. schreibersii*, *Pipistrellus pipistrellus*.
**Distribution**. ex-USSR: Ukraine, Armenia, Azerbaidjan, Uzbekistan, Tajikistan, Kirgizstan. UK, France, Italy, Czechia, Slaovakia, Hungary, Bulgaria, Greece. (fig. 40–55)

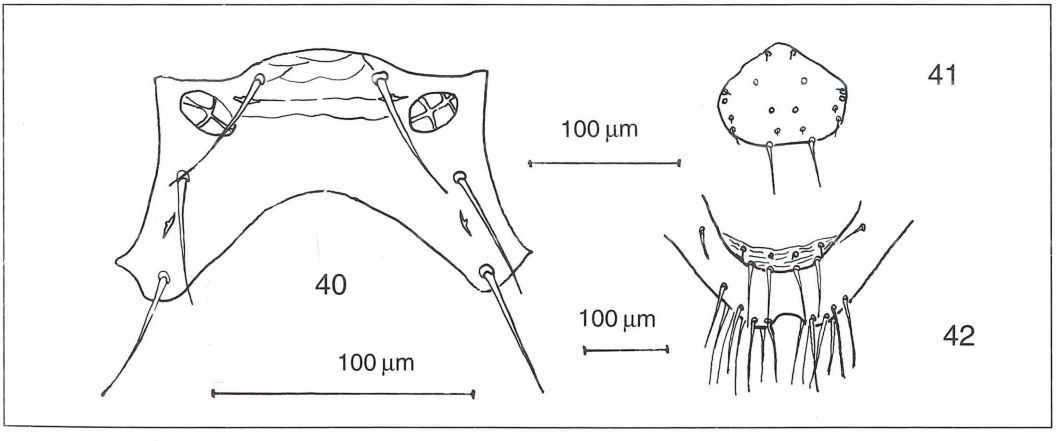



Fig. 40–42. *Macronyssus charusnurensis*. 40: sternal plate ♀ – 41: pygidial plate of protonympha – 42: opisthosoma ♂, dorsal.

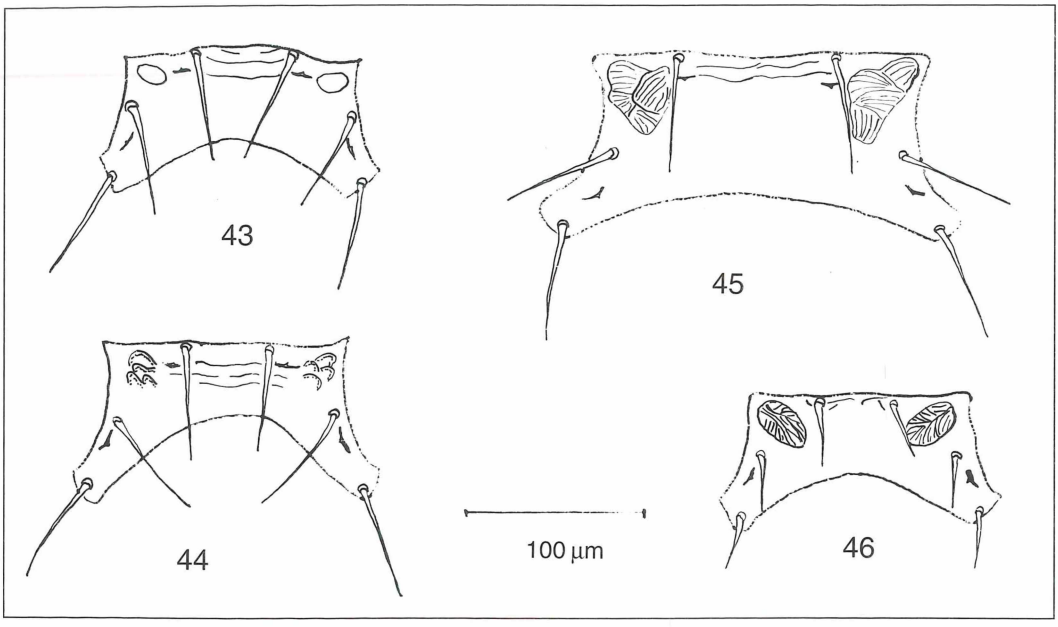



Fig. 43–46. *Macronyssus* spp., sternal plates . 43: *M. diversipilis* – 44: *M. granulosus* – 45: *M. cyclaspis* - 46: *M. kolenatii*.

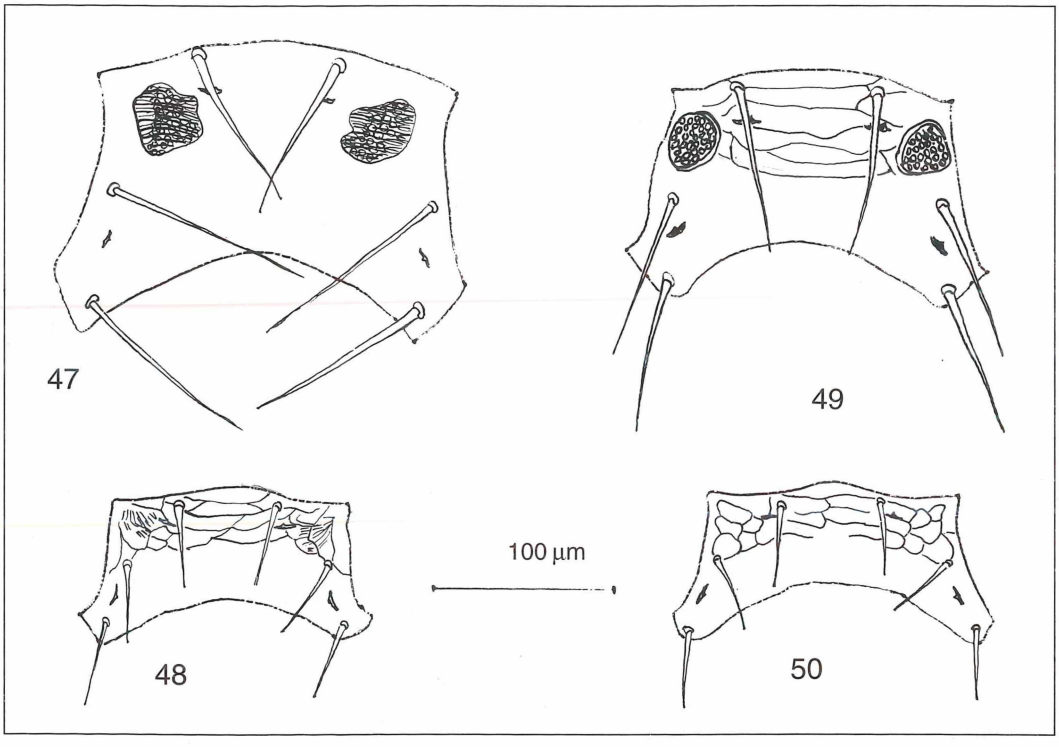



Fig. 47–50. *Macronyssus* spp., sternal plates ♀. 47: *M. ellipticus* – 48: *M. crosbyi* – 48: *M. rhinolophi* – 50: *M. flavus*.

