

New Collembolan species of the genera *Sensiphorura* Rusek, 1976 (Pachytullbergiidae) and *Cephalachorutes* Bedos & Deharveng, 1991 (Neanuridae) from Southern Vietnam

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ABSTRACT

Sensiphorura tiunovi n. sp., *S. anichkini* n. sp. and *Cephalachorutes judithae* n. sp. are described from monsoon tropical forests of Cat Tien National Park of Southern Vietnam. The first species differs from congeners (*S. marshalli* Rusek, 1976, *S. oligoseta* Bu, Potapov & Gao 2013, and *Sensiphorura anichkini* n. sp.) by the absence of microsensillum on metathorax. Both new species of *Sensiphorura* Rusek, 1976 differ from known species by details in dorsal chaetom. *Cephalachorutes judithae* n. sp. is characterized by the following combination of characters: absence of eyes, large S3 and S4 sensilla on antennal organ III and five chaetae on dens.

KEY WORDS
Poduromorpha,
Vietnam,
tropical forest soil,
new species.

RÉSUMÉ

Nouvelles espèces de Collemboles des genres Sensiphorura Rusek, 1976 (Pachytullbergiidae) et Cephalachorutes Bedos & Deharveng, 1991 (Neanuridae) du Vietnam méridional.

Sensiphorura tiunovi n. sp., *Sensiphorura anichkini* n. sp. et *Cephalachorutes judithae* n. sp. sont décrites des forêts tropicales humides du Parc national de Cat Tie, Vietnam méridional. La première espèce diffère des autres espèces du genre (*S. marshalli* Rusek, 1976, *S. oligoseta* Bu, Potapov & Gao 2013, et *Sensiphorura anichkini* n. sp.) par l'absence de microsensille sur le métathorax. Les deux nouvelles espèces de *Sensiphorura* Rusek, 1976 diffèrent des autres espèces connues par le patron de chaetotaxie dorsale. *Cephalachorutes judithae* n. sp. est caractérisée par la combinaison suivante de caractères: yeux absents, sensilles S3 et S4 sur l'organe antennaire III de grande taille, et cinq soies sur la dens.

MOTS CLÉS
Poduromorpha,
Vietnam,
forêts tropicale,
espèces nouvelles.

INTRODUCTION

In our previous publication (Shveenkova 2011) the abundance and taxonomic composition of Collembola were studied in forests of Cat Tien National Park (Southern Vietnam). 73 collembolan species were revealed, among them *Subisotoma quadrisensillata* Gao, Xiong & Potapov, 2009 was described as new to science. Below we give the descriptions of three other new species belonging to Poduromorpha Börner, 1913. In the previous publication both new species of *Sensiphorura* Rusek, 1976 were listed as "*Sensiphorura* sp.n." (sic), and *Cephalachorutes judithae* n. sp. was listed as "*Cephalachorutes* sp.n." (sic).

MATERIAL AND METHODS

SAMPLING AREA

Studied specimens have been collected during soil sampling. 185 quantitative soil cores were taken in November and December 2005 in eastern part of Cat Tien National Park (Southern Vietnam, Province Dong Nai) and surveyed later.

MORPHOLOGICAL TERMINOLOGY

The terminology used in the text and table follows Deharveng (1983), Deharveng & Weiner (1984), D'Haese (2003), Smolis (2008), Queiroz & Mendonça (2016) for Neanirinae Börner, 1901 (Neanuroidea Massoud, 1967 sensu D'Haese 2002); and Rusek (1976), Pomorski (1998), Fjellberg (1999), Weiner & Najt (1999), for Onychiurinae Börner, 1901 (Onychiuroidea Lubbock, 1867 sensu D'Haese 2002).

ABBREVIATIONS

Body parts

Abd.	abdomen;
Ant.	antennal segment;
AIIO	sensory organ of Ant. III;
PAO	post-antennal organ;
Ti	tibiotarsus;
Th.	thorax;
VT	ventral tube.

Types of chaetae

a	anterior chaetae;
m	medial chaetae;
ms	microchaetae (= microsensillum) on thorax and on Ant. IV;
p	posterior chaetae;
s	lateral lanceolate sensilla on meso- and metanotum, and lanceolate sensilla on lower subcoxa.
S	long sensory chaetae on tergites;
S1-8, S1-5	sensilla 1-8, 1-5 on Ant. IV and Ant. III.

Material deposit

MSPU	Moscow State Pedagogical University, Moscow;
MNHN	Muséum national d'Histoire naturelle, Paris.

SYSTEMATICS

Superfamily ONYCHIUROIDEA Lubbock, 1867

sensu D'Haese (2002)

Family PACHYTULLBERGIIDAE Stach, 1954

Genus *Sensiphorura* Rusek, 1976

Sensiphorura tiunovi n. sp.

(Figs 1, 2; Tables 1, 3, 4)

TYPE MATERIAL. — **Holotype.** ♀, Southern Vietnam, Province Dong Nai, Cat Tien National Park, 12.XII.2005, deciduous riparian forest of *Dipterocarpus alatus* Roxb. ex G. Don on a levee near the Dong Nai River, soil, c. 137 m a.s.l., Yu. Shveenkova leg., deposited in MSPU.

Paratypes. 2 ♀, same data as holotype, but forest of *Lagerstroemia calyculata* Kurz, c. 149 m a.s.l.; 2 ♀, same data as holotype, but collected in 2006, leg. A. Anichkin.

Other material. 1 juv., same data as holotype; 1 juv., same data as holotype, but 18.XI.2005; 1 ♀, same data as holotype, but forest of *Afzelia xylocarpa* (Kurz) Craib, 17.XII.2005; 2 ♀, same data as holotype, but collected in 2006, leg. A. Anichkin. 1 paratype are deposited in MSPU, 3 paratypes are deposited in MNHN.

