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New Palaearctic species of the tribe Thalassaphorurini Pomorski, 1998 (Collembola, Onychiuridae)

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Abstract

The paper is devoted to a taxonomic revision of the genus *Sensillonychiurus* Pomorski et Sveenkova, 2006. Five new species of this genus, i.e. *S. mirus* **sp. n.**, *S. taimyrensis* **sp. n.**, *S. vegae* **sp. n.**, *S. vitimicus* **sp. n.**, and *S. amuricus* **sp. n.**, as well as three new species of the related genus *Allonychiurus* Yoshii, 1995, i.e. *A. subvolinensis* **sp. n.**, *A. elikonius* **sp. n.**, and *A. unisetosus* **sp. n.** are being described from various regions of Eurasia. The diagnoses of both genera are amended to include described species. Two genera, *Tantulonychiurus* Pomorski, 1996 and *Thibaudichiurus* Weiner, 1996, are treated as junior synonyms of the genus *Allonychiurus*. *Agraphorura eisi* (Rusek, 1976) is transferred to *Sensillonychiurus*; *Tantulonychiurus volinensis* (Szeptycki, 1964) and *T. asiaticus* Babenko, 2007 to *Allonychiurus*. A review of morphological peculiarities of *Sensillonychiurus* is performed, comparisons with the other genera of Thalassaphorurini given, and a key to the known species provided.

Keywords

α-taxonomy, morphological review, *Sensillonychiurus*, *Allonychiurus*, northern Asia, eastern Europe

Introduction

This paper has been prompted through the discovery of a new species on the Barents coast of Kola Peninsula. This species from the tribe Thalassaphorurini is characterized by the combination of morphological features that fails to completely fit into any of the known genera of the tribe. Unfortunately, the tribe's generic classification, as well as that of the whole subfamily Onychiurinae, is still far from perfect. Starting from the pioneering papers by Bagnall (1948, 1949) and until recently, about 15 genera have been proposed for various representatives of the tribe. Most of these genera are entirely valid, yet some are considered junior synonyms. For instance, at least four synonyms are known for the type genus of the tribe, *Thalassaphorura* Bagnall, 1949 alone (see Sun et al. 2010). At present, according to the database of Collembola of the World (Bellinger et al. 1996–2011) the tribe includes nine widely accepted genera: *Thalassaphorura*, *Micronychiurus* Bagnall, 1949, *Uralaphorura* Martynova, 1978, *Allonychiurus* Yoshii, 1995, *Spinonychiurus* Weiner, 1996, *Tantulonychiurus* Pomorski, 1996, *Agraphorura* Pomorski, 1998, *Detriturus* Pomorski, 1998, and *Sensillonychiurus* Pomorski et Sveenkova, 2006. In addition, there are several generic names that are only used occasionally. Thus, the provisional synonymy of *Thibaudichiurus* Weiner, 1996 with *Allonychiurus* was recently rejected by Sun et al. (2011).

The only character uniting all of the members of the tribe Thalassaphorurini is the structure of the furcal remnant which forms a finely granulated area in mid-section of *Abd*.4 with 4 small setae arranged in two posterior rows. The second character shared, i.e. distinct antennal and tergal sensilla, is probably present in all genera, but not all species of the tribe. Taking this into account, evidently the genus *Uralaphorura* is to be excluded from the tribe in having nothing in common with the other Thalassaphorurini, being characterized by a quite different structure of the furcal remnant with four posterior setae arranged in a line. Thus, *Uralaphorura* is probably closer to Onychiurini than to Thalassaphorurini (see also Babenko 2009).

According to R.J. Pomorski (personal communication), two of the remaining eight genera, i.e. *Micronychiurus* and *Agraphorura* are to be considered as synonyms. Nevertheless we do not follow here this suggestion as it was never officially published and a discussion on the status of these genera is beyond the scope of our paper. In his draft Synopsis on Palaearctic Onychiuridae, Pomorski also intended to synonymize the genus *Tantulonychiurus* (and also *Thibaudichiurus*) with *Allonychiurus*. Most probably, this latter suggestion was dictated by its practical usefulness, as well as by the impossibility to unity the known species of all these "genera" into more or less natural groups, based only on our present knowledge. For instance, according to Sun et al. (2009) only five of about two dozen known species of *Allonychiurus* completely correspond to the diagnoses as given by Yoshii (1995) and Weiner (1996). Later the generic diagnosis was amended by Sun et al. (2011) to include some species showing a partly reduced tibiotarsal chaetotaxy and smooth sensillar clubs in *AO*. In this scope, *Allonychiurus* differs from both *Thibaudichiurus* and *Tantulonychiurus* only in having several rows of manubrial setae posterior to a furcal remnant, and more numerous labral setae. Two

latter genera were separated by the position of *MVO* and a different number of distal setae on the tibiotarsi, namely seven setae in two so far known species of *Tantulonychiurus* whereas the type species of the genus *Thibaudichiurus* has not eleven (Sun et al. 2011) but nine setae in distal whorl (personal communication of L. Deharveng). Such a generic classification of the complex partly simplified the situation, but did not completely solve the main problem existing in the group, i.e., the existence of many inadequately described species which can only provisionally be placed in this or that modern genus. Thus, six of 14 species treated as representatives of the genus *Allonychiurus* in the last paper of Sun et al. (2011) were marked by an asterisk indicating that "*species assignment requires confirmation*". Furthermore, it is rather difficult to apply this division to some known species as well, since some are purely parthenogenetic or just lack modified setae in reproductive males, e.g. *Tantulonychiurus asiaticus* Babenko, 2007, which is in other respects virtually identical to the members of the *Thibaudichiurus*/*Tantulonychiurus* complex. The degree of reduction of the tibiotarsal setae appears to be a rather variable character in some genera of Thalassaphorurini, still being unknown for many described forms. As a revision of all these related genera is beyond the scope of the present paper, we tentatively accept here a broadened conception of *Allonychiurus* (see diagnosis in the end of the paper) and use the following generic classification of Thalassaphorurini as consisting of seven genera: *Spinonychiurus* (d_0 on head absent, *PAO* lobes compound, sternum of *Abd*.3 clearly subdivided, tibiotarsi with 11 setae in distal whorl), *Detriturus* (d_0 absent, *PAO* lobes compound, sternum of *Abd*.3 not subdivided, *Abd*.5–6 fused, tibiotarsi with 11 setae in distal whorl), *Sensillonychiurus* (d_0 absent, *PAO* lobes compound, sternum of *Abd*.3 not subdivided, *Abd*.5–6 clearly separated, tibiotarsi with 7 or 9 distal setae), *Thalassaphorura* (d_0 present, *PAO* lobes simple), *Micronychiurus* (d_0 present, *PAO* lobes compound, *Abd*.6 with 1+1 prespinal microsetae, multiplication and unusual position of anterior *pso* on head and on abdominal tip, *AS* present or absent), *Agraphorura* (d_0 present, *PAO* lobes compound, *Abd*.6 with 1+1 prespinal microsetae, low number of dorsal *pso* in usual position, *AS* absent) and *Allonychiurus* (d_0 present, *PAO* lobes compound, *Abd*.6 with 2+2 prespinal setae, *AS* present). The latter genus includes two rather distinct species-groups, the *flavescens*-group and the *volinensis*-group, which clearly differ habitually, as well as in the number of labral setae and setal rows in the manubrial zone of *Abd*.4, but both latter characters may be size-dependent. At the same time, we are sure that this generic system requires additional attention, while the scopes of some genera might be cardinally changed in future.

The new species mentioned in the beginning of Introduction appears to be especially similar to the known representatives of the small eastern Asiatic genus *Sensillonychiurus*. A study of the available material from M. Potapov's and authors' collections reveals a whole number of closely related forms and shows that the original diagnosis of the genus must be somewhat amended. Thus, the present paper includes a brief review of the morphological peculiarities of *Sensillonychiurus* as compared to the other genera of the tribe, a slightly changed diagnosis and a key to all of the known species of this genus, as well as descriptions of five new species. In addition, three further new species

habitually similar but, according to the accepted system of Thalassaphorurini, assignable to the genus *Allonychiurus*, have also been described and used for comparative purposes. Types of all the new species are deposited in the collection of the Department of Zoology & Ecology, Moscow State Pedagogical University (MSPU).

Abbreviations

***A–E* papilla, *a, b, d, e* guards** – main labial papillae and associated guard setae (Fjellberg 1999)
A, ***AB***, ***AC*** and ***ABC*** – four types of labium in Onychiuridae in accordance with the presence of thickened and blunt-tipped setae on corresponding labial papillae (Fjellberg 1999)
***Abd*.1–6** – abdominal segments
A-B, T*-setae, setae *M and ***Y* –** tibiotarsal setae (Deharveng 1983)
***Ant*.1–4** – antennal subsegments
AO* –** antennal organ on ***Ant.3
AS* –** anal spines on ***Abd.6
bl. f. – basolateral field of labium (mentum)
bm. f. – basomedial field of labium (submentum)
d_0 – unpaired axial seta on ***area frontalis*** of the head
a_0, m_0 and p_0 – unpaired axial setae on terga
***Lg*.1–3** – legs
ms – microsensillum
MSPU – Moscow State Pedagogical University
MVO – male ventral organ
PAO – postantennal organ
***pso* –** pseudocellus
***psx* –** parapseudocellus
px – proximal setae on labium
***Th*.1–3** – tergal segments
***Ti*.1–3** – tibiotarsi
U_3 – inner edge of unguis on hind leg
VT – ventral tube

A review of the main morphological characters of *Sensillonychiurus* Pomorski et Sveenkova, 2006

The present review is based on the morphological peculiarities of five new species described in this paper, as well as on published data on all four so far known species of the genus. Three of them were described by the authors of the genus (Pomorski and Sveenkova 2006), the fourth one, *S. eisi* (Rusek, 1976), comb. n., has hitherto been treated as a species of *Agraphorura* (see Pomorski 2004; Arbea 2005). Nevertheless,

there is good evidence of its similarity to *Sensillonychiurus*, for instance, in the absence of d_0 on the head and in the presence of only three guard setae in *AO* (see figs 11A and 12D in Rusek 1976).

Body shape and size. All of the so far known species of *Sensillonychiurus* are among the smallest Onychiurinae, with body size ranging between 0.4 and 0.7 mm. The body is slender and elongated (Figs 8–9), with rather short antennae and clearly club-shaped *Ant*.4 (Fig. 10). Area antennalis is not distinctly demarcated.

Sensillar armature of the antennae. Pomorski and Sveenkova (2006) considered the presence of only three guard setae in *AO* as the main diagnostic feature of the genus *Sensillonychiurus*. These authors, based on an examination of all three species then known, found this character as being unique not only to Thalassaphorurini, but to all other Onychiurinae as well. They wrote that it "*may indicate that the new taxon is monophyletic*". However, our study reveals that not all of those species, albeit indeed strikingly similar, are characterized by such a deep reduction of the number of guard setae in *AO*. Thus, a far more usual number (4) of guard setae was found in the European *S. mirus* sp. n., as well as in two eastern Asian species, *S. vitimicus* sp. n. and *S. amuricus* sp. n., thus correlating with a full set (5) of papillae. Only one congener, *S. geminus* Pomorski et Sveenkova, 2006, has *AO* with five papillae but three guard setae. That is why not only the diagnosis of the genus has to be slightly amended, but its distinctions from the other genera of the tribe must be reconfirmed, although most of Thalassaphorurini are characterized by a complete set (5) of guard setae in *AO*. Apart from *Sensillonychiurus*, species with less numerous (4) guard setae are known only among *Agraphorura*. Discarding this character, the sensillar chaetotaxy of the antennae in *Sensillonychiurus* is not genus-specific, being more or less similar to that in the other genera of Thalassaphorurini: *Ant*.4 always bears two distinct thickened sensilla (a dorsal one subapically and an inner one in the mid-section of the segment), a small subapical organite (*or*) and a subbasal microsensillum (*ms*) which is clearly larger than that on *Ant*.3 (see, for instance, Figs 1, 10). The latter character is also typical of *Micronychiurus* and *Agraphorura*. The position of *ms* on *Ant*.4 in relation to ordinary setae slightly varies between different species (cf. Figs 11–14 and 15–17) and can be used in their identification. Sensorial elements in *AO* of different species of the genus are similar: clubs are smooth, more or less roundish, with or without clear ribs. A different type of sensorial clubs in *AO* (distinctly granulated, morula-like) is known among Thalassaphorurini only in some *Thalassaphorura* and in the *flavescens*-group of *Allonychiurus*.

Structure of the PAO. All species of *Sensillonychiurus* show a relatively wide *PAO* consisting of few (6–8) vesicles with numerous secondary lobes. As a whole, it usually looks like a single mass with only traces of vesicle divisions (Fig. 3).

Labrum. All congeners are characterized by a constant number (7) of labral setae, four distal ones being longer and clearly thicker, and two or four prelabral setae. The variant with two prelabral setae seems to be more common (see Table 1), but this character is still unknown in *S. eisi*, *S. virginis* Pomorski et Sveenkova, 2006 and *S. geminus*. Such a slightly reduced number of labral setae is also typical of all *Thalassaphorura* known for this character, as well as of the *volinensis*-group of *Allonychiurus*, but not

of the *flavescens*-group, at least some of which showing nine labral setae (Yoshii 1995; Sun et al. 2009, 2011). This feature is completely unknown in *Detriturus*, *Spinonychiurus*, and *Micronychiurus*, whereas among *Agraphorura* the existing information concerns only *A. calvoi* Arbea, 2005, which has nine labral setae (a presumed basal set for Onychiurinae), and *A. sangelensis* Kaprus' et Stebaeva, 2006, with two prelabral and seven labral setae (our data).

Labium. The type of labium most frequently seen in the genus is *AC*, with the *ABC*-type is found only in two species, *S. mirus* sp. n. and *S. vitimicus* sp. n. The number of setae on the proximal, basal and laterobasal fields of the labium is more or less stable, although individual variations and some asymmetry are visible in some specimens. The number of distal guard setae of the labial palp corresponds to the most common (and also complete) set found in Onychiurinae (Fjellberg 1999): seven long guard setae ($b_{3\text{-}4}$, $d_{3\text{-}4}$, and $e_{1\text{-}3}$) and four shorter (a_1, $b_{1\text{-}2}$ and d_2) ones set on papillae. The only notable peculiarity of the labium in the study group is the unusual length of a_1 seta which is clearly longer and thicker than $b_{1\text{-}2}$ or d_2 (Fig. 4). Unfortunately, the fine structure of the labium is known only for a few representatives of the tribe, this not allowing for serious comparisons to be made. We can only state that all three types of labium (*A*, *AC* and *ABC*) are known in *Thalassaphorura* (Sun et al. 2010), with *AC* being the most common. In the genus *Allonychiurus*, two types (*AC* and *ABC*) are found among species of the *volinensis*-group (Fjellberg 1999, our data), while only the *AC*-type is known in two species of the *flavescens*-group (see Sun et al. 2009, 2011). The *A*-type is observed in *Spinonychiurus epaphius* Kaprus' et Tsalan, 2009 and, according to Pomorski and Sveenkova (2006), in the genus *Detriturus.* The *AB*-type seems to be most characteristic of the genera *Agraphorura* (Pomorski 2004; Arbea 2005; Kaprus' and Stebaeva 2006) and *Micronychiurus* (Pomorski, pers. communication). The presence of a complete number of distal guard setae on the labial palp in such small-sized species as *Sensillonychiurus* is rather unexpected, as, for instance, all of the so far studied *Thalassaphorura* and members of the *volinensis*-group of *Allonychiurus*, being usually larger, have only ten guards (e_2 absent) (Fig. 41). The same is probably characteristic of the *flavescens*-group of *Allonychiurus* (Sun et al. 2009, 2011) although the authors believe that not e_2 but one of the *b*–setae is absent. A relatively long a_1–seta could be suggested as a possible apomorphy of the genus, but there is not enough information concerning the other groups of Thalassaphorurini for such an assertion.

Dorsal and ventral pso. Contrary to the majority of Onychiurinae, the number of dorsal and ventral *pso* does not significantly vary within the genus, being almost always as following: 32/133/33343 (dorsal) and 1/000/0000 (ventral). There are only two exceptions: *S. virginis*, with a lesser number of *pso* on thoracic terga (32/022/33343 as a whole), and *S. geminus*, with some *pso* on two abdominal sterna. The ventral pseudocellar formula of the latter species was given differently by Pomorski and Sveenkova (2006) in the original description (1/000/0101) and in their comparative table of diagnostic characters (1/000/10010). The former version is probably the correct one. Apart from this, *S. mirus* sp. n. often lacks the anteriormost *pso* of the postantennal group on a head. Such a dorsal formula (32/133/33343) is rather common in two other gen-

era of Thalassaphorurini, namely, *Agraphorura* and *Allonychiurus*, known also in some *Thalassaphorura*, as well as in different genera of Onychiurini and Oligaphorurini. The absence of *pso* on abdominal sterna as the most usual character of *Sensillonychiurus* can also be found among *Spinonychiurus*, *Allonychiurus* and *Detriturus.*

Parapseudocelli. The complete absence of parapseudocelli (*psx*) on the subcoxae, femora and abdominal sterna is characteristic of most of the studied species of the genus, except for *S. vegae* sp. n. which sometimes possesses a pair of *psx* on *Abd*.4. Such a weak development of *psx* is rather frequent among Thalassaphorurini, also known in *Micronychiurus*, *Agraphorura, Allonychiurus* (in both *flavescens*- and *volinensis*-groups), and some *Thalassaphorura*. Probably it at least partly correlates with the small size of specimens. Some intraspecific variations of *psx* numbers are likely (see, for instance, description of *S. vegae* sp.n.) and need further attention.

Dorsal chaetotaxy. The chaetotaxy in the genus was originally described as follows: "*Seta d_0 on the head absent. Abdominal terga of IV, V and VI with 2, 1 and 1 medial setae, respectively*". It can be added that these unpaired setae (m_0 and p_0 on *Abd*.4, p_0 on *Abd*.5 and a_0 on *Abd*.6) are meso- or macrosetae probably belonging to the primary chaetotic set, but not microsetae which can appear during ontogeny. Terga of *Th*.2-3 in adults with 3+3, of *Abd*.1-4 with 2+2 and of *Abd*.5 with 1+1, axial microsetae, additionally each tergum with 2+2 mesosetae in the axial group set out of line with microsetae (see, for instance, Fig. 8). The same pattern is found in all studied species which appear to have an almost symmetrical (especially in the mid-section of terga) and virtually identical dorsal chaetotaxy. This pattern seems to be unique to Thalassaphorurini. Thus, *Sensillonychiurus* shares the absence d_0 with only two genera of the tribe, *Spinonychiurus* and *Detriturus*. Known representatives of both these genera show different distributions of unpaired setae on the abdominal tip (Arbea and Jordana 1985; Palacios-Vargas and Diaz 1995; Pomorski 1998; Kaprus' and Tsalan 2009), the most similar but yet not identical is that in *D. jubilarius* (Gisin, 1957) (see fig. 97G in Fjellberg 1998). In the group with d_0 on the head, species of *Micronychiurus* and *Agraphorura* with known chaetotic patterns possess a medial seta only on *Abd*.6 (Palacios-Vargas and Deharveng 1982; Beruete et al. 1994; Pomorski 2004; Arbea 2005; Kaprus' and Stebaeva 2006), *Allonychiurus* has quite a different chaetotaxy of *Abd*.6 with one or two medial setae and 2+2 prespinal microsetae (Figs 40, 49), unpaired setae on *Abd*.4 and 5 are microsetae if present (Lee 1973; Weiner 1989; Sun et al. 2009, 2011). A similar pattern is typical of most *Thalassaphorura*.

Tergal and sternal sensilla. The lateral microsensillum in all studied species is always present on *Th*.2, but usually absent from *Th*.3, except for two species, *S. minusculus* Pomorski et Sveenkova, 2006 and *S. geminus*. Several thickened macrosensilla in certain parts on terga and sterna are also very typical of Thalassaphorurini and of *Sensillonychiurus* as well. The most usual number of such sensilla in the studied species is as follows, 1/011/222111 from head to *Abd.6* (Fig. 8), additionally two ventral sensilla are usually distinguishable on the anterolateral part of the head and one sensillum on each ventrolateral side of *Abd*.4 (Fig. 33). Variations are not frequent and somewhat obscure; the only clear exception being the European *S. mirus* sp. n. which shows more

dorsal sensilla (2/022/222221 as a whole). The described variability of the character in various genera of Thalassaphorurini permits to suggest that it can hardly be used in separating the genera. Moreover, the degree of sensillum differentiation varies widely both between and within species, being clearly age-dependent; sometimes the sensilla look like slightly thickened macrosetae distinguished only due to their positions. Some level of population variability of the character is not improbable either.

Ventral chaetotaxy. Most of the species of the genus lack setae on thoracic sterna. The only exception is *S. vitimicus* sp. n., with 0-1-1 setae on each side of the *linea ventralis* on the thorax (Fig. 33). Among Thalassaphorurini, the complete absence of ventral setae on the thorax is only observed in some species of the genus *Micronychiurus* (Pomorski, pers. communication) and *Agraphorura* (Pomorski 2004; Arbea 2005). All studied species also show no setae at the base of *VT* and a rather stable number of setae on its distal lobes (usually 6+6). These latter characters are not unusual in Thalassaphorurini, known, e.g., in some *Micronychiurus*, *Agraphorura* and *Allonychiurus.*

Tibiotarsal chaetotaxy The pattern characteristic of all studied species of the genus can be described as follows: seven or nine setae in the distal whorl (all or two *T*-setae absent), 7-7-6 setae in *B*-whorl, *Y*-seta present, but *M*-seta absent (Figs 20, 29–30). The same pattern with 9 distal setae was previously found in *S. eisi* by Fjellberg (1991). It is noteworthy that the latter character (absence of *M*-seta) only rarely occurs in Poduromorpha. Nevertheless, the same is probably characteristic of some *Agraphorura* (Palacios-Vargas and Deharveng 1982; Arbea 2005) but the number of tibiotarsal setae in the latter genus is rather variable, with both distal and proximal whorls being partly reduced. For instance, in *A. sangelensis Ti*.1-3 bare only 13-13-13 setae, respectively (seven in distal whorl, five *B*-setae and a slightly longer *Y*-seta set virtually in *B*-whorl, *M*-seta absent). Species of the genus *Micronychiurus* are known as having 7 or 9 distal setae and 8-8-7 setae in proximal whorls (Beruete et al. 1994), and so probably possess *M*-seta and lack one of the *B*-seta on *Ti*.3. All of the studied species of *Thalassaphorura*, as well as all *Allonychiurus* from the *volinensis*-group (also showing 7-9 distal setae on tibiotarsi), are characterized by a complete *B*-whorl on all legs (7-7-7) and the presence of both setae *M* and *Y* (Figs 47–48). The same pattern but with few additional proximal setae in *C*-whorls was known for *Allonychiurus antennalis* Sun, Chen et Deharveng, 2011 from the *flavescens*-group but the data for *A. megasomus* Sun, Yan et Chen, 2009 is different, with 11 distal setae, 8-7-7 setae in *B*-whorls, and 2-2-1 additional setae involved. All other genera of the tribe feature a complete set of distal setae; in addition, at least some of them, for instance *Detriturus jubilarius*, has *M*-seta (see fig. 389 in Pomorski 1998). These differences are evidently a good reason to complete the descriptions of tibiotarsal chaetotaxy in such oligochaetotic forms of Onychiurinae.

Subdivision of sterna. Among Thalassaphorurini there is a genus, *Spinonychiurus*, characterized by such a unique feature as a secondary division of *Abd*.3 sternum. Some traces of such division can also be seen in all well preserved specimens of *Sensillonychiurus* (Fig. 6), as well as in some other small-sized species of various group of Onychiurinae. Nevertheless, the anterior subsegment in *Sensillonychiurus* is narrow and, contrary to *Spinonychiurus*, lacks setae.

Furcal remnant position. In complete agreement with the main diagnostic character of Thalassaphorurini, the furcal remnant in all studied *Sensillonychiurus* is in the form of a finely granulated area in the mid-section of *Abd*.4, with four small setae arranged in two posterior rows. Individual variations in number and position of these setae are not frequent, but have been noted. The number of setal rows on manubrial area is also more or less stable: usually two rows (*mm* and *mp* according to Weiner (1996) with 4 setae in each can be distinguished (Fig. 33) although some variations especially in their position are also seen. Additionally 1+1 setae (*ma*?) usually present at a level with finely granulated area. The most significant is the anterior position of the latter area at contact with the border between *Abd*.3-4 sterna (Figs 6, 33). According to the available, mainly illustrative data (Fjellberg 1998, fig. 88A, Fig. 97F; Kaprus' and Stebaeva 2006, Fig. 7; Kaprus' and Tsalan 2009, Fig. 1.1), personal communication of R. Pomorski and our observations on the *volinensis*-group of *Allonychiurus*, all other genera of Thalassaphorurini are characterized by posterior position of furcal remnant in some distance from the border between *Abd*.3 and 4, and all of them (*flavescens*-group of *Allonychiurus* is the only exception) possess only one row of manubrial setae behind dental setae (Weiner 1996). These two characters, i.e. position of furcal remnant and number of manubrial rows of setae, clearly correlate. Thus, all studied species of the *volinensis*-group of *Allonychiurus* are characterized by the presence of the same number of 4+4 manubrial setae (Figs 43–44) as in *Sensillonychiurus* but due to posterior position of furcal remnant only one row of manubrial setae set posterior to dental setae. Species of the *flavescens*-group of *Allonychiurus* appear to be also characterized by posterior position of finely granulated area (see fig. 14 in Sun et al. 2010), but possess more manubrial setae arranged in several rows; sometimes a few additional setae are present (Weiner 1996; Sun et al. 2011). This difference was used as a main diagnostic feature in separation of *Allonychiurus* from *Tantulonychiurus* and *Thibaudichiurus* by Sun et al. (2011). However, it can also be considered as a result of polychaetosis clearly seen on fig. 1B in Sun et al. (2011). More investigation including a study of juveniles is probably needed to evaluate the significance of these differences.

Anal spines. A full spectrum from complete absence to strong spines set on low papillae is found among the studied species, but an intermediary situation is most frequent. The same is characteristic of *Spinonychiurus* and *Micronychiurus*, but not of *Detritura* and *Agraphorura* (complete absence of spines), *Thalassaphorura* (*AS* absent as an exception) and *Allonychiurus* (spines always present).

Based on this review of the morphological features, the following can be concluded:

Regardless of one's opinion on the status of the genus *Sensillonychiurus*, all studied species represent a rather homogeneous group of closely related forms, characterized by many common morphological features and seemingly congruent distributions mainly covering the northern parts of eastern Asia with insulated records from North America and Eastern Europe.

The genus *Sensillonychiurus* shares many characters with representatives of other genera of Thalassaphorurini, but a combination of characters seems to be unique for the tribe. The only features, which set the genus apart from all other Thalassaphorurini,

appear to be not the number of guard setae in *AO* but dorsal chaetotaxy and anterior position of furcal remnant at a contact with border between *Abd*.3 and 4 although the data concerning other genera is still rather limited for a final decision.

Briefly, the genus can be defined as Thalassaphorurini featuring compound vesicles in the *PAO*, a partial reduction of guard setae in the *AO* and on the tibiotarsi, the absence of d_0 on the head, anterior position of furca remnant and a clearly demarcated dorsal border between *Abd*.5 and 6.