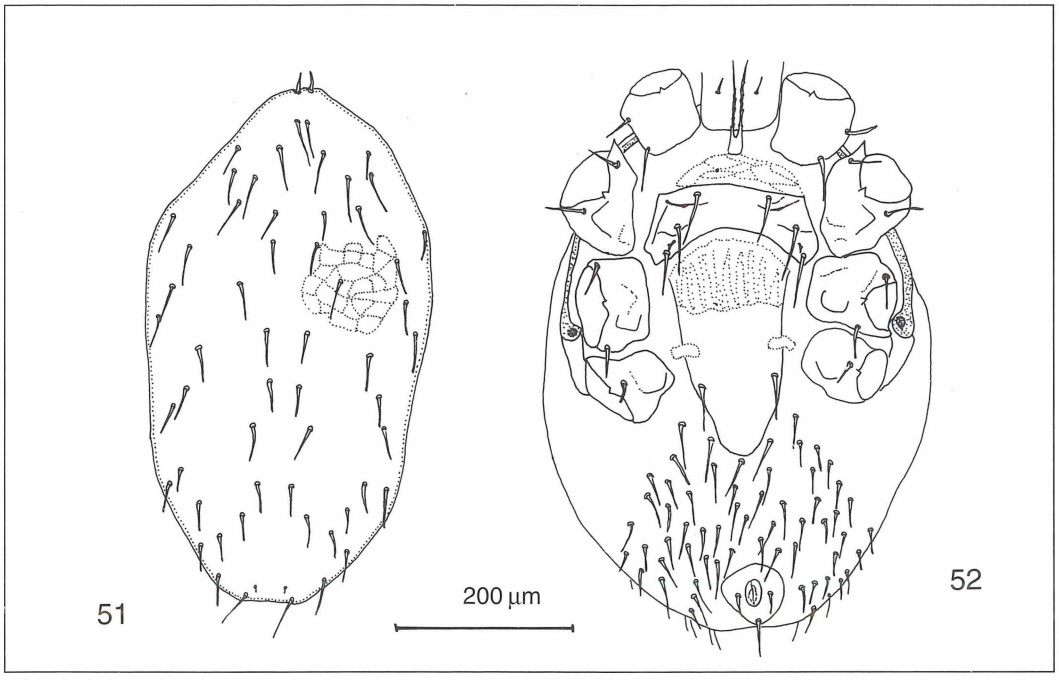



Fig. 51–52. *Macronyssus hosonoi* ♀. 51: dorsal plate – 52: idiosoma, ventral.

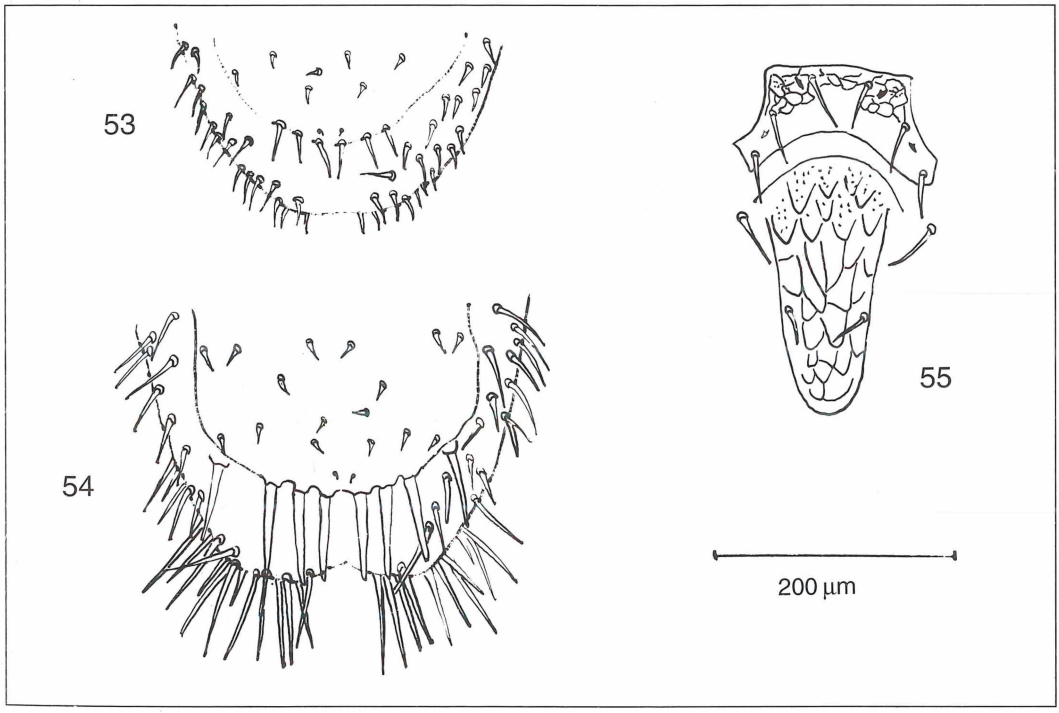



Fig. 53–55. *Macronyssus heteromorphus*. 53: opisthosoma ♀, dorsal – 54: pygidial plate of protonympha – 55: opisthosoma ♂, dorsal.

### 3. 3. 3. Genus *Steatonyssus* KOLENATI, 1858

Females

1 (4) Setae M 11 on opisthosomal plate are long.
2 (3) Setae M 11 are 1.5–2 times shorter then D 5 –7 (fig. 71) ..... *S. spinosus* WILLMANN, 1936
3 (2) Length of setae M 11 and D 5–7 are equal (fig. 59) ..... *S. noctulus* RYBIN, 1992
4 (1) Setae M 11 are short.
5 (11) Peritreme are short and not reaching the posterior margin coxa II.
6 (9) Setae St 1–3 are approximately equal in length; four pairs of short setae on posterior tip of opisthosomal plate are equal in length (D 8 – microsetae).
7 (8) Peritreme reaching middle coxa III; sternal plate with strong sclerotized posterior margin (fig. 68) ..... *S. occidentalis evansi* (MICHERDZINSKI, 1980)
8 (7) Peritreme almost reaching front margin coxa III; sternal plate with weak sclerotized band (fig. 61) ..... *S. desertorus* RYBIN, 1992
9 (6) Setae St 1 are 2 times shorter then St 3; setae S 8 are approximately 3 times longer then S 7 and M 11 (fig. 65) ..... *S. mongolicus* DUŠBÁBEK, 1962
10 (5) Peritreme are longer, reaching the posterior margin or the middle coxa II:
11 (12) Setae St 1 are very short, almost 3 times shorter than St 3 (fig. 69) ..... *S. periblepharus* KOLENATI, 1858
12 (11) Setae St 1 are slightly shorter then St 3.
13 (14) On posterior end of body there are 10–12 pairs of thick knife-liked setae (fig. 73) ..... *S. superans* ZEMSKAJA, 1951
14 (13) Thick knife-liked setae are absent.
15 (16) Peritreme reaching the middle of coxa II; anterodorsal spur on coxa II with 5 denticles, sometime undiscernable; setae S 7–8 and M 11 approximately equal in length (fig. 56) ..... *S. aglaiae* STANYUKOVICH, 1991
16 (15) Peritreme reaching the posterior margin of coxa II; large anterodorsal spur on coxa II; setae S 8 are slightly shorter then S 7. (fig. 60) ..... *S. cavus* RYBIN, 1992

Males

1 (2) Two dorsal plates (fig. 72) ..... *S. superans* ZEMSKAJA
2 (1) Single dorsal plate.
3 (6) Setae M 11 are long.
4 (5) Dorsal plate with 23–24 setal pairs; holoventral plate sligthtly broading behind coxa IV; anterior seta on coxa III resembles a fish tail ..... *S. spinosus* WILLMANN
5 (4) Dorsal plate with 25 setal pairs; holoventral plate narrow, without broading behind coxa IV; anterior seta on coxa III is ordinary ..... *S. noctulus* RYBIN
6 (3) Setae M 11 are short.
7 (10) Peritreme reaching middle of coxa III.
8 (9) Dorsal plate with 18 setal pairs; anterior seta on coxa III is ordinary .... *S. desertorus* RYBIN
9 (8) Dorsal plate with 19 setal pairs; anterior seta on coxa is III spur-like, floated with ridge-like thickening ..... *S. occidentails evansi* (MICHERDZINSKI)
10 (7) Peritreme reaching anterior margin coxa III or posterior margin coxa II.
11 (12) Dorsal plate is clearly divided into podosomal and opisthosomal parts closely connected with one another by a transverse furrow (fig. 66) ..... *S. mongolicus* DUŠBÁBEK
12 (11) Dorsal plate is undivided.
13 (14) Dorsal plate with 16 setal pairs; anterior seta on coxa III ist not floated ..... *S. cavus* RYBIN
14 (13) Dorsal plate with 19–20 setal pairs; anterior seta on coxa III is floated and looks like a fish tail (fig. 70) ..... *S. periblepharus* KOLENATI

Protonymphs

1 (2) Four pairs of intermediate sclerits between podosomal and opisthosomal plates ..... *S. spinosus* WILLMANN
2 (1) Two pairs of intermediate sclerits between podosomal and opisthosomal plates.