MATERIAL EXAMINED. — The material of *S. marshalli* Rusek, 1976: three specimens from Canada, Vancouver Island, from thick spongy hemlock litter on top of plateau, 31.V.1983, A. Fjellberg leg.; 1 paratype of *S. oligoseta* Bu, Potapov & Gao, 2013: ♀, from South China, Hainan Province (western coast), Changjiang County, vicinity of Changhua town, Qizi Bay, sand beach, flotation of sand samples, 7.IV.2011, C. W. Huang, M. B. Potapov, N. A. Kuznetsova and Y. Bu. leg. (deposited in MSPU).

DIAGNOSIS. — Apical vesicle small and globular. Ventral AIIO consisting of one large sensory club, one sensory rod, 3 long papillae and 3 protecting chaetae. Sensilla s present on Th. II-III. Lateral microsensilla ms present only on Th. II. Abd. I without a2 chaetae. M3 chaetae present on Abd. IV (only adult specimens) and a2 chaetae on Abd. II-III (last character variable among juveniles and adult specimen too). Sensilla on body: p3 on Th. II-III and Abd. I differentiating as slightly thickened sensilla; lanceolate sensilla present on abdomen dorsally (p3, Abd. II-V; p5, Abd. II-V; p5 on Abd. I varies - may be as chaeta ore as lanceolate sensilla, a0, Abd. VI); and 1 + 1 on Abd. V ventrally. Lower subcoxa I-III with 0, 2 + 1s, 2 + 1s (juveniles with 0, 1 + 1s, 1 + 1s) chaetae.

ETYMOLOGY. — The species is named in honor of Alexey Tiunov coordinating studies of soil fauna by Russian group in tropical forests of Cat Tien National Park, exploring the functional aspects of soil ecosystem.

DESCRIPTION

General

Holotype length 510 µm, color white, without pigmentation. Body shape cylindrical, granulation of integument very fine and uniform. Pseudocelli not visible. PAO usually consists of 9 vesicles (varies from 8 to 12) lying in two parallel rows, with 4 chaetae behind them (Fig. 1A). Anal spines short, set on small papillae.

Antennae

Antennae about as long as head or slightly shorter (Fig. 1A). Antennal segments III and IV almost fused, ventro-medial division more or less distinct (Fig. 2A-D). Apical part of antennae with 14 blunt sensilla: 2 short and thick on dorsal



FIG. 1. — *Sensiphorura tiunovi* n. sp.: **A**, dorsal chaetotaxy (by a dotted line chaetae on subcoxa and lateral chaetae; marked in circle: p5 on Abd. I, a2 on Abd. II-III, m3 on Abd. IV); **B**, ventral chaetotaxy of head; **C**, ventral chaetotaxy of abdomen (lateral chaetae by a dotted line); **D**, labium. Abbreviations: see Material and methods. Scale bars: A-C, 0.05 mm; D, 0.01 mm.