***Sensillonychiurus* Pomorski et Sveenkova, 2006**
http://species-id.net/wiki/Sensillonychiurus

Type-species. *Sensillonychiurus minusculus* Pomorski et Sveenkova, 2006: 191, by original designation.

Diagnosis. Small-sized Thalassaphorurini with low number of compound vesicles in PAO; labrum with 7 setae, labium of *AC* or *ABC*-type; *AO* with 4–5 papillae and 3–4 guard setae, smooth sensory clubs; distinct antennal, tergal and sternal sensilla, without d_0 on head, *Abd*.4 with m_0 and p_0, *Abd*.5 with p_0, *Abd*.6 dorsally with 1+1 prespinal microsetae and 1 medial macroseta; distal whorl of setae on *Ti*.1-3 with 7 or 9 setae, both *M* seta on all legs and B_6 on *Ti*.3 absent; *pso* on *Th*.1 usually present, no tendency to dorsal *pso* multiplication, low number of sternal *pso*; *psx* usually absent; sternum of *Abd*.3 not clearly divided, furcal remnant situated at contact with border between *Abd*.3-4 sterna with two regular rows of manubrial setae set posteriorly to 4 dental setae; *AS* present or absent.

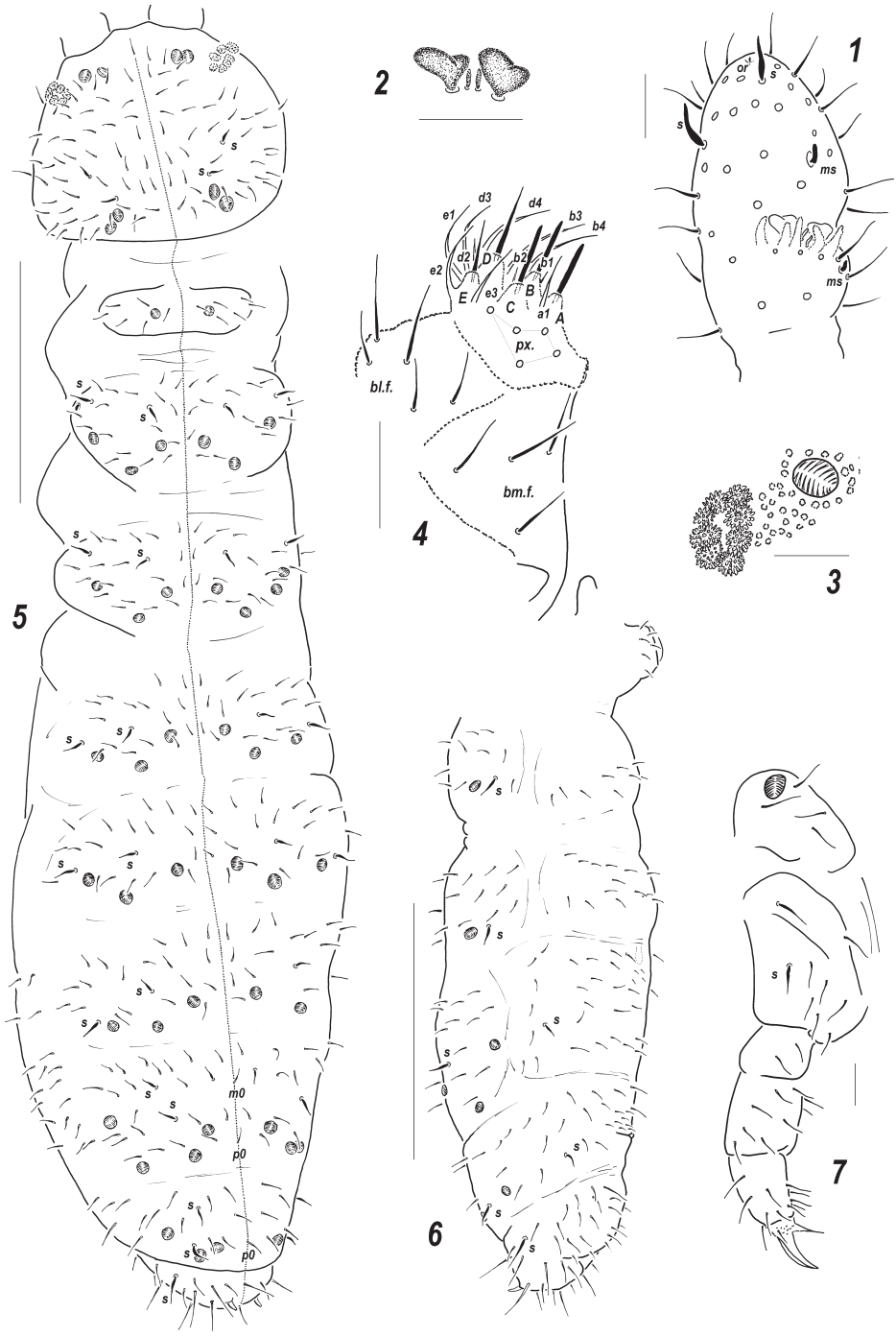
Description of species

***Sensillonychiurus mirus* sp. n.**
urn:lsid:zoobank.org:act:E9A79C2A-7B38-405D-8C45-7B8E67C0C22C
http://species-id.net/wiki/Sensillonychiurus_mirus
Figs 1–7

Material. Holotype ♀, Russia, NW of European part, Kola Peninsula, Dalnie Zelentsy [69°07'N, 36°03'E], coastal sandy steep with sparse vegetation (flotation), 19.vii.2009, leg. A. Babenko (MSPU).

Paratypes 5 ♀, same data as holotype (MSPU).

Description. Colour white. Size 0.56–0.60 mm. Body slender and elongated. Antennae about as long as head, antennal area not clearly demarcated. *Ant*.4 with two distinct thickened sensilla, subapical organite and basal microsensillum present (Fig. 1). *Ant*.3 organ consisting of 5 papillae, 2 sensory rods, 2 smooth and usually slightly bilobed sensory clubs (Fig. 2), 4 guard setae, and a lateral microsensillum (Fig. 1). *Ant*.1 and 2 with 7–8 and 12–13 setae, respectively. *PAO* with 7–8 composed vesicles (Fig. 3).



Figures 1–7. *Sensillonychiurus mirus* sp. n. **1** *Ant.*3–4; **2** sensorial elements of *Ant.*3 organ **3** *PAO* and adjacent *pso* **4** labium **5** dorsal chaetotaxy and *pso* distribution **6** abdomen, lateral view **7** *Lg.*3. Scales: 5–6 – 0.1 mm, 1–4, 7 – 0.01 mm.

Table 1. Main diagnostic characters of the known species of *Sensillonychiurus*

	Dorsal *pso*	Dorsal sensilla	AO papillae/ guards	Position of *ms* on *Ant*.4	Number of prelabral setae	Type of labium	*ms* on *Th*.3	Number of setae on *Th*.1	Ventral setae on thorax	Number of distal tibiotarsal setae	*pso*/ *psx* on *Abd*.4	Unguiculus / unguis ratio	Anal spines
S eisi	32/133/33343	1/011/22211	4/3	low	?	AC	?	5+5	?	9	?	0.3	–
S. minusculus	32/133/33343	1/011/222111	4/3	low	2	AC	+	5+5	–	7	–	0.5	–
S. virginis	32/022/33343	1/011/222111	4/3	low	?	AC	–	5+5	–	9	–	0.33	–
S. geminus	32/133/33343	1/011/222111	5/3	low	?	AC	+	5+5	–	9	*pso*	0.75	+
S. mirus sp.n.	2(3)2/133/33343	2/022/222221	5/4	upper	4	ABC	–	6+6	–	9	–	~0.5	+
S. taimyrensis sp.n.	32/133/33343	1/011/221111	4/3	upper	2	AC	–	6+6	–	7	–	~0.6	+
S. vegae sp.n.	32/133/33343	1/011/221111	4/3	low	2	AC	–	6+6	–	7	–/*psx*	~0.6	+
S. vitimicus sp.n.	32/133/33343	1/011/221111	5/4	upper	4	ABC	–	6+6	+	9	–	~0.6	+
S. amuricus sp.n.	32/133/33343	1/011/221111	5/4	upper	2	AC	–	6+6	–	9	–	~0.7	+
Sensillonychiurus sp.	32/133/33343	1/011/2222?11	4/3	low	2	?	–	6+6	–	9	–	?	+

Labrum with 7 setae and 4 prelabral ones. Apical part of labium with thick terminal setae on papillae *A*, *B* and *C* (*ABC*-type), 11 guard setae, a_1 clearly longer and thicker than other spiniform guard setae, i.e. b_{1-2} and d_2 (Fig. 4), and 5 proximal setae. Basal fields of labium (mentum and submentum) with 4 and 5 setae, hypostomal complex reduced to one long seta and a minute projection. Maxillary palp simple, with 2 sublobal setae.

Pseudocellar formula (*pso*) as follows, dorsal: 2(3)2/133/33343 (rarely some *pso* duplicated), ventral: 1/000/0000, parapseudocelli (*psx*) invisible. Each upper subcoxa with one *pso*. Localization of *pso* as in Fig. 5. Granulation fine and uniform, without areas of enlarged granules. Dorsal chaetotaxy almost symmetrical, setae smooth and clearly differentiated only on abdominal tip, in more anterior parts of body setae differing in shape but not in size: some of them straight, thick and blunt, others curved and pointed, sensilla distinct: 2/022/222221 (dorsal) and 2/000/00011 (ventral) (Figs 5–6), occasionally some additional mesosetae can be thickened and look like other sensilla, thickened sensillum present on coxae *Lg.*3 (Fig. 7). *Th.*1 with 6+6 setae as a rule. Lateral microsensilla present only on *Th.*2. Unpaired dorsal seta d_0 on head absent, *Abd.*4 with m_0 and p_0, *Abd.*5 with p_0, *Abd.*6 dorsally with one axial macroseta and 1+1 prespinal microsetae (Fig. 5). Thoracic sterna without setae along *linea ventralis*, ventral chaetotaxy of abdomen as in Fig. 6. *Abd.*3 sternum unclearly divided, anterior subsegment without setae. Furca reduced to a small area of fine granulation situated at contact with border between *Abd.*3-4 sterna, with 2+2 small posterior setae arranged in 2 rows, manubrial area with 4+4 setae set in two rows (Fig. 6). Ventral tube with 6+6 distal setae, proximal ones at corpus base absent. Upper subcoxae usually with 3-3-4, tibiotarsi with 17-17-16, setae: distal whorl with 9 setae (7 *A* and two *T*-setae), row *B* with 7-7-6 setae, setae *M* absent but *Y* present. Unguis simple, with neither inner nor lateral tooth, unguiculus with an indistinct basal lamella, shorter than unguis (Fig. 7). Anal spine short but rather strong, set on unclear papillae.

Affinities. *S. mirus* sp.n. clearly differs from the all previously described species of the genus first of all in having not three but four guard setae in *AO*. Nevertheless it is not a unique character for the group. The same structure of *AO* (5 papillae and 4 guards) as in *S. mirus* sp. n. is known in two other species of the genus, *S. vitimicus* sp. n. and *S. amuricus* sp. n. (see descriptions below). All these species which are characterized by only a weak reduction of *AO* with a highest possible number of papillae and 4 guard setae have many other characteristics in common (see Table 1.). Nonetheless, *S. mirus* sp. n. can easily be distinguished from *S. vitimicus* sp. n. by the complete absence of setae on thoracic sterna, from *S. amuricus* sp. n. in the different type of labium (*ABC* in *S. mirus* sp. n. versus *AC* in *S. amuricus* sp. n.), and in four prelabral setae (*S. amuricus* sp. n. possesses only two prelabral setae which are more common in the genus).

Etymology. Initially, the name *mirus* (odd, strange, unusual in Latin) reflects both an isolated position of the new species within the genus and the gap between its type-locality and the distributions of the other known species of the genus which are pure Asiatic or American. The level of morphological uncommonness has lowered after the performed survey of all available material, but the geographical isolation still exists.

Distribution. Known only from the type locality.

***Sensillonychiurus taimyrensis* sp. n.**
urn:lsid:zoobank.org:act:AC031C4C-13EA-45F9-9DD5-575BD8287653
http://species-id.net/wiki/Sensillonychiurus_taimyrensis
Figs 8, 10–14, 18, 21

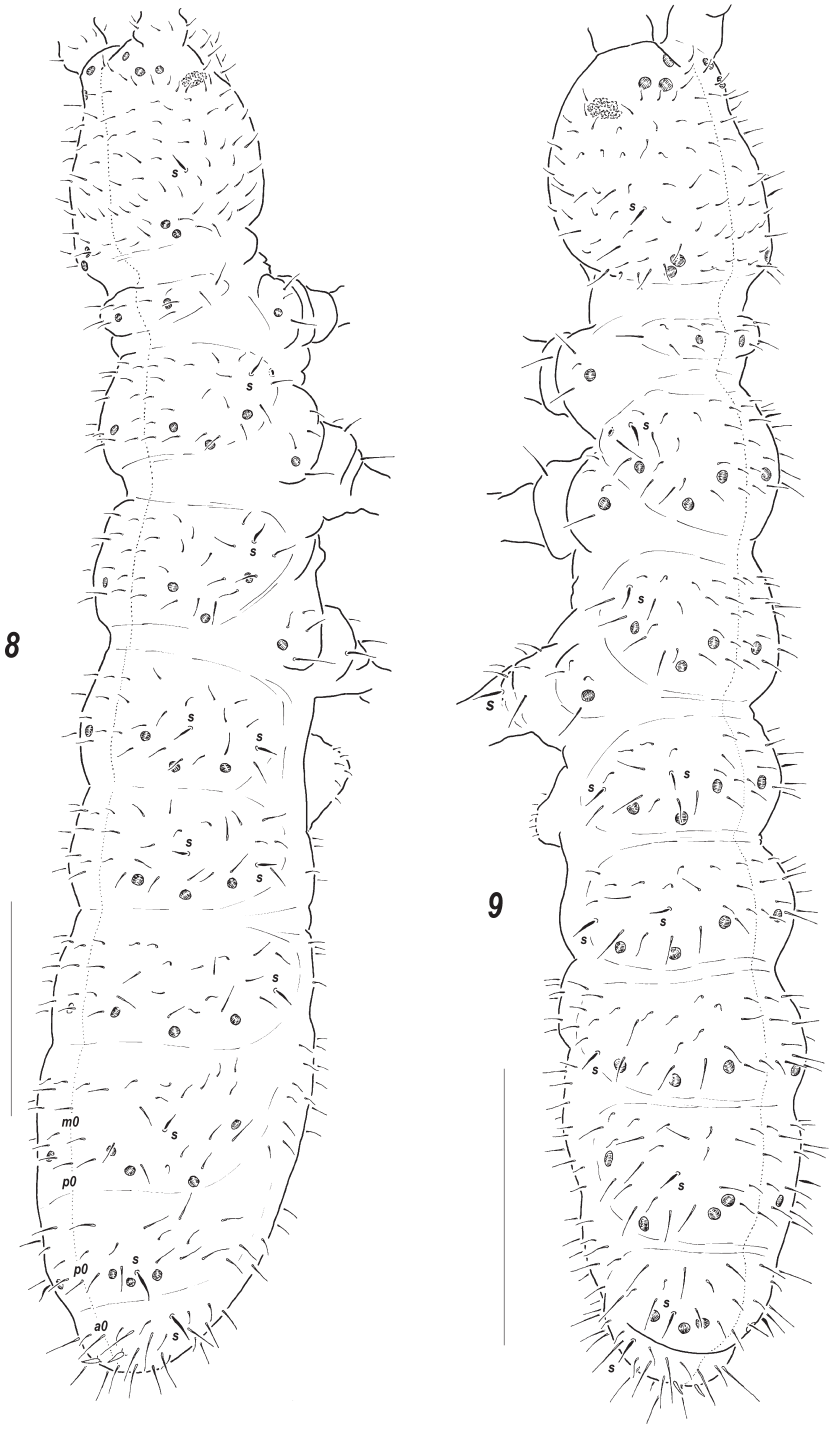
Material. Holotype ♀, Russia, Taimyr Peninsula, northern coast of Taimyr Lake, Postoyannaya River [74°38'N, 101°55'E], low river terrace, mosses, *Dryas* sp., *Astragalus* spp., 02.viii.1993, leg. A. Babenko (MSPU).

Paratypes 5 ♀ and 4 ♂, same data as holotype; 2 ♀ and 1 ♂, Taimyr Peninsula, northwestern coast of Lake Pyasino [70°04'N, 87°39'E], herbaceous meadow on south-facing slope, sand, 03.viii.2001; 16 ♀, 10 ♂ and 6 juv., Taimyr Peninsula, middle reaches of Pyasina River, Ust-Tareya [73°15'N, 90°35'E], herbaceous meadow on south-facing slope, 22.vii.2010, leg. A. Babenko (MSPU).

Other material. 1 ♀, Russia, Siberia, northwestern Buryatia, Ust'-Barguzin [53°25'N, 109°01'E], Lake Baikal shore, sandy beach (ca 5 m from water edge, flotation), 21.viii.2008, leg. M. Potapov; 1 ♀, Russia, Siberia, Buryatia, Vitim Plateau, vicinity of Eravna (Sosnovo-Ozerskoe) [52°27'N, 111°09'E], dry birch forest, 21.viii.2009, leg. A. Chimitova.

Description. Colour white. Size 0.56–0.62 mm. Body slender and elongated. Antennae about as long as head, antennal area not clearly demarcated. *Ant.*4 with a subapical organite, two distinct thickened sensilla, and a subbasal microsensillum set well above proximal row of setae (Figs 10–14). *Ant.*3 organ consisting of 4 papillae, 2 sensory rods, 2 smooth sensory clubs, 3 guard setae, and a lateral microsensillum (Fig. 10). *Ant.*1 and 2 usually with 8 and 13 setae, respectively. *PAO* with 7(8) composed vesicles. Labrum with 7 setae and 2 prelabral ones (2/3-4). Apical part of labium of *AC*-type, with (5)6 proximal setae and usually with a complete set of guard setae (11), although asymmetrical absence of one of *e*-guard setae also visible, a_1-guard long. Basal fields of labium (mentum and submentum) with 4 and 5 setae. Hypostomal complex with one long and one shorter projection. Maxillary palp simple, with 2 sublobal setae.

Pseudocellar formula (*pso*) as follows, dorsal: 32/133/33343, ventral: 1/000/0000, parapseudocelli (*psx*) invisible. Each upper subcoxa with one *pso*. Localization of *pso* as in Fig. 8. Granulation rather fine and uniform, without areas of clearly enlarged granules. Dorsal chaetotaxy almost symmetrical, setae smooth and clearly differentiated, especially on last abdominal terga, in anterior parts of body meso and microsetae similar in size but differing in shape: mesosetae straight and blunt, microsetae curved and pointed, sensilla more or less distinct on terga and less evident on sterna: 1/011/221-2111 (dorsal) (Fig. 8) and 2/000/0000-1 (ventral), sensillum on coxae of *Lg.*3 present but not distinct. *Th.*1 with 6+6 setae. Lateral microsensilla present only on *Th.*2. Unpaired dorsal seta d_0 on head absent, *Abd.*4 with m_0 and p_0, *Abd.*5 with p_0, *Abd.*6 with one axial macroseta (Figs 8, 18). Axial microsetae p_1 set anteriorly to mesosetae p_2 on *Abd.*1-3 (Fig. 21). Thoracic sterna without setae along *linea ventralis*. *Abd.*3 sternum unclearly divided, anterior subsegment without setae. Furca reduced to a small area of fine granulation situated at contact with border between *Abd.*3-4



Figures 8–9. Dorsal chaetotaxy and *pso* distribution, *Sensillonychiurus taimyrensis* sp. n. **8** and *Sensillonychiurus vegae* sp. n. **9** Scale: 0.01 mm.

sterna, with 2+2 small posterior setae arranged in two rows, manubrial area with 4+4 setae set in two rows. Ventral tube with 6+6 distal setae, proximal ones at corpus base absent. Upper subcoxae usually with 3-4-4, tibiotarsi with 15-15-14, setae: distal rows with 7 setae (all *T*-setae absent), row *B* with 7-7-6 setae, setae *M* absent but *Y* present. Unguis simple, with neither inner nor lateral tooth, unguiculus with an indistinct basal lamella, clearly shorter than unguis (about 0.6–0.65 U_3). Anal spines short (0.7–0.75 U_3) but rather thick (thickness/length 0.23–0.28), set on low papillae.

Affinities. Apart from *S. taimyrensis* sp. n., only two known species of the genus, i.e. *S. minusculus* and *S. vegae* sp. n., completely lack all *T*-setae on tibiotarsi (distal whorl with 7 setae). *S. minusculus* clearly differs in having lateral *ms* on *Th*.3 and *Abd*.6 without *AS*. Two other species, *S. vegae* sp. n. and *S. taimyrensis* sp. n. are very similar, sharing many common characteristics (see Table 1). Nonetheless *S. taimyrensis* sp. n. can be easily distinguished due to stronger *AS* set on low papillae (cf. Figs 18 and 19), more distal position of *ms* on *Ant*.4 (cf. Figs 10–14 and 15–17) and clear differences in the mutual position of microsetae p_1 and mesosetae p_2 on *Abd*.3 (cf. Figs 21 and 22).

Etymology. The new species was named after its *terra typica*.

Distribution. Despite a few records the new species is probably widespread in eastern Siberia being found in such remote regions as Taimyr's tundras and mountainous Buryatia. Previously the species was erroneously listed for Taimyr as *Tantulonychiurus volinensis* (Szeptycki, 1964) by Babenko (2003) and Babenko and Fjellberg (2006).

Sensillonychiurus vegae sp. n.

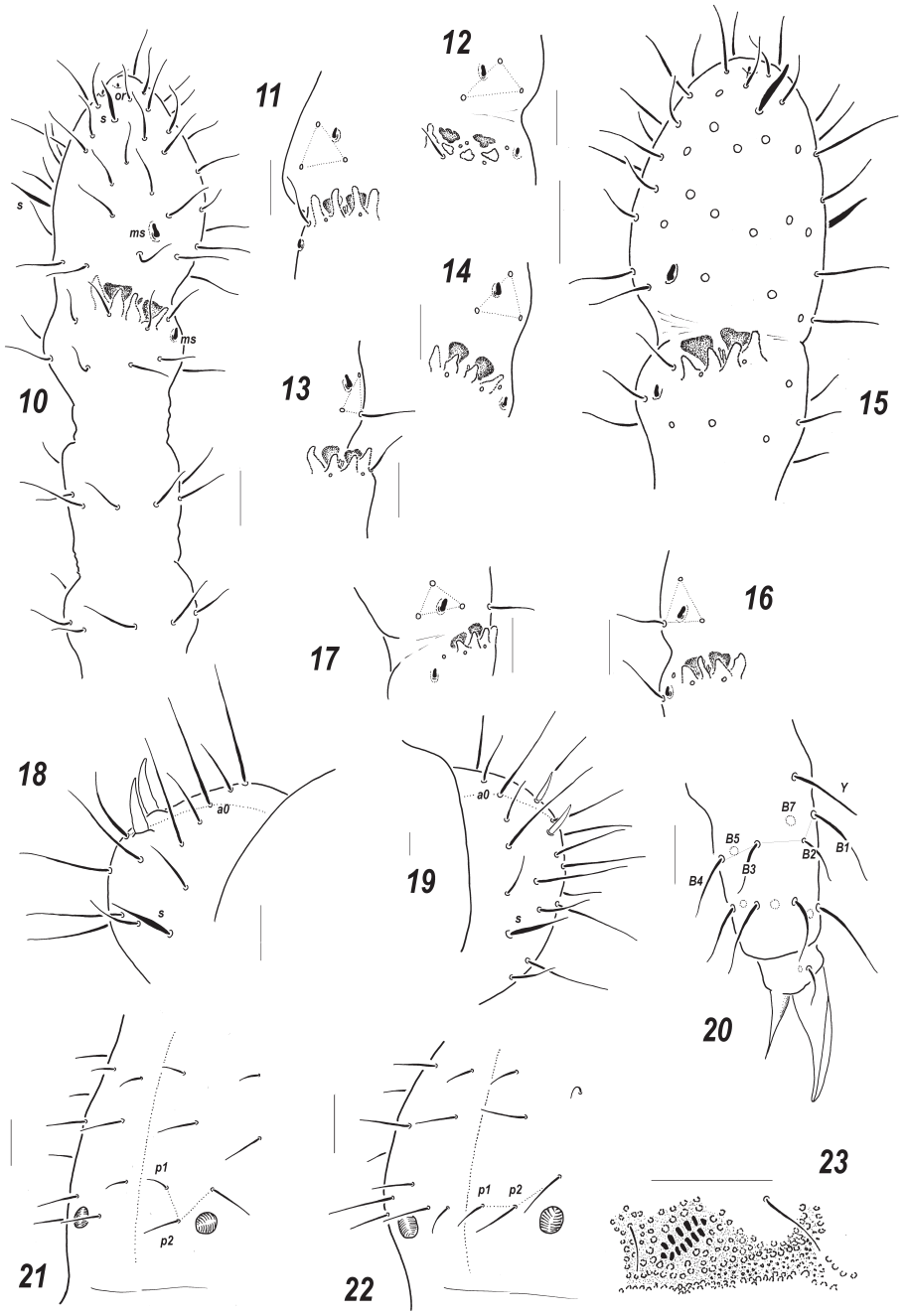
urn:lsid:zoobank.org:act:0086C2ED-D20C-45F3-A220-4F4D9383558B
http://species-id.net/wiki/Sensillonychiurus_vegae
Figs 9, 15–17, 19–20, 22–23

Material. Holotype ♂, Russia, eastern Siberia, Yakutia (Sakha Republic), mouth of Yana River, Shirokostan Peninsula, vicinity of Lake Ledyanoe [72°25'N, 141°00'E], *Dryas* association on steep slope, 04.viii.1994, leg. A. Babenko (MSPU).

Paratypes 6 ♀, 1 ♂, and 1 juv., Russia, eastern Siberia, Yakutia (Sakha Republic), left bank of Kolyma River [69°32'N, 160°44'E], grass (*Elymus sibiricus*) association on a polar fox hill, 19.viii.1994, leg. A. Babenko (MSPU).

Other material: 1♀ and 2♂, Russia, Siberia, northwestern Buryatia, Ust'-Barguzin [53°25'N, 109°01'E], shore of Lake Baikal, pine forest on sandy dunes (flotation), 21.viii 2008, leg. M. Potapov; 2♀, 6♂ and 6 juv., Russia, Siberia, Buryatia, Vitim Plateau, vicinity of Eravna (Sosnovo-Ozerskoe) [52°27'N, 111°09'E], pine forest with *Rhododendron dauricum*, 08.ix.2008, leg. A. Chimitova; 2 ♂, same region, but birch forest, 25.viii.2009, leg. A. Chimitova (MSPU).