3 (4) Posterior seta on coxa III floated near base, the tip is pointed and becoming a thin thread ..... *S. superans* ZEMSKAJA
4 (3) Posterior seta on coxa III is ordinary.
5 (6) Podosomal plate is small (length about 80, width about 55) ..... *S. occidentalis evansi* (MICHERDZINSKI)
6 (5) Length of podosomal plate is more then 100, width is more then 80.
7 (10) Length of tarsi I and IV are equal.
8 (9) Tarsi I and IV are very short (near 64); the length of sternal setae is about 21 (fig. 64) ..... *S. desertorus* RYBIN
9 (8) Lengths of I and IV tarsi are about 80–100; lengths of sternal setae are 37–38 (fig. 63) ..... *S. noctulus* RYBIN
10 (7) Length of tarsi I is more then that of tarsi IV.
11 (12) Length of tarsi I and IV is not larger then 110 ..... *S. periblepharus* KOLENATI
12 (11) Length of tarsi I and IV is much larger.
13 (14) Basal width of tarsi is 27–32; length of tarsi IV is 145–161 (fig. 62) ..... *S. cavus* RYBIN
14 (13) Basal width of tarsi is 37–38; length of tarsi IV is 134–135 (fig. 57–58) ..... *S. aglaiae* STANYUKOVICH

*Steatonyssus aglaiae* STANYUKOVICH, 1991 (fig. 56–58)
**Host**. *Rhinolophus ferrumequinum*.
**Distribution**. Crimea.

*Steatonyssus cavus* RYBIN, 1992 (fig. 60–62)
**Hosts**. *Rhinolophus ferrumequinum*, *Barbastella leucomelas*.
**Distribution**. Kirgizstan.

*Steatonyssus desertorus* RYBIN, 1992 (fig. 61–64)
**Host**. *Eptesicus bottae*.
**Distribution**. Kirgizstan.

*Steatonyssus mongolicus* DUŠBÁBEK, 1966 (fig. 65–67)
**Host**. *Myotis mystacinus*.
**Distribution**. Tajikistan. Mongolia.

*Steatonyssus noctulus* RYBIN, 1992 (fig. 59)
**Hosts**. *Nyctalus noctula*, *Miniopterus schreibersii*.
**Distribution**. ex-USSR: Russia, Latvia, Belorussia, Moldava, Ukraine, Azerbaidjan, Kazachstan, Kirgizstan.

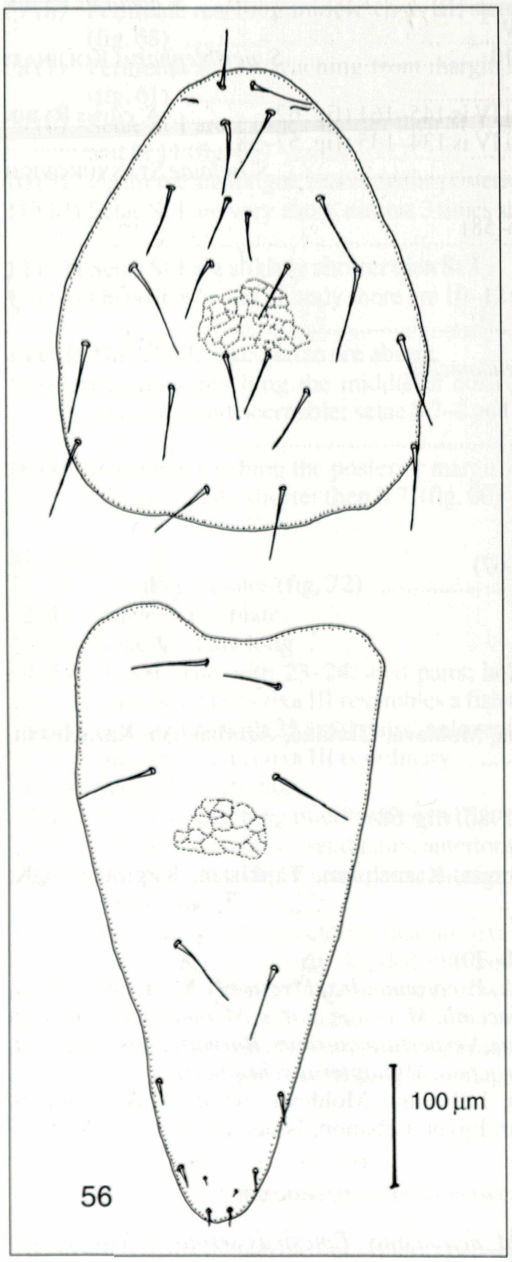
*Steatonyssus occidentalis evansi* (MICHERDZINSKI, 1980) (fig. 68)
**Hosts**. *Myotis mystacinus*, *M. blythi*, *E. serotinus*.
**Distribution**. ex-USSR: Russia, Belorussia, Georgia, Kazachstan, Tajikistan, Kirgizstan. UK, Germany, Czechia, Slovakia.

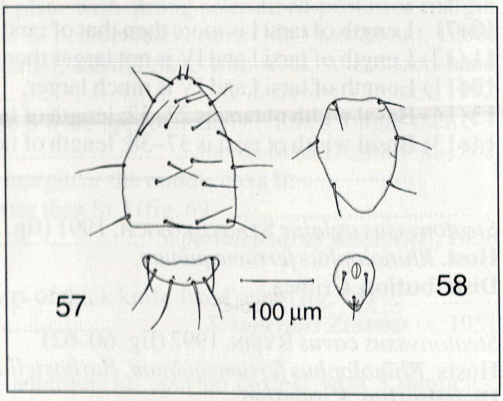
*Steatonyssus periblepharus* KOLENATI, 1858 (fig. 69–70)
**Hosts**. *Pipistrellus pipistrellus*, *P. kuhli*, *P. nathusii*, *P. coromandra*, *Myotis blythi*, *M. mystacinus*, *M. brandti*, *M. daubentoni*, *M. dasycneme*, *M. capaccinii*, *M. emarginatus*, *M. nattereri*, *Eptesicus serotinus*, *E. nilssoni*, *Plecotus auritus*, *P. austriacus*, *Vespertilio murinus*, *Barbastella barbastella*, *Rhinolophus ferrumequinum*, *R. euryale*, *Nyctalus noctula*, *Miniopterus schreibersii*.
**Distribution**. ex-USSR: Russia, Estonia, Latvia, Lithuania, Moldova, Armenia, Azerbaidjan, Georgia, Turkmenistan, Uzbekistan. Europe. Aldjir, Egypt, Lebanon, Israel, Afghanistan, Mongolia, Pakistan, China.