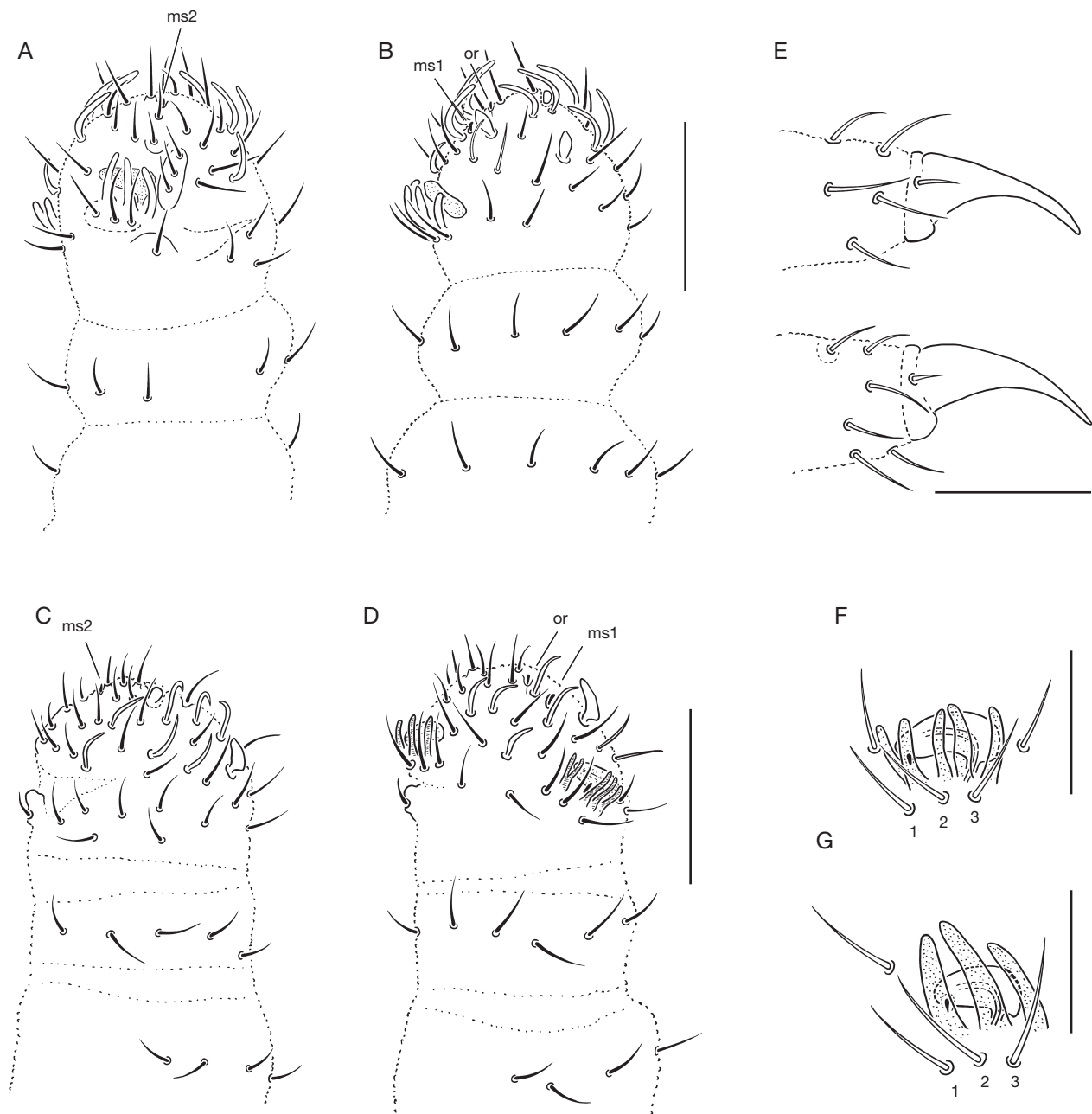


FIG. 2. — *Sensiphora tiunovi* n. sp.: **A-D**, antennae, ventral (**A**), dorsal (**B**), medial (**C**), and lateral (**D**) views; **E**, tibiotarsus, two different views (chaetae by a dotted line absent on Ti of third legs); **F**, dorso-lateral AIIIO; **G**, ventral AIIIO (1-3 – protected chaetae). Abbreviations: **or**, organite; **ms**, microsensilla. Scale bars: A-D, 0.025 mm; E-G, 0.01 mm.

side, and 12 long and slim, five lateral (Fig. 2D) and seven medial (Fig. 2C) ones. Apical vesicle small and globular. Two microsensilla and small subapical organite present on apical part of antennae. Dorso-lateral antennal organ III as in Onychiuridae Lubbock, 1867 (Fig. 2B, D, F). It consists of one large sensory club, one sensory rod, 4 (5) long cuticular papillae (one of papillae often strongly bifurcate making expression of additional papilla, although only 4 pa-

pilla basements always observed) and 3 protecting chaetae. Similar structure (ventral AIIIO, consisting of one large sensory club, one sensory rod, 3 long papillae and 3 protecting chaetae) present ventrally (Fig. 2A, D, G). Ventral part of antennae have hillock formation of cuticle (tubercles) with 1-3 chaetae, which form a semicircle near ventral antennal organ (Fig. 2A). Ant. I and Ant. II with 7 and 11 chaetae, respectively.

TABLE 1. — Chaetotaxy of *Sensiphorura tiunovi* n. sp. Individual variation of holotype chaetotaxy: **1**, **2**, on Abd. I p1 absent, p5 normal chaetae; **3**, on Abd. V – 9 a-chaetae (a2 asymmetrical present); **a**, one chaeta is asymmetrical in holotype. On Abd. VI – a0 sensilla absent in holotype but commonly present in other specimens. Abbreviations: *, p3 is not lanceolate but slightly thickened. Others abbreviations, see Material and methods.

Thorax segments			Abdomen segments				
I	II	III	I	II	III	IV	V
a		6	8	10	10 ^a	8	8 ³
m	8	6	2	2	2	4	
p		8*	10* ¹	10 ^a	10	8	7
lateral			1 + 1 ^a	3 + 3 ^a	3 + 3	6 + 6	1 + 1
sensilla	s and ms	s	p5 ²	p3, p5 ^a	p3, p5, 1 + 1 upper lateral	p3, p5	m0, p3, p5

Mouthparts

Mouthparts well-developed. Labium generally as in *S. marshalli* (Fjellberg 1999: fig. 41) with 4 papilla (A-D), 2 long guard chaetae (b3, b4), 3 short guard chaetae (a1, b1, b2 – very small and reduced); 3 small hypostomal and 3 proximal chaetae are present (Fig. 1D). The basomedian and basolateral fields has 4 and 5 chaetae, respectively. Mandibles and maxilla as in *S. marshalli*.

Chaetotaxy

Head with chaetae a0 and c0, without d0. Dorsal chaetotaxy with frequent asymmetries (Fig. 1A). Juveniles with incomplete composition of chaetae: dorsal chaetae p1 on Abd. I-IV, m2 on Th. II-III, a2 on Abd. II-III and some other chaetae usually absent (Table 4). The full composition of the chaetae (so-called chaetom pattern) more commonly found in adult specimens (see Table 1). Sensilla s present on Th. II-III. Lateral microsensilla ms present only on Th. II. Chaetotaxy of Abd. VI as on Figure 1A. A0 is sensilla, it is as long as a1 and a2 chaetae. Ventral chaetotaxy as on Fig. 1B, C. Four rows of chaetae on Abd. IV. VT with 4 + 4 proximal chaetae and 1 + 1 on the basis. 1 + 1 sensilla present on Abd. V ventrally.

Legs

Upper subcoxa I-III with 1, 2, 2 chaetae respectively. Lower subcoxa I-III with 0, 2 + 1s, 2 + 1s chaetae (juveniles with 0, 1 + 1s, 1 + 1s chaetae). Tibiotarsus with 11, 11, 10 (rarely 11) chaetae on leg I, II, III, respectively (Fig. 2E), without empodial appendage, claw without teeth.

REMARKS

The new species belongs to genus *Sensiphorura* due to two antennal sensory organs (on Ant. III-IV), high number of sensilla on apical part of antennae, simple vesicles of PAO arranged in two rows, reduced structure of labium, and missing visible pseudocelli. Ventral antennal sensory organ is unique feature of the genus.