Description. Colour white. Size 0.40–0.52 mm, holotype 0.47 mm long. Body slender and elongated. Antennae about as long as head, antennal area not clearly demarcated. Sensillar armature of *Ant*.4 as usual: two distinct thickened sensilla, a sub-



Figures 10–23. *Sensillonychiurus taimyrensis* sp. n. **(10–14, 18, 21)** and *Sensillonychiurus vegae* sp. n. **(15–17, 19–20, 22–23) 10** antenna **11–17** position of *ms* on *Ant*.4, different views **18–19** *Abd*.6 **20** tibiotarsus of *Lg*.3; **21–22** axial chaetotaxy of *Abd*.3 **23** ventral *psx* on posterolateral part of *Abd*.4 (specimen from Vitim Plateau). Scale: 0.01 mm.

apical organite and a basal microsensillum set almost in line with proximal row of setae (Figs 15–17). *Ant*.3 organ consisting of 4 papillae, 2 sensory rods, 2 smooth sensory clubs, 3 guard setae, and a lateral microsensillum (Fig. 15). *Ant*.1 and 2 usually with 8 and 13(14) setae, respectively. *PAO* with 6–7(8) composed vesicles. Labrum with 7 setae and 2 prelabral ones (2/3–4), four setae of apical row thicker. Apical part of labium with thick terminal setae on papillae *A* and *C* (*AC* – type), (5)6 proximal setae and a complete set (11) of guard setae: 7 long [b_{3-4}, d_{3-4}, e_{1-3}] and 4 spiniform [a_1, b_{1-2} and d_2] ones set on papillae, a_1 clearly longer than others. Basal fields (mentum and submentum) with 4 and 5 setae. Maxillary palp simple, with two sublobal setae.

Pseudocellar formula (*pso*) as follows, dorsal: 32/133/33343, ventral: 1/000/0000, *Abd*.4 sterna with or without 1+1 parapseudocelli laterally (see Variability). Each upper subcoxa with one *pso*. Granulation fine and uniform, slightly enlarged granules rarely present around medial *pso* on abdominal tip and on head. Dorsal chaetotaxy almost symmetrical (Fig. 9), setae smooth and clearly differentiated, especially on last abdominal terga, in anterior parts of body meso and microsetae only slightly differing in size but different in shape: mesosetae straight and blunt, microsetae curved and pointed. Tergal sensilla (1/011/221111 in number) distinct, sternal ones (2/000/0000-1) hardly distinguished, sensillum on coxae of *Lg*.3 evident. *Th*.1 usually with 6+6 setae. Lateral microsensilla present only on *Th*.2. Unpaired dorsal seta d_0 on head absent, *Abd*.4 with m_0 and p_0, *Abd*.5 with p_0, *Abd*.6 with one axial macroseta (Figs 9, 18). Axial microsetae p_1 lying almost in line with mesosetae p_2 on *Abd*.3 (Fig. 22) and sometimes also on *Abd*.2. Thoracic sterna without setae along *linea ventralis*. *Abd*.3 sternum unclearly divided, anterior subsegment narrow and without setae. Furca reduced to a small area of fine granulation situated at contact with border between *Abd*.3-4 sterna, with 2+2 small posterior setae arranged in two rows, manubrial area usually with 4+4 setae set in two rows. Ventral tube with 6+6 distal setae, proximal ones at corpus base absent. Upper subcoxae usually with 3-4-4, tibiotarsi with 15-15-14, setae: distal rows with 7 setae (all *T*-setae absent), row *B* with 7-7-6 setae, setae *M* absent but *Y* present (Fig. 20). Unguis simple, with neither inner nor lateral tooth, unguiculus with an indistinct basal lamella, about 0.6 times as long as inner edge of U_3. Anal spine rather long (0.6–0.7 U_3) but thin (thickness/length 0.13–0.23) (Fig. 19), set without papillae.

Variability. The types of *S. vegae* sp.n. completely lack *psx* as well as all so far studied species of the genus. Nonetheless, at least some of the specimens collected on Vitim Plateau possess 1+1 ventral parapseudocelli on *Abd*.4 (Fig. 23) being otherwise identical to the types. This population may represent a separate species, but its reliable distinction is hardly possible. Anyway, more material from different points of the distributional range is needed to evaluate the constancy and significance of this character.

Affinities. Virtually all of the main morphological characteristics of *S. vegae* sp. n. (structure of *AO* and *PAO*, labrum and labium, dorsal and ventral chaetotaxy, number and distribution of *pso*, presence of *ms* only on *Th*.2, number of setae on subcoxae, tibiotarsi and *VT*) are identical to those of sympatric *S. taimyrensis* sp. n. Concerning the differences of *S. vegae* sp. n. from *S. taimyrensis* sp. n. see description of the latter.

Etymology. The new species was initially collected during the joint Swedish-Russian expedition arranged in 1994 in order to commemorate A.E. Nordenskiöld's first trip on "Vega" board along the Northern Sea Route (1878–1879). That is why it is named after Nordenskiöld's famous steamship "Vega".

Distribution. Known from several remote areas of eastern Siberia. Previously, it was erroneously listed for Yakutia as *Tantulonychiurus volinensis* (Szeptycki, 1964) by Babenko and Fjellberg (2006).

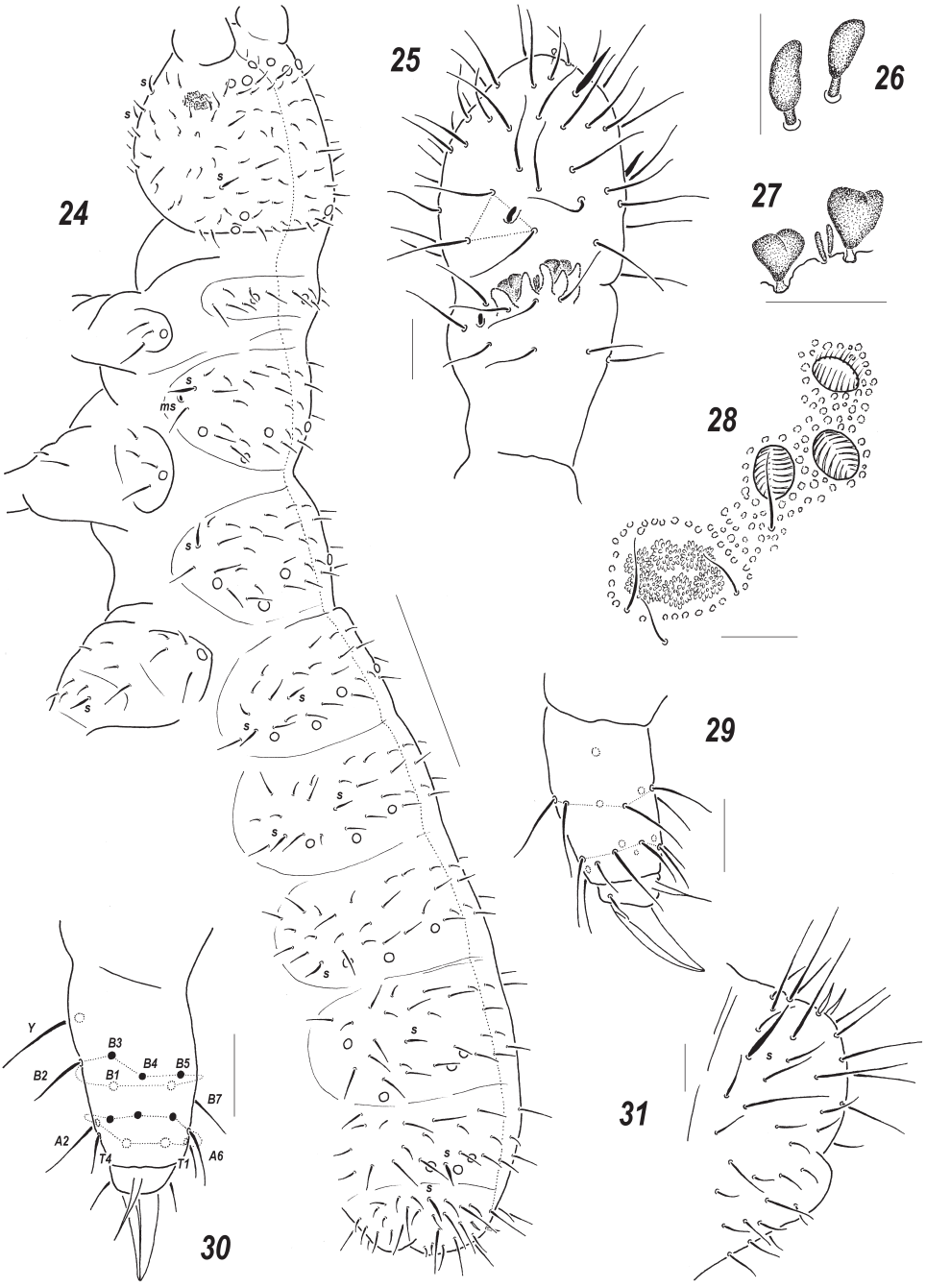
***Sensillonychiurus amuricus* sp. n.**
urn:lsid:zoobank.org:act:E99FF1BA-7739-4019-A89B-7F2E998A520F
http://species-id.net/wiki/Sensillonychiurus_amuricus
Figs 24–31

Material. Holotype ♀, Russia, Asiatic part, Khabarovsk suburbs, right bank of Amur river [48°33'N, 135°01'E], upper part of sandy beach (flotation), 26 iv 2010, M. Potapov leg (MSPU).

Paratypes 3 ♀, 4 ♂ and 1 juv., same data as holotype (MSPU).

Description. Colour white. Size of mature specimens 0.62–0.72 mm. Body slender and elongated. Antennae about as long as head, antennal area not clearly demarcated. *Ant*.4 with a subapical organite, two distinct thickened sensilla, and a subbasal microsensillum set well above proximal row of setae (Fig. 25). *Ant*.3 organ consisting of 5 papillae, 2 sensory rods, 2 smooth sensory clubs (Figs 26–27), 4 guard setae, and a lateral microsensillum (Fig. 25). *Ant*.1 and 2 usually with 8 and 13(14) setae, respectively. *PAO* with 6–7 composed vesicles (Fig. 28). Labrum with 7 setae and 2 prelabral ones (2/3–4). Apical part of labium with thick terminal setae on papillae *A* and *C* (*AC* – type), 7 long guard setae [$b_{3\text{-}4}$, $d_{3\text{-}4}$, $e_{1\text{-}3}$] and 4 spiniform ones [a_1, $b_{1\text{-}2}$ and d_2] set on low papillae, a_1 clearly longer and thicker than b_1. Proximal part of labium as usual, with 6 setae, basal fields (mentum and submentum) with 4 and 5 setae. Maxillary palp simple, with 2 sublobal setae.

Pseudocellar formula (*pso*) as follows, dorsal: 32/133/33343, ventral: 1/000/0000, parapseudocelli (*psx*) invisible. Each upper subcoxa with one *pso*. Localization of *pso* as in Fig. 24. Granulation rather fine and uniform, without areas of clearly enlarged granules. Dorsal chaetotaxy almost symmetrical, setae smooth and clearly differentiated, especially on last abdominal terga, differences between macro- and microsetae in anterior parts of body not so pronounced but visible: macrosetae more straight and blunt, microsetae curved and pointed. Dorsal sensilla distinct, flame-like, 1/011/221111 in number (Fig. 24), ventral ones (2/000/0001) slightly thickened and sometimes hard to detect, sensillum on coxae of *Lg*.3 distinct. *Th*.1 with 6+6 setae. Lateral microsensilla present only on *Th*.2. Unpaired dorsal seta d_0 on head absent, *Abd*.4 with m_0 and p_0, *Abd*.5 with p_0, *Abd*.6 with one axial macroseta (Fig. 24). Thoracic sterna without setae along *linea ventralis*. *Abd*.3 sternum unclearly divided, anterior subsegment without setae. Furca reduced to a small area of fine granulation situated at contact with border



Figures 24–31. *Sensillonychiurus amuricus* sp. n. **24** dorsal chaetotaxy **25** *Ant.*3–4 **26–27** sensorial elements of *Ant.*3 organ, different view **28** *PAO* and adjacent *pso* **29–30** tibiotarsus of *Lg.*3, different views **31** *Abd.*6. Scales: 24 – 0.1 mm, 25–31 – 0.01 mm.

between *Abd.*3-4 sterna, with 2+2 small posterior setae arranged in two rows, manubrial area with 4+4 setae set in two rows. Ventral tube with 6+6 distal setae, proximal ones at corpus base absent. Upper subcoxae usually with 3-4-4, tibiotarsi with 17-17-16, setae: distal rows with 9 setae (2 *T*-setae absent), row *B* with 7-7-6 setae, setae *M* absent but *Y* present (Figs 29–30). Unguis simple, with neither inner nor lateral tooth, unguiculus with an indistinct basal lamella, shorter than unguis (ca 0.7 U_3). Anal spines short (0.7–0.75 U_3) and thin, set without papillae (Fig. 31).

Affinities. The same structure of *AO* (five papillae and four guard setae) as in *S. amuricus* sp. n. is only known in two species of the genus, *S. mirus* sp. n. and *S. vitimicus* sp. n. All these species which are characterized by only a weak reduction of *AO* with a full number of papillae and 4 guard setae also show the highest number of setae (9) in the distal tibiotarsal whorl. Both can easily be distinguished from *S. amuricus* sp. n. in having a different type of the labium (*ABC* versus *AC* in *S. amuricus* sp. n.) and four prelabral setae (*S. amuricus* sp. n. possesses only two prelabral setae, which occurs more commonly in the genus). Apart from this, *S. amuricus* sp. n. is the largest congener.

Two other species of the genus, *S. virginis* and *S. geminus*, are characterized by the most complete set of tibiotarsal setae (17-17-16) but against the background of a pronounced reduction of *AO.*

Etymology. The new species was named after its *terra typica*.

Distribution. Known only from the type locality.

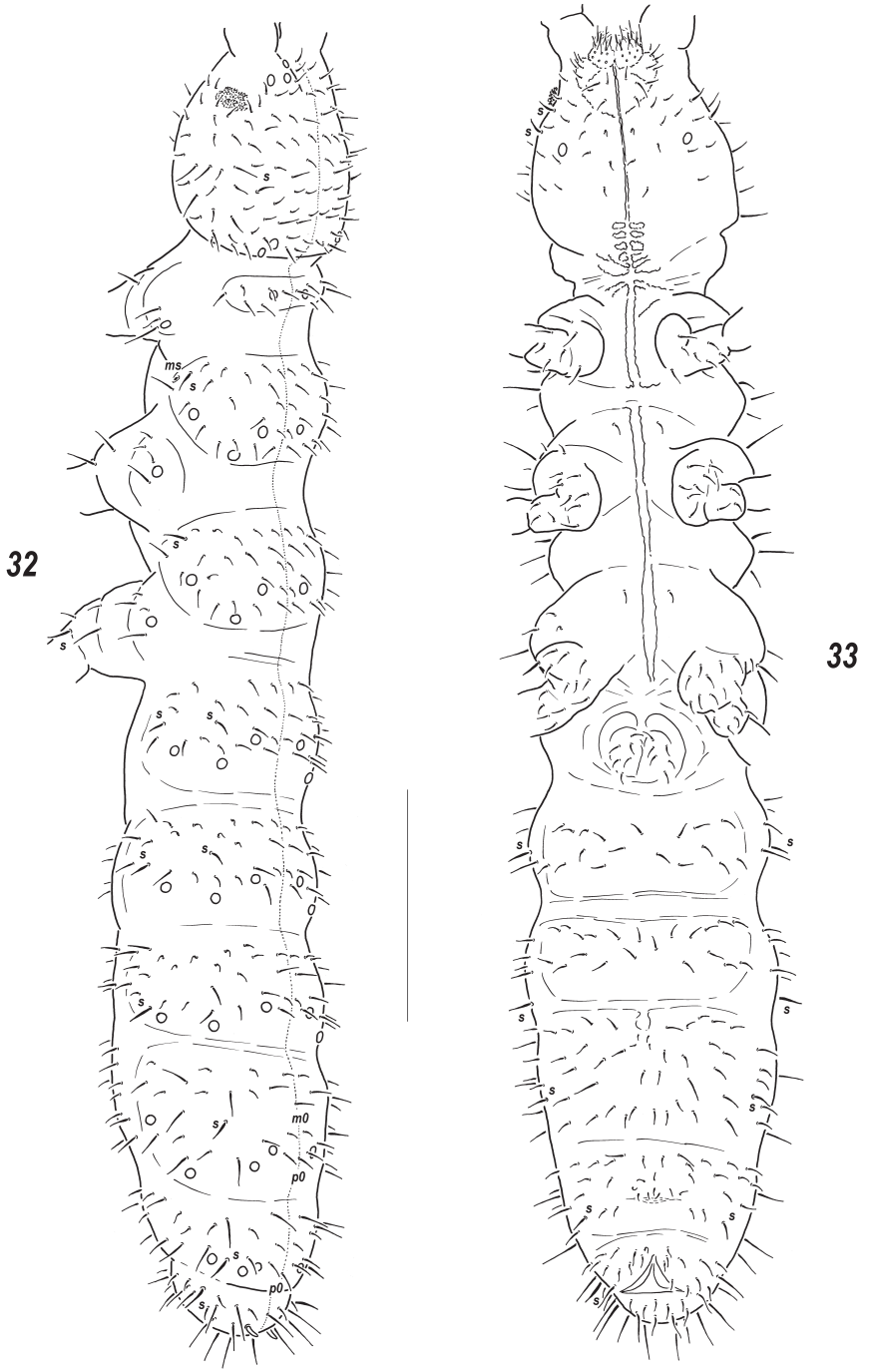
***Sensillonychiurus vitimicus* sp. n.**

urn:lsid:zoobank.org:act:1EB550A9-8192-4BEF-8826-93D1ABB96418
http://species-id.net/wiki/Sensillonychiurus_vitimicus
Figs 32–36

Material. Holotype ♂, Russia, Siberia, Buryatia, Vitim Plateau, vicinity of Telemba [52°44'N, 113°16'E], larch forest with *Betula fruticosa*, 23.viii.2009, leg. A. Chimitova (MSPU).

Paratypes 7 ♀ and 3 ♂, same data as holotype; 1♀ same region but… larch forest with rich herbaceous cover, 04.x.2009, leg. A. Chimitova (MSPU).

Description. Colour white. Size 0.58–0.68 mm (females), 0.50–0.58 (males). Body slender and elongated. Antennae about as long as head, antennal area not clearly demarcated. *Ant.*4 with 2 distinct thickened sensilla, a subapical organite and a basal microsensillum present, the latter set well above proximal row of setae (Fig. 34). *Ant.*3 organ consisting of 5 papillae, 2 sensory rods, 2 smooth sensory clubs, 4 guard setae, and a lateral microsensillum (Fig. 34). *Ant.*1 and 2 with 8 and (12)13 setae, respectively. *PAO* with 7–8 composed vesicles. Labrum with 7 setae and 4 prelabral ones. Labium of *AC*-type, but terminal setae on papillae *C* slightly thinner, guard setae as usual for genus: 7(6) long (b_{3-4}, d_{3-4}, e_{1-3}) and 4 spiniform (a_1, b_{1-2} and d_2) ones, a_1 clearly longer and thicker than others. Proximal part of labium with (5)6 setae, mentum and submentum with 4 and 5 setae, respectively. Maxillary palp simple, with 2 sublobal setae.



Figures 32–33. *Sensillonychiurus vitimicus* sp. n. **32** dorsal chaetotaxy **33** ventral chaetotaxy. Scale: 0.1 mm.

Pseudocellar formula (*pso*) as follows, dorsal: 32/133/33343, ventral: 1/000/0000, parapseudocelli (*psx*) invisible. Each upper subcoxa with one *pso*. Localization of *pso* as in Fig. 32. Granulation fine and uniform, slightly enlarged granules often present around *pso* on last abdominal terga. Dorsal chaetotaxy almost symmetrical, setae smooth and clearly differentiated especially on abdominal tip, in more anterior parts of body macro and microsetae mainly differing in shape, sensilla distinct on terga and less evident on sterna: 1/022/221111 (dorsal) and 2/000/00011 (ventral) (Figs 32–33), thickened sensillum present also on coxae of *Lg.*3. *Th.*1 with 6+6 setae. Lateral microsensilla present only on *Th.*2. Unpaired dorsal seta d_0 on head absent, *Abd.*4 with m_0 and p_0, *Abd.*5 with p_0, *Abd.*6 dorsally with one axial macroseta and 1+1 prespinal microsetae (Fig. 32). Thoracic sterna with 0-1-1 setae on each side of *linea ventralis*, ventral chaetotaxy of abdomen as in Fig. 33. *Abd.*3 sternum unclearly divided, anterior subsegment without setae. Furca reduced to a small area of fine granulation situated at contact with border between *Abd.*3-4, with 2+2 small posterior setae arranged in two rows, manubrial area with 4+4 setae set in two rows (Fig. 33). Ventral tube with 6+6(7) distal setae, proximal ones at corpus base absent. Upper subcoxae usually with 3-(3)4-4, tibiotarsi with 17-17-16 setae: distal rows with 9 setae (7 *A* and two *T*-setae), row *B* with 7-7-6 setae, setae *M* absent but *Y* present (Fig. 36). Unguis simple, with neither inner nor lateral tooth, unguiculus with indistinct basal lamella, clearly shorter than unguis (Fig. 36). Anal spine rather strong (about as long as 0.6–0.7 U_3), set on unclear papillae (Fig. 35).

Affinities. Due to the presence of four guard setae in *AO*, *S. vitimicus* sp. n. is the most similar to *S. mirus* sp. n. and *S. amuricus* sp. n. All these three species have many other characteristics in common (see Table 1), but *S. vitimicus* sp. n. can easily be distinguished by the presence of setae on thoracic sterna (a presumed apomorphic condition within Onychiuridae according to Fjellberg (1998).

Etymology. The new species was named after its *terra typica*.

Distribution. Known from several biotopes in vicinity of the type locality.

One more species of the genus *Sensillonychiurus* was found on Kamchatka (vicinity of Petropavlovsk, sandy sea beach with weed debris, leg. L. Lobkova). It differs from *S. virginis* in having setiform anal spines, from *S. geminus* by the absence of lateral *ms* on *Th.*3. The lack of material (only a single female is available) did not allow us to describe it, but it is listed in the key and in Table 1 as *Sensillonychiurus* sp.

Key to the known species of *Sensillonychiurus* Pomorski et Sveenkova, 2006

1	*AS* not differentiated	**2**
–	*AS* present	**4**
2	Tibiotarsi with 7 distal setae	***minusculus* Pomorski et Sveenkova, 2006**
–	Tibiotarsi with 9 distal setae	**3**
3	Dorsal *pso* as 32/022/33343	***virginis* Pomorski et Sveenkova, 2006**
–	Dorsal *pso* as 32/133/33343	***eisi* (Rusek, 1976), comb. n.**

4 Tibiotarsi with 9 distal setae.....**5**
– Tibiotarsi with 7 distal setae.....**9**
5 Both *Th*.2-3 with lateral *ms*, ventral *pso* on *Abd*.4 present [1/000/0101 as a whole].....***geminus* Pomorski et Sveenkova, 2006**
– Only *Th*.2 with lateral *ms*, *Abd*.4 without ventral *pso* [1/000/0000 as a whole].....**6**
6 *AO* with 5 papillae and 4 guard setae (Figs 1, 25) **7**
– *AO* with 4 papillae and 3 guard setae (as in Fig. 10)....***Sensillonychiurus* sp.**
7 Thorax with ventral setae ..... ***vitimicus* sp. n.**
– Thorax without ventral setae **8**
8 Labium of the *ABC* type (Fig. 4), 4 prelabral setae present.....***mirus* sp. n.**
– Labium of the *AC* type, only two prelabral setae present..... ***amuricus* sp. n.**
9 *AS* strong, set on low papillae (Fig. 18), *ms* on *Ant*.4 clearly above proximal setae (Figs 10–14), microsetae p_1 set anteriorly to mesosetae p_2 on all terga from *Abd*.1 to *Abd*.3 (Fig. 21).....***taimyrensis* sp. n.**
– *AS* as thick short setae (Fig. 19), *ms* on *Ant*.4 almost in line with proximal setae (Figs 15–17), microsetae p_1 set in line with p_2 on *Abd*.3 (Fig. 22) .... ***vegae* sp. n.**

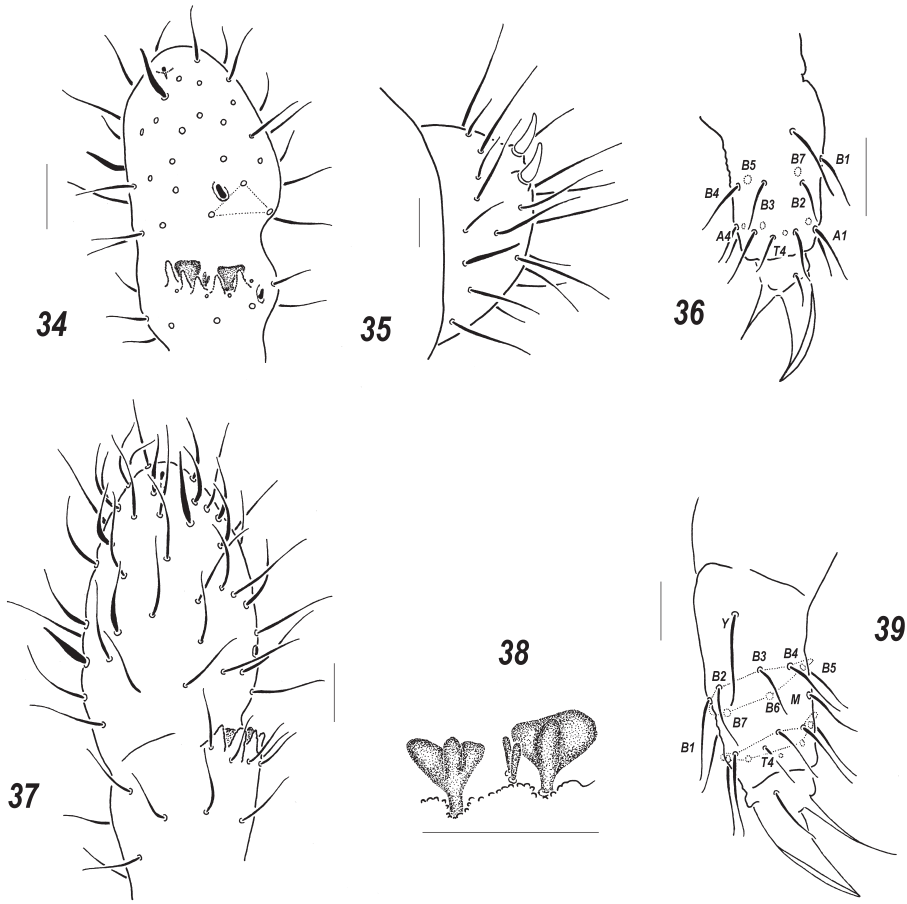
Genus *Allonychiurus* Yosii, 1995
http://species-id.net/wiki/Allonychiurus

Syn. *Pseudonychiurus* Lin Shang-Xiang, 1980 (mistakenly created for the moulting specimen)
Syn. *Tantulonychiurus* Pomorski, 1996, syn.n.
Syn. *Thibaudichiurus* Weiner, 1996

Type-species. *Onychiurus flavescens* Kinoshita, 1916: 458, by original designation.

