

TAXONOMIC CORRECTIONS TO THE FEATHER MITE GENERA *PTERONYSSUS* ROBIN, 1877 AND *PARAPTERONYSSUS* FACCINI ET ATYEO, 1981 (ANALGOIDEA, PTERONYSSIDAE)

ТАКСОНОМИЧЕСКИЕ ПОПРАВКИ К РОДАМ ПЕРЬЕВЫХ КЛЕЩЕЙ *PTERONYSSUS* ROBIN, 1877 И *PARAPTERONYSSUS* FACCINI ET ATYEO, 1981 (ANALGOIDEA, PTERONYSSIDAE)

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ABSTRACT

РЕЗЮМЕ

Taxonomic corrections are made with regard to two feather mite genera, *Pteronyssus* Robin, 1877 and *Parapteronyssus* Faccini et Atyeo 1981, species of which parasitize woodpeckers (Piciformes, Pcidae). The type species of the *Pteronyssus* Robin, 1877, originally designated as *Dermaleichus picinus* Koch, 1841, was misidentified by the author of the genus and this situation has not been corrected by subsequent investigators. *Parapteronyssus robini* Faccini et Atyeo, 1981 (= *Dermaleichus picinus sensu* Robin, 1877, **nec** Koch, 1841), which was used for the creation the genus *Pteronyssus* Robin, is now fixed as the type species of this genus (under the Article 70.3.2, International Code of Zoological Nomenclature). In the sequence of this taxonomic action, the genus *Parapteronyssus* Faccini et Atyeo, 1981 becomes a junior synonym to the genus *Pteronyssus* Robin. The taxon *Pteronyssus sensu* Faccini et Atyeo, 1981 represents a distinct genus and does not correspond to the genus *Pteronyssus* Robin in the original concept and in the sense fixed here. As the name “*Pteronyssus*” for the taxon of Faccini and Atyeo is preoccupied, it is replaced by a new name, *Neopteronysus* nom. n. The species *Dermaleichus picinus* Koch, 1841 retains a type species of this taxon as it was originally designated. Corrected diagnoses of the genera *Pteronyssus* and *Neopteronysus* are proposed. Type species of both genera are redescribed, based on the material collected from respective type hosts.

Сделаны таксономические поправки для двух родов перьевых клещей, *Pteronyssus* Robin, 1877 и *Parapteronyssus* Faccini et Atyeo, 1981, представители которых паразитируют на птицах семейства дятловых (Piciformes, Pcidae). Типовой вид рода *Pteronyssus* Robin, 1877, первоначально обозначенный как *Dermaleichus picinus* Koch, 1841, был определен автором рода ошибочно, и данная таксономическая ситуация не была корректно исправлена до настоящего времени. Вид *Parapteronyssus robini* Faccini et Atyeo, 1981 (= *Dermaleichus picinus sensu* Robin, 1877, **nec** Koch, 1841), который реально использовался в качестве основы рода *Pteronyssus* Robin, зафиксирован в настоящей работе в качестве типового вида этого рода (согласно Статье 70.3.2, Международный Кодекс Зоологической Номенклатуры). Вследствие данного таксономического акта род *Parapteronyssus* Faccini et Atyeo, 1981 становится младшим синонимом рода *Pteronyssus* Robin. Таксон *Pteronyssus sensu* Faccini et Atyeo (1981) представляет собой четко очерченный таксон родового ранга и не соответствует пониманию рода *Pteronyssus* Robin в исходной концепции и в смысле, зафиксированном в данной работе. Поскольку название “*Pteronyssus*” для этого таксона оказывается преокупированным, оно замещено новым названием *Neopteronysus* nom. n. Вид *Dermaleichus picinus* Koch, 1841 остается типовым видом этого рода по первоначальному обозначению.

Составлены новые диагнозы для родов *Pteronyssus* и *Neopteronysus*. Типовые виды обоих родов переописаны на основании материала, собранного с соответствующих типовых хозяев.

INTRODUCTION

The feather mite family Pteronyssidae Oudemans, 1941 includes about 130 species currently arranged in 22 genera [Faccini, Atyeo, 1981; Gaud, 1991; Gaud, Atyeo, 1996; Mironov, 1989, 2001]. This family is widely distributed on different families of the Passeriformes and Piciformes, and a few species are recorded on the Coraciiformes

The genus *Pteronyssus* Robin [in Robin, Megnin, 1877] is the type genus of the family Pteronyssidae. This genus was established more than one hundred year ago; however, there is a taxonomic problem concerning a correct assignment of the type species, because it was found out that the originally designated type species, *Dermaleichus picinus* Koch, 1841, was actually misidentified by the authors of the genus. This original error has caused a variety of subsequent misidentifications and errors in the systematics of the pteronyssid mites associated with woodpeckers. In the recent generic revision of the family Pteronyssidae [Faccini, Atyeo, 1981], this problem was not formally resolved from the point of view of the Code of Zoological Nomenclature. The main objectives of the present paper are to establish the type species for the genus *Pteronyssus* Robin, 1877, to provide a new diagnosis of this genus and to resolve several additional nomenclature problems caused by this taxonomic action.

MATERIAL EXAMINED

Most of the specimens examined in the present study are in the collections of pteronyssid mites deposited in Zoological Institute, Russian Academy of sciences (Saint Petersburg, Russia); some material was borrowed from the University of Georgia (Athens, USA).

Diagnoses of genera and redescription of type species are given in the format used for the pteronyssid mites by Faccini and Atyeo [1981] and Mironov [2001]. The general morphological terms, leg and idiosomal chaetotaxy follow Gaud and Atyeo [1996]. All measurements in the redescription of type species are given in micrometers (μm).

Abbreviations used in collection data: ZISP — Zoological Institute, Saint Petersburg, Russia; UGA — University of Georgia, Athens, USA; AMNH — American Museum of Natural History, New York,

USA; NHMB — Natural History Museum, Basel, Switzerland. Where a sample is provided with two numbers, the first refers to the collection number of the slide with mite specimens, the second is a collection number of a respective host specimen.

DISCUSSION

The type species of the genus *Pteronyssus* was originally designated by Robin [1968] as *Dermaleichus picinus* Koch, 1841. Few years later, Robin [in Robin, Megnin, 1877] had given a full diagnosis of this genus and “redescription” of the type species. This species was described by Koch [1841, see the citation for Koch, 1935–1944] from the Black Woodpecker, *Dryocopus martius* (L.), in Germany. According to reliable recent records it is a monoxenous parasite of this host [Černý, 1963, Černý, Schumilo, 1973; Faccini, Atyeo, 1981; Mironov, 1989]. However, when Robin designated and redescribed the type species, he based on a material, which was collected from the Green Woodpecker, *Picus viridis* L., apparently in France, and actually represented a different pteronyssid species. Thus, Robin has misidentified the species, which he used as a basis for the new genus.