*Steatonyssus spinosus* WILLMANN, 1936 (fig. 71)
**Hosts**. *Myotis myotis*, *M. blythi*, *M. daubentoni*, *M. mystacinus*, *Eptesicus serotinus*, *Vestpertilio*

*murinus*, *V. superans*, *Nyctalus noctula*, *N. leisleri*, *Pipistrellus savii*, *P. pipistrellus*, *Barbastella barbastella*, *Plecotus auritus*, *Rhinolophus hipposideros*, *R. ferrumequinum*.
**Distribution**. ex-USSR: Russia, Estonia, Latvia, Ukraine, Moldova, Armenia, Turkmenistan, Kirgizstan. Corsica, Korea, China.

*Steatonyssus superans* ZEMSKAJA, 1951 (fig. 72–73)
**Hosts**. *Vespertilio superans, V. murinus, Eptesicus nilssoni.*
**Distribution**. ex-USSR: Russia, Kazachstan, Tajikistan. Korea. (fig. 56–73)



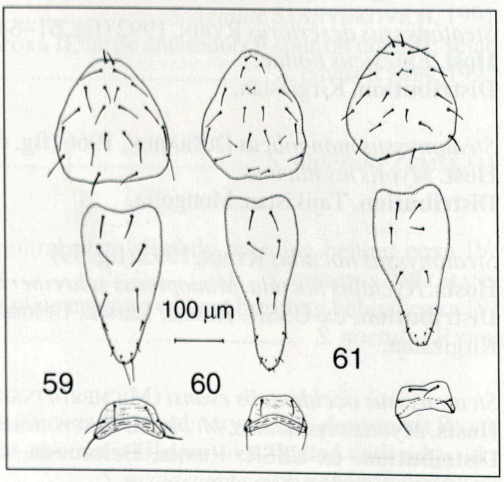




Fig. 57–58. *Steatonyssus aglaiae* protonympha. 57: dorsal plates – 58: sternal and anal plates.

Fig. 59–61. *Steatonyssus* spp. ♀, dorsal and sternal plates. 59: *St. noctulus* – 60: *St. cavus* – 61: *St. desertorus*.

Fig. 56. *Steatonyssus aglaiae* ♀, dorsal plates.

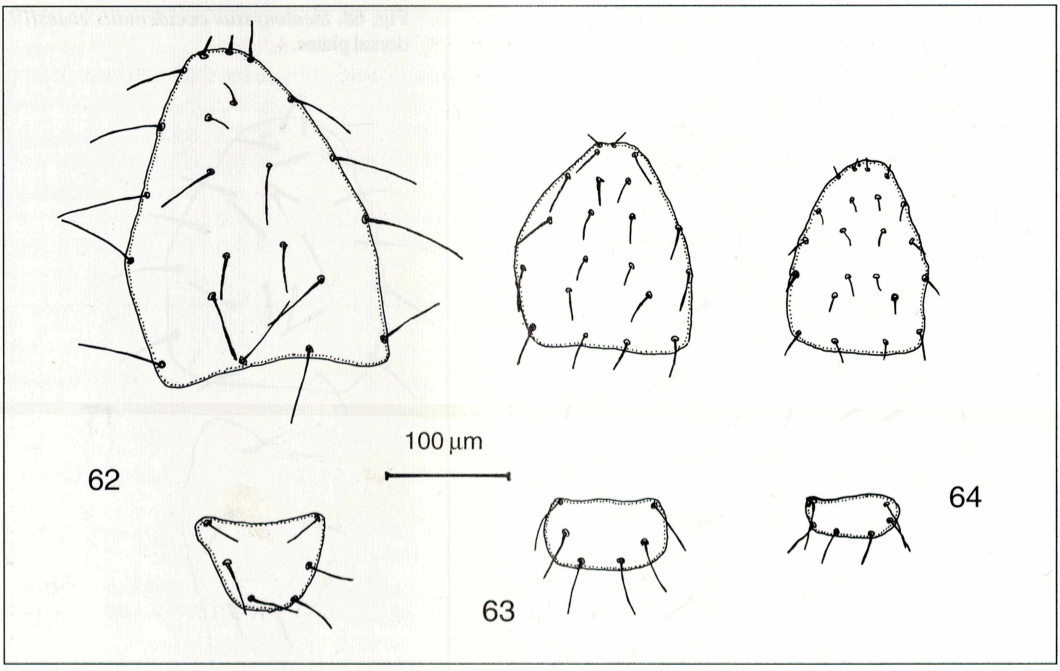



Fig. 62–64. *Steatonyssus* spp., dorsal plates of protonymphae. 62: St. cavus – *63: St. noctulus* – 64: *St. desertorus*.

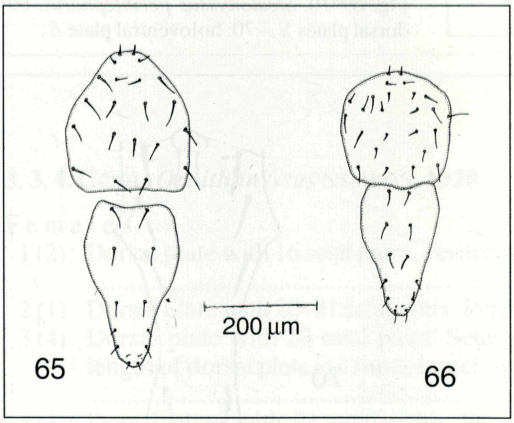



Fig. 65–66. *Steatonyssus mongolicus*. 65: dorsal plate ♀ – 66: dito ♂.

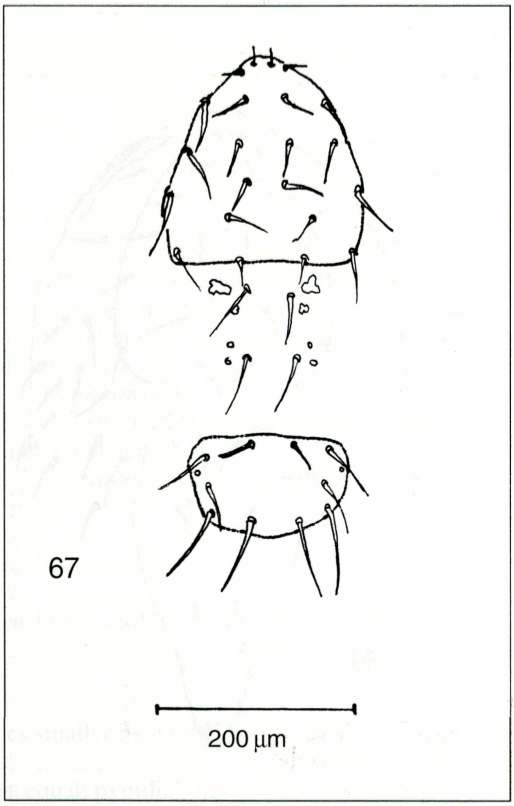



Fig. 67. *Steatonyssus mongolicus*, dorsal plates of protonympha.