Diagnosis. Small- or medium-sized Thalassaphorurini with compound vesicles in PAO; labrum with 7 or 9 setae, labium of *AC* or *ABC*-type; *AO* with 4–5 papillae and 5 guard setae, smooth or granulated sensory clubs; antennal and tergal sensilla usually distinct, d_0 on head present, *Abd*.4 and 5 usually with some axial microsetae, *Abd*.6 dorsally with 2+2 prespinal microsetae and 1–2 medial macrosetae; distal whorl on *Ti*.1-3 with 7, 9 or 11 setae, *B*-whorl usually complete on all tibiotarsi, *M* seta present; no tendency to dorsal *pso* multiplication, head and abdominal sterna with ventral *pso*, dorsal *pso* on *Th*.1 usually present; *psx* not numerous or absent; sternum of *Abd*.3 not subdivided, furcal remnant situated at some distance from border between *Abd*.3-4 sterna, with one or several rows of manubrial setae posterior to dental setae; *MVO* present or absent; *AS* present.

Remarks. As it was already stressed in Introduction the genus is accepted here in a wider scope than it was proposed by Sun et al. (2011) to include species described below. In this scope the genera *Tantulonychiurus* Pomorski, 1996 and *Thibaudichiurus*



Figures 34–39. *Sensillonychiurus vitimicus* sp. n. **(34–36)** and *Allonychiurus elikonius* sp. n. **(37–39)** **34, 37** *Ant*.3-4 **35** *Abd*.6 **36, 39** tibiotarsus of *Lg*. 3, different views **38** sensorial elements of *Ant*.3 organ. Scale: 0.01 mm.

Weiner, 1996 recognized as valid by Sun et al (2011) are placed here in synonymy of *Allonychiurus*. In our opinion, the generic value of main differentiated character of these genera, i.e. the number of setal rows on manubrial area, appears to be size and age dependent and needs further attention to be proved. The genus in the accepted scope is rather heterogeneous but completely analogous to *Thalassaphorura* which mainly differs in having simple vesicles in *PAO*. Here we only deal with the representatives of so called *volinensis*-group of the genus characterized by small size (less than 1.0 mm), smooth sensorial clubs and usually four papillae in *AO*. According to the generic classification proposed by Sun et al. (2011), the species described below should probably be assigned to the genus *Tantulonychiurus* since all of them are characterized by only one row of manubrial setae posterior to dental microsetae and by the position of *MVO* on *Abd*.4 sternum if present. In this case, the degrees of reduction of the tibiotarsal

setae found in the new species completely fill up the gap between *Tantulonychiurus* and *Thibaudichiurus* (7–9 versus 9 setae, respectively) and make their distinction rather problematic, taking also into account that not all of these species possess a *MVO*. That is why we are inclined to leave a decision concerning the status of all these genera pending a complete revision of the complex.

Allonychiurus elikonius sp. n.

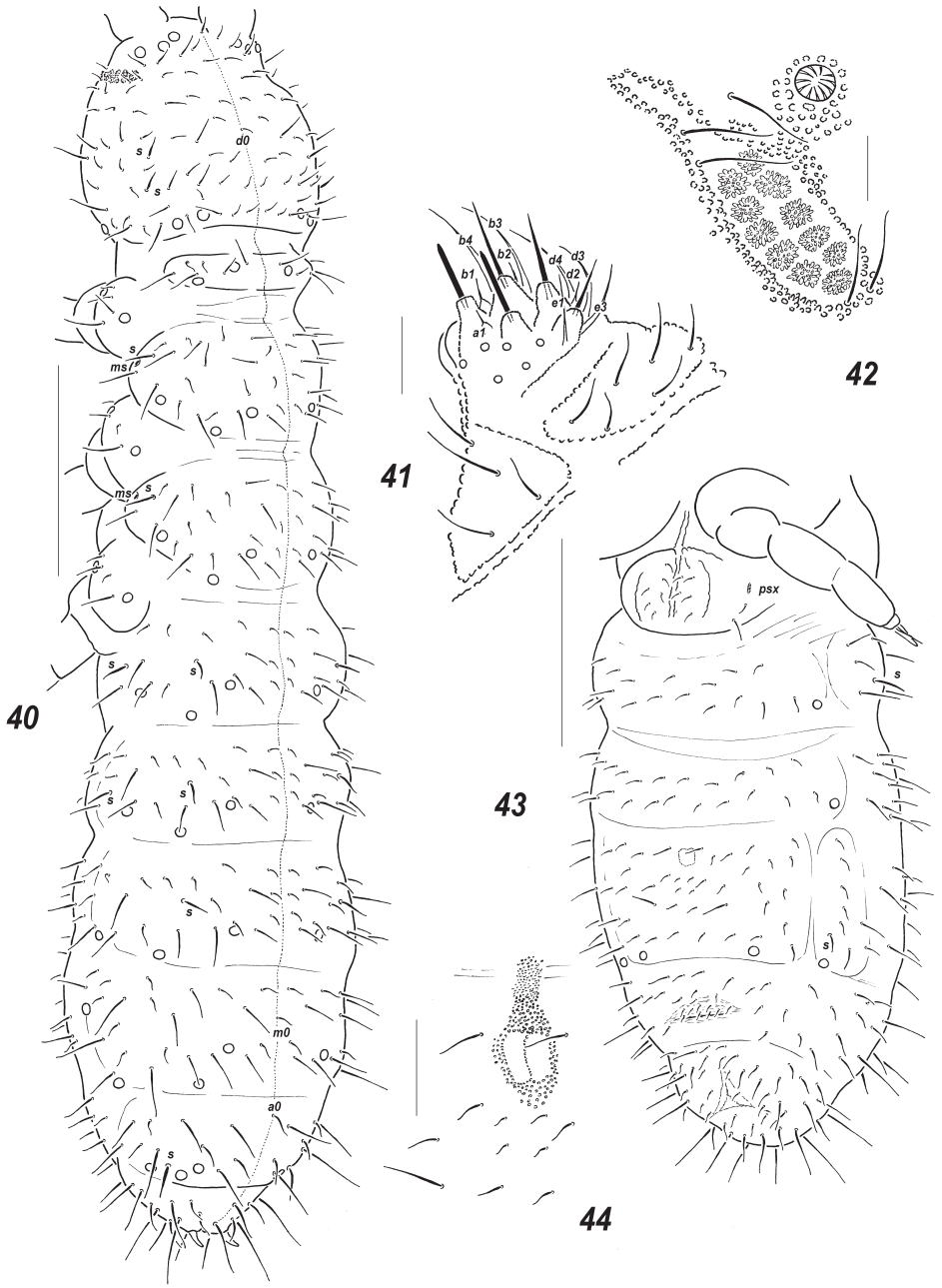
urn:lsid:zoobank.org:act:6843EC79-00D9-4039-96E1-D5088E2ACA99
http://species-id.net/wiki/Allonychiurus_elikonius
Figs 37–44

Material. Holotype ♀, Russia, Yakutia (Sakha Republic), Suntar-Khayata Mt Range, upper reaches of Kyubyume River [63°13'N, 139°32'E], 1,300 m alt., sandbank in Elikon River bed (flotation), 06.vii.2002, leg. O. Makarova (MSPU).

Paratypes: 22 females on slides and more than 300 specimens in alcohol, same data as holotype; 11 females, same region, 1,480 m alt., plant community with predominance of *Dryas* sp. on slope, 07.vii.2002; 7 females, same region, 1,430 m alt., herbaceous meadow on south-facing slope, 07.vii.2002; 14 females on slides and more than 800 specimens in alcohol, same region, greenhouse of "Vostochnaya" Meteorological Station, 1,287 m alt., 24.vii.2002, leg. O. Makarova (MSPU).

Description. Colour white. Size 0.72–0.84 mm. Body slender and elongated. Antennae about as long as head, antennal area not clearly demarcated. *Ant.*4 rather long and narrow, with several curved and slightly thickened sensilla, 2 of which (dorso-subapical and inner-subbasal) straighter and especially distinct, a subapical organite small, usually spherical, a basal microsensillum present (Fig. 37). *Ant.*3 organ consisting of 4 (or rarely 4+5) low papillae, 2 sensory rods, 2 smooth sensory clubs with ribs (Fig. 38), 5 guard setae, and a lateral microsensillum (Fig. 37). *Ant.*1 and 2 as a rule with 9 and 12–13 setae. *PAO* with 10–12 composed vesicles set at some distance from each other (Fig. 42). Labrum with 7 setae and 4 prelabral ones. Apical part of labium with thick terminal setae on papillae *A* and *C* (*AC*-type), 6 long (b_{3-4}, d_{3-4}, $e_{1, 3}$; e_2 absent) and 4 spiniform (a_1, b_{1-2} and d_2), guard setae, a_1 shorter than others (Fig. 41). Proximal field of labium usually with 6 setae, basal fields (mentum and submentum) with 4 and 6 setae. Maxillary palp simple, with 2 sublobal setae.

Pseudocellar formula (*pso*) as follows, dorsal: 32/233/33343, ventral: 11/000/0112, additionally one parapseudocellus (*psx*) present on each side of *VT* anteriorly to basal setae (Fig. 43). Each upper subcoxa with two *pso*. Localization of *pso* as in Figs 40, 43. Granulation fine and uniform, without areas of enlarged granules. Dorsal chaetotaxy almost symmetrical, setae smooth and clearly differentiated, especially on abdominal tip, sensilla not always distinct, sometimes hard to detect, particularly so on sterna and medially on *Abd.*1-3: 2/011/222010 (dorsal) and 2/000/00010 (ventral) (Fig. 40), a thickened sensillum on coxae of *Lg.*3 present. *Th.*1 with 5-6(7) setae on each side. Terga of *Th.*2-3 and *Abd.*1-3 with 3+3, *Abd.*4 with 2+2 and *Abd.*5 with 1+1, axial



Figures 40–44. *Allonychiurus elikonius* sp. n. **40** dorsal chaetotaxy **41** labium **42** *PAO* and adjacent *pso* **43** ventral chaetotaxy **44** furcal remnant. Scales: 40, 43 – 0.1 mm, 41-42, 44 – 0.01 mm.

microsetae. Lateral microsensilla present on both *Th*.2-3. Unpaired dorsal setae: d_0 on head, microseta m_0 on *Abd*.4, microseta a_0 on *Abd*.5, and 2 macrosetae a_0 and m_0 on *Abd*.6, supplemented by 2+2 prespinal microsetae (Fig. 40).

Sterna of *Th*. 2-3 with 1+1 setae along *linea ventralis*, ventral chaetotaxy of abdomen as in Fig. 43. *Abd*.3 sternum unclearly divided, anterior subsegment without setae. Furca reduced to a small area of fine granulation situated at some distance from border between *Abd*.3-4, with 2+2 small posterior setae arranged in 2 rows (Fig. 44), manubrial area with 4+4 setae arrange in 2 rows but only one of them set posteriorly to small dental setae (Fig. 43). Ventral tube with (5)6+6 distal setae and 2 proximal ones at corpus base. Upper subcoxae with (3)4-4-4, tibiotarsi with 18-18-18, setae: distal whorl with 9 setae (7 *A* and 2 *T*-setae), 7 setae in row *B* on each leg, setae *M* and *Y* present (Fig. 39). Unguis simple, with neither inner nor lateral tooth, unguiculus narrow with a long apical filament, latter usually reaching slightly beyond unguis (Fig. 39). Anal spine thick and slightly curved, set on unclear papillae.

Affinities. The main morphological features of *A. elikonius* sp. n. are similar to those of *A. volinensis*, *A. subvolinensis* sp. n. and *A. asiaticus* (Babenko, 2007), comb. n. (see Table 2). Thus, all four species are characterized by virtually identical dorsal chaetotaxy and similar numbers of *pso* on all terga, sterna and subcoxae. The presence of a complete set of *B*-setae and *M*-seta on all tibiotarsi is also shared by them. *A. elikonius* sp. n. has a different type of the labium (*AC* in *A. elikonius* sp. n. versus *ABC* in three other species) and differs from *A. volinensis* and *A. subvolinensis* in the mutual position of antennal *pso* (cf. Figs 40 and 45). There are also some variations of the number of distal setae on the tibiotarsi in these four species (7 setae in *A. volinensis* and *A. asiaticus*, 9 in *A. elikonius* and *A. subvolinensis*). *A. asiaticus* is the only species in the group showing five papillae in *AO* (found in *elikonius* only in exceptional cases), and only *A. subvolinensis* is characterized by the presence of setae on all thoracic sterna (absent from *Th*.1 in all other species).

It is more difficult to distinguish *A. elikonius* sp. n. from three Korean and one Chinese species of the group, namely *A. mariangeae* (Thibaud et Lee, 1994), *A. donjiensis* (Lee et Kim, 1994), *A. jindoensis* (Lee et Kim, 1994), and *A. foliatus* (Rusek, 1967), because their descriptions are incomplete and probably not fully correct in certain details. The most complete description is that of *A. mariangeae.* It is rather similar to *A. elikonius* sp. n. in having an almost identical chaetotaxy, the same number of dorsal *pso* and tibiotarsal setae (see Table 2). The only difference of the sternal *pso* formula is the presence of true pseudocellus on *Abd*.1 in *A. mariangeae* instead of an elongated parapseudocellus without clear cuticular ring in *A. elikonius* sp. n. However, these organs are homologous and sometimes difficult to distinguish. The most characteristic feature of *A. mariangeae* is the presence of *MVO* in mature males. Unfortunately, *A. elikonius* sp. n. in the region under study is only represented by parthenogenetic populations: among more than 100 specimens checked, all were females. Formally, these species differ in size (0.75–0.83 mm in *A. elikonius* sp. n. versus 0.5–0.65 mm in *A. mariangeae*), in the absence of ventral setae on *Th*.1 in *elikonius*, in the different number of setae on *Ant*.1 (9 in *A. elikonius* versus 8 in *A. mariangeae*), by unguiculus length (equal to or slightly longer than unguis in *A. elikonius* versus 0.75 of U_3 in *A. mariangeae*), and by the absence of a_0 on *Abd*.5 in *A. mariangeae*, but all these characters are probably variable.

Table 2. Main diagnostic characters of the known species of the *volinensis*-group of *Allonychiurus*

	Dorsal *pso*	Ventral *pso*	*pso* on upper subcoxae	*AO* papillae/ guards	Ventral setae on thorax	Dorsal sensilla	Type of labium	Number of prelabral setae	Number of distal setae on tibiotarsi	Unguiculus / unguis ratio	*MVO* position	Number of setae on *VT*
A. volinensis	32/233/33343	11/000/1112‡	2-2-2	4/5	0-1-1	1/011/222121	ABC	4	7	0.9-1.1	*Abd.*4	1/6/2
A. foliatus	32/233/33323†	01/000/0000 [?]	1-2-2	4/5	?	?	?	?	?	0.75	*VT* + genital plate	?/6/?
A. mariangeae	32/233/33343	11/000/1112	2-2-2	4/5	1-1-1	2/011/111111	?	?	9	0.75	genital plate	0/6/2
A. donjiensis	22/222/22222 [?]	11/200/0011 [?]	1-1-1	4/5	?	?	?	?	?	0.75	?	?/6/?
A. jindoensis	32/233/33333	10/000/0102	1-1-1	4/5	?	?	?	?	?	0.75	?	?/6/?
A. asiaticus	32/233/33343	11/000/0112	2-2-2	5/5	1-1-1	1/011/222221	ABC	4	7	0.7-0.8	absent	1/6/2
A. elikonius sp. n.	32/233/33343	11/000/0112	2-2-2	4(5)/5	0-1-1	2/011/222010	AC	4	9	0.9-1.1	males unknown	0/6/2
A. subvolinensis sp. n.	32/233/33343	11/000/1112	2-2-2	4/5	1-1-1	1/011/222111	ABC	4	9	~0.9	*Abd.*4	1/6/2
A. unisetosus sp.n.	32/233/33343	11/000/0111	2-2-2	4/5	0-1-1	1/011/222121	ABC	2	9	0.9-1.1	*Abd.*4 [?]	1/6/2

† According to the original description, the species is characterized by 33/233/33323 dorsal *pso* and complete absence of ventral *pso*; most lateral *pso* on posterior side of a head are considered here as being ventral.

‡ Slightly different formula of ventral *pso*, i.e. 11/000/0112, is given by Fjellberg (1998)

Three remaining species of the *volinensis*-group were described as having a lesser number of dorsal and ventral *pso* (see Table 2). Yet this probably needs verification. In any case, clear differences in the ecological preferences of compared species confirm the specificity of *A. elikonius* sp. n. The monsoon subtropical climate of southern Korea (the habitats of *A. mariangeae*, *A. donjiensis*, and *A. jindoensis* are sand beaches) and central China (vicinity of Shanghai, the only known locality of *A. foliatus*) has nothing to do with the extremely continental conditions of mountainous Yakutia (about 160 km from Oymyakon, one of the coldest places on Earth), where *A. elikonius* sp. n. was found. Nevertheless, the probability that some of these nominate species can probe to be conspecific with *A. elikonius* sp. n. cannot be completely ruled out until their adequate redescriptions.

Etymology. The new species was named after its type-locality, Elikon River.

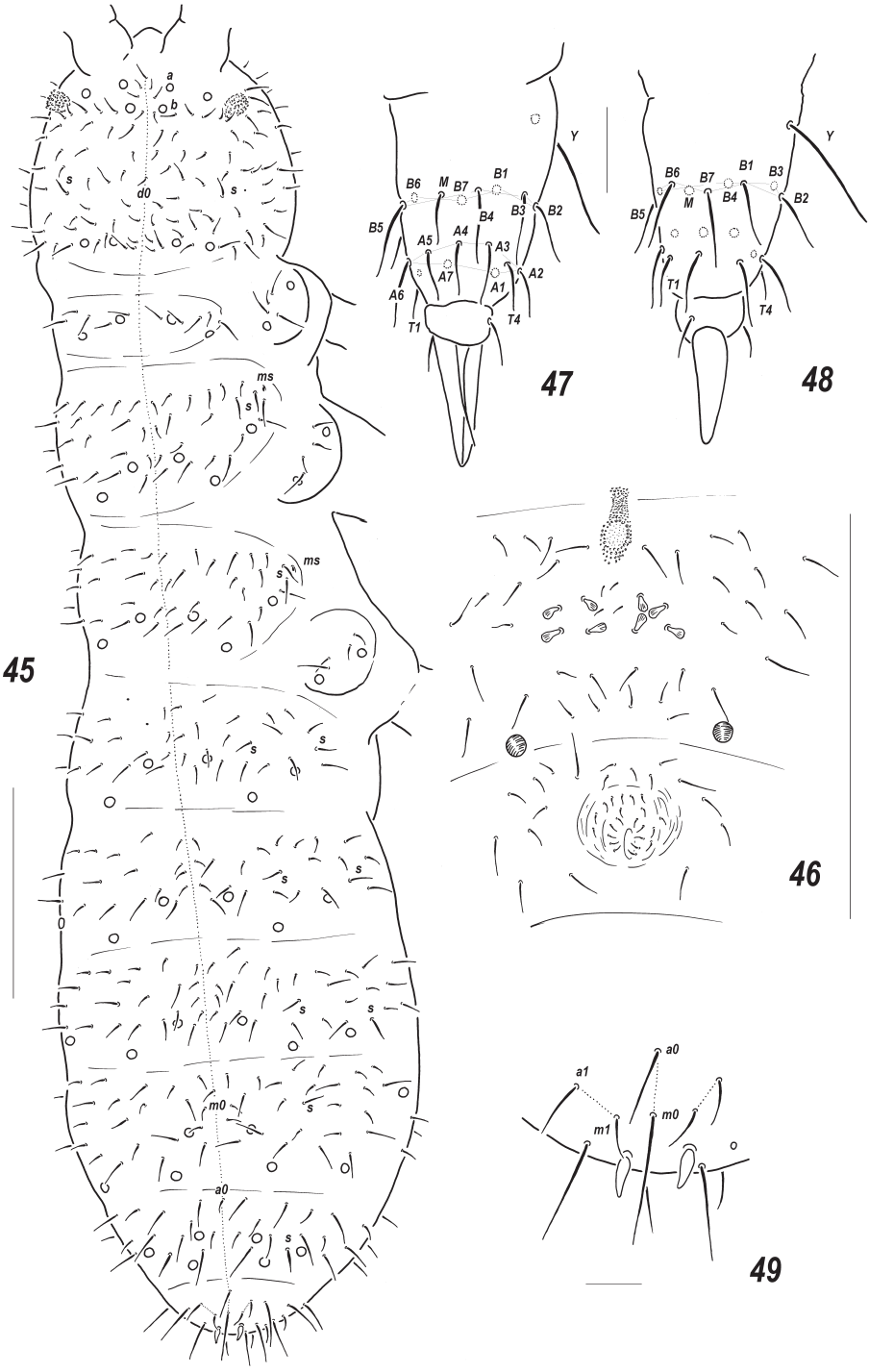
Distribution. Still known only from the region of the type-locality, where it inhabits a number of different communities up to 1,500 m alt.

***Allonychiurus subvolinensis* sp. n.**
urn:lsid:zoobank.org:act:2400049E-3FC5-4642-AD7D-05683CA7F275
http://species-id.net/wiki/Allonychiurus_subvolinensis
Figs 45–49

Material. Holotype ♂, Russia, Tuva Republic, northern macroslope of Eastern Tannu-Ola Mt Range, 5 km S of Lake Chagytai [51°00'N, 94°43'E], larch forest belt, 1,300 m alt., under larch (*Larix sibirica*), 16.vi.2003, leg. S.K. Stebaeva (MSPU).

Paratypes ♂, same region and locality, ca 1,400 m, 17.vi.2003; ♀, same region, meadow steppe, ca 1,200 m alt., under *Dracocephalum ruyschiana*, 17.vi.2003; 6♀ and 3♂, Russia, Tuva Republic, southern macroslope of Eastern Tannu-Ola Mt Range, 20 km N of Khol'-Oozhu [50°44'N, 94°23'E], 1,600 m alt., meadow steppe, under *Spiraea* sp., 16.vii.1993; 7 specimens, Russia, Tuva Republic, foothills of southern macroslope of Eastern Tannu-Ola Mt Range, basin of Aryskannyg-Khem River, 15 km E of Khol'-Oozhu [50°41'N, 94°35'E], ca 1,100-1,250 m alt., dry steppe, under *Nanophyton grubovii*, 17.vii.1993; 12♀ and 10♂, Russia, Tuva Republic, Sangelen Plateau, 25–30 km NE of Erzin [50°15'N, 95°09'E], ca 1,000 m alt., upper terrace of Erzin River, steppe with *Caragana spinosa*, 03viii.1995, all leg. S.K. Stebaeva (MSPU).

Description. Colour white. Size 0.55–0.62 mm. Body slender and elongated, slightly wider in region of *Abd*.4. Antennae about as long as head, antennal area not clearly demarcated. *Ant*.4 rather short and wide, 2 usual sensilla not especially thickened but distinct, a subapical organite and a basal microsensillum present. *Ant*.3 organ consisting of 4 low papillae, 2 sensory rods, 2 smooth sensory clubs without clear ribs, 5 guard setae, and a lateral microsensillum. *Ant*.1 and 2 with 8 and (12)13 setae, respectively. *PAO* wide (length/width ratio ca 1.5), with about 7–10 composed vesicles set close together. Labrum as a rule with 7 setae and 4 prelabral ones, but holotype with an abnormal number of setae set asymmetrically. Apical part of labium with thick



Figures 45–49. *Allonychiurus subvolinensis* sp. n. **45** dorsal chaetotaxy **46** *MVO* on *Abd.*4 **47–48** tibiotarsus of *Lg.*3, different views **49** *Abd.*6, dorsal chaetotaxy. Scales: 45–46 – 0.1 mm, 47–49 – 0.01 mm.

terminal setae on papillae *A*, *B* and *C* (*ABC* – type), seta *A* clearly thicker, 6 long (e_2 absent) and four spiniform (a_1, b_{1-2} and d_2), guard setae, a_1 shorter than others. Proximal field of labium with 5 setae, basal fields (mentum and submentum) with 4 and 5 setae. Maxillary palp simple, with 2 sublobal setae.

Pseudocellar formula (*pso*) as follows, dorsal: 32/233/33343 (Fig. 45), ventral: 11/000/1112. Each upper subcoxa with two *pso*. Granulation fine and uniform, without areas of enlarged granules. Dorsal chaetotaxy more or less symmetrical, setae smooth and rather thick, clearly differentiated only on abdominal tip, sensilla: 1/011/222111 (dorsal) and 2/000/00010 (ventral), but distinguishable mainly because of their stable positions, only lateral ones on *Th*.2-*Abd*.1 and posterior one on *Abd*.5 always distinct (Fig. 45), as well as a sensillum on coxae of *Lg*.3. *Th*.1 with 5+5(6) setae. Terga of *Th*.2-*Abd*.1 with 3, *Abd*.2-3 with 3(4), *Abd*.4 with 2-3 and *Abd*. 5 with 1, pairs of axial microsetae, additionally each tergum with 1+1 posterior axial mesosetae set slightly out of line with microsetae. Some unpaired dorsal setae also present: d_0 on head, microseta m_0 on *Abd*.4, microseta a_0 on *Abd*.5, and two macrosetae a_0 and m_0 on *Abd*.6, supplemented by 2+2 prespinal microsetae (Fig. 45, 49). Lateral microsensilla present on both *Th*.2-3.

Each sternum of *Th*. 1-3 with 1+1 setae along *linea ventralis.* Secondary division of *Abd*.3 sternum unclear because of bad preservation. Furca reduced to a small area of fine granulation situated at some distance from border between *Abd*.3-4 sterna with 2+2 small posterior setae arranged in 2 rows (Fig. 46), manubrial area with 4+4 setae arrange in 2 rows but only one of them set posteriorly to dental setae (Fig. 46). Ventral tube usually with 1+1 frontal, 6+6(5–7) distal and 2 proximal setae at corpus base. Upper subcoxae usually with 4-4-4, tibiotarsi with 18-18-18. setae: distal row on each leg with 9 setae (7 *A* and 2 *T*-setae), 7 setae in row *B*, setae *M* and *Y* present (Figs 47–48). Unguis simple, with neither inner nor lateral tooth, unguiculus narrow, almost as long as unguis (ca 0.9 U_3). Anal spines thick and slightly curved, set without clear papillae. Reproductive males with *MVO* identical to that in *A. volinensis* with 4+4 modified club-like setae in mid-ventral section of *Abd*.4 behind furcal remnant (Fig. 46), in not reproductive males these setae spiniform.

Affinities. *A. subvolinensis* sp. n. is very similar to the European *A. volinensis* (Szeptycki, 1964), comb. n. in many features. Both have a somewhat isolated position within the *volinensis*-group of *Allonychiurus* due to the wide *PAO*, the presence of *MVO* on *Abd*.4 and the different positions of *pso* at the antennal base, with *b*-pseudocelli set closer to the mid-line than *a*-pseudocelli. They can easily be distinguished from each other due to the different number of tibiotarsal setae (9 setae in distal whorl in *A. subvolinensis* sp. n. versus 7 setae in *A. volinensis*) and by the presence of ventral setae on all thoracic sterna in *A. subvolinensis* sp. n. (*A. volinensis* lacks setae on *Th*.1). The third very similar species of the same group, *A. unisetosus* sp. n., is described below. For differences with *A. volinensis* and *A. subvolinensis* sp. n. see the description of *A. unisetosus* sp. n.