The type materials of the species described by Koch [1841] and Robin [in Robin, Megnin, 1877] are lost, but the differences between these species are clearly evident from descriptions and figures. In the original descriptions, males of the former species, from *D. martius*, have distinct opisthosomal lobes, while females have a hysteronotal shield separated into anterior and opisthosomal parts, and the posterior margin of the opisthosoma has a wide terminal extension between bases of the macrochaetae *h3*. Males of the latter species, from *P. viridis*, have a median hysteronotal ridge, and females have a pair of small opisthosomal shields. Nevertheless, the misidentification of the type species of the genus *Pteronyssus* was not recognized by subsequent authors for more than a hundred of years. Most subsequent investigators either applied the name *Pteronyssus picinus* to the species really described by Koch, or considered this name as a synonym of other formerly described species referred to the genus *Pteronyssus* [Canestrini, 1886; Canestrini, Kramer, 1899; Oudemans, 1929, 1937; Vitzthum 1929]. Most commonly, *Pteronyssus picinus* (Koch) was erroneously considered as a junior synonym of *Pteronyssus gracilis* (Nitzsch, 1818), which was actually a distinct pteronyssid species differed from those described by Koch and Robin. As the misidentification made by Robin was not

recognised, his redescription of *Pteronyssus picinus* was considered simply as an incorrect one, and the new species actually collected by this author from *P. viridis* did not get a valid name until the revision of the family.

In the recent generic revision of the family Pteronyssidae, in which numerous collections from different European woodpeckers were included, Faccini and Atyeo [1981] noticed for the first time that mites described by Koch and Robin were two different species. Up to that time, the genus *Pteronyssus* had included nine species described from Picidae. In the course of the revision, four species were left in the genus *Pteronyssus* in the sense of the revisers, and five species were assigned to a new genus, *Parapteronyssus* Faccini et Atyeo. It is important to stress here, that these two genera are reliably distinct. As a result of their revision, *Dermaleichus picinus*, as described by Koch, was left in the genus *Pteronyssus* under the name *Pteronyssus picinus* (Koch), and considered by the authors as the type species. At the same time, the species *Pteronyssus picinus sensu* Robin, which had been used originally as the diagnostic basis for the genus *Pteronyssus*, was assigned to the new genus, *Parapteronyssus*, and was given a new valid name, *Parapteronyssus robini* Faccini et Atyeo.

Faccini and Atyeo noted [1981] pointed out that the species described by Robin as *Pteronyssus picinus* differed from *Dermaleichus picinus* Koch and used the species described by Koch as the type of the genus *Pteronyssus* in the generic revision of Pteronyssidae. However, under the rules of the second edition of the International Code of Zoological Nomenclature [1964] used at that time, a resolution of such a situation, a choice and fixation of a type species, was to be achieved by being referred to the Commission for a ruling (Articles 41, 65b, 70). This was not done, and therefore the taxonomic problem has not been formally solved.

As the genus *Pteronyssus* Robin, the type genus of the family, was originally based on a misidentified type species, Articles 41 and 65.2.5 of the fourth edition of the Code [1999] apply. These articles specifically recommend application of Article 70.3 to resolve the problem.

Taking into consideration that the creation of the genus *Pteronyssus* Robin was actually based on *Pteronyssus picinus sensu* Robin from *Picus viridis*, and the original generic diagnosis of this genus [Robin, Megnin, 1877] contained clear characteristics allowing its differentiation from other pteronyssid genera, it is logical and expedient to choose

this species as the type species for the genus *Pteronyssus*. In addition, the representative of the genus *Pteronyssus sensu* Robin are morphologically uniform, while *Pteronyssus sensu* Faccini and Atyeo is polymorphic and includes several clear species groups [Faccini, Atyeo, 1981; Gaud, 1991]. Each of these species groups may ultimately be elevated to generic status.

Therefore, under Article 70.3.2 of the Code, the type species of the genus *Pteronyssus* Robin, 1877 is now fixed: *Parapteronyssus robini* Faccini et Atyeo, 1981. This name was proposed for the species *Pteronyssus picinus sensu* Robin, 1877, **nec** Koch, 1841, which was misidentified as *Dermaleichus picinus* Koch, 1841 and originally designated by Robin [in Robin, Megnin, 1877]. As the name *Pteronyssus picinus* Robin, 1877, **nec** Koch, 1841 was replaced by the new name, *Parapteronyssus robini*, within the concept of the genus *Parapteronyssus* [Faccini, Atyeo, 1981], the valid name of this type species now is *Pteronyssus robini* (Faccini et Atyeo, 1981) comb. n.

Following the rules of the Zoological Nomenclature, this taxonomic action leads to several additional taxonomic actions to maintain the stability of nomenclature in the Pteronyssidae.

1. The genus *Parapteronyssus* Faccini et Atyeo, 1981 becomes a junior synonym of the genus *Pteronyssus* Robin in the sense fixed in the present study. Therefore, all species formerly included into the genus *Parapteronyssus* are returned to the genus *Pteronyssus*, within the framework of which they were formerly described. Valid names of all species are listed after the formal diagnosis of the *Pteronyssus* given below.

2. The genus *Pteronyssus*, as treated by Faccini and Atyeo [1981], should receive a new name, since this name is preoccupied. This taxon receives here the new generic name, *Neopteronysus* nom. n. Diagnosis of the genus *Neopteronysus* and a list of valid species referred to this genus according to the present taxonomic concept are also given in the present study.

DESCRIPTIONS OF TAXA

Pteronyssidae Oudemans, 1941

Pteronyssus Robin, 1877

Pteronyssus Robin, 1868: 786 (nom. nud.); Robin, in Robin, Megnin, 1877: 421; Canestrini, 1886: 269 (part.); Canestrini, Kramer, 1899: 78 (section *obtusae*, part.); Vitzthum, 1929: 97 (part.); Gaud, Mouchet, 1959: 513 (part.); Gaud, Till, 1961: 276 (part.); Černý, Schumilo, 1973: 89 (part.).

Parapteronyssus Faccini, Atyeo, 1981: 41; Mironov, 1989: 104, syn. n.