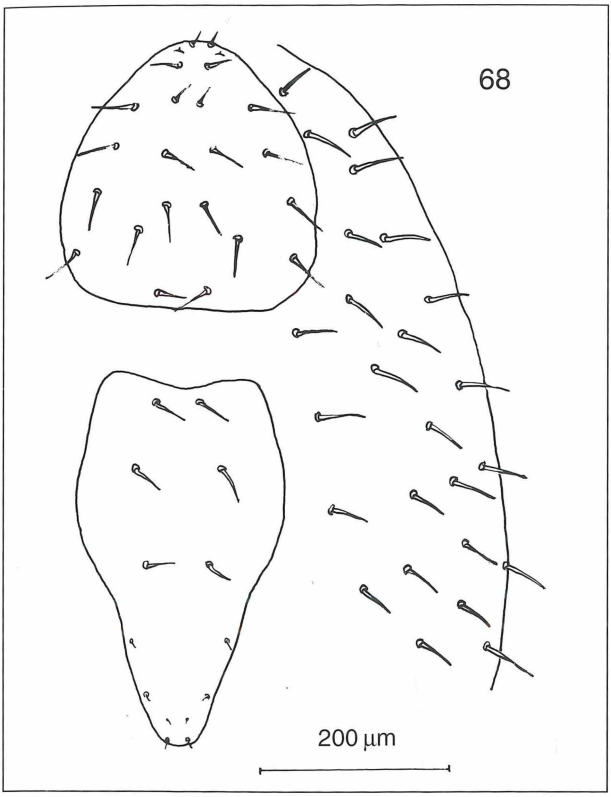
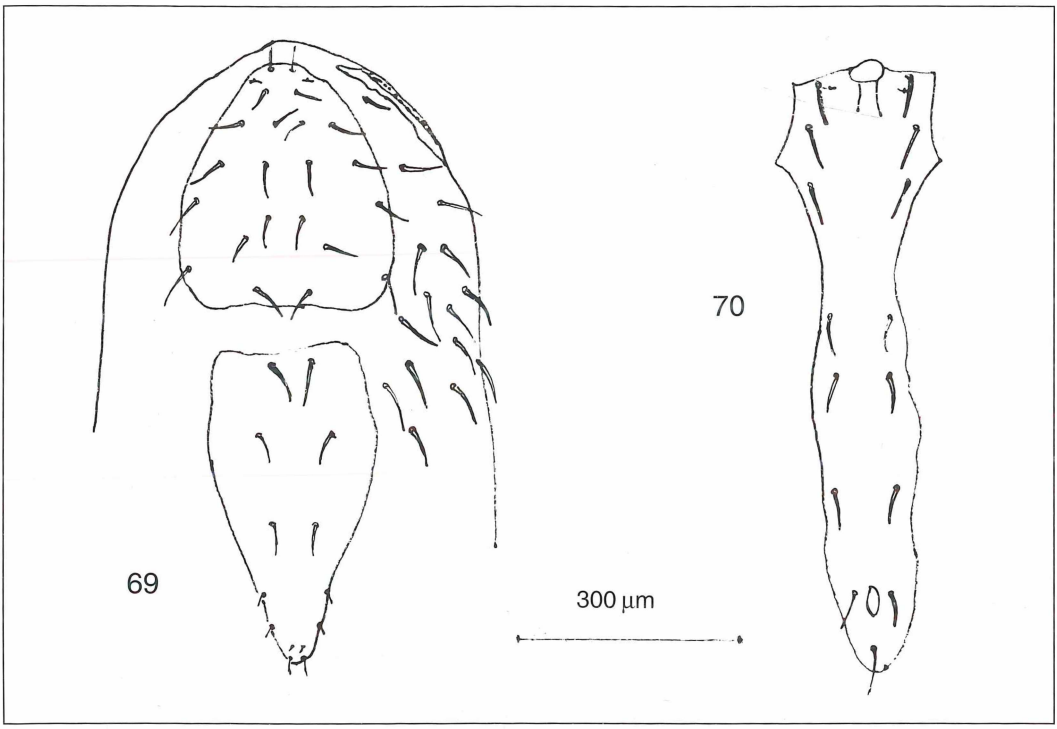



Fig. 68. *Steatonyssus occidentalis evansi* ♀, dorsal plates.

Fig. 69–70. *Steatonyssus periblepharus*. 69: dorsal plates ♀ – 70: holoventral plate ♂.



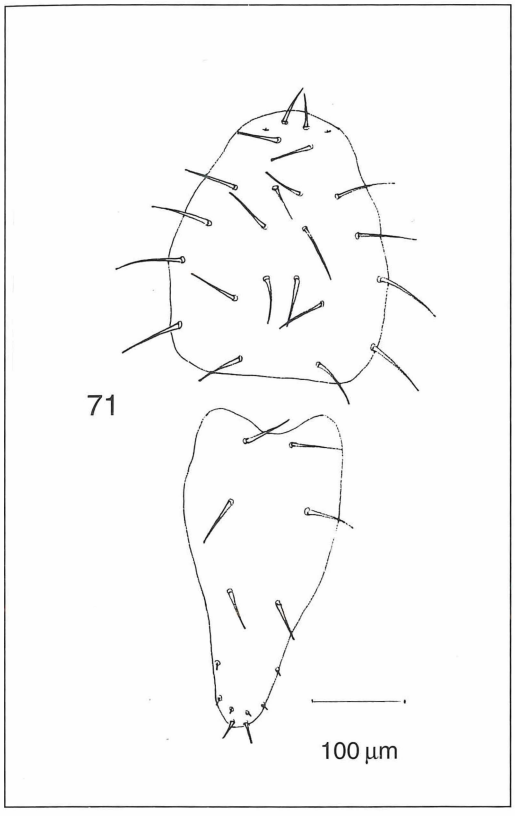
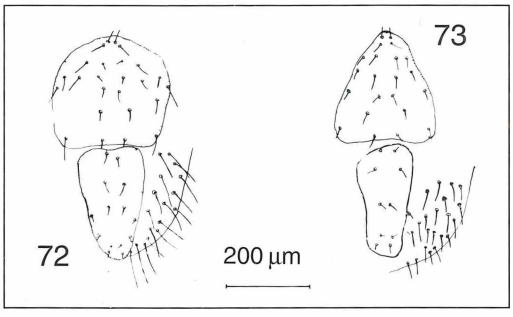



Fig. 71. *Steatonyssus spinosus* ♀, dorsal plates.

Fig. 72–73. *Steatonyssus superans*, dorsal plates. 72: ♂ – 73: ♀.




### 3. 3. 4. Genus *Ornithonyssus* SAMBON, 1928

Females

1 (2) Dorsal plate with 16 setal pairs. Peritreme reaching an anterior margin of coxa III. (fig. 74) . ..... *Ornithonyssus flexus* (RADOVSKY, 1967)

2 (1) Dorsal plate with 20–21 setal pairs. Peritreme reaching a middle of coxa II.

3 (4) Dorsal plate with 20 setal pairs. Setae M 11 on the end of the plate are the longest. The length of dorsal plate is 3 times larger then the width (fig. 77) ..... ..... *Ornithonyssus pipistrelli* (OUDEMANS, 1904)

4 (3) Dorsal plate with 21 setal pairs. Setae M 11 is shorter then others setae on the plate. Maximum width of dorsal plate is 2 times smaller then length ..... ..... *Ornithonyssus hoogstraali* (KEEGAN, 1956)

Males

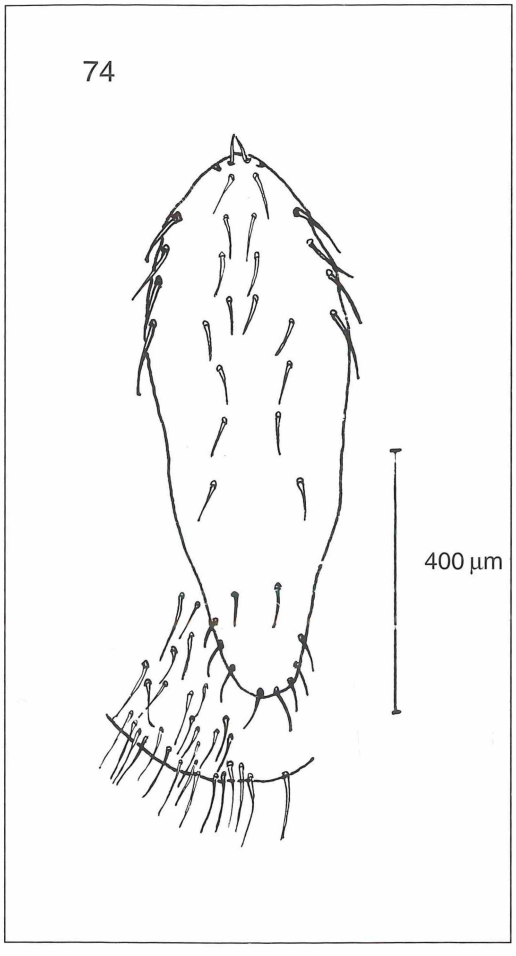
1 (2) Holoventral plate with 17 setae. Peritreme reaching a middle of coxa II (fig. 75) ..... ..... *O. hoogstraali* (KEEGAN)