Sensiphorura tiunovi n. sp. differs from other *Sensiphorura* spp. (*S. marshalli* and *S. oligoseta*) by the absence of microsensilla on thorax III (this character was verified and clearly seen on all 10 individuals). Microsensilla on thorax II present as in other species of the genus. New species differs from *S. marshalli* also

TABLE 2. — Chaetotaxy of *Sensiphorura anichkini* n. sp.: individual variation of holotype chaetotaxy: **1**, only 4 m-chaetae on Th. II (m2 absent); **2**, p1 absent on Abd. I, Abd. III and Abd. IV (only 8, 8 and 6 p-chaetae, respectively); **3**, on Abd. II only 8 a-chaetae (a2 absent); **a**, one chaeta is asymmetrical in holotype. Abbreviations: *, p3 is not lanceolate but slightly thickened sensilla. Others abbreviations, see Material and methods.

Thorax segments			Abdomen segments				
I	II	III	I	II	III	IV	V
a		6	6	8 ^a	10 ³	10 ^a	8
m	8 ^a	6 ¹	6	2	2	2	4
p		8*	8*	10 ²	10 ^a	10 ^{2a}	8 ²
lateral				0 + 0	3 + 3 ^a	3 + 3	6 + 6 ^a
sensilla	s and ms	s and ms			p3, p5	p3, p5, 1 + 1 upper lateral	p3, m0, p3, p5

with small apical sensory club, absence of a2 chaetae on Abd. I (in all specimens), unlike sensilla-pattern on body (differentiation of p3, p5 as chaeta or sensilla). Contrary to *S. oligoseta*, the new species has m3 chaetae on Abd. IV and a2 chaetae on Abd. II-III (last character variable among adult specimen too).

Chaetom of all species of *Sensiphorura* is age dependent and is often asymmetrical (Table 4). In earlier age instars some chaetae may be absent: m2 on Th. II-III, and m3 on Abd. IV; a2 on Abd. II-III, p1 on Abd. I-IV, lateral chaetae on Abd. I. Chaetae on lower subcoxa are also unstable: adult have 0, 2 + 1s, 2 + 1s; juveniles – 0, 1 + 1s, 1 + 1s chaetae. P5 on Abd. I may be chaeta or lanceolate sensilla, it varies too.

After original description, *S. oligoseta* has only 11 slim antennal sensilla and 11 chaetae on Ti III (vs 12 and 10, in new species, respectively). Some variation probably exists in *S. oligoseta*: we observed one paratype of *S. oligoseta*, in which number of antennal sensilla and tibiotarsal distal chaeta on the third legs were the same as in new species (12 and 10). Material of *S. marshalli* examined by us also show 10 chaetae on Ti of third legs. By contrast, two specimens of *Sensiphorura tiunovi* n. sp. have increased number of chaetae on Ti III (11 + 11 and 10 + 11 on left + right third legs). So we are not including these features in differences between *S. oligoseta* and new species.

Different numbers of guard chaetae of dorso-lateral AIII (5, 4 and 3) were given for *S. marshalli*, *S. oligoseta* and *S. tiunovi* n. sp., respectively. In fact, this difference is explained by different terminology which was used in first descriptions. The chaetae positioned at base of papilla are included to this group by us (Fig. 2F), as common in Onychiuroidea (Pomorski 1998; Weiner & Najt 1999).

Sensiphorura anichkini n. sp. (Fig. 3; Tables 2-4)

TYPE MATERIAL. — **Holotype**. ♀ juv., Southern Vietnam, Province Dong Nai, Cat Tien National Park, 18.XI.2005, forest of *Dipterocarpus alatus* on a basalt ridge, soil, c. 149 m a.s.l., Yu. Shveenkova leg., deposited in MSPU.

Paratypes. 3 ♀, same data as holotype.

Other material. 1 juv., same data as holotype, but forest of *Tetrameles nudiflora* R. Brown, 2.XI.2005; deposited in MNHN.