Type species: *Parapteronyssus robini* Faccini et Atyeo, 1981 (= *Pteronyssus picinus sensu* Robin 1877, nec Koch, 1841) from *Picus viridis*.

Both sexes. Epimerites I fused, V- or Y-shaped, sternum about 1/4 total length of epimerites. Seta *vi* present. Prodorsal shield narrow, a parallel-sided or pear-shaped plate, not extending or slightly extending beyond row of scapular setae, not encompassing setae *c1*; scapular setae *se*, *si* off the shield. Setae *c2* hair-like short. Setae *c3* narrowly lanceolate or hair-like. Setae *dp2* of palpal hair-like, simple. Setae *ba* of tarsi I–II hair-like. Solenidion σI longer than ωI on legs I. Ventral membrane of tarsus I long, about 1/2 length of segment. Entire surface of coxal fields I, II with striated tegument.

Male. Opisthosomal lobes scarcely marked or opisthosoma bluntly rounded. Posterior margin of opisthosoma with triangular terminal membranes (Fig. 1a) or without them (in *Pteronyssus brevipes* Berlese, 1885). Supranal concavity ovate, very short, open posteriorly into terminal cleft. Setae *c2* on medial margins of humeral shields or on striated tegument. Setae *ps1* anterior to *h3*, or these pairs at the same level. Hysteronotal shield with or without median heavy sclerotized ridge. Coxal fields III closed or almost closed. Transventral sclerite and epiandrium commonly present (the sclerite absent in *P. robini*). Epiandrium crescent-shaped and fused with posterior margin of transventral sclerite, tips of epiandrium not encompassing genital apparatus; or epiandrium represented by little sclerite of irregular form and transventral sclerite absent (*P. robini*). Anal discs circular, large. Adanal shields represented by bow-like sclerites between bases of setae *ps3* (Fig. 1b). Narrow adanal membranes present. Setae *h3* lanceolate, short. Tarsus III elongated, with acute apical process (Fig. 1c). Setae *r* variable in length, subequal or significantly longer than tarsus III.

Female. Idiosoma moderately elongated. Set of hysteronotal shields: pair of variously shaped opisthosomal shields in posterior part of opisthosoma, not extending to the terminus (Fig. 2a). Hysteronotal gland openings *gl* on striated teguments. Epigynium rectangular or semicircular (Fig. 2b). Terminal copulatory extension commonly absent; if present, represented by parallel-sided, short tube or small cone.

The genus includes five species associated with the Picidae of the genera, *Dendrocopos*, *Melanerpes*, *Picus* and *Picoides*: *Pteronyssus robini* (Fac-

cini et Atyeo, 1981) comb. n., *P. brevipes* Berlese, 1885, *P. centurus* McDaniel et Price, 1963, *P. dubinini* Černý et Schumilo, 1973, *P. picoides* Černý et Schumilo, 1973.

***Pteronyssus robini* (Faccini et Atyeo, 1981) comb. n.**

Figs. 1, 2.

Pteronyssus picinus (non Koch, 1841): Robin, in Robin, Megnin, 1877: 423, tab. 24, fig. 1–3.

Pteronyssus gracilis (non Nitzsch, 1818): Černý, Schumilo, 1973: 94, syn. n.

Parapteronyssus robini Faccini, Atyeo, 1981: 45; Mironov, 1998: 106, fig. 1, 5, 2, 3, 3, 1, syn. n.

Material examined. 7 males, 15 females (ZISP 4244) from *Picus viridis*, Moldavia, Chernovitzky Prov., Storozhinetzky distr., Ropcha 10.09.1957, R. Schumilo; 9 males, 10 females (ZISP 4246), Russia, Northern Osetia, 12.11.1999, Yu. Komarov; 1 male, same host, (NHMB 3347), Switzerland, Morschach, 30.06.72, W. Buettiker; 2 males, 5 females from *Picus canus* Gm. (ZISP 1523), Russia, Vologda Prov., Darwin reserve, 12.11.1948, I. Oliger; 3 males, 5 females (ZISP 4247), same host, Russia, Leningrad Prov., Gumbaritzky, 25.10.1981, S. Mironov; 2 males, 4 females (ZISP 1513) from *Dendrocopos major* (L.), Russia, Kaliningrad Prov., 2.05.1957 I.E. Bykhovskaya; 7 males, 2 females (ZISP 4253) from *D. medius* (L.), Moldavia, 5.04.1967. R. Schumilo; 5 males, 10 females (ZISP 4252) from *D. minor* (L.), Russia, Kaliningrad Prov., Rybachij, 15.07.1980, S. Mironov. The redescription is based on the material from the Green Woodpecker, *Picus viridis*, from Moldavia Republic.

Male. Length of idiosoma 330–345, width of idiosoma 175–187. Prodorsal shield extending beyond level of scapular setae, posterior margin with small median extension, lateral margins with triangular incision around bases of scapular setae *si*, *se*; length along median line 95–103, width of anterior part (anterior to scapular setae) 32–38, setae *se* separated by 48–52. Length of hysterosoma 192–205. Setae *c3* narrowly lanceolate, with acute apex, 25–28 in length. Hysteronotal shield: anterior margin slightly convex, greatest length 170–178, width at anterior margin 100–105, surface with heavily sclerotized longitudinal ridge extending almost to anterior margin (Fig. 1a). Dorsal setae *e1* approximately at level of dorsal hysteronotal openings *gl*, setae *ps1* at level of setae *h3*. Opisthosoma slightly attenuate to posterior end, terminal cleft and opisthosomal lobes scarcely expressed, posterior margin of opisthosoma between bases of setae *h3* with a