2 (1) Holoventral plate with 13 setae. Peritreme reaching a middle of coxa III (fig. 78) ..... ..... *O. pipistrelli* (OUDEMANS)

Protonymphs

1 (2) The length of the pygidial plate 2–2.5 is times smaller its width; six setae pairs on plate (fig. 79) ..... *O. pipistrelli* (OUDEMANS)

2 (1) Length and width of pygidial plate are almost equal; pygidial plate with 4–5 setal pairs.




3 (4) Pygidial plate with 4 setal pairs: 2 pairs of short setae and 2 pairs thickened knife-like setae (fig. 76) ..... .....*O. hoogstraali* (KEEGAN)

4 (3) Pygidial plate with 5 setal pairs: 4 pairs long setae and an pair of short setae ..... .....*O. flexus* (RADOVSKY)

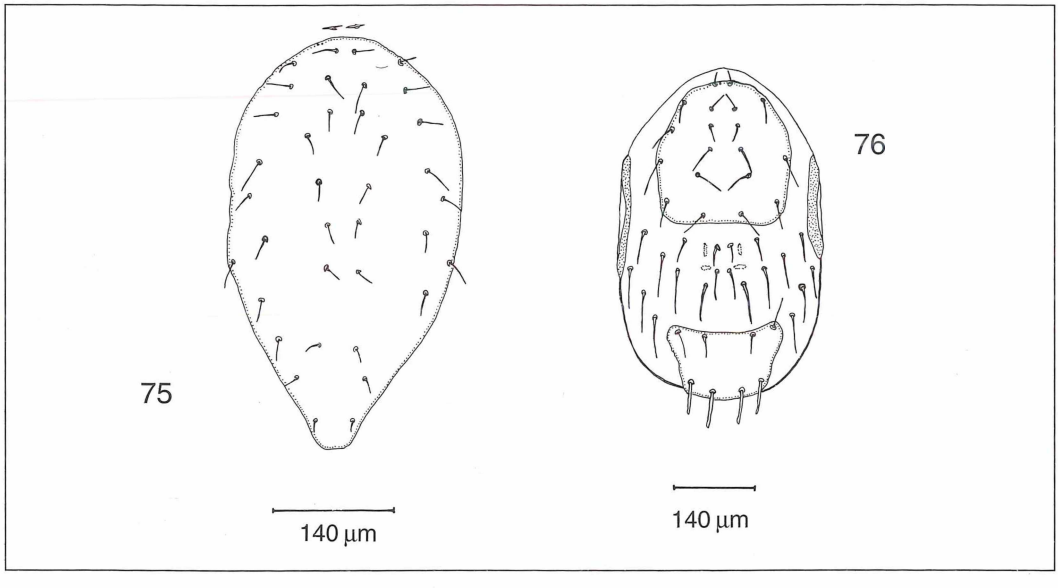
*Ornithonyssus flexus* (RADOVSKY, 1967) (fig. 74)
**Hosts**. *Myotis lucifagus, M. mystacinus.*
**Distribution**. Ukraine, Tajikistan. USA.

*Ornithonyssus hoogstraali* (KEEGAN, 1956) (fig. 75–76)
**Host**. *Tadarida teniotis.*
**Distribution**. Kirgizstan. Canar Islands, Egypt.

*Ornithonyssus pipistrelli* (OUDEMANS, 1904) (fig. 77–79)
**Hosts**. *Myotis dasycneme, M. daubentoni, M. brandti, M. mystacinus, M. ikonnikovi, Pipistrellus nathusii, Eptesicus nilssoni, Nyctalus noctula, Plecotus auritus, P. austriacus.*
**Distribution**. ex-USSR: Russia, Latvia, Georgia, UK, Romania.

Fig. 74. *Ornithonyssus flexus* ♀, dorsal plate.

Fig. 75–76. *Ornithonyssus hoogstraali*. 75: dorsal plate ♂ – 76: dorsal plates of protonympha.



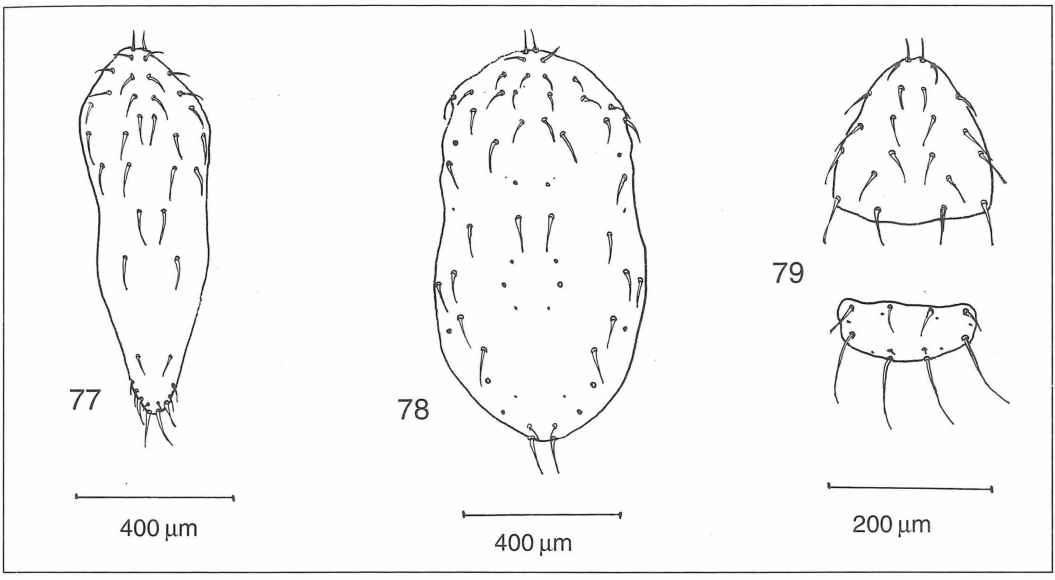



Fig. 77–79. *Ornithonyssus pipistrelli*, dorsal plates. 77: ♀ – 78: ♂ – 79: protonympha.