Etymology. The name reflects the general similarity to *A. volinensis*.

Distribution. The new species was previously listed for Tuva as *Onychiurus* s.str. by Stebaeva (2003). It appears to be rather common in the region in various plant communities, from mountain forests to arid steppes.

***Allonychiurus unisetosus* sp. n.**
urn:lsid:zoobank.org:act:613014D9-6782-4406-B0C6-CEC3DEEDB568
http://species-id.net/wiki/Allonychiurus_unisetosus
Figs 50–54

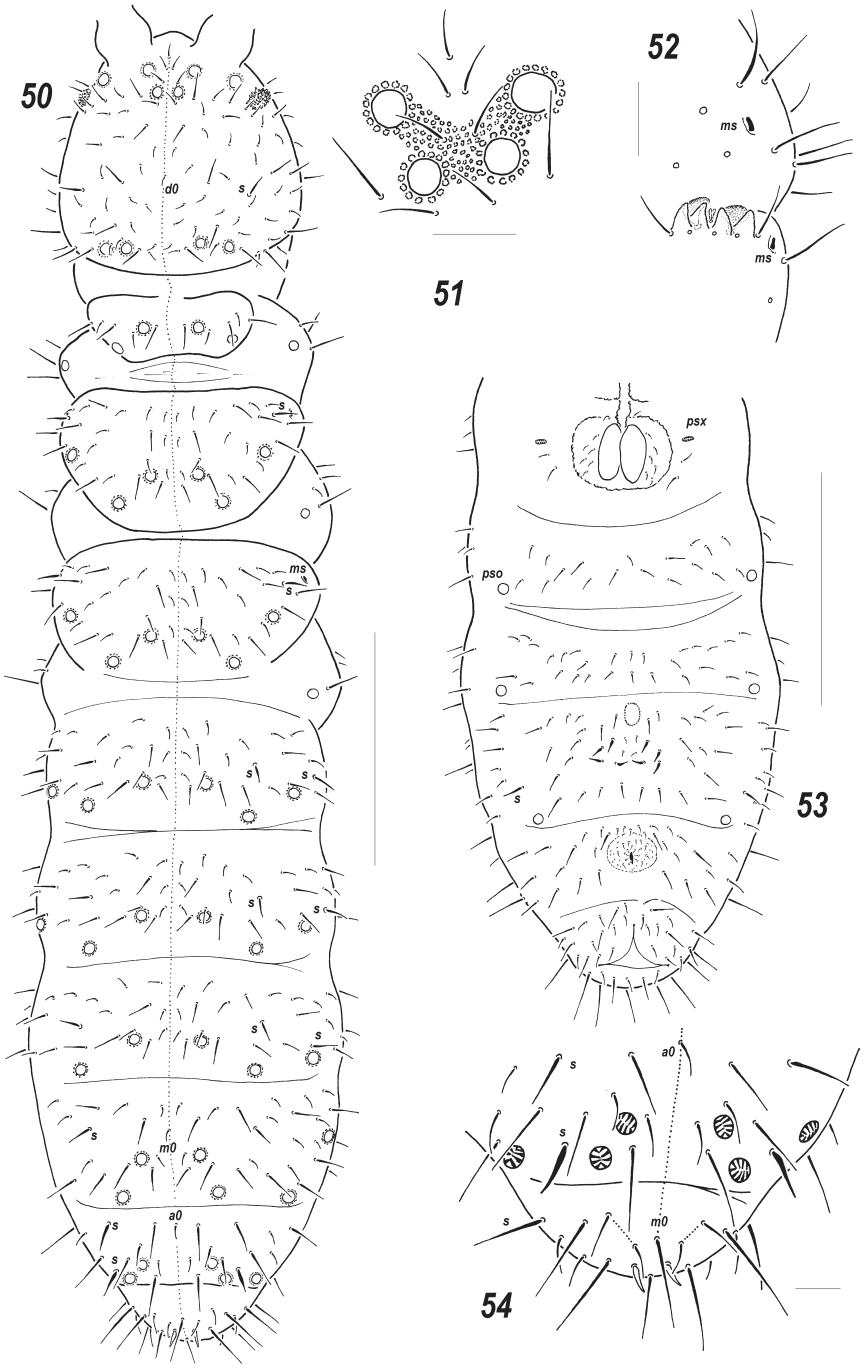
Material. Holotype ♂, Russia, Tuva Republic, northern macroslope of Eastern Tannu-Ola Mt Range, vicinity Shuurmak [50°38'N, 95°18'E], spruce-larch (*Picea obovata*, *Larix sibirica*) forest, on larch stump under *Cladonia chlorophaea*, 1,450 m alt., 12.viii.1997, leg. N.V. Sedel'nikova (MSPU).

Paratypes 8♀ and ♂, same sample as holotype; 1♀, same region, stony outcrops in mountain steppe, under *Xanthoparmelia somloënsis* and *Parmelia saxatilis,* 1,450 m alt., 12.viii.1997, leg. N.V. Sedel'nikova (MSPU).

Description. Colour white. Size 0.55–0.65 mm. Body elongated, wider in region of *Abd.*4. Antennae about as long as head, antennal area not clearly demarcated. *Ant.*4 rather short and wide, 2 usual sensilla not especially thickened but distinct, a subapical organite and a basal microsensillum present. *Ant.*3 organ consisting of 4 low papillae, 2 sensory rods, 2 smooth sensory clubs without clear ribs, 5 guard setae, and a lateral microsensillum (Fig. 52). *Ant.*1 and 2 usually with 8 and 13 setae, respectively. *PAO* wide (length/width ratio ca 1.5), with (7)8–10 composed vesicles set close together. Labrum with 7 setae and 2 prelabral ones. Apical part of labium with thick terminal setae on papillae *A*, *B* and *C* (*ABC* – type), seta *A* clearly thicker, 6 long (e_2 absent) and four spiniform (a_1, b_{1-2} and d_2), guard setae, a_1 shorter than others. Proximal field of labium with 5 setae, basal fields (mentum and submentum) with 4 and 5 setae. Maxillary palp simple, with 2 sublobal setae.

Pseudocellar formula (*pso*) as follows, dorsal: 32/233/33343 (Fig. 50), ventral: 11/000/0111 (one specimen with 1+2 ventral *pso* on *Abd.*4 also visible), sternum of *Abd.*1 with 1+1 *psx* on each side of *VT* (Fig. 53). Upper subcoxae with two *pso* and (2)3-(3)4-(3)4 setae, respectively. Generally granulation rather fine, but areas of clearly enlarged granules usually present around some *pso* and in mid and lateral parts of thorax. Dorsal chaetotaxy almost symmetrical, setae smooth and rather thick, clearly differentiated into macro and microsetae, sensilla poorly distinguishable, 1/011/222121 (dorsal) and 2/000/00010 (ventral), only lateral ones on *Th.*2-*Abd.*1 and posterior one on *Abd.*5 always distinct (Figs 50, 54). Sensillum on coxae of *Lg.*3 present. *Th.*1 with (4)5+5 setae. Terga of *Th.*2-*Abd.*3 with 3, *Abd.*4 with 2 and *Abd.* 5 with 1, pairs of axial microsetae, additionally each tergum with 1+1 posterior axial mesosetae set slightly out of line with microsetae. Unpaired dorsal setae: d_0 on head, microseta m_0 on *Abd.*4, microseta a_0 on *Abd.*5, and only one macrosetae (m_0) on *Abd.*6, supplemented by 2+2 prespinal microsetae (Figs 50, 54). Lateral microsensilla present on both *Th.*2-3.

Sterna of *Th.* 1-3 with 0-1-1 setae on each side of *linea ventralis.* Furca reduced to a small area of fine granulation situated at some distance from border between *Abd.*3-4 sterna with 2+2 small posterior setae arranged in 2 rows, manubrial area with 4+4 setae arrange in 2 rows but only one row set posteriorly to small dental setae (Fig. 53). Ventral tube usually with 1+1 frontal, 6+6 distal and 2(3) proximal setae at corpus base. Tibiotarsi with 18-18-18 setae: distal row on each leg with 9 setae (7 *A* and 2 *T*-setae),



Figures 50–54. *Allonychiurus unisetosus* sp. n. **50** dorsal chaetotaxy **51** position of anteromedial *pso* on head **52** *AO* **53** ventral chaetotaxy of abdomen **54** *Abd.*6, dorsal chaetotaxy. Scales: 50, 53 – 0.1 mm, 51–52, 54 – 0.01 mm.

7 setae in row *B*, setae *M* and *Y* present. Unguis simple, without teeth, unguiculus narrow, gradually tapering, with fine filament reaching tip of unguis. Anal spines curved and rather thin, set without papillae. *MVO* in reproductive males probably identical to that in *A. volinensis* but in both available mature males only thickened setae present in mid-ventral section of *Abd*.4 (Fig. 53).

Affinities. *A. unisetosus* sp. n., *A. volinensis* and *A. subvolinensis* sp. n. constitutes a rather homogeneous subgroup among the known species of the *volinensis*-group of *Allonychiurus*. All of them are characterized by identical position of antennal *pso* with *b*-pseudocellus set close to midline and out of antennal area (cf. Figs 50–51 and 40). Such a position is unique for the group. *A. unisetosus* sp. n. shares equal number of tibiotarsal setae (9) with *A. subvolinensis* sp. n. and identical ventral chaetotaxy of thorax (0-1-1) with *A. volinensis* (see Table 2) but differs from both species in having only two prelabral setae, one ventral *pso* on *Abd*.4 as a rule, only one axial macroseta on dorsal side of *Abd*.6 (cf. Figs 54 and 49), and clearly thinner *AS*.

Etymology. The name reflects the presence of only one axial macroseta on *Abd*.6 in the new species separating it from similar congeners.

Distribution. Known from several nearby localities of mountain Tuva, previously listed for the same region as *Onychiurus* s.str. sp. by Stebaeva et al. (2001).

***Allonychiurus asiaticus* (Babenko, 2007), comb.n.**
http://species-id.net/wiki/Allonychiurus_asiaticus

Syn. *Tantulonychiurus asiaticus* Babenko, 2007

Material. 15 specimens, Russia, Siberia, Krasnoyarsk Territory, Achinsk Region, 7 km from Nazarovo [57°02'N, 90°39'E], ca 400 m alt., meadows of various types, 1987–88; 9 specimens, Russia, West Siberia, 25 km S of Novosibirsk, Academgorodok [54°49'N, 83°08'E], wet grass-herbaceous meadow, 02.X.1994, all leg. S. Stebaeva.

The above new material collected from an area lying far south (more than 1,000 km) of the terra typica of the species differs from the original description in having more clearly differentiated tergal sensilla, but otherwise being very similar. These specimens may even represent a separate species, but material from intermediate areas is needed to evaluate the significance of these differences.

Acknowledgements

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A new species of the genus *Quedius* Stephens, 1829, subgenus *Microsaurus* Dejean, 1833, from northeastern North America (Coleoptera, Staphylinidae, Staphylinini, Quediina)

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urn:lsid:zoobank.org:pub:809160C2-9937-42C9-A0C5-19C4DB28061B

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Abstract

The paper contains a description of a new species of the subgenus *Microsaurus* Dejean, 1833, of the genus *Quedius* Stephens, 1829, based on specimens from northeastern North America (Canada: Ontario, Quebec, New Brunswick; USA: New Hampshire).

Keywords

Coleoptera, Staphylinidae, Staphylininae, *Quedius,* subgenus *Microsaurus*. Nearctic, northeastern North America, taxonomy, new species, description, distribution

Introduction

Since the publication of the revision of the tribe Quediini of America north of Mexico by Smetana (1971a), followed by six supplements (Smetana 1971b, 1973, 1976, 1978, 1981, 1990), no additional new species has been described from that territory. The species

described as new in this paper has been known to the senior author for many years (specimens from Ontario and New Hampshire) but remained undescribed. Quite recently, after numerous specimens of this species were discovered in New Brunswick and Quebec during 2008–2010, the species attracted new attention. The new species is remarkably similar in general habitus and especially in the coloration to the widely distributed *Q. erythrogaster* Mannerheim, 1852, but it differs from the latter by several striking character states concerning the chaetotaxy of pronotum and the unique type of punctation of the elytra.

Material and methods

Acronyms used in the text, when referring to the deposition of the specimens, are as follows:

AFC Natural Resources Canada, Canadian Forest Service - Atlantic Forestry Centre, Fredericton, New Brunswick, Canada.

CNC Canadian National Collection of Insects, Agriculture and Agri-Food Canada, Ottawa, Canada.

RWC Reginald P. Webster collection, Charters Settlement, New Brunswick, Canada.

UNHC University of New Hampshire collection, Durham, New Hampshire, United States.

The features on the aedoeagus are described as seen in ventral view (with paramere up).

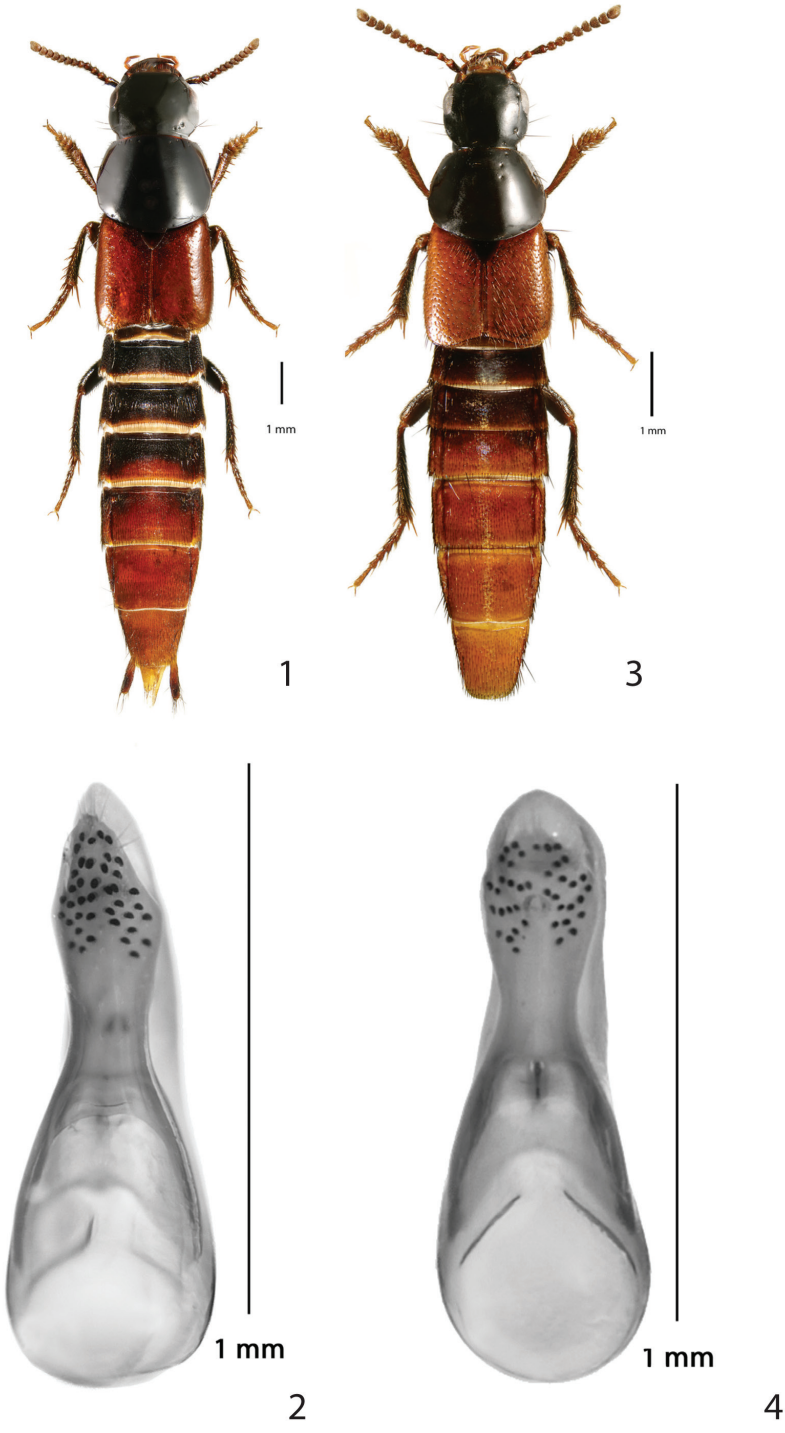
The locality data are given exactly as they appear on the locality labels. The measurement ratios given in the description are average values. Specimens were photographed using an image processing system (Nikon SMZ 1500 stereoscopic microscope: Nikon digital camera DXM 1200F; and Adobe Photoshop software).

Taxonomy

***Quedius* (*Microsaurus*) *bicoloris* sp. n.**
urn:lsid:zoobank.org:act:2D27D89F-7565-42CD-A065-2A790E8E1213
http://species-id.net/wiki/Quedius_(Microsaurus)_bicoloris
Figs 1, 2, 5–8

Type locality. Canada, New Brunswick, York Co. 15 km W of Tracy, off Rt. 645, 45.6848°N, 66.8821°W.

Type material. Holotype (male): CAN., NEW BRUNSWICK, YORK CO. 15 km W of Tracy, off Rt. 645, 45.6848°N, 66.8821°W 25 April–4 May 2009 R. Webster & M.-A. Giguère. coll. // red pine forest Lindgren funnel trap // PHOTO 10- 006 P.

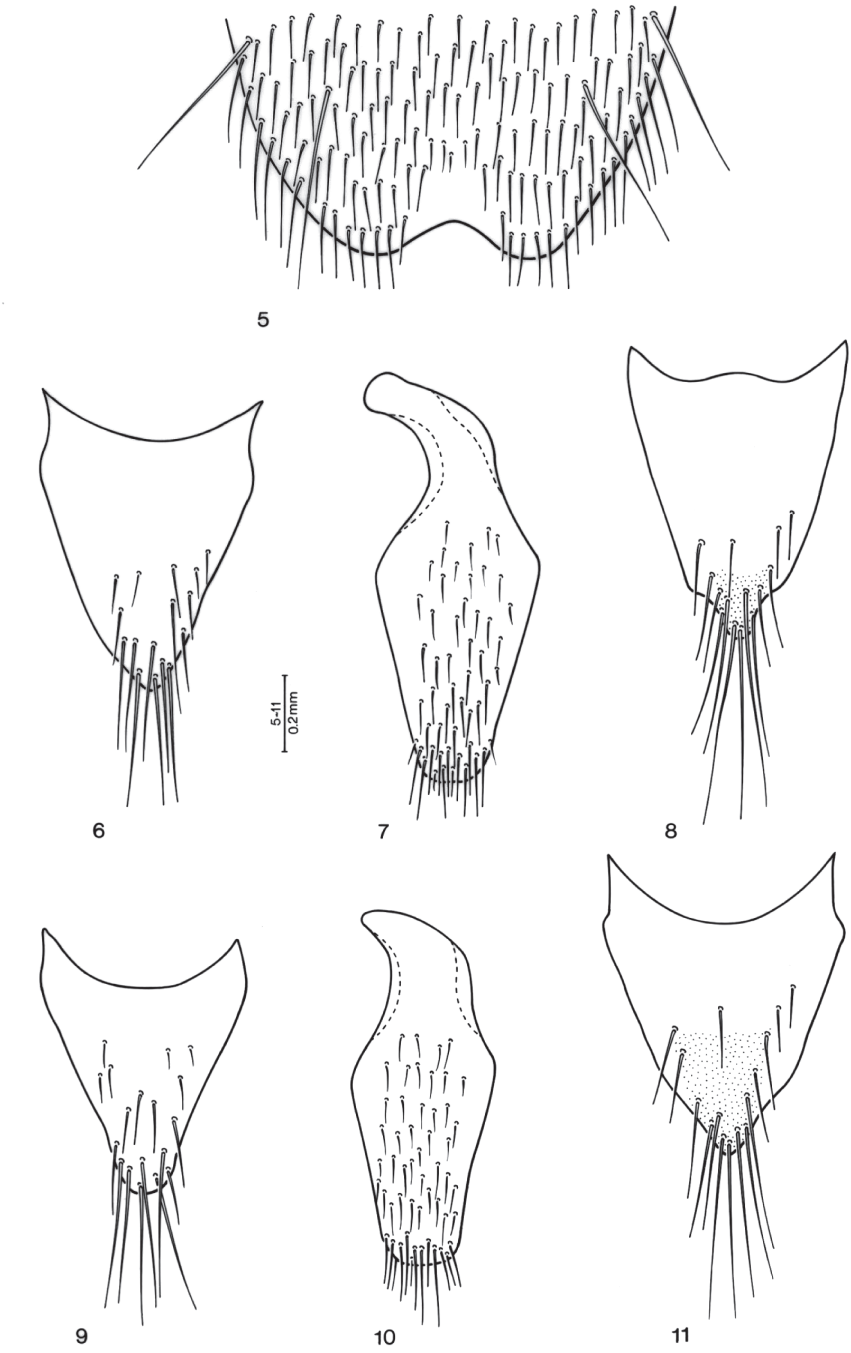


Figures 1–4. *Quedius bicoloris* sp. n.: **1** habitus **2** aedoeagus, ventral view. *Quedius erythrogaster* Mannerheim, 1852: **3** habitus **4** aedoeagus, ventral view.

Sylvestre". In CNC, Ottawa. Allotype (female): same labels as holotype, - last label + AFCF0005479. In CNC, Ottawa.

Paratypes: **CANADA:** NEW BRUNSWICK: same labels as allotype, but date 4–11 May 2009 + AFCF0005476, 1 ♀ (AFC); same labels as allotype, but date 19–25 May 2009 + AFC F0005480, 1 ♀ (AFC); same labels as holotype (except for last label), 1 ♀ (RWC); same labels as holotype (except for last label) but date 25 May–1 June 2009, 1 ♂ (CNC); same labels as holotype (except for last label) but date 19–25 May 2009 + AFCF0005481, 1 ♀ (AFC); CAN., NEW BRUNSWICK, YORK CO., 14 km WSW of Tracy, S of Rt. 645, 45.6741°N, 66.8661°W 26 April–10 May 2010, R. Webster & C. MacKay. coll. // Old mixed forest with Red and White Spruce, Red and White Pine, Balsam Fir. Eastern White Cedar. Red Maple and *Populus* sp. Lindgren funnel trap, 1 ♀ (RWC); same labels as previous + AFCF 0005484, 1 ♂ (CNC); same labels as previous + AFCF0005483, 1 ♂ (AFC). CARLETON CO., Jackson Falls., "Bell Forest" 46.2200°N, 67.7231°W, 9–14 May 2009, R. Webster & M.-A. Giguère. coll. // Rich Appalachian hardwood forest with some conifers, Lindgren funnel trap , 1 ♀ (CNC); same two labels but date 23–28 April 2010, 1 ♂, 1 ♀ (RWC); same two labels as previous but date 14–20 May, 1 ♂ (CNC); same two labels as previous but date 20–26 May 2009 + Staph. Species 544, 1 ♀ (RWC); same two labels as previous but date 16–21 June 2009, 1♀ (RWC); same two labels as previous but date 12–19 June 2010 and R. P. Webster coll., 1 ♂ (RWC); same two labels as previous but date 19–27 May 2010, 1 ♂, 1 ♀ (CNC, RWC). QUEENS CO., Cranberry Lake P. N. A. 46.1125°N, 65.6075° W 24 April–5 May 2009 R. Webster & M.-A. Giguère. coll. // Red oak forest Lindgren funnel trap // AFCF 0005475, 1 ♂ (AFC); same two labels as previous but date 27 May–5 June 2009 + AFCF 0005477, 1 ♂ (AFC); same two labels as previous but date 18–25 June 2009 + AFCF 0005476, 1 ♀ (AFC). SUNBURY CO., Acadia Research Forest 45.9866N 66.3841W 28 April–8 May 2009, R. Webster & M.-A. Giguêre, coll. // Red spruce forest with red maple and balsam fir Lindgren funnel trap // AFCF 0005482, 1 ♀ (AFC). ONTARIO: ON, Constance Bay, 1. X. 1953, EC Becker, 1 ♂, 1 ♀ (CNC). QUEBEC: CANADA, Qc . Co Gatineau Buckingham 45°34'N, 75°28'W, 12.-19. VI. 2000 Project Verglas 2000 // Lindgren Érablière á sucre 2000-3-0680 // *Quedius* sp. 1 Dét. G. Pelletier 2002, 1 ♀ (CNC). **UNITED STATES:** NEW HAMPSHIRE: Strafford Co., Durham Foss Fm. Rd. Water Tower X-22-1980, Coll. W. J. Morse, 1 ♂ (UNHC); USA: NH: Straf. Co., 1 mi N Durham, water tower 10-30-1982, W. J. Morse, 1 ♂ (UNHC).

Diagnosis. *Quedius bicoloris* is in general habitus and coloration quite similar to *Q. erythrogaster* Mannerheim, 1852, but differs in several external characters, as well as in the differently shaped aedoeagus (Figs 1–4). The main diagnostic external characters are the reduction of each of the dorsal rows on the pronotum to one puncture situated close to the anterior margin of pronotum, and the unique character of the elytral punctation (see the description). The aedoeagus, although it is of the same general build, is markedly different, both in the shape of the apical portion of median lobe and the shape of the paramere (Figs 2, 4). Tergite 10 of the female genital segment is also different (Figs 8, 11).



Figures 5–11. *Quedius bicoloris* sp. n.: **5** apical portion of male sternite 8 **6** tergite 10 of male genital segment **7** sternite 9 of male genital segment **8** tergite 3–10 of female genital segment. *Quedius erythrogaster* Mannerheim, 1852: **9** tergite 10 of male genital segment **10** sternite 9 of male genital segment **11** tergite 10 of female genital segment.

Description. Head, pronotum, and scutellum black. Elytra rusty red. First two and basal half of third visible abdominal tergites or first three visible tergites entirely piceous black to black, remainder of abdominal tergites rusty red to pale reddish. Mandibles piceous black to black, maxillary and labial palpi testaceous. Antennae piceous, becoming gradually variably paler toward apex. Legs piceous, with dorsal faces of front tibiae and all tarsi variably paler. Head of rounded quadrangular shape, wider than long (ratio 1.21), usually slightly widened behind eyes, posterior angles obsolete; eyes rather small, feebly convex, tempora somewhat longer than eyes seen from above (ratio 1.20); no additional setiferous punctures between anterior frontal punctures; posterior frontal puncture shifted markedly posteriad, situated close to posterior margin of head, two punctures between it and posterior margin of head (one of these punctures missing unilaterally in some specimens); temporal puncture shifted posteriad, separated from posteriomedial margin of eye by distance about twice as long as its distance from posterior margin of head; surface of head with very fine, very dense microsculpture of transverse and oblique waves, with intermixed fine micropunctulae that become gradually coarser toward posterior portions of head. Antennae short, moderately widened toward apex, segments 2 and 3 subequal in length, segments 4 and 5 about as long as wide, segments 6 to 10 wider than long, gradually becoming shorter, with segments 9 and 10 markedly transverse, last segment about as long as two preceding segments combined. Pronotum wider than long (ratio 1.15), widest at about posterior third, narrowed anteriad, with lateral margins continuously arcuate with broadly rounded base, transversely convex, lateral portions not explanate; dorsal rows each with only one puncture at anterior pronotal margin (puncture occasionally doubled unilaterally); sublateral rows each with one puncture close to anterior margin of pronotum; microsculpture similar to that on head, but slightly denser, intermixed micropunctulae quite fine. Scutellum impunctate, surface with microsculpture of very fine waves. Elytra moderately long, at base narrower than pronotum at widest point, no more than vaguely dilated posteriad, at suture as long as, at sides somewhat longer than pronotum at midline (ratio 1.14); punctation dual, consisting of moderately coarse and very fine punctures; coarser punctures on each elytron forming a group on medial half of elytral base laterad of scutellum and from there extending in a sparse, very variable, unstable erratic pattern posteriad toward posterior margin of each elytron; irregular row of coarser punctures present along suture of each elytron and on margin of elytra; very fine punctures present in irregular, variable pattern on entire surface of each elytron, including lateral portion; surface between punctures without appreciable microsculpture. Wings fully developed. Abdomen with tergite 7 (fifth visible) with fine whitish apical seam of palisade setae; tergite 2 (in front of fully visible tergite 3) impunctate (some micropunctulae present); punctation of abdominal tergites dense at base of each tergite, becoming sparser toward apex of each tergite, and in general toward apex of abdomen; pubescence piceous; surface between punctures with exceedingly fine microsculpture of broken striae.