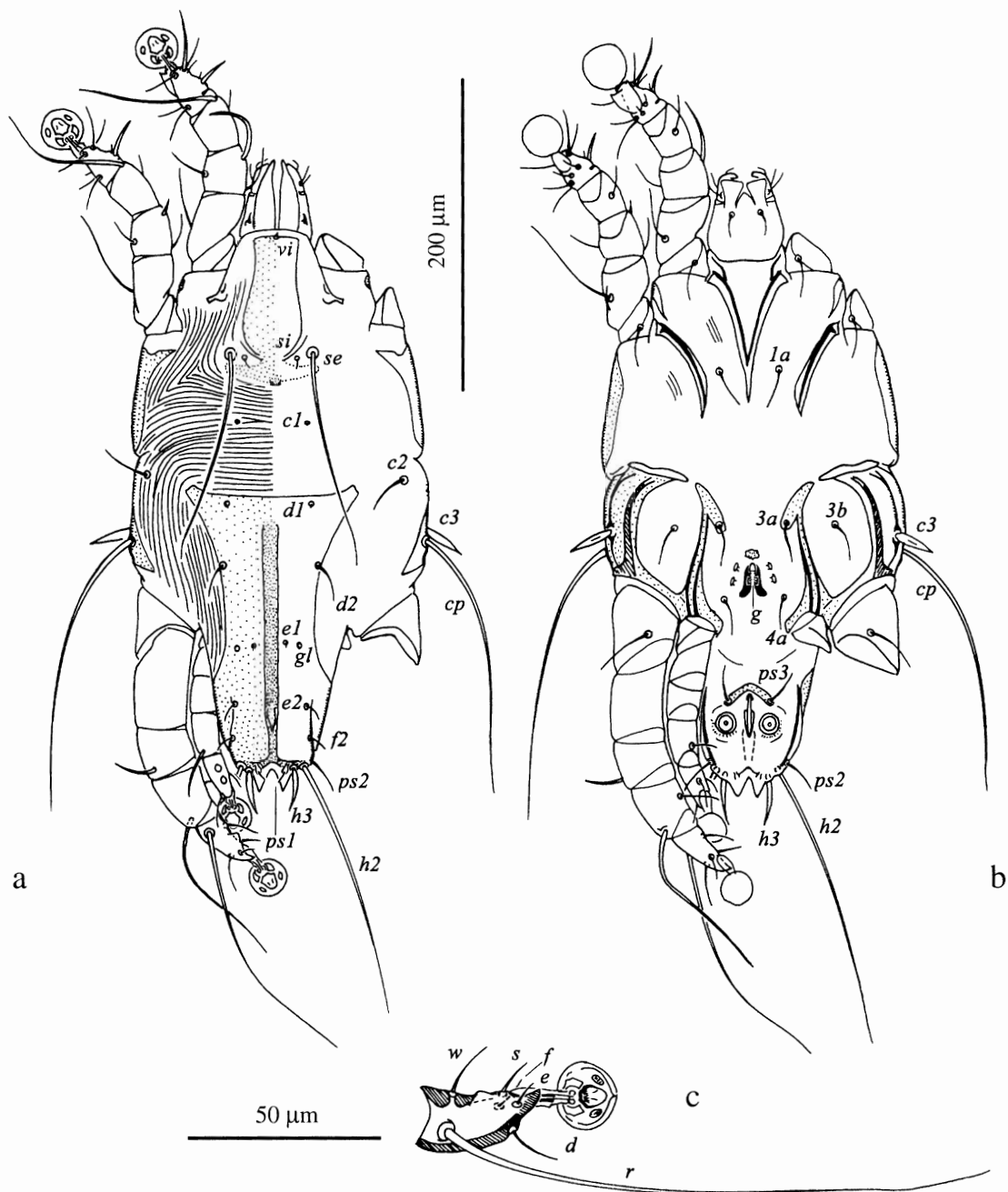


Fig. 1. *Pteronyssus robini*, male. a — dorsal view, b — ventral view, c — tarsus III, dorsal view.

pair of small triangular terminal membranes. Length of terminal membranes 10–11. Distance between setae, seta and opening rows: *c2*–*d2* 55–60, *d2*–*e2* 82–88, *d2*–*gl* 45–49, *gl*–*e1* 0–7, *h2*–*h2* 38–40. Setae *h3* narrowly lanceolate, 22–24 in length. Transventral sclerite absent, medial ends of epimerites IIIa an oblique T; epiandrium a small sclerite of irregular form at apex of genital apparatus. Setae *3a*, *3b* at the same transverse level (Fig. 1b). Genital arch 20–22 in length, 11–13 in width, genital setae *g* at mid-level of genital arch, setae *4a* at base of genital arch. Adanal apodemes almost straight.

Adanal membranes narrow, slightly enlarged posteriorly. Adanal shield a crescent like sclerite connecting bases of setae *ps3*. Tarsus III 35–37 in length; seta *r* 120–165 in length, 4–5 times longer than this segment, seta *s* needle-like (Fig. 1c). Tarsus IV without dorsobasal teeth.

Female. Length of idiosoma 472–495, width of idiosoma 210–225. Prodorsal shield as in the male, 115–120 × 48–54, setae *se* separated by 62–88. Length of hysterosoma 300–335. Setae *c3* narrowly lanceolate, 30–33 in length. Posterior margin of opisthosoma bluntly rounded, without lobes.