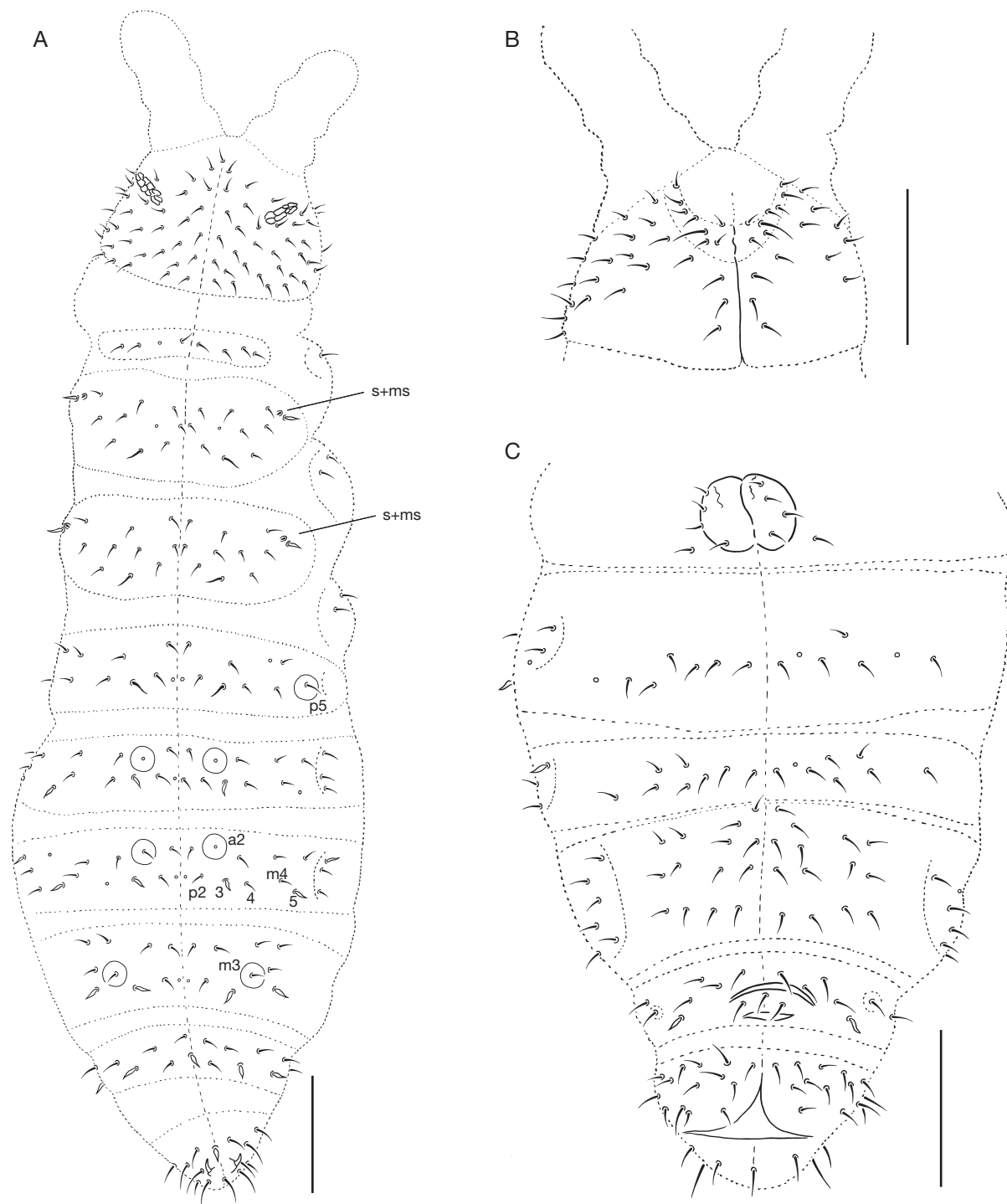


FIG. 3.— *Sensiphorura anichkini* n. sp.: **A**, dorsal chaetotaxy (lateral and subcoxal chaetae separated by a dotted line; marked in circle: p5 on Abd. I, a2 on Abd. II–III, m3 on Abd. IV); **B**, ventral chaetotaxy of head; **C**, ventral chaetotaxy of abdomen (lateral chaetae by a dotted line). Abbreviations: see Material and methods. Scale bars: 0.05 mm.

DIAGNOSIS. — Apical vesicle small and globular. Ventral AIIIO consisting of one large sensory club, one sensory rod, 3 long papillae and 3 protecting chaetae. Sensilla s and lateral microsensilla ms present on both Th. II–III. Abd. I without a2 chaetae. M3 chaetae present on Abd. IV (only adult specimens) and a2 chaetae on Abd. II–III (last character variable among juveniles and adult specimen too). Sensilla on body: p3 on Th. II–III and Abd. I differentiating as slightly thickened sensilla; lanceolate sensilla present on abdomen dorsally

(p3 – Abd. II–V, p5 – Abd. II–V, a0 – Abd. VI); and 1 + 1 on Abd. V ventrally. Lower subcoxa I–III with 0, 1 + 1s, 2 + 1s (juveniles with 0, 1 + 1s, 1 + 1s) chaetae.

ETYMOLOGY. — The species is named in honor of Alexander Anichkin, who investigated soil invertebrates (macrofauna) in Cat Tien National Park and kindly collected some studied material of the new collembolan species.

TABLE 3. — Variability of diagnostic characters of new *Sensiphorura* Rusek, 1976 species. Abbreviations: see Material and methods.

Species	<i>S. tiunovi</i> n. sp. (8 ♀, 2 juv.)	<i>S. anichkini</i> n. sp. (4 ♀, 1 juv.)
a2 on Abd. II-III		
present on each side	Abd. II (2 ♀, 1 juv.), Abd. III (3 ♀, 1 juv.)	Abd. II (1 ♀), Abd. III (2 ♀, 1 juv.)
only on one side	Abd. II (3 ♀), Abd. III (2 ♀, 1 juv.)	Abd. II (1 ♀), Abd. III (2 ♀)
absent on each side	Abd. II (1 juv.)	Abd. II (1 ♀-holotype, 1 juv.)
not clearly observed	3 ♀	1 ♀
m3 on Abd. IV		
present on each side	5 ♀	3 ♀
absent on each side	2 juv.	1 juv.
not clearly observed	3 ♀	1 ♀
p5 on Abd. I		
lanceolate	4 ♀	—
normal chaetae	1 ♀ (holotype, present only one side), 2 juv.	3 ♀, 1 juv.
not clearly observed	3 ♀	1 ♀
chaetae on lower subcoxa		
0, 2+1s, 2+1s	7 ♀	—
0, 1+1s, 2+1s	—	4 ♀
0, 1+1s, 1+1s	2 juv.	1 juv.
not clearly observed	1 ♀	—

DESCRIPTION

General

Holotype length 505 µm, color white, without pigmentation. Body shape cylindrical, granulation of integument very fine and uniform. Pseudocelli not visible. PAO usually consisting of 10 vesicles (varies from 8 to 12) lying in two parallel rows, with 4 chaetae behind them (Fig. 3A). Anal spines short, set on small papillae.