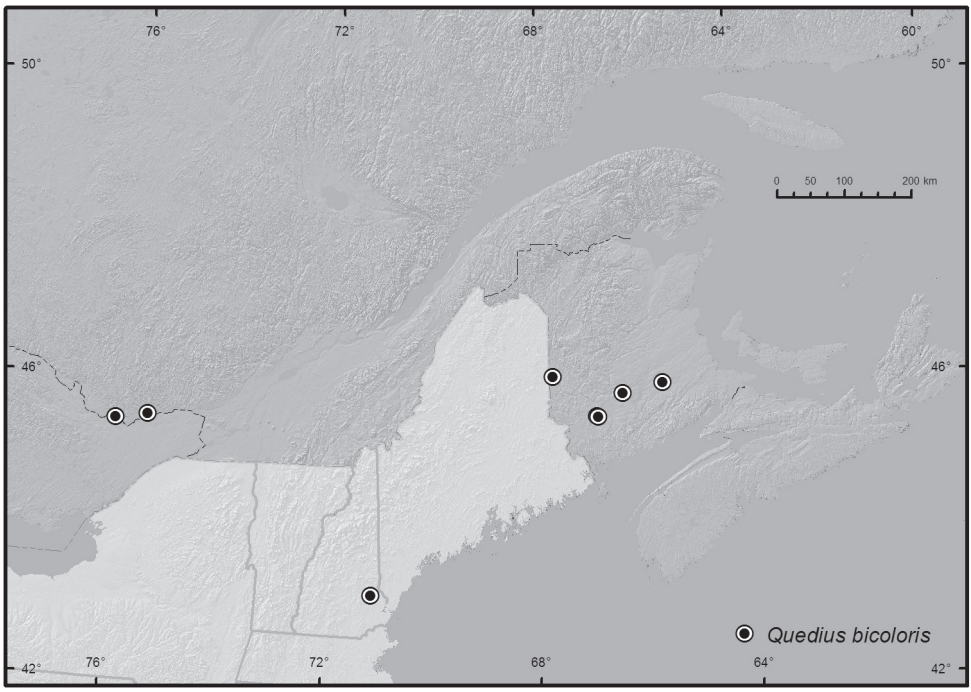
Male. First four segments of front tarsus moderately dilated, sub-bilobed, each densely covered with tenent setae ventrally; segment 2 about as wide as apex of tibia;

segment 4 narrower than preceding segments. Sternite 8 with two macrosetae on each side, apical margin with moderately wide and rather shallow, obtusely arcuate medioapical emargination, small triangular area before emargination flattened and smooth (Fig. 5); sternite 7 with apical margin minutely, arcuately emarginate medially; sternite 6 with a small field of denser setae mediobasally. Genital segment with tergite 10 markedly, evenly narrowed toward narrowly arcuate apex, setose at and around apex, otherwise with only sparse, minute setae (Fig. 6); sternite 9 with moderately robust basal portion, apical portion arcuate apically, without differentiated setae, setose as in Fig. 7. Aedoeagus (Fig. 2) rather robust; median lobe subparallelsided in middle portion, anteriorly narrowed into short apical portion with narrowly arcuate apex; paramere short, robust, apical portion of characteristic diamond shape, apex of apical portion distinctly not reaching apex of median lobe; four setae at apex and two similar setae at each lateral margin below apex; sensory peg setae on underside of paramere quite numerous, covering entire apical portion with exception of small triangular mediobasal area.

Female. First four segments of front tarsus similar to those of male, but markedly less dilated, segment 2 slightly narrower than apex of tibia (ratio 0.90). Tergite 10 of genital segment similar to that of *Q. erythrogaster*, but smaller and narrower, with pigmented medioapical area much smaller (Figs 8, 11).

Length 7.5–9.5 mm.

Geographical distribution. *Quedius bicoloris* is distributed in northeastern North America (Map 1). It is presently known from New Brunswick, Ontario, and Quebec



Map 1. Presently known distribution of *Quedius bicoloris*.

in Canada and, so far, only from New Hampshire in the United States. It is expected to be more widely distributed.

Bionomics. Little is known about biology of the species. The Quebec specimen was taken from a Lindgren funnel trap in a sugar maple stand, the specimens from New Hampshire were all taken sitting on cool walls of a water tower. The New Brunswick specimens were collected from Lindgren funnel traps during a study to develop a general attractant for the detection of invasive species of Cerambycidae. Adults were taken in a variety of forest types, including an old (120-180-year-old trees) red pine forest, old mixed forest with red and white spruce, red and white pine, balsam fir, eastern white cedar, red maple, and *Populus* sp., Rich Appalachian Hardwood Forest (sugar maple, beech, ash, butternut), and a red oak forest, red spruce forest with red maple and balsam fir. These traps mimic tree trunks and are often effective for sampling species of Coleoptera that live in microhabitats associated with standing trees (Lindgren 1983). This species is probably associated with standing trees, possibly living in subcortical habitats or in fungi on trees.

Etymology. The specific epithet is the combination of Latin adverb *bis* (twice) and the genitive of the noun *color*, *-oris*, m (meaning of two colors). To be treated as noun in apposition. It refers to the coloration of the body of the species.

Acknowledgments

We thank Ian DeMerchant (AFC) for creating the distribution maps and Patricia Silvestre (Laurentian Forestry Centre) for taking the habitus and genitalia photographs. We thank Nichole Braun, Katie Burgess, Marie-Andrée Giguère, Nancy Harn, Rob Johns, Ervin Kovacs, Marsell Laity, Colin MacKay, Wayne MacKay, and Jessica Price for technical assistance and collecting specimens. We thank Natural Resources Canada, Canadian Forest Service; the Canadian Food Inspection Agency; and USDA APHIS for funding the study on early detection of invasive cerambycids, which provided many specimens in Lindgren funnel traps. We also thank the Meduxnekeag River Association for permission to sample beetles at the Meduxnekeag Valley Nature Preserve (which includes the Bell Forest) and the New Brunswick Department of Natural Resources (Fish and Wildlife Branch) for issuing permits for sampling in protected natural areas and providing logistical support.

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RESEARCH ARTICLE

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Schaeferiana (*Gaboniella* subgen. n.) *incompleta* sp. n. from Gabon, with notes on its relationships and new records from the Central African Republic (Hemiptera, Heteroptera, Pyrrhocoridae)

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Abstract

A new subgenus, *Gaboniella* **subgen. n.**, of the genus *Schaeferiana* Stehlík, 2008, and its type species, *Schaeferiana* (*Gaboniella*) *incompleta* **sp. n.** are described from Gabon. In addition the first state records of *Sericocoris* (*Depressoculus*) *albomaculatus* Stehlík, 2008 and *Schaeferiana* (*Schaeferiana*) *mirabilis* Stehlík, 2008 from the Central African Republic are provided.

Keywords

Heteroptera, Pyrrhocoridae, taxonomy, new species, Gabon, Central African Republic, Afrotropical Region

Introduction

In this contribution, we describe the subgenus, *Gaboniella* subgen. n., of the genus *Schaeferiana* Stehlík, 2008, and its type species, *Schaeferiana* (*Gaboniella*) *incompleta* sp. n. from Gabon. This species is interesting from morphological and phylogenetic point of

view, as it possesses characters placing it between the subgenus *Depressoculus* Stehlík, 2008 of *Sericocoris* Karsch, 1892 and the genus *Schaeferiana* Stehlík, 2008, especially in the peculiar structure of the head and pronotum. As the new species does not fit the diagnosis of the genus *Schaeferiana* in some points, we establish a new subgenus to accommodate it.

Sericocoris (*Depressoculus*) includes two species distributed in tropical Africa from Liberia to Democratic Republic of Congo: *Sericocoris* (*D.*) *albomaculatus* Stehlík, 2008 (western, north-western and eastern parts of the Democratic Republic of Congo – provinces Kwilu, Sud-Kivu, Nord-Kivu, Nord-Ubangi and Sud-Ubangi) and the widely distributed *S.* (*D.*) *antennatus* (Distant, 1881), which includes four described subspecies: *S.* (*D.*) *antennatus antennatus* (Liberia, Nigeria, Cameroon, Equatorial Guinea: Bioko Island, Gabon, Congo), *S.* (*D.*) *antennatus obscuratus* Stehlík, 2008 (western, north-western, and north-central parts of the Democratic Republic of Congo – provinces Bas-Uelé, Equateur, Kwilu, Mongala, Sud-Ubangi, Tshopo and Tsuapa), *S.* (*D.*) *antennatus immaculatus* Stehlík, 2008 (north-eastern and eastern areas of the Democratic Republic of Congo – Bas-Uelé, Haut-Uelé, Ituri, Nord-Kivu, and Sud-Kivu), and *S.* (*D.*) *antennatus congolanus* Stehlík, 2008 (south-west of the Democratic Republic of Congo – province Kongo Central) (Stehlík 2008). The genus *Schaeferiana* was so far monotypical, including only *S. mirabilis* Stehlík, 2008 from north-western, north-central, and eastern areas of the Democratic Republic of Congo (Maniema, Nord-Kivu, Sud-Kivu, and Tshopo provinces) (Stehlík 2008). The present records of *S.* (*D.*) *albomaculatus* and *S. mirabilis* from the Central African Republic shift the distribution of these species further west.

Materials and methods

To a large extent, the terminology for body parts in this contribution follows van Doesburg (1968), but the more specific terms proposed by Schaefer (1977) are employed for the genital capsule.

Taxonomy

***Schaeferiana* Stehlík, 2008**
http://species-id.net/wiki/Schaeferiana

Schaeferiana Stehlík, 2008: 14–19.

Type species: *Schaeferiana mirabilis* Stehlík, 2008, by original designation.

Diagnosis. Pronotal collar widened. Anterior, pale portion of pronotum elevated.

Discussion. Stehlík (2008) established *Schaeferiana* as a new genus with particular reference to its structure of the pronotal collar and callar lobe, which is unique among all Pyrrhocoridae:

'Pronotum rather long, widening markedly towards base, posterior angles and posterior margin distinctly rounded; lateral margins strongly raised dorsally, concave (deeply in males, slightly in females); at level of callar lobe lateral margins wider than anteriorly. Pronotal collar projecting posteriad, forming rather large, horizontal plate of rectangular shape with rounded angles and irregular shallow imprints, extended above callar lobe. Base of callar lobe rudimentary, its anterior two-thirds cavernous, mostly covered by the rectangular projection of the pronotal collar, visible only as a narrow fissure. Anterolateral margin of the rudimentary part usually extended above level of the median part and strongly convex. Pronotal lobe towards base uniformly gibbous, anterolaterally deeply depressed' (Stehlík 2008). However, based on the new material available, this original diagnosis must be modified – the pale, transverse, ridge-shaped structure interpreted by Stehlík (2008) as posterior third of callar lobe, in fact, represents the anterior margin of the pronotal lobe.

However, *Schaeferiana* (*Gaboniella*) *incompleta* sp. n. does not fit the diagnosis of the genus *Schaeferiana* in some points, so we establish a new subgenus to accommodate it. This species is interesting from morphological and phylogenetic point of view, as it possesses characters placing it between the subgenus *Depressoculus* of *Sericocoris* and the genus *Schaeferiana*, especially in the structure of head and pronotum.

Key to the subgenera of *Schaeferiana* Stehlík, 2008

1(2) Pronotal collar slightly widened (length 0.27 mm (♂)), touching tightly the slightly gibbose callar lobe of pronotum. Anterior, pale portion of pronotal lobe only slightly elevated above the surrounding surface (not reaching the lateral margins). Head dorsally without wrinkles or a median furrow. ..... ***Gaboniella* subgen. n.**

2(1) Pronotal collar strongly widened (length 0.59 mm (♂)), in the form of a horizontal plate covering the strongly depressed callar lobe posteriorly, so there is a nearly closed space except for a narrow slit posteriorly. Anterior, pale portion of pronotal lobe strongly gibbose, ridge-like. Head dorsally wrinkled with developed median furrow. ..... ***Schaeferiana* s. str.**

***Gaboniella* subgen. n.**

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http://species-id.net/wiki/Schaeferiana_(Gaboniella)

Type species. *Schaeferiana* (*Gaboniella*) *incompleta* sp. n., here designated.

Diagnosis. Differing from the nominotypical subgenus in the characters given in the key.

Etymology. The name of the subgenus is formed from the area of origin, Gabon; gender feminine.

***Schaeferiana* (*Gaboniella*) *incompleta* sp. n.**
urn:lsid:zoobank.org:act:94C280F9-3F7E-4F73-9357-8499C471A1BD
http://species-id.net/wiki/Schaeferiana_(Gaboniella)_incompleta
Figs 1–3

Type material. Holotype: ♂, **GABON:** 'Mission biologique au Gabon, P.P. Grasse Directeur, Belinga 222, 19.iii.[19]63, H. Coiffait' (coll. Muséum national d'Histoire naturelle, Paris).

Description. ***Colouration*** (Fig. 1). Head both dorsally and ventrally, lateral pronotal margins, pronotal epipleuron, dorsal margin of pleural flange I, ventrites (except white stripes on posterior margins of ventrites II–V), ventral and dorsal laterotergites, and pygophore red. Antennae (except of basal third of antennomere 4), callar lobe (with reddish tinge), transverse median stripe on pronotal lobe, scutellum, base of clavus (narrowing towards apex of scutellum), median round spot on corium, apex of corium, small spot on base of membrane, large round median spot on membrane, labium, pleura I–III, and legs, including coxae and trochanters, black. Basal third of antennomere 4, widened pronotal and prosternal collar, pleural flange I (except dorsal margin), entire pleural flanges I and II, epicoxal lobes I–III, and wide stripes on posterior margins of ventrites II–V white. Slightly elevated transverse stripe anteriorly on pronotal lobe, posterior margin of pronotum (widely), apical portion of clavus, and most of corium whitish-orange. Membrane pale gray.

Structure. Head. Body smaller, nearly parallel-sided. Head dorsally without wrinkles, median furrow not developed. Gena under the eye with distinct rounded depression anterior to bulges, extending to the median part of temple and eye. Eyes relatively small, weakly protruding. Eye and temple dorsoventrally flattened; gena under eye with distinct depression. Labium reaching base of ventrite IV.

Pronotum short. Widened pronotal collar tightly touching the slightly gibbose callar lobe. Lateral pronotal margin wide, strongly elevated dorsally, slightly concave medially. Anterior portion of pronotal lobe very slightly elevated above surrounding surface, not reaching lateral pronotal margins. Posterior pronotal margin rounded.

Scutellum. Posterior two thirds of scutellum slightly convex.

Legs slender, long. Profemur not markedly thickend compared with meso- and metafemur, slightly attenuated basally and towards apex. Ventral face of profemur with five remote teeth. Tibiae distally with slender semi-erect spines.

Pygophore (Fig. 2). Ventral portion of ventral wall receding in lateral view. Ventral rim medially concave, with a small tooth near each side of the incision. Lateral rim elevated above the ventral rim, sharp, somewhat lower near the dorsal rim. Ventral and lateral rim infolding steeply sloping into genital chamber; lateral rim infolding with a convex at midlength, and with a larger patch of minute black denticles near the dorsal rim.

Parameres parallel, their apices reaching up to anal tube. Paramere (Fig. 3) narrow at base, then strongly widened towards genital chamber (seen *in situ*). Dorsal margin of paramere proximally roundly incised, the incision terminated by a spine; distal part of the dorsal margin slightly concave; apex of paramere narrowly rounded.

Figures 1–2. *Schaeferiana* (*Gaboniella*) *incompleta* sp. n., holotype, male. **1** habitus **2** pygophore in dorsal view.

Measurements (mm). Holotype (♂). Body length 10.8 mm; head: width (including eyes) 1.73, interocular width 1.03; lengths of antennomeres: 1 – 2.21, 2 – 1.78, 3 – 1.35, 4 – 5.43; pronotum: length 1.84, maximum width 2.97; length of pronotal collar 0.27; scutellum: length 1.40, width 1.51; corium: length 5.56, width 1.51.

Differential diagnosis. The new species differs from *Schaeferiana* (*S.*) *mirabilis* in the characters defining both subgenera. Moreover, *S.* (*G.*) *incompleta* is smaller, its pronotum is shorter, the lateral pronotal margins are red (black in *S.* (*S.*) *mirabilis*), and the membrane is pale gray with a large central black spot (mostly black with orange median spot and pale gray apical margin in *S.* (*S.*) *mirabilis*).

Etymology. The species epithet is the Latin adjective *incompletus*, *-a*, *-um*, meaning incomplete, referring to the incompletely modified pronotal collar and callar lobe compared with *Schaeferiana* (*S.*) *mirabilis*.

Distribution. Known only from the type locality in Gabon.

Faunistics

***Schaeferiana* (*Schaeferiana*) *mirabilis* Stehlík, 2008**
http://species-id.net/wiki/Schaeferiana_(Schaeferiana)_mirabilis
Fig. 4

Material examined. Central African Republic: WSW, Sangha province, 45 km E of Nola, (GPS) 03°40'N, 16°26'E, 570 m a.s.l., 17.xii.2008, 2 ♂♂ 1 ♀, J. Halada lgt. (coll. Z. Jindra, Praha).

Distribution. Democratic Republic of Congo (Stehlík 2008). New record for the Central African Republic.

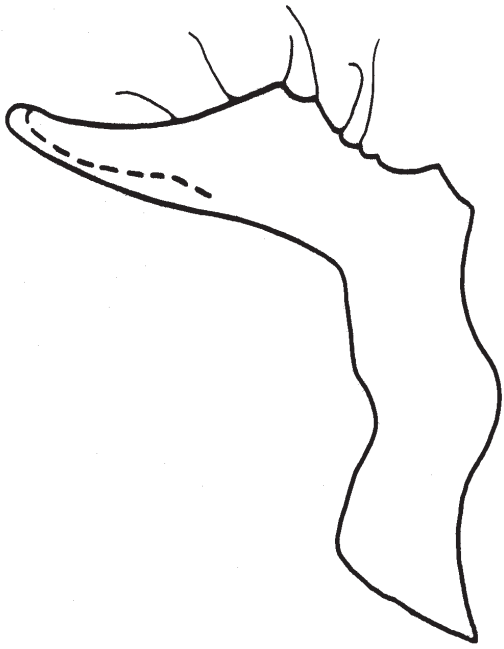
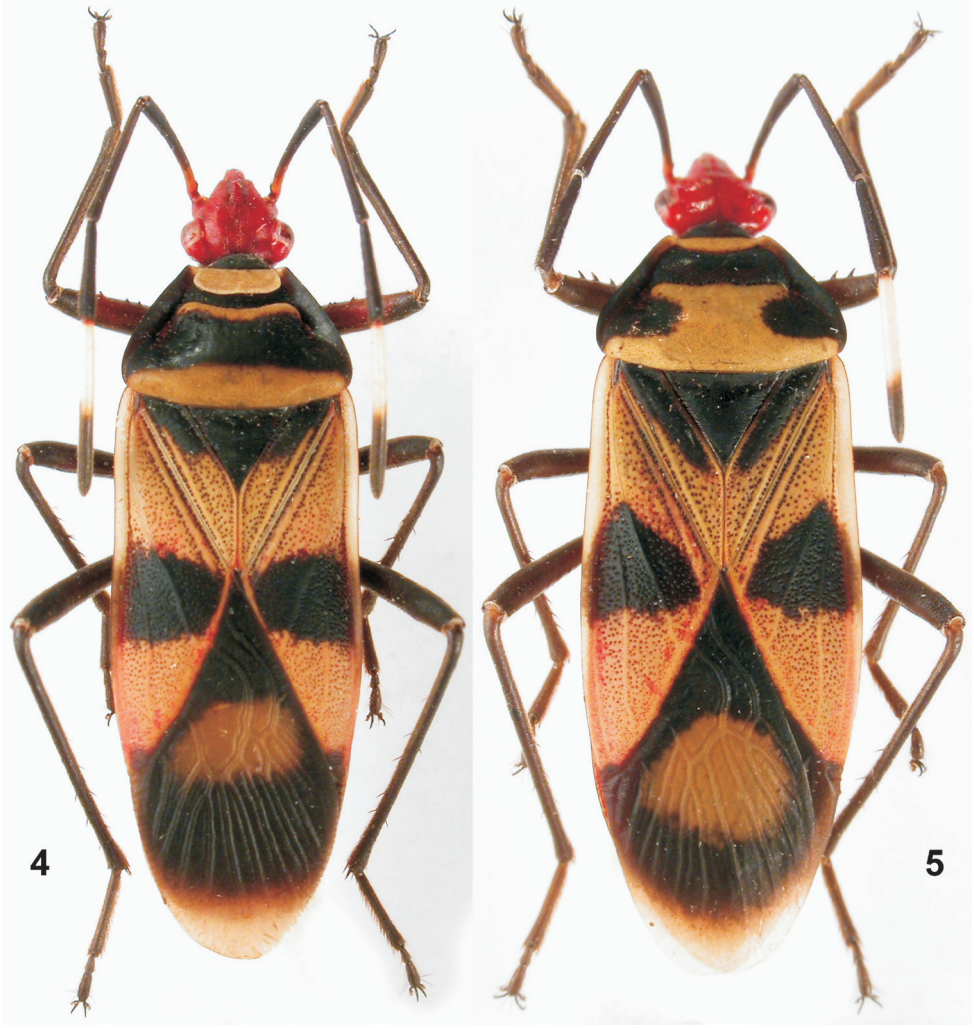


Figure 3. *Schaeferiana* (*Gaboniella*) *incompleta* sp. n., holotype, male, paramere.

***Sericocoris* (*Depressoculus*) *albomaculatus* Stehlík, 2008**
http://species-id.net/wiki/Sericocoris_(Depressoculus)_albomaculatus
Fig. 5

Material examined. Central African Republic: WSW, Sangha province, 45 km E of Nola, (GPS) 03°40'N, 16°26'E, 570 m a.s.l., 17.xii.2008, 1 ♀, J. Halada lgt. (coll. Z. Jindra, Praha).

Distribution. Democratic Republic of Congo (Stehlík 2008). New record for the Central African Republic.



Figures 4–5. Habitus. **4** *Schaeferiana* (*Schaeferiana*) *mirabilis* Stehlík, 2008, male **5** *Sericocoris* (*Depressoculus*) *albomaculatus* Stehlík, 2008, female.

Acknowledgements

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Andinopanurgus, a new Andean subgenus of *Protandrena* (Hymenoptera, Andrenidae)

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Abstract

A new subgenus of *Protandrena* Cockerell (Panurginae: Protandrenini) from South America, *Andinopanurgus* Gonzalez & Engel, **subgen. n.**, is described and figured for distinctive species of the genus occurring at mid- and high elevations in the Andes from Venezuela to Peru (1100–3400 m). In addition to the distribution, the subgenus is easily distinguished from other subgenera by a unique combination of morphological characters in both sexes, especially in the hidden sterna and genitalia of the male. *Protandrena amyae* **sp. n.**, and *P. femoralis* **sp. n.**, are also described and figured from the Ecuadorian and Peruvian Andes. New geographical records and a key to the species are also provided.

Keywords

Anthophila, Apoidea, Panurginae, *Heterosarus*, *Rhophitulus*, South America, taxonomy

Introduction

Panurgine bees of the tribe Protandrenini (*sensu* Michener 2007) are restricted to the Western Hemisphere where they are diverse and abundant in temperate areas of the Americas

but poorly represented to nearly absent in the tropics. The tribe is relatively small, consisting of about 400 species (Ascher and Pickering 2011) grouped into 11 genera and multiple subgenera (Table 1), some of them, particularly those in the genus *Protandrena* Cockerell, are treated at the generic level (e.g., Ruz 1986; Moure et al. 2008; Ascher and Pickering 2011).

Although depauperate in andrenid bees by comparison to the temperate Andes, during the last decade several species of panurginae have been identified from the tropical Andes, from Bolivia to Venezuela (Gonzalez 2004; Gonzalez and Engel 2004; Gonzalez and Ruz 2007). This is particularly the case for five unusual panurgine species distributed from Venezuela, Colombia, and Ecuador described by Gonzalez and Ruz (2007) in the genus *Protandrena* (*sensu* Michener 2007). These species are morphologically distinctive and, as in other temperate South American *Protandrena* s.l. (e.g., Ruz and Chiappa 2004; Ramos and Melo 2006), they could not be assigned to any of the available subgenera. Although tropical Andean bees are still poorly documented and underrepresented in collections, recent appraisals of museum specimens have revealed a couple of additional new panurgine species belonging to this same group. Although initially regarded as oddities, it is becoming obvious to us that these species form a clear lineage of tropical Andean panurgines, distinct from other subgenera of *Protandrena* s.l. and easily recognized by a unique combination of morphological characters in both sexes, but particularly in the male. Herein we propose a new subgeneric name, *Andinopanurgus* Gonzalez and Engel subgen. n., for these species and describe the two new species from Ecuador and Peru. We also provide new geographical records and a key to species in the hope of drawing these to the attention of melittologists working with the Andean fauna.

Material and methods

Morphological terminology follows that of Engel (2001) and Michener (2007), while the format for the description generally follows that used by Gonzalez and Ruz (2007). Photomicrographs were prepared using a Nikon D1× digital camera attached to an Infinity K-2 long-distance microscopic lens. Measurements were made with an ocular micrometer attached to an Olympus SZX-12 stereomicroscope. Measurements in descriptions are for the holotype, with values for paratypes in parentheses. The abbreviations F, S, T, OD, and PW are used for antennal flagellomere, metasomal sternum and tergum, and ocellar diameter and puncture width, respectively. Type specimens are deposited in the National Museum of Natural History, Washington, DC, USA (USNM) and the Snow Entomological Collection, Division of Entomology, University of Kansas Natural History Museum, Lawrence, Kansas, USA (SEMC).

Table 1. Summary of generic and subgeneric classification of Protandrenini (*sensu* Michener 2007), with the new subgenus included. Those subgenera still recognized at the generic level by some authors are indicated with an asterisk; note that *Neffapis* has been segregated into a separate tribe, Neffapini (Engel 2005). The distribution and approximate number of species are based on Michener (2007), Moure et al. (2008), and Ascher and Pickering (2011). NA = North America; CA = Central America; SA = South America.