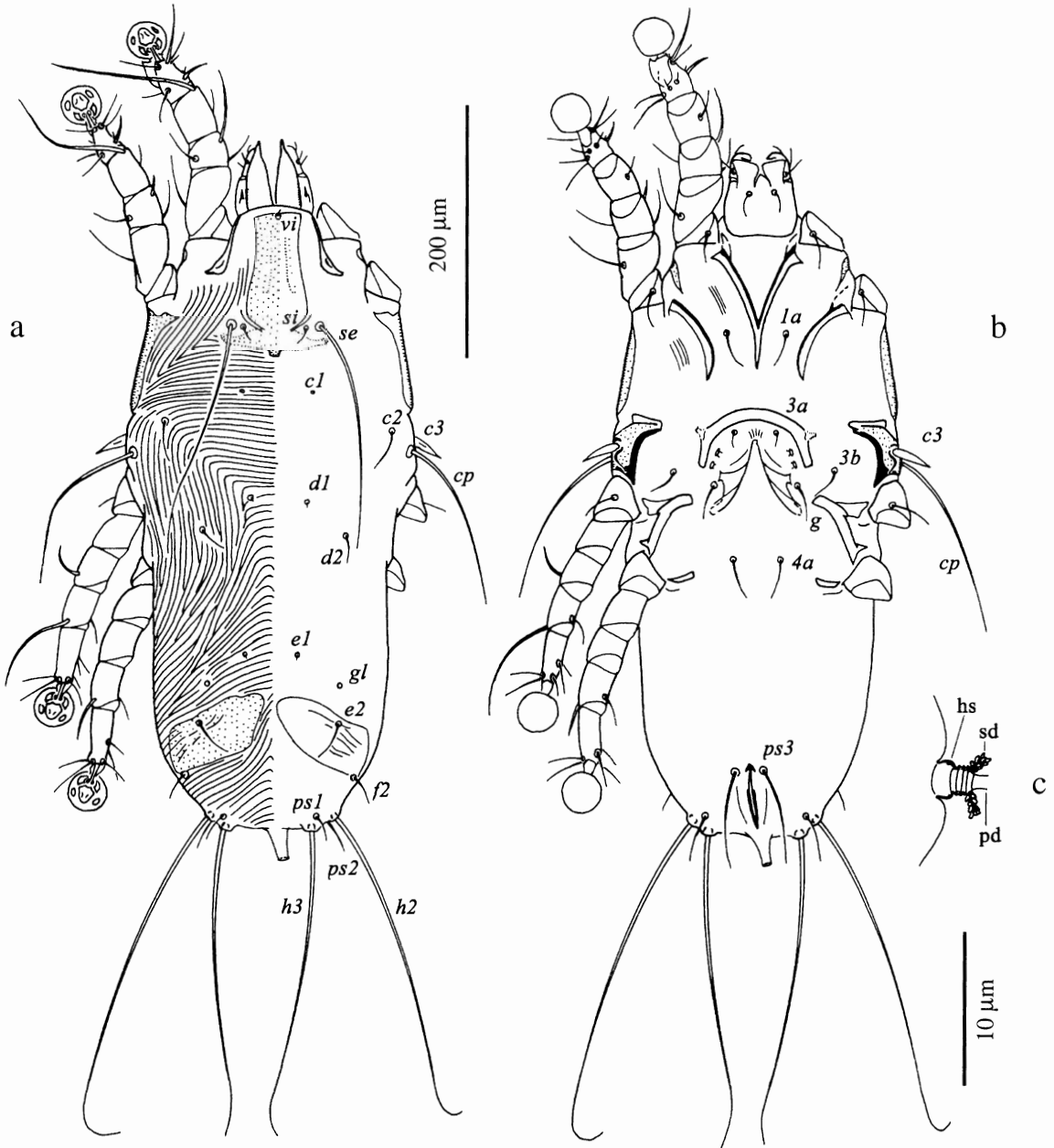


Fig. 2. *Pteronyssus robini*, female. a — dorsal view, b — ventral view, c — head of spermatheca.

Lateral opisthosomal shields as irregularly-shaped sclerites in posterior quarter of opisthosoma (Fig. 2a), their medial margin separated by 10–15. Setae *e2* on anterior margin of lateral opisthosomal shields, setae *f2* in posterior lateral angle, other dorsal hysteronotal setae and openings *gl* on striated tegument. Terminal copulatory extension a parallel-sided tube 26–28 in length, 8–9 in width. Distance between setae and seta rows: *c2*–*d2* 88–102, *d2*–*e2* 132–140, *e2*–*f2* 26–42, *h2*–*h2* 86–95. Epigynium almost semicircular, 39–47 in length, 82–88 in width (Fig. 2b). Spermatheca as in Fig. 2c.

Type host: Green woodpecker *Picus viridis*.

Host associations. Various woodpecker species of the genera *Dendrocopos* and *Picus* distribut-

ed in northern Palaearctic [Černý, Schumilo, 1973; Faccini, Atyeo, 1981; Mironov, 1989, 1997].

***Neopteronysus* Mironov nom.n.**

Pteronyssus: Canestrini, 1886: 269 (part.); Canestrini, Kramer, 1899: 78 (section *obtusae*, part.); Vitzthum, 1929: 97 (part.); Gaud, Mouchet, 1959: 513 (part.); Gaud, Till, 1961: 276 (part.); Černý, Schumilo, 1973: 89 (part.); Faccini, Atyeo, 1981: 55; Mironov, 1989: 106; Gaud, 1991: 116, syn. n.

Type species: *Dermaleichus picinus* Koch, 1941 from *Dryocopus martius*.

Both sexes. Epimerites I fused Y-shaped, sternum about 1/2 total length of epimerites. Seta *vi* present. Prodorsal shield variously shaped: large

triangle covering most part of propodosoma or narrow, longitudinal plate in median part of propodosoma; this shield not fused with scapular shields, not encompassing setae *c1*, scapular setae *se*, *si* on or off the shield. Setae *c2* narrowly lanceolate, needle-like, or setiform, short. Setae *c3* lanceolate, short. Setae *dp2* of palpaе simple, hair-like. Setae *ba* of tarsi I–II hair-like. Solenidion $\sigma 1$ longer than $\omega 1$ on legs I. Ventral membrane of tarsus I long, about 1/2–3/4 length of segment. Entire surface of coxal fields I, II with striated tegument.

Male. Opisthosomal lobes short and small, bluntly rounded or trapezoidal in shape, terminal cleft triangular or weakly marked. Posterior margin of lobes without membranes (Fig. 3a). Supranal concavity usually ovate, very short, open posteriorly into terminal cleft. Setae *c2* on medial margins of humeral shields. Setae *ps1* anterior to setae *h3*. Hysteronotal shield without internal sclerotized ridges. Coxal fields III open. Transventral sclerite and epiandrium commonly absent (Fig. 3b); if present (*pyncospilus* group), epiandrium crescent-shaped and fused with posterior margin of transventral sclerite. Anal discs circular, large. Adanal shields represented by 1–5 small variously shaped sclerites anterior to anal slit, or these sclerites absent. Narrow adanal membranes present. Setae *h3* narrowly lanceolate, short, or represented by long thin setae. Tarsus III elongated, with acute apical process (Fig. 3c). Setae *r* usually longer than tarsus III.

Female. Idiosoma moderately elongated. Set of hysteronotal shields variable, represented by three main types: two large shields — the anterior hysteronotal plate of trapezoid form and opisthosomal plate extending to posterior end of body and commonly bearing several longitudinal ridges (*pycinus* group) (Fig. 4a); three large shields — the anterior hysteronotal plate a variously-shaped polygon and paired opisthosomal plates commonly extending to posterior end of the body (*pyncospilus* group); small unpaired or paired sclerite situated in the centre of opisthosoma and not extending to poster margin of the body (*pici* group). Hysteronotal gland openings *gl* on lateral margins of opisthosomal plates (in most species of *pycinus* and *pyncospilus* groups), or on striated teguments (*pici* group). Epigynium semicircular or almost rectangular (Fig. 4b). Terminal copulatory extension or terminal copulatory extension present.

The genus includes eight described species associated with the woodpeckers of the genera *Campethera*, *Dendrocopos*, *Dryocopus*, *Picus* and

Picoides: *Neopteronysus pycinus* (Koch, 1841) comb. n., *N. dicronotus* (Gaud, 1991) comb. n., *N. elongatus* (Buchholz, 1869) comb. n., *N. malaconotus* (Gaud, 1991) comb. n., *N. pachyphrichus* (Gaud, 1991) comb. n., *N. pici* (Scopoli, 1763) comb. n., *N. pyncospilus* (Gaud et Mouchet, 1959) comb. n., *N. yungipycinus* (Mironov, 1987) comb. n.