Antennae

Antennae about as long or slightly shorter than head (Fig. 3A). Antennal segments III and IV almost fused, ventro-medial division more or less distinct. Apical part of antennae with 14 blunt sensilla: 2 short and thick on dorsal side, and 12 long and slim (five lateral and seven medial ones). Apical vesicle small and globular. Two microsensilla and small subapical organite present on apical part of antennae. Dorso-lateral antennal organ III as in Onychiuridae, with one large sensory club, one sensory rod, 4 (5) long cuticular papillae (one of papillae often strongly bifurcate making expression of additional papilla, although only 4 papilla basements always observed) and 3 protecting chaetae. Similar structure (ventral AIIIO, consisting of one large sensory club, one sensory rod, 3 long papillae and 3 protecting chaetae) present ventrally. Ventral part of antennae with hillock formation of cuticle (tubercles) with 1-3 chaetae, which form a semicircle near ventral antennal organ. Ant. I and Ant. II with 7 and 11 chaetae, respectively. Antennae as in *S. tiunovi* n. sp.

PAO usually consisting of 10 vesicles (varies from 8 to 12) lying in two parallel rows, with 4 chaetae behind them (Fig. 3A). Head with chaetae a0 and c0, without d0.

Mouthparts

Mouthparts well-developed. Labium generally as in *S. marshalli* (Fjellberg 1999: fig. 41) with 4 papilla (A-D), 2 long

guard chaetae (b3, b4), 3 short guard chaetae (a1, b1, b2 – very small and reduced), 3 small hypostomal and 3 proximal chaetae present. Basomedian and basolateral fields with 4 and 5 chaetae, respectively. Mandibles and maxilla as in *S. marshalli*.

Chaetotaxy

Head with chaetae a0 and c0, without d0. Dorsal chaetotaxy with frequent asymmetries (Fig. 3A); incomplete in juveniles: dorsal chaetae p1 on Abd. I-IV, m2 on Th. II-III, a2 on Abd. II-III and some other chaetae usually absent (Table 4). Full composition of chaetae (chaetom pattern) more commonly found in adult specimens (see Table 2). Sensilla s and lateral microsensilla ms present on both Th. II-III. Chaetotaxy of Abd. VI as on fig. 3A. A0 is sensilla, it is as long as a1 and a2 chaetae. Ventral chaetotaxy as on Fig. 3B, C. Abd. IV with 4 rows of chaetae. VT with 4 + 4 proximal chaetae and 1 + 1 on the basis. 1 + 1 sensilla present on Abd. V ventrally.

Legs

Upper subcoxa I-III with 1, 2, 2 chaetae respectively. Lower subcoxa I-III with 0, 1 + 1s, 2 + 1s chaetae (juveniles with 0, 1 + 1s, 1 + 1s chaetae). Ti with 11, 11, 10 chaetae on leg I, II, III, respectively, without empodial appendage, claw without teeth.

REMARKS

Sensiphorura anichkini n. sp. is very close to previous species *Sensiphorura tiunovi* n. sp. (Table 3). They clearly differ by lateral microsensilla ms on Th. III (absent in *S. tiunovi* n. sp. and present in *S. anichkini* n. sp.). Less important differences are: chaetae on lower subcoxa of the second legs (1 + 1s in *S. anichkini* n. sp. versus 2 + 1s in *S. tiunovi* n. sp. only in adult specimens); p5 on Abd. I (lanceolate in *S. tiunovi* n. sp. or normal in the second species) (Table 4). Last difference needs to be verified with more specimens.

TABLE 4. — Differences between *Sensiphorura* species. Symbols: *, variable in all age instars; **, only for adult. For other abbreviations see Material and methods. The data on *S. marshalli* Rusek, 1976 is given after Rusek's description.

Species	<i>S. tiunovi</i> n. sp.	<i>S. anichkini</i> n. sp.	<i>S. oligoseta</i> Bu, Potapov & Gao, 2013	<i>S. marshalli</i> , Rusek, 1976
distribution	South Vietnam	South Vietnam	South China	West Canada
apical vesicle of Ant. IV	small	small	small	large
papillae/protecting chaetae of ventral AIIIO	3 (all long)/3	3 (all long)/3	3 (all long)/3	2 + 1 (one short)/2
ms on Th. III	—	+	+	+
p3 on Th. II-III, Abd. I	slightly thickened	slightly thickened	slightly thickened	lanceolate
p5 on Abd. I	lanceolate *	normal chaetae	lanceolate	normal chaetae
p5 on Abd. III	lanceolate	lanceolate	lanceolate	normal chaetae
a2 on Abd. I				+
a2 on Abd. II-III	+ *	+ *		+
m3 on Abd. IV	+ **	+ **		+
chaetae on lower subcoxa	0, 2** + 1s, 2** + 1s	0, 1 + 1s, 2** + 1s	0, 2 + 1s, 2 + 1s	?

Sensiphorura anichkini n. sp. differs also from *S. marshalli* by small apical sensory club, absence of a2 chaetae on Abd. I, details of dorsal sensory chaetom (differentiation of p3, p5 as normal chaeta versus sensilla), structure of ventral AIIIO. Contrary to *S. oligoseta*, new species have m3 chaetae on Abd. IV and a2 chaetae on Abd. II-III (last character variable), also only one chaetae on lower subcoxa of the second leg (1 + 1s in *S. anichkini* n. sp. ore 2 + 1s in *S. oligoseta*).

Superfamily NEANUROIDEA Massoud, 1967
sensu D'Haese (2002)

Family NEANURIDAE Börner, 1901
sensu Deharveng (2004)

Genus *Cephalachorutes* Bedos & Deharveng, 1991

Cephalachorutes judithae n. sp.
(Figs 4, 5)

TYPE MATERIAL. — **Holotype**. ♂, Southern Vietnam, Province Dong Nai, Cat Tien National Park, 12.XI.2005, deciduous forest of *Lagerstroemia calyculata*, soil, c. 149 m a.s.l., Yu. Shveenikova leg.; deposited in MSPU.