Taxa	**Species**	**Distribution**
Genus *Anthemurgus* Robertson	1	NA (USA)
Genus *Anthrenoides* Ducke	65	SA (Argentina, Brazil, Chile, Paraguay)
Genus *Chaeturginus* Lucas de Oliveira & Moure	2	SA (Brazil)
Genus *Liphanthus* Reed		
Subgenus *Leptophanthus* Ruz & Toro	9	SA (Argentina, Chile)
Subgenus *Liphanthus* Reed	9	SA (Chile)
Subgenus *Melaliphanthus* Ruz & Toro	3	SA (Chile)
Subgenus *Neoliphanthus* Ruz & Toro	1	SA (Chile)
Subgenus *Pseudoliphanthus* Ruz & Toro	4	SA (Argentina, Chile)
Subgenus *Tricholiphanthus* Ruz & Toro	3	SA (Chile)
Subgenus *Xenoliphanthus* Ruz & Toro	4	SA (Chile)
Genus *Neffapis* Ruz	1	SA (Chile)
Genus *Parapsaenythia* Friese	7	SA (Argentina, Bolivia, Brazil, Paraguay)
Genus *Protandrena* Cockerell		
Subgenus *Andinopanurgus* **subgen. n.**	7	SA (Colombia, Ecuador, Peru, Venezuela)
Subgenus *Austropanurgus* Toro*	1	SA (Chile)
Subgenus *Heterosarus* Robertson*	41	NA, CA, SA
Subgenus *Metapsaenythia* Timberlake	1	NA (Mexico, USA)
Subgenus *Parasarus* Ruz*	1	SA (Argentina, Chile)
Subgenus *Protandrena* Cockerell*	~50	NA, CA, SA
Subgenus *Pterosarus* Timberlake*	~40	NA, CA (Canada to Guatemala)
Genus *Psaenythia* Gerstaecker	~80	SA (Argentina, Brazil, Chile)
Genus *Pseudopanurgus* Cockerell	33	NA, CA (USA to Costa Rica)
Genus *Rhophitulus* Ducke		
Subgenus *Cephalurgus* Moure & Lucas de Oliveira*	5	SA (Brazil, Paraguay)
Subgenus *Panurgillus* Moure	21	SA (Brazil, Argentina)
Subgenus *Rhophitulus* Ducke	3	SA (Brazil, Argentina)
Incertae sedis		
Genus *Stenocolletes* Schrottky	1	SA (Argentina)

Systematics

Tribe Protandrenini Robertson, 1904
Genus *Protandrena* Cockerell, 1896

***Andinopanurgus* Gonzalez & Engel, subgen. n.**
urn:lsid:zoobank.org:act:1F38EF71-936F-4F45-9A56-F84107823BE9
http://species-id.net/wiki/Andinopanurgus

Type species. *Protandrena bachue* Gonzalez & Ruz, 2007.

Diagnosis. The new subgenus can be recognized easily by the following combination of characters: body predominantly dark brown to black with reduced yellow maculations; forewing with two submarginal cells (e.g., Figs 1, 13); propodeum glabrous basally; mesoscutum finely punctate; dorsal surface of propodeum longer than metanotum; anterior tentorial pit at outer subantennal sulcus, just above intersection between outer subantennal and epistomal sulci; female metatibial scopa with sparse, mostly simple setae; and male SVI with broad U- or V-shaped midapical emargination (Figs 8, 16); TVII with distal margin straight or medially emarginate (Fig. 6); and gonostylus simple, without apical lobes or projections, without long apical setae, and completely fused to gonocoxite (Figs 11, 12, 19, 20).

Description. *Female*: Small to moderate-sized bees (4–12 mm in length); color mainly dark brown to black, nonmetallic, without yellow maculations except on pronotal lip; integument dull to weakly shiny, distinctly imbricate to granular between punctures, especially on dorsal surface of mesosoma and posterior surface of mesofemur; punctures coarser, denser on head than on meso- and metasoma; pubescence predominantly dark brown to black, short, and sparse; pubescence longer and denser on head and mesosoma; metatibial scopa consisting of sparse, long, mostly simple setae; metasomal terga and sterna, except on apical segments, with distal margins glabrous; SVI with dense patch of branched setae laterally (cf. Gonzalez and Ruz 2007: Figs 41–44). Head broader than long, about as wide as mesosoma; mandible edentate, pointed; labrum with strong ridge bordering glabrous, impunctate basal area; clypeus less than three times broader than long; supraclypeal area usually more distinctly convex than clypeus in profile; lower mesal paraocular area gently convex; anterior tentorial pit at outer subantennal sulcus, just above epistomal sulcus; antennal toruli about at middle of face; antennal scape unmodified, not surpassing lower tangent of median ocellus in repose; antennal flagellum about as long as head width or longer, unmodified or crenulate basally on posterior surface; facial fovea well-marked, elongate; compound eyes subparallel; lower margin of median ocellus coinciding with upper orbital tangent; vertex gently convex; gena about as wide as or slightly wider than compound eye in profile, widest dorsally, narrower ventrally; labiomaxillary complex of moderate length, not distinctly elongate; maxillary palpus with six equally long palpomeres; labial palpus with four palpomeres, first palpomere about as long as combined lengths of remaining

palpomeres, second palpomere about as long as third and fourth palpomeres individually; glossa about one-half length of prementum; galeal comb composed of 20 bristles. Pronotal collar rounded, not carinate; dorsal surface of propodeum gently sloping to subhorizontal, longer than metanotum, weakly striate. Forewing with pterostigma more than three times longer than broad, about twice as wide as prestigma, margin basal to vein r-rs diverging from costa, that within marginal cell slightly convex; marginal cell obliquely and broadly truncate at apex, appendiculate, slightly longer than distance from its apex to wing tip; two submarginal cells (i.e., 1rs-m absent), first submarginal cell longer than second; basal vein gently curved to nearly straight; 1m-cu distal to 2Rs (second free abscissa Rs, or first submarginal crossvein *sensu* Michener 2007); 2m-cu basal to 2rs-m (second submarginal crossvein *sensu* Michener 2007); jugal lobe about three-fourths length of vannal lobe; hind wing with second abscissa of M+Cu more than three times length of cu-a; 6–8 distal hamuli. Legs unmodified; mesofemur without well-developed comb on ventral margin basally; mesotibial spur slightly shorter than mesobasitarsus, straight or nearly so, with coarse branches (*sensu* Engel 2009) (cf. Gonzalez and Ruz 2007: Figs 39, 40); metatibia about twice as long as metabasitarsus, keirotrichia on inner surface except on anterior and posterior margins; metabasitibial plate carinate, with semierect, short, stiff setae on disc; metatibial spurs slightly curved apically to nearly straight; metabasitarsus strongly projecting on posterodistal margin; pretarsal claws cleft, inner ramus shorter than outer. Metasomal TII with well-marked lateral fovea; pygidial plate subtriangular, well-defined, medially elevated; SVI with distal margin rounded or truncate.

Male: As in female except longer, sparser body pubescence, clypeus often maculate, metabasitibial plate glabrous, and the following: antennal flagellum unmodified (Figs 13, 27) to weakly (Fig. 2) or strongly (Fig. 26) crenulate on posterior surface; compound eyes subparallel to slightly convergent ventrally. Outer surfaces of pro- and mesotibiae apically with small spine; metatibia with posterior marginal carina weakly toothed basally; metabasitarsus with posterodistal margin not distinctly projecting as in female; pretarsal claws symmetrical or with inner ramus shorter than outer. Metasoma usually more elongate than in female, sometimes petiolate; TVII without pygidial plate, distal margin straight or with V-shaped median emargination (Fig. 6); sterna with distal margins straight or convex, except SVI with distinct U- or V-shaped median emargination (Figs 8, 16); SVII with apical lobes attached to small discal area, not distinctly constricted basally, distally retrorse (Figs 9, 17, 30); SVIII longer than broad, midapical projection rather short (about one-half length of disc body), not distinctly constricted basally, broadly rounded apically (Figs 10, 18); genital capsule slightly longer than broad, gonobase absent; gonostylus about as long as penis valves or slightly longer, simple, fully fused to gonocoxite, gently or strongly curved in profile, without long, branched setae on apex; volsella clearly differentiated in medial digitus and lateral cuspis, denticulate, digitus elongate; penis valves simple, narrow, basally fused; penis membranous, bilobed, apically wide, about as long as penis valves (Figs 11, 12, 19, 20).

Etymology. The new genus-group name is a combination of Andes, referring to the Andean distribution of this group of bees, and *Panurgus*, type genus of the Panurginae. The name is masculine.

Included species. In addition to the type species, *P. bachue* Gonzalez & Ruz, the subgenus includes the following taxa: *P. amyae* sp. n., *P. femoralis* sp. n., *P. guarnensis* Gonzalez & Ruz, *P. maximina* Gonzalez & Ruz, *P. rangeli* Gonzalez & Ruz, and *P. wayruronga* Gonzalez & Ruz.

Comments. The subgenus occurs at mid- and high elevations (1100–3400 m) in the Andes from Venezuela to Peru. Two species groups (one consisting of *P. guarnensis* and *P. femoralis*, the other including the remaining species) can be recognized within *Andinopanurgus* by the characters indicated in the key to species (*infra*) (Table 2).

The general habitus of *Andinopanurgus* as well as the shape of the male sixth and seventh sterna suggest species of *Rhophitulus* Ducke and *Heterosarus* Robertson but the propodeum is basally pubescent in *Rhophitulus* and, in both taxa, TVII is gently or strongly projected medially on the distal margin, SVII has lobes with much broader apex, and the gonostylus has long branched setae apically and is partially fused to the gonocoxite, at least ventrally. In addition, *Andinopanurgus* lacks the distinctive dorsal remnant of the gonobase of *Rhophitulus*. The rather narrow and distally retrorse apical lobes of SVII of *Andinopanurgus* (Figs 9, 17) resemble those of *Protandrena* s.str. and *Metapsaenythia* Timberlake, but the apex of these lobes lack the distinctive spatulate setae present in the latter. *Metapsaenythia* has also a propodeum basally pubescent and a metasoma that is frequently red. If future studies demonstrate that *Protandrena* s.l. is paraphylectic, perhaps some of its subgenera, including *Andinopanurgus*, may well be recognized at the generic level.

***Protandrena* (*Andinopanurgus*) *amyae* Gonzalez & Engel, sp. n.**
urn:lsid:zoobank.org:act:BBCDA150-6DF7-4F65-824C-638DA480DF87
http://species-id.net/wiki/Protandrena_(Andinopanurgus)_amyae
Figs 1–12

Holotype. ♂ (Fig. 1), Ecuador: Napo. Past. Road from Baeza to Papallacta, km. 188, 13-IV-1977 [13 April 1977], Elaine R. Hodges (USNM).

Paratype. ♂, Ecuador: Napo, Baeza (22 Kms. W.), 15 May 1975, elev. 8000ft. / Collected by sweeping net above damp road bed / Collected by Ashley B. Gurney (SEMC).

Diagnosis. The male of this species can easily be recognized by the antennal flagellum weakly crenulate on the posterior surface (Fig. 2), the mandible distinctly broad apically (Figs 4, 5), and the posterior hypostomal carina strongly projecting into a tooth (Fig. 4).

Description. *Male*: Body length 8.70 mm (8.50 mm); forewing length 6.50 mm (6.70 mm); head width 2.40 mm (2.48 mm). Head 1.4× wider than long; inner orbits of compound eyes subparallel (Fig. 3); intertorular distance 1.7× OD, 0.7× length of

Table 2. Summary of currently included species in *Andinopanurgus* with information on the known sexes, distribution, and some morphological characters. Plus (+) and dash (–) symbols indicate presence and absence of a particular character, ? = unknown.

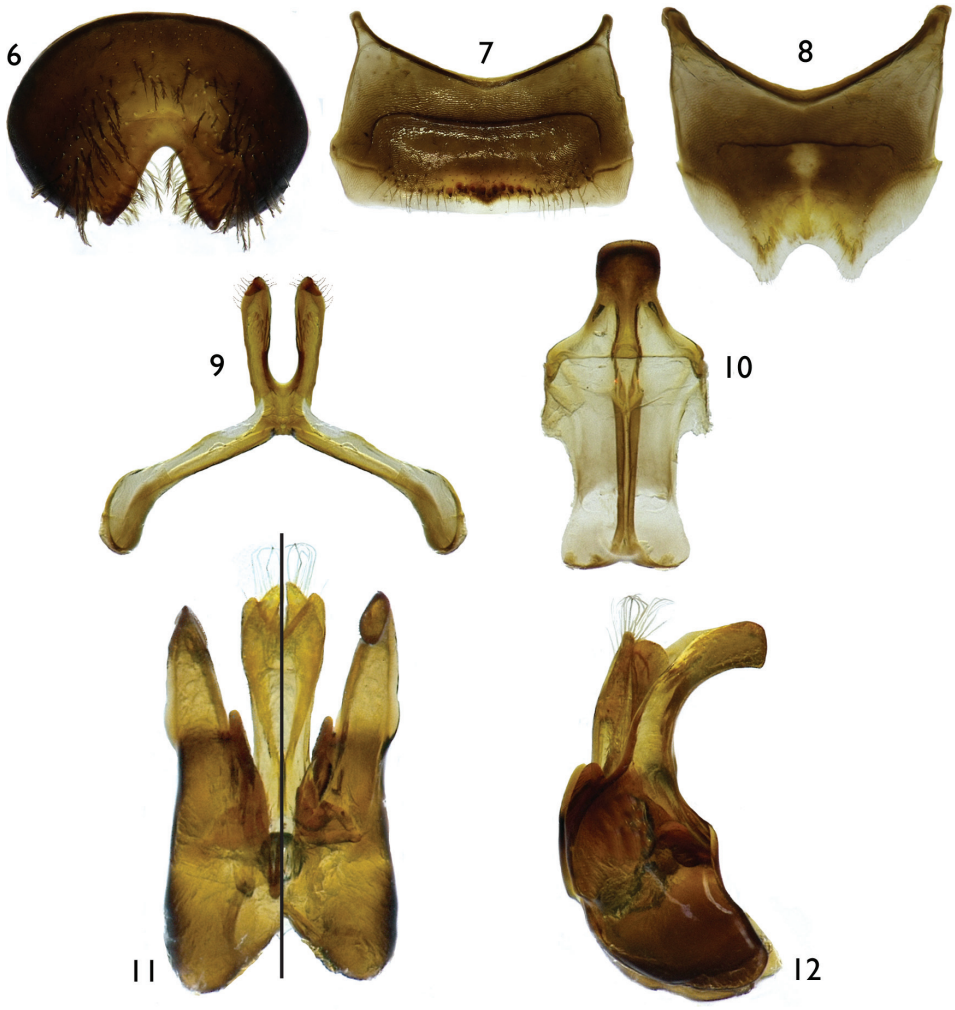
Taxon	Sexes known	Distribution	Elevation (m.s.l.)	Male		Female
				Antennal flagellum	*Spines of SV*	*Antennal flagellum*
"*bachue* species group"						
P. amyae **sp. n.**	♂	Ecuador: Napo	2438	weakly crenulate	+	?
P. bachue Gonzalez & Ruz	♂♀	Colombia: Boyacá, Cundinamarca	2830–3380	strongly crenulate	+	weakly crenulate
P. maximina Gonzalez & Ruz	♀	Venezuela: Mérida	2360	?	?	unmodified
P. rangeli Gonzalez & Ruz	♂♀	Colombia: Boyacá, Cundinamarca	2600–2830	unmodified	+	unmodified
P. wayruronga Gonzalez & Ruz	♂	Ecuador: Napo, Pichincha	3150	strongly crenulate	+	?
"*guarnensis* species group"						
P. guarnensis Gonzalez & Ruz	♂♀	Colombia: Antioquia	2000	unmodified	–	unmodified
P. femoralis **sp. n.**	♂♀	Peru: Pasco	1100–1780	unmodified	–	unmodified

torulorbital distance; torulus diameter equal to OD; ocellocular distance 3.4× OD, 2.0× greater than ocelloccipital distance; interocellar distance 1.3× OD; compound eye 1.8× longer than wide; clypeus 2.6× broader than long, projecting about 0.4× compound eye width in lateral view; gena 1.2× broader than compound eye in profile; supraclypeal area, just below inferior torular tangent, distinctly protuberant; frontal line elevated just above antennal toruli to one-half distance between antennal toruli and median ocellus, ending at that point; inner subantennal sulcus about 0.7× length of outer subantennal sulcus; facial fovea 1.7× longer than broad, about one-half length of scape; scape 2.1× longer than broad, antennal flagellum slightly longer than head width, F1–F6 weakly crenulate on posterior surface, not forming deep concavity between flagellomeres (Fig. 2); pedicel about one-third length of F1, about as long as broad, F1 1.8× longer than broad, about 1.5× longer than F2 and F3 individually, remaining flagellomeres about as long as broad, except last flagellomere longer than broad; mandible distinctly broad apically (Figs 4, 5); posterior hypostomal carina strongly projecting into a tooth (Fig. 4). Forewing pterostigma 4.0× longer than broad; prestigma 3.1× longer than broad (prestigma width measured to its margin). Mesosoma slightly narrower than head width; mesoscutum 1.3× wider than long, 2.3× longer than mesoscutellum, 4.5× longer than metanotum; propodeum with basal part about three-fourths of mesoscutellum length in dorsal view; protibial spur with apical portion of rachis long, about three-fourths of malus length, with distinct row of 10 elongate branches (not including apical portion of rachis); mesotibial spur gently curved apically, with coarse branches, less than one-half of mesobasitarsus length; metatibia

Figures 1–5. Male of *Protandrena* (*Andinopanurgus*) *amyae* Gonzalez and Engel, **sp. n. 1** Lateral habitus of holotype. **2** Detail of paratype antenna showing crenulations. **3** Facial aspect of holotype. **4** Oblique ventral view of paratype head showing hypostomal tooth (arrow). **5** Lateral aspect of paratype head.

with posterior marginal carina weakly toothed on upper two-thirds; metatibial spurs slightly curved apically, inner spur slightly longer than outer; pretarsal claws cleft, inner ramus slightly shorter than the outer. Lateral fovea of TII ellipsoid, about 2.0× longer than broad; TVII with V-shaped median emargination on distal margin (Fig. 6); SV–SVIII, and genital capsule as in figures 7–12.

Color dark brown to black, except apex of mandible reddish brown and clypeus with yellow maculation as in figure 3. Wing membranes brownish, veins and pterostigma dark brown.



Figures 6–12. Male terminalia of *Protandrena* (*Andinopanurgus*) *amyae* Gonzalez and Engel, **sp. n. 6** Apical view of tergum VII. **7** Sternum V. **8** Sternum VI **9** Sternum VII. **10** Sternum VIII. **11** Genital capsule (left half is dorsal aspect, right half is ventral aspect). **12** Lateral aspect of genital capsule.

Head with sparse, long (2.5–3.0× OD), semierect, poorly-branched, black setae except brownish setae on condylar and outer grooves of mandible, gena posteriorly, and hypostomal area; scape with long setae, 2× as long as maximum scape diameter. Pronotum with short (0.5–1.0× OD), dense, brownish setae along dorsal margin and pronotal lobe; mesoscutum, mesoscutellum, and metanotum with two types of setae: sparse, long (2.5–3.0× OD), erect, poorly-branched, black setae, and dense, short (0.5× OD), brownish setae; mesepisternum and lateral and posterior areas of propodeum with mostly sparse, long (2.5–3.0× OD), erect, branched, brownish setae; legs with setae mostly brownish, longer and denser on coxae, trochanters, and profemur. Metasoma with terga mostly bare, with minute (≤ 0.3× OD), semierect, sparse ferrugi-

nous setae on discs, laterally with denser and longer setae; TVI with long (2× OD), semierect, dark brown setae on disc, setae denser on TVII; sterna with sparse, short (1× OD), semierect setae, denser and longer on sides of each sternum.

Outer surface of mandible and basal area of labrum smooth and shiny, impunctate; clypeus with sparse (1–1.5× PW), faint punctures, integument between punctures imbricate; supraclypeal area with scattered punctures laterally, weakly imbricate, shinier than on clypeus medially; subantennal area and inferior paraocular area with punctures separated by a puncture width or less, integument strongly imbricate to nearly granular (as on remainder of face); remaining areas of face with coarse punctures, contiguous, smaller than on clypeus; gena strongly imbricate with faint punctures. Mesoscutum, mesoscutellum, and metanotum with small, dense punctures (≤ 1× PW), integument granular between punctures; mesepisternum strongly imbricate with scattered (1–2.0× PW), faint punctures, punctures coarser and denser dorsally; metepisternum transversely weakly striate near wing base, otherwise strongly imbricate. Propodeum strongly imbricate with fine and weak striae basally, lateral and posterior surfaces with faint, scattered punctures. Metasomal terga and sterna shiny, weakly imbricate with minute, scattered (2–3.0× PW) punctures on discs, punctures coarser and denser on TVII; distal margins of terga shiny, weakly imbricate, impunctate except on TVII.

Female: Unknown.

Etymology. The specific epithet is a matronym honoring Mrs. Amy Comfort de Gonzalez, loving and supporting wife of the senior author.

***Protandrena* (*Andinopanurgus*) *femoralis* Gonzalez & Engel, sp. n.**
urn:lsid:zoobank.org:act:BB7E3450-892C-4DBA-8EBA-ADABB1135D4F
http://species-id.net/wiki/Protandrena_(Andinopanurgus)_femoralis
Figs 13–25

Holotype. ♂, Peru: Pasco Dept. [Departamento] San Miguel Eneñas, NW Villa Rica-Puerto Bermudas Rd., 1780 m, 10°44'0"S, 75°11'54"W, 16 Oct 1999; R. Brooks, PERU1B99 037, ex: yellow composite / SM0149359, KUNHM-ENT [barcode label] (SEMC).

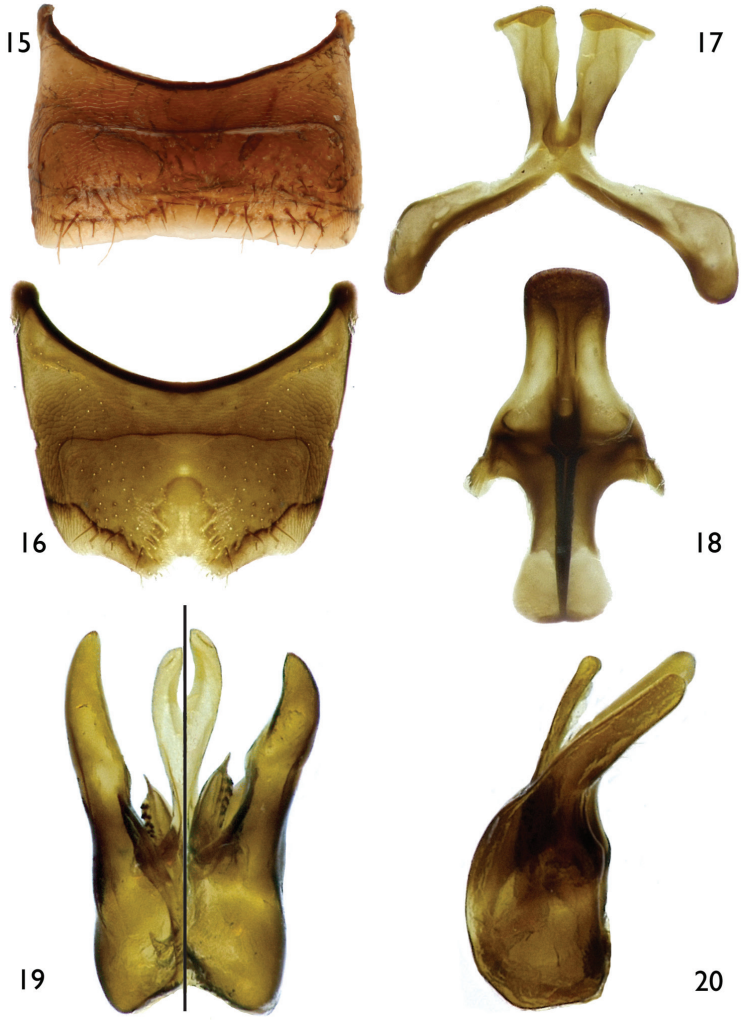
Paratypes. (*n* = 3♀♀, 12♂♂) 2♂♂ with same date as the holotype; 1♂, Pasco Dept. San Juan, Villa Rica-Puerto Bermudas Rd., Rio Cacazu, 1100 m, 10°39'12"S, 75°6'54"W, 16 Oct 1999; R. Brooks, PERU1B99 034A, ex: on flowering tree; 3♀♀, 9♂♂, Pasco Dept. Villa Rica Rd., 1475 m, 10°47'6"S, 75°18'54"W, 15 Oct 1999; R. Brooks, D. Brzoska, PERU1B99 030 (SEMC).

Diagnosis. Both sexes of *P. femoralis* are most similar to *P. guarnensis* from northwestern Colombia in their small body size (4.5–6.0 mm in body length), F1 about as long as F2, absence of maculations on the male clypeus, male TVII with a straight distal margin, male SV without spines on the midapical margin, and general shape of the

Figures 13–14. Male of *Protandrena* (*Andinopanurgus*) *femoralis* Gonzalez and Engel, **sp. n. 13** Lateral aspect. **14** Facial aspect.

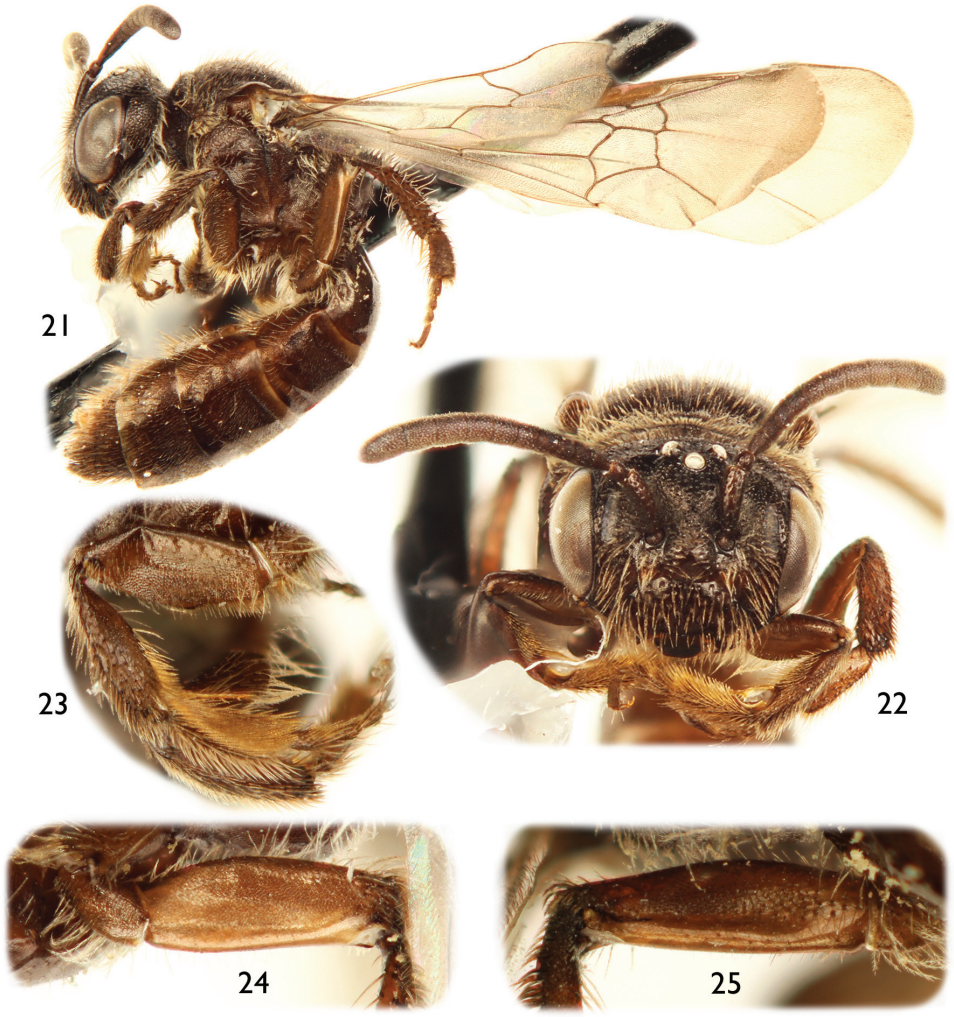
genitalia and hidden sterna. The male can easily be separated by the structure of SVII, which has broader apical lobes (cf. Figs 17 and 30), and the gonostylus, which is more robust in profile than that of *P. guarnensis*, about the same width across its length, and basally not protuberant on the medial margin in dorsal view (Figs 19, 20). The female can be recognized by the posterior surface of the mesofemur and anterior and posterior surfaces of the metafemur distinctly depressed (Figs 23–25). In *P. guarnensis* the apical lobes of SVII are narrow, parallel-sided, with the retrorse section of the apex comma-shaped (Fig. 30); the gonostylus is slender in profile, slightly tapering towards the apex, and strongly protuberant basally on the medial margin in dorsal view (cf. Gonzalez and Ruz 2007: Figs 28, 32). The meso- and metafemora of the female of *P. guarnensis* are unmodified, not distinctly depressed.