Remark. The genus includes three species groups. The *pycinus* group: in both sexes prodorsal shield entire, variously shaped (as large triangle covering almost prodorsum, or narrow, longitudinal plate in its median part); in males, transventral sclerite and epiandrium absent, opisthosomal lobes trapezoidal, attenuate to apices; in females, hysteronotal shield represented by two large pieces — the anterior hysteronotal plate as inverted trapezium, and opisthosomal plate extending to posterior end of body and commonly bearing longitudinal ridges. Included species: *N. pycinus*.

The *pyncospilus* group: in both sexes prodorsal shield split or demarked by transverse furrow at level of scapular setae into anterior and posterior parts; in males, transventral sclerite present, epiandrium fused with its posterior margin, opisthosomal lobes wide, bluntly rounded; in females, hysteronotal shield represented by three large pieces — the anterior hysteronotal plate a variously-shaped polygon, and pair of opisthosomal plates commonly extending to posterior end of the body (in *N. dicronotus*, these three fragments fused into entire λ -shaped shield). Included species: *N. dicronotus*, *N. malaconotus*, *N. pachyphrichus*, and *N. pyncospilus*.

The *pici* group: in both sexes prodorsal shield as a narrow, longitudinal plate in median part prodorsum, or a large triangle covering almost prodorsum; in males, transventral sclerite and epiandrium absent, opisthosomal lobes weakly expressed, rounded; in females, hysteronotal shield a small unpaired or paired sclerite situated in the centre of opisthosoma and not extending to poster margin of the body. Included species: *N. elongatus*, *N. pici*, and *N. yungipycinus*.

It is also worth to note that some undescribed species from South and South-east Asia, represented in a comparative material examined in the course of the present study, display intermedial features between groups characterised above.

***Neopteronysus pycinus* (Koch, 1841) comb. n.**

Dermaleichus pycinus Koch, 1841: fasc. 33, No. 16, 17.
Pteronyssus pycinus: Oudemans, 1937: 2202 (part.);
 Faccini, Atyeo, 1981: 57, fig. 45–48; Mironov, 1989: 107, fig. 1, 4, 2, 4, 5, 3.
Pteronyssus gaudi Černý, 1963: 651.

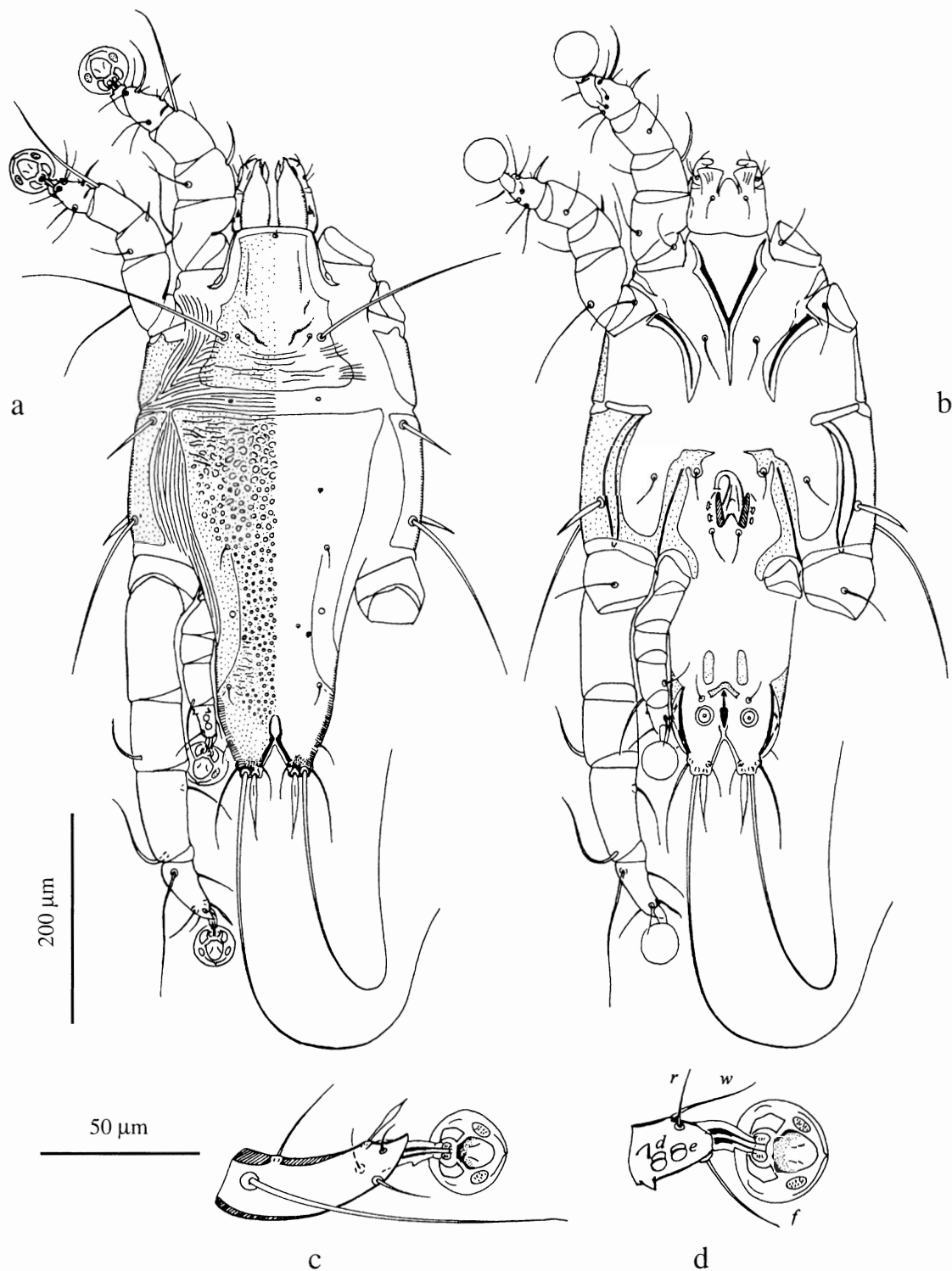


Fig. 3. *Neopteryonyssus picinus*, male. a — dorsal view, b — ventral view, c — tarsus III, dorsal view, d — tarsus IV, dorsal view.