## 4. Host-Parasite List Chiroptera-Gamasina (for ex-USSR)

(*denotes a host association which are new for ex-USSR)

order CHIROPTERA Blumenbach, 1779
suborder MICROCHIROPTERA Dobson, 1875
family RHINOLOPHINAE Lesson, 1827

***Rhinolophus hipposideros*** (Bechstein, 1800)
*Eyundhovenia euryalis oudemansi* (Eynhoven)*
*Paraperiglischrus rhinolophinus* (Koch)
*Macronyssus ellipticus* (Kolenati)*
*M. rhinolophi* (Oudemans)*
*Steatonyssus spinosus* Willmann*

***R. euryale*** Blasius, 1853
*Eyndhovenia euryalis eryalis* (Canestrini)*
*Paraperiglischrus rhinolophinus* (Koch)
*Spinturnix myoti* (Kolenati)
*Ichoronyssus scutatus* (Kolenati)*
*Macronyssus granulosus* (Kolenati)*
*M. rhinolophi* (Oudemans)*
*Steatonyssus periblepharus* Kolenati

***R. mehelyi*** Matschie, 1901
*Eyndhovenia euryalis euryalis* (Canestrini)*
*Paraperiglischrus rhinolophinus* (Koch)
*Spinturnix myoti* (Kolenati)
*Macronyssus rhinolophi* (Oudemans)*

***R. ferrumequinum*** (Schreber, 1774)
*Eyndhovenia euryalis oudemansi* (Eyndhoven)*
*Paraperiglischrus rhinolophinus* (Koch)
*Spinturnix myoti* (Kolenati)
*S. plecotinus* (Koch)*
*S. psi* (Kolenati)*
*Ichoronyssus scutatus* (Kolenati)*
*Macronyssus ellipticus* (Kolenati)*
*M. rhinolophi* (Oudemans)*
*Steatonyssus aglaiae* Stanyukovich*
*S. cavus* Rybin
*S. periblepahrus* Kolenati
*S. spinosus* Willmann*

family VESPERTILIONIDAE Gray, 1821

***Myotis myotis*** (Borkhausen, 1797)
*Spinturnix myoti* (Kolenati)
*S. mystacinus* (Kolenati)*
*S. psi* (Kolenati)*
*Ichoronyssus scutatus* (Kolenati)
*Macronyssus cyclaspis* (Oudemans)
*M. diversipilis* (Vitzthum)*
*M. ellipticus* (Kolenati)
*M. flavus* (Kolenati)
*M. granulosus* (Kolenati)
*M. rhinolophi* (Oudemans)*
*Steatonyssus periblepharus* Kolenati
*S. spinosus* Willmann

***M. blythi*** (Tomes, 1857)
*Eyndhovenia euryalis oudemansi* (Eyndhoven)*

*Spinturnix acuminatus* (Koch)
*S. kolenatii* Oudemans*
*S. myote* (Kolenati)
*S. psi* (Kolenati)*
*Ichoronyssus scutatus* (Kolenati)*
*Macronyssus corethroproctus* (Oudemans)*
*M. ellipticus* (Kolenati)
*M. flavus* (Kolanati)
*M. granulosus* (Kolenati)
*M. rhinolophi* (Oudemans)*
*Steatonyssus occidentalis evansi* (Michedzinski)*
*S. periblepharus* Kolenati
*S. spinosus* Willmann

***M. nattereri*** (Kuhl, 1818)
*Spinturnix myoti* (Kolenati)*
*S. plecotinus* (Koch)*
*Macronyssus cyclaspis* (Oudemans)*
*M. diversipilis* (Vitzthum)*
*M. ellipticus* (Kolenati)*
*M. flavus* (Kolenati)*
*M. granulosus* (Kolenati)*
*Steatonyssus periblepharus* Kolenati*

***M. mystacinus*** (Kuhl, 1819)
*Spinturnix kolenatii* Oudemans*
*S. myoti* (Kolenati)
*S. mystacinus* (Kolenati)
*S. plecotinus* (Koch)*
*Macronyssus charusnurensis* Dušbábek*
*M. corethroproctus* (Oudemans)*
*M. crosbyi* (Ewing et Stover)*
*M. ellipticus* (Kolenati)*
*M. flavus* (Kolenati)*
*M. granulosus* (Kolenati)*
*M. heteromorphus* Dušbábek et Radovsky*
*M. kolenatii* (Oudemans)*
*Steatonyssus mongolicus* Dušbábek
*S. occidentalis evansi* (Micherdzinski)*
*S. periblepharus* Kolenati
*S. spinosus* Willmann *
*Ornithonyssus flexus* (Radovsky)*
*O. pipistrelli* (Oudemans)*

***M. brandti*** (Eversmann, 1845)
*Spinturnix kolenatii* Oudemans*
*S. myoti* (Kolenati)*
*S. mystacinus* (Kolenati)*
*S. plecotinus* (Koch)*
*Macronyssus cyclaspis* (Oudemans)*
*M. diversipilis* (Vitzthum)*
*M. ellipticus* (Kolenati)*
*M. evansi* Stanyukovich*
*M. granulosus* (Kolenati)*
*M. heteromorphus* Dušbábek et Radovsky*
*M. kolenatii* (Oudemans)*
*S. periblepharus* Kolenati*
*Ornithonyssus pipistrelli* (Oudemans)*

***M. ikonnikovi*** (Ognev, 1911)
*S. myoti* (Kolenati)*
*Ornithonyssus pipistrelli* (Oudemans)*

***M. frater*** (Allen, 1923)
*Macronyssus cyclaspis* (Oudemans)*

***M. dasycneme*** (Boie, 1825)
*Spinturnix acuminatus* (Koch)
*S. myoti* (Kolenati)
*S. mystacinus* (Kolenati)*
*Macronyssus corethroproctus* (Oudemans)*
*M. crosbyi* (Ewing et Stover)*
*M. diversipilis* (Vitzhum)*
*M. ellipticus* (Kolenati)
*M. granulosus* (Kolenati)*
*M. kolenatii* (Oudemans)
*Steatonyssus periblepharus* Kolenati
*Ornithonyssus pipistrelli* (Oudemans)*

***M. daubentoni*** (Kuhl, 1818)
*Spinturnix acuminatus* (Koch)
*S. kolenatii* (Oudemans)
*S. myoti* (Kolenati)
*S. plecotinus* (Koch)
*Macronyssus charusnurensis* Dušbábek*
*M. cyclaspis* (Oudemans)
*M. diversipilis* (Vitzthum)*
*M. ellipticus* (Kolenati)*
*M. flavus* (Kolenati)*
*M. granulosus* (Kolenati)*
*M. heteromorphus* Dušbábek et Radovsky*
*Steatonyssus periblepharus* Kolenati
*S. spinosus* Willmann*
*Ornithonyssus pipistrelli* (Oudemans)*

***M. capaccinii*** (Bonaparte, 1837)
*Spinturnix myoti* (Kolenati)*
*S. psi* (Kolenati)*
*Macronyssus granulosus* (Kolenati)*
*Steatonyssus periblepharus* Kolenati*

***M. emarginatus*** (Geoffroy, 1806)
*Spinturnix emarginatus* (Kolenati)*
*S. myoti* (Kolenati)*
*Macronyssus rhinolophi* (Oudemans)*
*Steatonyssus periblepharus* Kolenati*

***Plecotus auritus*** (Linnaeus, 1758)
*Spinturnix kolenatii* (Oudemans)*

*S. myoti* (Kolenati)
*S. mystacinus* (Kolenati)*
*S. plecotinus* (Koch)*
*Macronyssus charusnurensis* Dušbábek*
*M. cyclaspis* (Oudemans)*
*M. diversipilis* (Vitzhum)*
*M. ellepticus* (Kolenati)*
*M. evansi* Stanyukovich*
*M. granulosus* (Kolenati)*
*M. heteromorphus* Dušbábek et Radovsky*
*Steatonyssus periblepharus* Kolenati*
*S. spinosus* Willmann*
*Ornithonyssus pipistrelli* (Oudemans)*

***P. austriacus*** (Fischer, 1829)
*Spinturnix plecotinus* (Koch)*
*Macronyssus cyclaspis* (Oudemans)*
*Steatonyssus periblepharus* Kolenati*
*Ornithonyssus pipistrelli* (Oudemans)*

***Barbastella barbastellus*** (Schreber, 1774)
*Spinturnix barbastelli* (Kolenati)*
*S. myoti* (Kolenati)*
*Macronyssus barbastellinus* Dušbábek et Pintschuk*
*M. cyclaspis* (Oudemans)*
*M. granulosus* (Kolenati)*
*Steatonyssus periblepharus* Kolenati*
*S. spinosus* Willmann*