Description. *Male*: Body length 5.0 mm (4.73–5.33 mm); forewing length 4.47 mm (4.47–4.60 mm); head width 1.50 mm (1.50–1.60 mm). Head 1.4× wider than long; inner orbits of compound eyes converging below (Figs 14); intertorular



Figures 15–20. Male terminalia of *Protandrena* (*Andinopanurgus*) *femoralis* Gonzalez and Engel, **sp. n.** **15** Sternum V. **16** Sternum VI. **17** Sternum VII. **18** Sternum VIII. **19** Genital capsule (left half is dorsal aspect, right half is ventral aspect). **20** Lateral aspect of genital capsule.

distance 2.3× OD, 0.9× length of torulorbital distance; torulus diameter equal to OD; ocellocular distance 3.4× OD, 2.8× greater than ocelloccipital distance; interocellar distance 1.3× OD; compound eye 1.8× longer than wide; clypeus 2.4× broader than long, projecting about 0.3× compound eye width in lateral view; gena 0.8× width of compound eye in profile; supraclypeal area, just below inferior torular tangent, distinctly protuberant; frontal line weakly elevated just above antennal toruli to one-half distance between antennal toruli and median ocellus, ending at that point; inner subantennal sulcus about 0.7× length of outer subantennal sulcus; facial fovea about 2.0× longer than broad, 0.4× length of scape; scape 2.1× longer



Figures 21–25. Female of *Protandrena* (*Andinopanurgus*) *femoralis* Gonzalez and Engel, **sp. n. 21** Lateral habitus. **22** Facial aspect. **23** Posterior surface of mesofemur. **24** Anterior surface of metafemur. **25** Posterior surface of metafemur.

than broad, antennal flagellum unmodified, slightly longer than head width (Figs 13–14); pedicel slightly shorter than F1, about as long as broad, F1 about as long as broad, subequal to F2 and F3 individually, remaining flagellomeres about as long as broad, except last flagellomere longer than broad; mandible pointed. Forewing prestigma 3.2× longer than broad (prestigma width measured to its margin); pterostigma 3.6× longer than broad. Mesosoma narrower than head width; mesoscutum 1.3× wider than long, 2.7× longer than mesoscutellum, 5.7× longer than metanotum; propodeum with basal part about three-fourths of mesoscutellum length in dorsal view; protibial spur with apical portion of rachis long, about one-half length

of malus, with distinct row of about 10 elongate branches (not including apical portion of rachis); mesotibial spur straight or nearly so, with coarse branches, slightly more than one-half mesobasitarsus length; metatibia with posterior marginal carina weakly toothed on upper third; metatibial spurs of similar length, slightly curved apically; pretarsal claws with rami of similar length. Lateral fovea of TII elongate, about 4.0× longer than broad; TVII with distal margin straight or nearly so; SV–SVIII, and genital capsule as in figures 15–20.

Color dark reddish brown to black, without yellow maculations. Wing membranes subhyaline, slightly brownish, veins and pterostigma dark brown.

Head with sparse, long (2.5–3.0× OD), semierect, poorly-branched, black setae except brownish setae on condylar and outer grooves of mandible, gena posteriorly, and hypostomal area; scape with long setae, 2× as long as maximum scape diameter. Pronotum with short (0.5–1.0× OD), dense, brownish setae along dorsal margin and pronotal lobe; mesoscutum and mesoscutellum with two types of dark brown setae: sparse, long (1.5–2.0× OD), erect, poorly-branched setae, and short (0.5–1.0× OD), slightly denser setae; metanotum with short setae as on mesoscutellum; mesepisternum and lateral and posterior areas of propodeum with very sparse, long (1.5–2.0× OD), erect, branched, brownish setae; legs with setae mostly brownish, longer and denser on coxae, trochanters, and profemur. Metasomal terga with minute (≤ 0.3× OD), semierect, dense ferruginous setae on discs, laterally with denser and longer setae; TVI with long (1.5–2× OD), semierect, dark brown setae on disc, setae denser on TVII; sterna with sparse, short, semierect setae (1.5× OD) on discs, denser and longer laterally; preapical margin of SIV with few, semierect thick setae, each seta consisting of short rachis with three or four long branches, resembling scales or bundles of several setae at low magnifications.

Outer surface of mandible and basal area of labrum smooth and shiny, impunctate; clypeus with sparse (1–1.5× PW), faint punctures, integument between punctures weakly imbricate basally, becoming nearly smooth and shiny toward apex; supraclypeal area with scattered punctures laterally, weakly imbricate, medially shiny as on clypeus; remaining areas of face with coarse punctures separated by a puncture width or less, integument strongly imbricate to nearly granular, punctures becoming weaker and sparser on vertex; gena strongly imbricate with faint punctures. Mesoscutum, mesoscutellum, and metanotum with small, sparse punctures, integument granular between punctures; mesepisternum strongly imbricate with scattered (1–2.0× PW), faint punctures, punctures coarser and denser dorsally; metepisternum transversely weakly striate near wing base, otherwise strongly imbricate. Propodeum strongly imbricate with few fine, weak striae basally (barely visible), lateral and posterior surfaces with faint, scattered punctures. Metasomal terga and sterna shiny, lineolate-imbricate with minute punctures separated by about two puncture widths on discs, punctures coarser and denser on TVII, sparser on sterna; distal margins of terga shiny, weakly imbricate, impunctate except on TVII.

Female: As in male except shorter body pubescence, lighter and shinier integument (Fig. 21), and the following: Body length 5.53–5.73 mm; forewing length 4.87–5.0 mm; head width 1.60–1.67 mm. Inner orbits of compound eyes subparallel (Fig. 22); intertorular distance 2.6× OD, about as long as torulorbital distance; torulus diameter subequal to OD; ocellocular distance 3.5× OD, 2.5× greater than ocelloccipital distance; interocellar distance 1.6× OD; compound eye 2.1× longer than wide; clypeus 2.9× broader than long, projecting about 0.4× compound eye width in lateral view; supraclypeal area gently convex, not distinctly protuberant medially; facial fovea 3.3× times longer than broad, 0.7× length of scape; scape 2.7× longer than broad, antennal flagellum about as long as head width. Forewing prestigma 5.0× longer than broad (prestigma width measured to its margin); pterostigma 4.5× longer than broad. Mesoscutum about 5.0× longer than metanotum; protibial spur with apical portion of rachis about three-fourths length of malus, with about five branches (not including apical portion of rachis); mesotibial spur about 0.7× mesobasitarsus length; mesofemur with posterior surface and metafemur with anterior and posterior surfaces distinctly depressed (Figs 23–25); inner metatibial spur slightly shorter than outer; pretarsal claws with inner ramus shorter than the outer. Lateral fovea of TII about 3.0× longer than broad.

Etymology. The specific epithet refers to the distinctly depressed meso- and metafemora of the female of the species.

***Protandrena* (*Andinopanurgus*) *wayruronga* Gonzalez & Ruz**
http://species-id.net/wiki/Protandrena_(Andinopanurgus)_wayruronga

Protandrena wayruronga Gonzalez and Ruz, 2007: 400 [♂].
Rhophitulus wayruronga (Gonzalez and Ruz); Ascher and Pickering 2011 [unjustified transfer].

New record. 1♂, Ecuador, Pich. [Pichincha], Quito (48 KmS), 6 May 1975, Ashley Gurney (USNM).

Comments. This species was previously known from the male holotype collected in Papallacta, Napo (Ecuador). Gonzalez and Ruz (2007) tentatively identified a single specimen from Cauca, Colombia, as the female of this species. The putative female is very similar to another one from Valle, Colombia, except in the length of the apex of the protibial spur; in the specimen from Cauca the apex is long, about one-half of the malus length, whereas in the female from Valle it is short, about one-third of the malus length, as it is in the holotype. Such a difference in both females suggests that they might not be conspecific, although we do not know how variable this character is within and among species. The complete label data of the female from Valle are as follows: "Colombia: Valle, Tenerife, Paramo at 12,000' R. E. Dietz, Sept. 15, 1970" (USNM).

Key to Subgenera of *Protandrena* (modified from Michener 2007)

Males

1 Forewing with three submarginal cells (occasional individuals have only two) (North and Central America)..... ***P.* (*Protandrena* s. str.)**

– Forewing with two submarginal cells **2**

2(1) Propodeal triangle basally pubescent (metasoma often red or largely so) (Nearctic) ..... ***P.* (*Metapsaenythia*)**

– Propodeal triangle basally glabrous..... **3**

3(2) Metatibial spurs strongly curved at apices; first submarginal cell on posterior margin shorter than second (Chile)..... ***P.* (*Austropanurgus*)**

– Metatibial spurs or at least one of them slightly curved or almost straight; first submarginal cell on posterior margin about as long as or longer than second... **4**

4(3) Gonostylus less than one-third as long as gonocoxite; SVI scarcely notched apically (face black) (South America) ..... ***P.* (*Parasarus*)**

– Gonostylus over one-half as long as gonocoxite; SVI with deep midapical notch or slit **5**

5(4) Mesoscutum with punctures well marked, many of them separated by spaces larger than their diameters; SVI with midapical emargination narrow, deep (North and Central America)..... ***P.* (*Pterosarus*)**

– Mesoscutum with punctures very small, homogeneous, commonly dense; SVI midapical emargination U- or V-shaped **6**

6(5) TVII gently or strongly projected medially on distal margin; gonostylus with long branched setae apically, partially fused to gonocoxite, at least ventrally... ..... ***P.* (*Heterosarus*)**

– TVII not projecting medially on distal margin, straight or with V-shaped median emargination (Fig. 6); gonostylus without long, branched setae on apex, fully fused to gonocoxite (Figs 11, 12, 19, 20) ... ***P.* (*Andinopanurgus*)**

Females

1 Forewing with three submarginal cells (only two in occasional individuals) (North and Central America)..... ***P.* (*Protandrena* s. str.)**

– Forewing with two submarginal cells **2**

2(1) Tibial scopa of rather long, abundant setae with clearly visible branches (North and Central America)..... ***P.* (*Pterosarus*)**

– Tibial scopa of sparser setae that lack branches, or some of them with few, minute branches **3**

3(2) Propodeal triangle basally pubescent (metasoma often largely red) (Nearctic)... ..... ***P.* (*Metapsaenythia*)**

– Propodeal triangle basally glabrous..... **4**

4(3) Metatibial spurs strongly curved at apices; anterior tentorial pit at intersection between outer subantennal and epistomal sulci..... **5**

– Metatibial spurs not strongly curved at apices; anterior tentorial pit not at intersection between outer subantennal and epistomal sulci, just below or above intersection **6**

5(4) First submarginal cell on posterior margin shorter than second; face with yellow areas (Chile) ..... ***P.* (*Austropanurgus*)**

– First submarginal cell on posterior margin longer than second; face black (South America) ..... ***P.* (*Parasarus*)**

6(4) Anterior tentorial pit in epistomal sulcus slightly to distinctly below intersection between outer subantennal and epistomal sulci; propodeum usually with dorsal surface at most as long as metanotum ..... ***P.* (*Heterosarus*)**

– Anterior tentorial pit at outer subantennal sulcus, just above intersection between outer subantennal and epistomal sulci; propodeum with dorsal surface longer than metanotum ..... ***P.* (*Andinopanurgus*)**

Key to species of *Andinopanurgus*

Males

Note that the male of *P. maximina* is unknown.

1 Clypeus without cream or yellow maculations; F1 short, about as long as F2; face and disc of mesoscutum weakly shiny; SV without spines on midapical margin, with fringe of normal, minutely-branched setae; TVII with distal margin straight, not medially emarginate **2**

– Clypeus with cream or yellow maculations; F1 distinctly longer than F2; face and disc of mesoscutum dull; SV with distinctly stout, short spines on midapical margin (Figs 7, 28, 29); TVII with V-shaped median emargination on distal margin **3**

2(1) SVII with apical lobes narrow, parallel-sided, retrorse section of apex comma-shaped (Fig. 30); gonostylus slender in profile, slightly tapering towards apex, basally strongly protuberant on medial margin in dorsal view (Colombia: Antioquia) ..... ***P. guarnensis* Gonzalez & Ruz**

– SVII with apical lobes not parallel-sided, much broader apically (apex about twice as broad as base), retrorse section of apex not comma-shaped (Fig. 17); gonostylus more robust in profile, about same width across its length, basally not protuberant on medial margin in dorsal view (Peru)... ***P. femoralis* sp. n.**

3(1) Antennal flagellum weakly (Fig. 2) or strongly (Fig. 26) crenulate on posterior surface; SV with more than four spines on midapical margin; larger bees (body length 7.9–11.8 mm) **4**

– Antennal flagellum unmodified, not crenulate on posterior surface (Fig. 27); SV with a row of four spines on midapical margin; small bees (body length 5.7–6.1 mm) (Colombia: Boyacá, Cundinamarca)..... ..... ***P. rangeli* Gonzalez & Ruz**

4(3) Antennal flagellum strongly crenulate on posterior surface, with deep concavity between flagellomeres (Fig. 26); mandible not distinctly broad apically; posterior hypostomal carina unmodified, without a tooth; protibial spur with apex of rachis very short (less than one-third of malus length), with less than five elongate branches (not including apical portion of rachis); SIII–SV with distal margins distinctly convex; SV with midapical row of spines medially projecting (Figs 28, 29) **5**

– Antennal flagellum weakly crenulate on posterior surface, without deep concavity between flagellomeres (Fig. 2); mandible distinctly broad apically (Figs 4, 5); posterior hypostomal carina with strong tooth (Fig. 4); protibial spur with apex long, about three-fourths of malus length, with a distinct row of 10 elongate branches (not including apical portion of rachis); SIII–SIV with distal margins gently convex; SV with midapical row of spines straight, not medially projecting (Fig. 7) (Ecuador: Napo) ..... ***P. amyae* sp. n.**

5(4) F8 and F9 crenulate; SV midapical row of spines of unequal sizes, distal two spines distinctly longer (Fig. 29) (Ecuador: Quito, Napo) ..... ***P. wayruronga* Gonzalez & Ruz**

– F8 and F9 unmodified, not crenulate (Fig. 26); SV with midapical row of spines of about same size, without two distinctly long spines distally (Fig. 28) (Colombia: Boyacá, Cundinamarca) ..... ***P. bachue* Gonzalez & Ruz**

Females

Note that the females of *P. amyae* and *P. wayruronga* are unknown. However, given that the male of these species have crenulate antennal flagella they likely should run to *P. bachue* in the key.

1 Antennal flagellum unmodified, not crenulate **2**

– Antennal flagellum modified, weakly crenulate on posterior surface of F1–F5 (Colombia: Boyacá, Cundinamarca) ..... ***P. bachue* Gonzalez & Ruz**

2(1) F1 about as long as F2; discs of mesoscutum and mesoscutellum shiny, weakly imbricate between punctures; metatibia with brownish to whitish scopal setae **3**

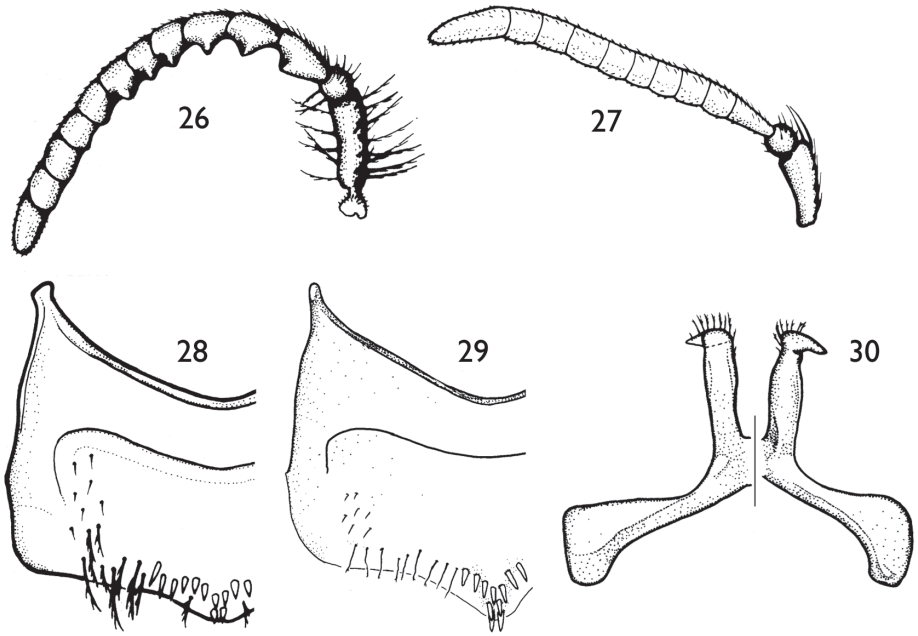
– F1 distinctly longer than F2; discs of mesoscutum and mesoscutellum dull, strongly imbricate between punctures; metatibia with dark brown to black scopal setae **4**

3(2) Mesofemur with posterior surface and metafemur with anterior and posterior surfaces distinctly depressed (Figs 23–25) (Peru) ..... ***P. femoralis* sp. n.**

– Meso- and metafemora unmodified, not distinctly depressed (Colombia: Antioquia) ..... ***P. guarnensis* Gonzalez & Ruz**

4(2) Small bees (head width 1.6–1.7 mm; body length 5.6–6.3 mm) (Colombia: Boyacá, Cundinamarca) ..... ***P. rangeli* Gonzalez & Ruz**

– Larger bees (head width 1.9–2.1 mm; body length 7.8 mm) (Venezuela) ..... ***P. maximina* Gonzalez & Ruz**



Figures 26–30. Representative features of *Andinopanurgus* species (from Gonzalez and Ruz 2007). **26.** Male antenna of *Protandrena* (*Andinopanurgus*) *bachue* Gonzalez and Ruz. **27** Male antenna of *P.* (*A.*) *rangeli* Gonzalez and Ruz. **28** Sternum V of *P.* (*A.*) *bachue*. **29** Sternum V of *P.* (*A.*) *wayruronga* Gonzalez and Ruz. **30** Sternum VII of *P.* (*A.*) *guarnensis* Gonzalez and Ruz.

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Maritime Provinces Staphylinidae (Coleoptera): Addenda and Corrigenda

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Majka and Klimaszewski (2010) surveyed the Aleocharinae fauna of the Maritime Provinces of Canada, reporting that 203 species were known in the region. They also added 16 new provincial records from the region. Inadvertently, they neglected to provide new provincial records of three species that were indicated as occurring in Nova Scotia in Table 1 (pp. 23-33) of their results. This omission is rectified below wherein *Gyrophaena modesta* Casey, *Gyrophaena subnitens* Casey, and *Placusa vaga* Casey are all newly recorded as occurring in Nova Scotia. Klimaszewski et al. (2010, pp. 77) also erroneously reported *Tachyporus nitidulus* as occurring in Prince Edward Island. There are no records of this adventive Palaearctic species from the province, although it is more widely distributed in Nova Scotia than hitherto reported. Additional records of *T. nitidulus* are provided from Nova Scotia.

Gyrophaena modesta Casey, 1906

NOVA SCOTIA: Kings County: Wolfville, 19 September 1998, J. Ogden, sweeping grasses (1, J. Ogden coll.).

Gyrophaena modesta is newly recorded from Nova Scotia (Fig. 1). It was reported from Alberta and New Brunswick by Gouix and Klimaszewski (2007). It has also been found in the United States in Illinois, Indiana, Michigan, Minnesota, New Hampshire, and New York (Seevers 1951). It has been found in various coniferous, deciduous and mixed forests on fresh gilled fungi, and occasionally on decaying gilled fungi and *Pleurotus* sp. fungi on a log (Klimaszewski et al. 2009).

***Gyrophaena subnitens* Casey, 1906**

NOVA SCOTIA: Halifax County: Waverly, 14 May 1965, 27 May 1965, 8 June 1965, B. Wright, red oak, window trap (7, Nova Scotia Museum).

Gyrophaena subnitens is newly recorded from Nova Scotia (Fig. 1). It was reported from Manitoba and Ontario by Gouix and Klimaszewski (2007) and Seevers (1951), and from New Brunswick by Klimaszewski et al. (2009). It has also been found in the United States in Illinois, Kansas, Maine, Michigan, Minnesota, Missouri, New York, and Wisconsin (Seevers 1951). It has been recorded on gilled mushrooms in a mixed forest and in red oak (*Quercus rubra*) forest (Klimaszewski et al. 2009). In Nova Scotia it was collected in a red oak forest.

***Placusa vaga* Casey, 1911**

NOVA SCOTIA: Kings County: North Alton, 2 June 2005, D.H. Webster, under bark of *Populus tremuloides* windfall (1, DH Webster coll.).

Placusa vaga is newly recorded from Nova Scotia (Fig. 1). The specimen collected in North Alton was found in association with *Carpophilus sayi* Parsons (Nitidulidae) (abundant) and *Corticeus tenuis* (LeConte) (Tenebrionidae) (infrequent). *Placusa vaga* was reported from British Columbia and Québec by Gouix and Klimaszewski (2007) and from New Brunswick by Webster et al. (2009). Specimens in New Brunswick were also collected under the bark of poplars and at a sap flow on a recently cut poplar, as well as in drift material on a river margin.

***Tachyporus nitidulus* (Fabricius, 1781)**

NOVA SCOTIA: Halifax County: Halifax, 19 June 2009, S. MacIvor, open area, pitfall trap (1, Saint Mary's University); **Hants County:** Upper Rawdon, 24 June 2008, 25 June 2008, 26 June 2009, 27 June 2009, 28 June 2009, 21 July 2009, 22 July 2009, 24 July 2009, 13 August 2009, 14 August 2009, 26 August 2009, 8 September 2009, J. Renkema, highbush blueberry field, pitfall trap (21, Dalhousie University); **Queens County:** Kejimkujik National Park, 24 August 1994, B. Wright, hemlock forest, leaf litter (1, Nova Scotia Museum).

Tachyporus nitidulus was reported from New Brunswick by Klimaszewski et al. (2005), and from Nova Scotia by Majka and Klimaszewski (2008a). Majka and Klimaszewski (2008b) discussed its zoogeographic status, noting (after Campbell 1979) that it may consist of two distinct species or populations. Pending further investigation, they regarded *T. nitidulus* as an adventive Palaearctic species in North America.

Subsequently, however, Klimaszewski et al. (2010) indicated that this species had also been found in Prince Edward Island. This reference, however, was incorrect. There are no collections or published reports of this species from the province. Consequently, *Tachyporus nitidulus* is removed from the faunal list of Prince Edward Island. It has, however, been found more widely in Nova Scotia than previously reported, and the records above provide additional collecting localities in the province (Fig. 1).

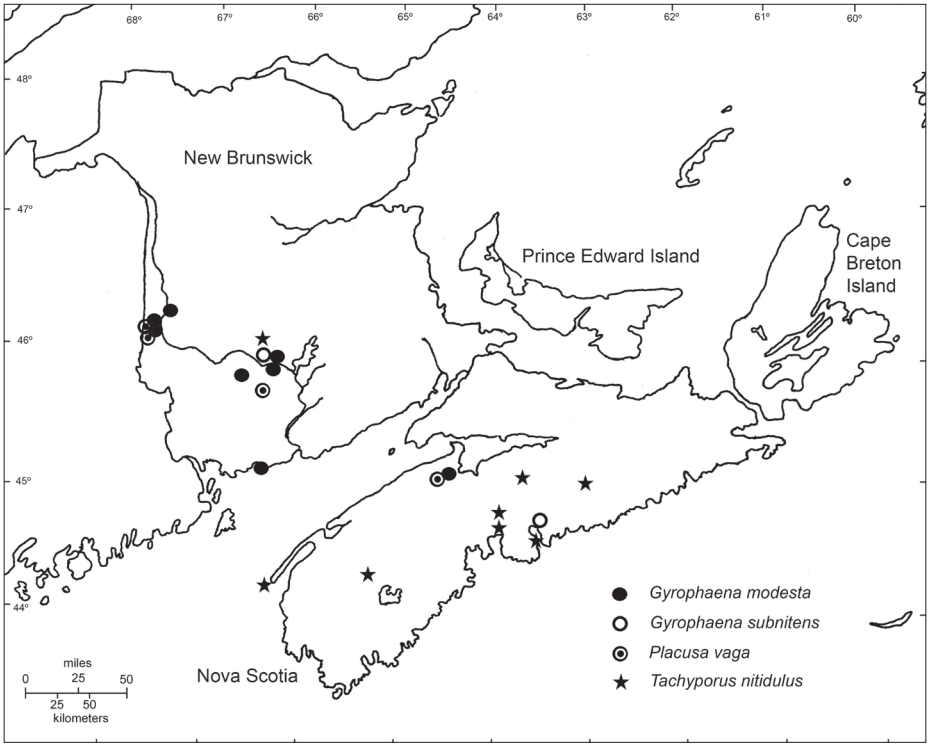

Figure 1. The distribution of *Gyrophaena modesta*, *Gyrophaena subnitens*, *Placusa vaga* and *Tachyporus nitidulus* in the Maritime Provinces of Canada. Localities indicated are from Klimaszewski et al. (2009), Webster et al. (2009), Majka and Klimaszewski (2008a), and the present study.

It is often found in moist habitats such as river debris and swampy areas, along streams, lakes, or in wet seepages. It is common in all kinds of rotting materials; found in leaf litter, decaying material in hollow logs and stumps, and in mammal nests; and has been swept from flowers and bushes (Campbell 1979).

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