Material examined. 1 male, 3 females (UGA 3366, AMNH 552 708) from *Dryocolus martius* (L.), Germany, Renthendorf, 8.05.1832, coll. unknown; 16 males, 20 females (ZISP 4233), same host, Russia, Leningrad Prov., Gumbaritzky, 22.08.1981, S.V. Mironov; 4 males, 4 females (ZISP 4240), same host, Russia, Volzhsko-Kamskiy kray

[recently Tatarstan], Lubyany, 15.11.1958, coll. unknown; 2 females (ZISP 1487), same host, Russia, Moscow Prov., Zvenigorod, 10.08.1948, Lange; 10 males, 10 females (ZISP 4242), same host, Moldavia, Chernovitzy Prov., Vizhnitzkiy dist., 27.07.1964, M. Lunkashu; 1 male (ZISP1823), same host, Russia, Primorye, Sudzukhin reserve, 17.04.1944, M.

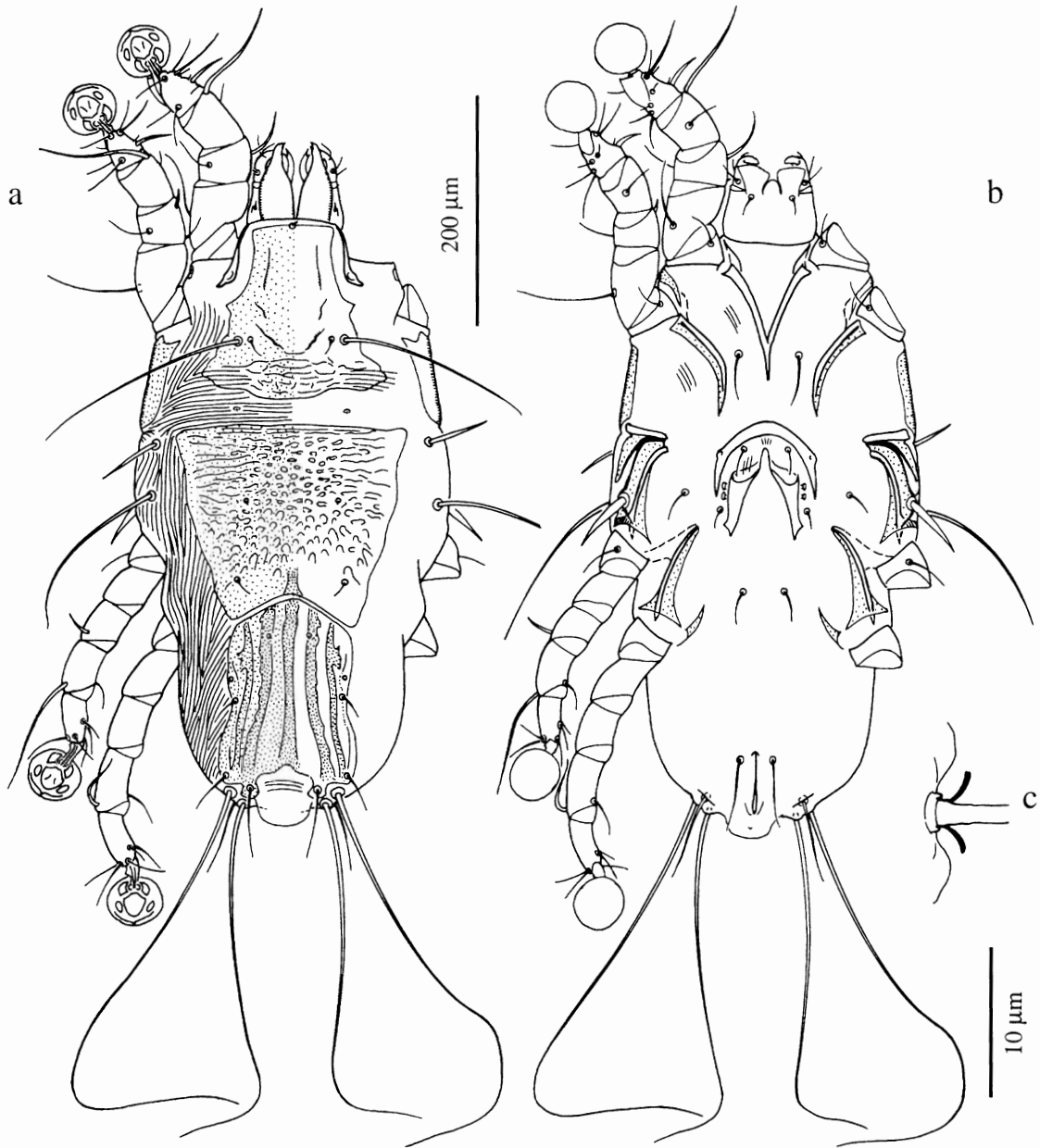


Fig. 4. *Neopteronyssus picinus*, female. a — dorsal view, b — ventral view, c — head of spermatheca.

Volkova. The redescription is based on specimens from Russia, the Leningrad Province.

Male. Length of idiosoma 520–560, width of idiosoma 255–265. Prodorsal shield large, triangular, covering most part of prodorsum, encompassing bases of scapular setae, posterior part with transverse striation (Fig. 3a), posterior margin with very wide and short median extension, length along median line 150–160, width at posterior margin 146–155, setae *se* separated by 88–92.

Length of hysterosoma 355–380. Setae *c2* needle-like, 50–54 in length. Subhumeral setae *c3* narrowly lanceolate, with acute apex, 52–54 in length. Hysteronotal shield: anterior margin almost straight, greatest length 350–370, width at

anterior margin 175–192, surface with numerous small ovate or irregularly-shaped lacunae. Dorsal setae *e1* slightly anterior to level of dorsal hysteronotal openings *gl*. Opisthosoma elongate, parallel-sided, terminal part of opisthosoma with two small triangular opisthosomal lobes, with setae *h2* and *h3* on apices. Terminal cleft triangular, length 31–35, width (distance between setae *h3*) 28–36, interlobar membrane scarcely developed along cleft margin. Distance between setae and openings: *c2*–*d2* 110–120, *d2*–*e2* 130–135, *d2*–*gl* 75–79, *e1*–*gl* 4–8, *h2*–*h2* 45–53. Setae *h3* narrowly lanceolate, with very thin apices, 48–52 in length. Transventral sclerite absent, medial ends of epimerites IIIa with sclerotized areas of irregular form, epiandri-

um absent (Fig. 3b). Setae *3a* slightly anterior to *3b*. Genital arch 51–56 in length, 32–35 in width, genital setae *g* indistinct at the background of genital apparatus, setae *4a* slightly posterior to base of genital arch. Adanal apodemes bow-like, adanal membranes narrow, slightly enlarged posteriorly. Adanal shield represented by crescent-like sclerite between bases of setae *ps3*, and pair of longitudinal sclerites anterior to these setae. Tarsus III 60–64 in length; seta *r* 1.5–2 times longer than this segment, seta *s* slightly enlarged (Fig. 3c). Tarsus IV with 2 acute and short dorsobasal teeth (Fig. 3d).