Paratypes. 1 ♀ juv., same data as holotype, 1 ♀, same data as holotype, but 11.XI.2005, 1 ♀, same data as holotype, but forest of *Dipterocarpus alatus* on a basalt ridge, 18.XI.2005.

Other material. 2 juv., same data as holotype, 1 juv., same data as holotype, but bamboo thickets, 17.XII.2005, 1 ♀, same data as holotype, but forest of *Afzelia xylocarpa*, 17.XII.2005. 1 paratype ♀ juv. deposited in MSPU, 2 paratypes ♀♀ deposited in MNHN.

DIAGNOSIS. — Color white, without pigmentation and eyes. S-sensilla on Ant. IV: S1-S3 slightly stout and rather short, ms slightly longer (developed as S-sensilla); S8, S4, S7 relatively longer. S4 and S7 much thicker than other S-sensilla. S-sensilla of Ant. III: S2 and S5 subequal to ms on Ant. IV. S2 two times longer than S3-4 (so S3, S4 are relatively large). A2 absent on all tergites, p2 absent on Abd. IV. Dens with 5 + 5 chaetae.

ETYMOLOGY. — The species is named in honor of Judith Najt, for her great contribution to systematics of Neanuridae, including tropical groups of species.

DESCRIPTION

General

Holotype 570 µm, paratype (♀ juv.) 620 µm. Color white, without pigmentation. Integumentary secondary granulation developed. Eyes absent.

Antennae

Ant. IV and Ant. III almost fused dorsally (Fig. 4B). Ant. IV with apical papilla reduced and fused with the apex; subapical organite in ventro-apical position (Fig. 4C). Seven well developed, thickened S-sensilla on Ant. IV. S1-S3 slightly stout and rather short, ms slightly longer (developed as S-sensilla); S8, S4, S7 relatively longer. S4 and S7 much thicker than other S-sensilla. Sensory organ of Ant. III with ventral guard S-sensilla (S2), 2 rod-like internal S-microchaeta (S3-4), ventral S-microchaeta (S1) and dorsal guard S-sensilla (S5, shifted apically towards S8 of Ant. IV). Sensilla S2 and S5 subequal to ms on Ant. IV. S2 two times longer than S3-4 (so S3, S4 are relatively large). Ant. I and Ant. II with 7 and 11 chaetae respectively.

Mouthparts

Mouthparts typical for the genus (Fig. 5C). Mandible long and thin with 2 strong basal teeth, 7 very small or some larger and 2 apical bigger. Labium typical for the genus (Fig. 5A).

Chaetotaxy

Head without chaetae a0 and c3 (Fig. 4A). Body chaetom composed of small normal chaetae and long sensory S-chaetae, ratio c. 1:(3-4). Number of S-chaetae on tergites corresponding to standard hypogastrurian pattern (2 + ms, 2/1,1,1,1 on each half-tergite from Th. II to Abd. V). Th. I with 2 chaetae on each side. Th. II-III with 3 + S dorso-external chaetae. Th. II-Abd. III with 3 dorso-internal chaetae. A2 absent on all tergites, p2 absent on Abd. IV. On Abd. I 2 + 2 or 1 + 1 chaetae between sensory S-chaetae (chaetae a1 present in some specimens on one side). Tibiotarsus without M-chaetae (7 + 11, 7 + 11, 6 + 11 chaetae) (Fig. 5D). Subcoxa with 1, 2, 2 chaetae.