***B. leucomelas*** Cretzschmar, 1830
*Spinturnix barbastelli* (Kolenati)*
*S. plecotinus* (Koch)*
*Steatonyssus aglaiae* Stanyukovich*

***Pipistrellus pipistrellus*** (Schreber, 1774)
*Eyndhovenia euryalis oudemansi* (Eyndhoven)*
*Spinturnix acuminatus* (Koch)*
*S. myoti* (Kolenati)
*Macronyssus cyclaspis* (Oudemans)*
*M. diversipilis* (Vitzthum)*
*M. flavus* (Kolenati)*
*M. kolenatii* (Oudemans)*
*M. rhinolophi* (Oudemans)*
*Steatonyssus periblepharus* Kolenati
*S. spinosus* Willmann*

***P. nathusii*** (Keyserling et Blasius, 1839)
*Spinturnix acuminatus* (Koch)
*S. kolenatii* Oudemans
*S. myoti* (Kolenati)
*Macronyssus corethroproctus* (Oudemans)*
*M. crosbyi* (Ewing et Stover)*
*M. flavus* (Kolenati)*
*M. kolenatii* (Oudemans)*
*Steatonyssus periblepharus* (Kolenati)
*Ornithonyssus pipistrelli* (Oudemans)*

***P. kuhlii*** (Kuhl, 1819)
*Spinturnix bakeri* (Rudnick)*
*Macronyssus cyclaspis* (Oudemans)*
*M. kolenatii* (Oudemans)*
*Steatonyssus periblepharus* (Kolenati)*

***P. savii*** (Bonaparte, 1837)
*Spinturnix acuminatus* (Koch)*
*S. nobleti* Deunff et al.*
*S. psi* (Kolenati)*
*Steatonyssus spinosus* (Willmann)*

***Nyctalus leisleri*** (Kuhl, 1818)
*Spinturnix acuminatus* (Koch)
*S. helvetiae* Deunff et al.*
*Macronyssus flavus* (Kolenati)*
*M. granulosus* (Kolenati)
*S. spinosus* Willmann

***N. noctula*** (Schreber, 1774)
*Spinturnix acuminatus* (Koch)
*S. kolenatii* Oudemans
*S. myoti* (Kolenati)
*S. mystacinus* (Kolenati)
*S. plecotinus* (Koch)*
*Macronyssus flavus* (Kolenati)
*Steatonyssus noctulus* Rybin
*S. periblepharus* Kolenati
*S. spinosus* Willmann*
*Ornithonyssus pipistrelli* (Oudemans)*

***Eptesicus serotinus*** (Schreber, 1774)
*Eyndhovenia euryalis oudemansi* (Eyndhoven)*
*Paaperiglischrus rhinolophinus* (Koch)*
*Spinturnix acuminatus* (Koch)*
*S. bakeri* Rudnick*
*S. kolenatii* Oudemans
*S. myoti* (Kolenati)
*S. mystacinus* (Kolenati)
*S. psi* (Kolenati)
*Macronyssus cyclaspis* (Oudemans)*
*M. diversipilis* (Vitzhum)*
*Steatonyssus occidentalis evansi* (Micherdzinski)*
*S. periblepharus* Kolenati
*S. spinosus* (Willmann)*

***E. nilssoni*** (Keyserling et Blasius, 1839)
*Spinturnix kolenatii* Oudemans
*S. myoti* (Kolenati)
*S. plecotinus* (Koch)*
*Macronyssus cyclaspis* (Oudemans)*

*M. diversipilis* (Vitzthum)*
*M. flavus* (Kolenati)*
*M. heteromorphus* Dušbábek et Radovsky*
*M. kolenatii* (Oudemans)*
*Steatonyssus periblepharus* Kolenati
*S. superans* Zemskaja*
*Ornithonyssus pipistrelli* (Oudemans)*

***E. bottae*** Peters, 1869
*Steatonyssus desertorus* Rybin

***Vespertilio murinus*** Linnaeus, 1758
*Spinturnix kolenatii* Oudemans*
*S. myoti* (Kolenati)*
*S. mystacinus* (Kolenati)*
*Ichoronyssus scutatus* (Kolenati)*
*Macronyssus corethroproctus* (Oudemans)*
*M. crosbyi* (Ewing et Stover)*
*M. diversipilis* (Vitzthum)*
*M. flavus* (Kolenati)*
*M. kolenatii* (Oudemans)*
*Steatonyssus periblepharus* (Kolenati)*
*S. spinosus* Willmann*
*S. superans* Zemskaja*

***V. superans*** Thomas, 1898
*Spinturnix myoti* (Kolenati)*
*Steatonyssus spinosus* Willmann*
*S. superans* Zemskaja

***Otonycteris hemprichi*** Peters, 1859
*Spinturnix myoti* (Kolenati)*

***Miniopterus schreibersi*** (Kuhl, 1819)
*Eyndhovenia euryalis euryalis* (Canestrini)*
*E. e. oudemansi* (Eyndhoven)*
*Spinturnix myoti* (Kolenati)*
*S. psi* (Kolenati)*
*Ichoronyssus scutatus* (Kolenati)*
*Macronyssus granulosus* (Kolenati)*
*M. rhinolophi* (Oudemans)*
*Steatonyssus noctulus* Rybin*
*S. periblepharus* Kolenati*

***Murina leucogaster*** Milne-Edwards, 1872
*Spinturnix acuminatus* (Koch)*
*S. kolentii* Oudemans*
*S. maedai* Uchikawa et Wade*
*S. myoti* (Kolenati)*
*Macronyssus cyclaspis* (Oudemans)*
*M. diversipilis* (Vitzthum)*
*M. ellipticus* (Kolenati)*
*M. granulosus* (Kolenati)*
*M. heteromorphus* Dušbábek et Radovsky

family MOLOSSIDAE Gill, 1872

***Tadarida teniotis*** (Rafinesque, 1814)
*Ornithonyssus hoogstraali* Keegan*

## Summary

The results of processing our own material and also the collectional material on the gamasids of Russia and adjacent countries (15.843 mites from 1.937 bats of 34 species), as well as the analysis of our literature data, have led us to conclusion that the fauna of the invesigated region includes 41 species of 7 genera from two gamasid family. For the first time were described the males and protonymphs of *Streatonyssus noctulus*, *S. cavus* and *S. desertorus*. The definition keys of genera and species of spinturnicids and of macronissyds of bats of the investigated region were produced. New data on the localities and the hosts were given. The most characteristic species for the investigated area are those which possess transpalaearctic and southpalaearctic areals. A host-parasite list is given.

## Zusammenfassung

*Bestimmungsschlüssel für auf Fledermäusen (Chiroptera) lebende gamaside Milben (Acari, Parasitiformes, Mesostigmata, Macronyssoidea et Laelaptoidea) von Rußland und angrenzenden Ländern (ex-UdSSR).* – In diesem riesigen Territorium sind bisher 41 Arten festgestellt worden, die den Gattungen *Paraperiglischrus* (1 sp.), *Eyndhovenia* (1 sp., 2 sspp.), *Spinturnix* (13 spp.), *Macronyssus* (13 spp.), *Steatonyssus* (9 spp.), *Ornithonyssus* (3 spp.) und *Ichoronyssus* (1 sp.) angehören. Ihre Verbreitung ist zumeist transpalaearktisch und südpalaearktisch. Für diese Gamasiden, deren Nachweise für das Territorium der ehemaligen Sowjetunion überwiegend neu sind, ist ein Bestimmungsschlüssel entworfen. Eine Wirt-Parasiten-Liste beschließt die Arbeit.

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