Female. Length of idiosoma 510–535, width of idiosoma 265–280. Prodorsal shield as in the male, 152–158 × 155–164, setae *se* separated by 93–100. Length of hysterosoma 330–358. Setae *c2* needle-like, 49–53 in length. Subhumeral setae *c3* narrowly lanceolate, 53–55 in length. Arrangement of hysteronotal shields: anterior hysteronotal plate and opisthosomal plate separated by narrow transverse furrow of soft tegument (Fig. 4a). Anterior hysteronotal plate a large trapezium, posterior margin concave, surface mostly with numerous little ovate lacunae, greatest length 168–175, length along median line 144–152, width at anterior margin 182–186. Opisthosomal plate extending to bases of setae *h2*, *h3*, lateral margins almost parallel-sided, posterior margin with rectangular incision between setae *ps1*, surface with 5 longitudinal heavy sclerotized ridges. Setae *e2* and openings *gl* on lateral margins of opisthosomal plate. Posterior margin of opisthosoma rounded, terminal copulatory extension between setae *h3* large, semicircular or trapezoid in shape, 18–20 in length, 40–45 in width. Distance between setae and seta rows: *c2*–*d2* 118–130, *d2*–*e2* 100–105, *e2*–*f2* 40–46, *e1*–*e2* 30–34, *h2*–*h2* 78–88. Epigynium almost semicircular, 58–66 in length, 88–96 in width (Fig. 4b). Head of spermatheca as in Fig. 4c.

Type host. Black woodpecker, *Dryocops martius*.

Host associations. Known from the type host only, in Europe and north-eastern Asia [Černý, 1963; Černý, Schumilo, 1973; Faccini, Atyeo, 1981; Mironov, 1989].

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REFERENCES

- Canestrini G. 1886. Famiglia degli Analgesini. *Prospertes Acarofauna Italiana*. Vol.2. P. 241–311.
- Canestrini G., Kramer P. 1899. *Demodicidae und Sarcoptidae*. Tierreich. Lief. 7. Friedlander und Sohn, Berlin. 193 p.
- Černý V. 1963. Deux espèces nouvelles d'Acariens plumicoles. *Acarologia*. Vol. 5. P. 649–652.
- Černý V., Schumilo R.P. 1973. The feather mite genus *Pteronyssus* (Analgoidea: Avenzoariidae) on European woodpeckers. *Folia parasitologica*. Vol.20. P. 89–95.
- Faccini J.L.H., Atyeo W.T. 1981. Generic revisions of the Pteronyssinae and Hyonyssinae (Analgoidea: Avenzoariidae). *Proceedings of the Academy of Natural Sciences of Philadelphia*. Vol.133. P. 20–72.
- Gaud J. 1991. Acariens sarcoptiformes plumicoles parasites des oiseaux piciformes d'Afrique. V. Acariens des genres *Pegopteronyssus* et *Pteronyssus* (Analgoidea, Avenzoariidae). *Journal of African Zoology*. Vol.105. P. 113–124.
- Gaud J., Atyeo W.T. 1996. Feather mites of the World (Acarina, Astigmata). The supraspecific taxa. *Annales de Musée Royal de l'Afrique Centrale, Sciences Zoologique*. Vol. 277 (Pt. I), p. 1–193, (Pt. II), p. 1–436.
- Gaud J. & Mouchet J. 1959. Acariens plumicoles des oiseaux du Cameroun. V. Pterolichidae. *Annales de Parasitologie humaine et comparée*. Vol.34. P. 493–545.
- Gaud J., Till W.M., 1961. Suborder Sarcoptiformes. In: Zumpt F. (Ed.) *The arthropod parasites of vertebrates in Africa south of the Sahara (Ethiopian Region)*. Vol. 1. Chelicerata. Publications of the South African Institute for Medical Research. Vol. 9. No.1. Johannesburg. P. 180–325.
- International Commission on Zoological Nomenclature. 1964. *International Code of Zoological Nomenclature adopted by the XV International Congress of Zoology*. International Trust for Zoological Nomenclature, London. 176 p.
- International Commission on Zoological Nomenclature. 1999. *International Code of Zoological Nomenclature*. Fourth Edition. Adopted by the International Union of Biological Sciences. International Trust for Zoological Nomenclature, London. 306 p.

- Koch C. L. 1835–1844. *Deutschland Crustaceen, Myriapoden und Arachniden*. Eine Beitrag zur Deutschen Fauna. Regensburg. Heft 1–40.
- Mironov S.V. 1989. A review of the feather mites of the subfamily Pteronyssinae from the USSR (Analgoidea, Avenzoariidae). *Parazitologicheskij Sbornik*. Nauka, Leningrad. Vol.35. P.96–124. [In Russian]
- Mironov S.V. 1997. Contribution to the feather mites of Switzerland with descriptions of five new species (Acarina: Sarcoptiformes). *Bullétin de la Societé Entomologiques Suisse*. Vol.70. P.455–471.
- Mironov S.V. 2001. Four new genera of the feather mite family Pteronyssidae Oudemans, 1941 (Astigmata: Analgoidea) with notes on systematics of the family. *Acarina*. Vol.9. P.3–22.
- Oudemans A. 1929. *Kritisch Historisch Overzicht der Acarologie* (v.2, 1759–1804). E.J. Brill, Leiden. 1097 p.
- Oudemans A. 1937. *Kritisch Historisch Overzicht der Acarologie* (v. 3, 1805–1850). E.J. Brill, Leiden. 3379 p.
- Robin C. 1868. Mémoires sur les Sarcoptides avicoles et sur les métamorphoses des acariens. *Compte rendu hebdomadaire des séances de l'Académie des Sciences*, Paris. Vol.66 (16). P. 76–786.
- Robin C., Megnin P. 1877. Mémoires sur les Sarcoptides avicoles. *Journal de l'Anatomie et Physiologie*, Paris. Vol. 13. P. 391–429.
- Vitzthum H. *Die Tierwelt Mitteleuropas*. Bd. III, Lief. 3. Quelle & Meyer, Leipzig. 112 pp.