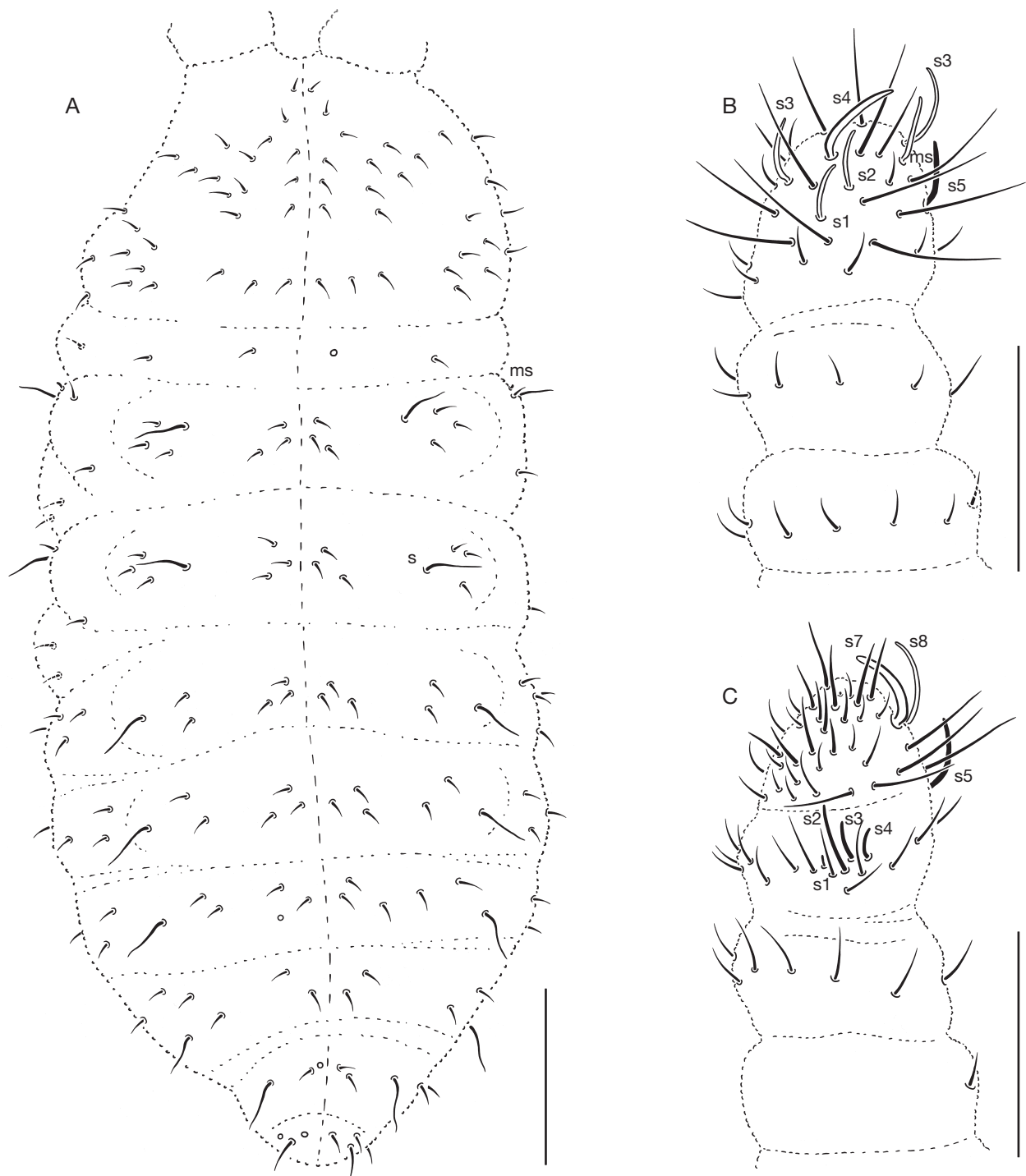


FIG. 4. — *Cephalachorutes judithae* n. sp.: **A**, dorsal chaetotaxy; **B**, antennae, dorsal view; **C**, antennae, ventral view. Abbreviations: see Material and methods. Scale bars: A, 0.1 mm; B, C, 0.05 mm.

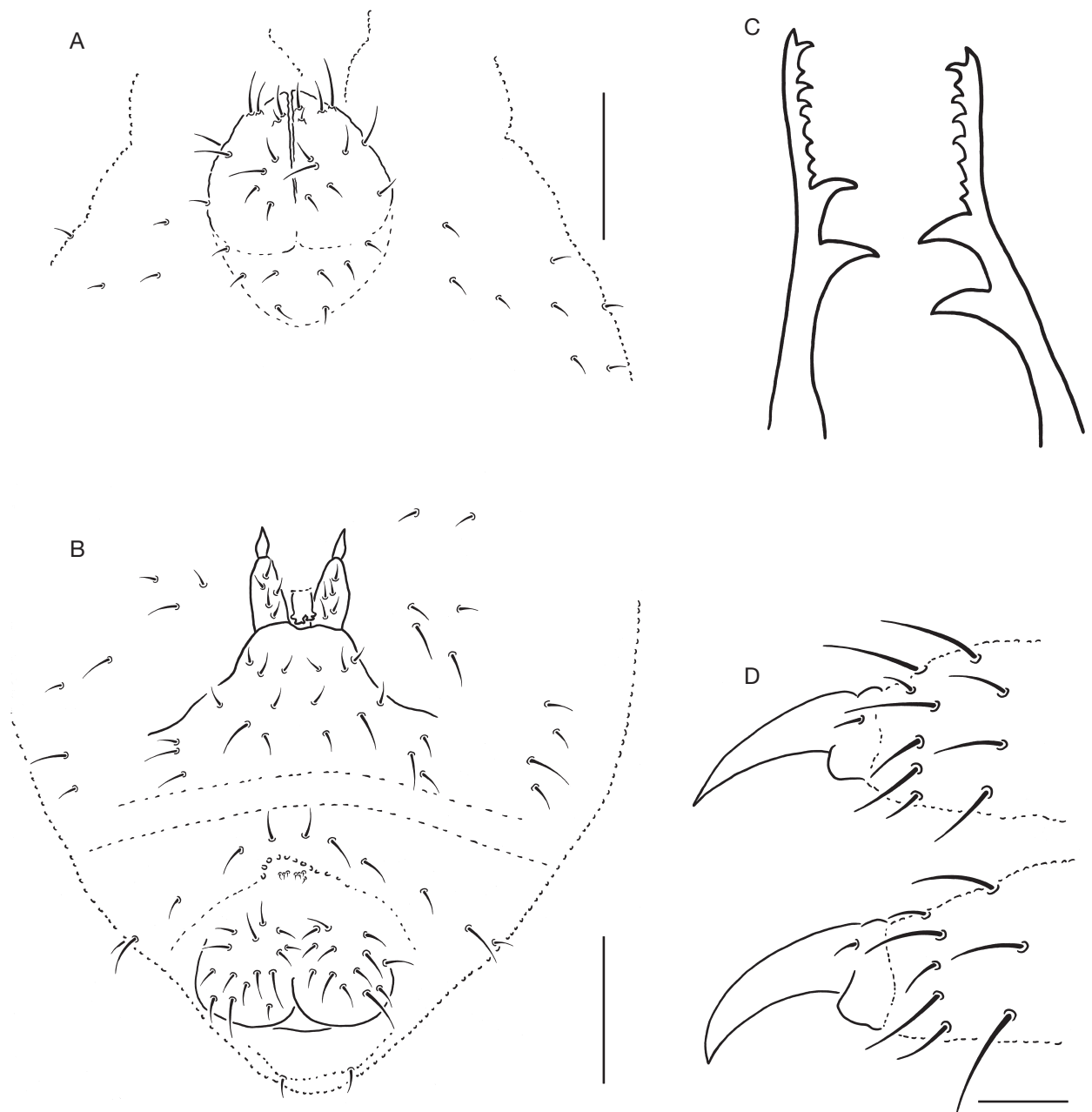


FIG. 5. — *Cephalachorutes judithae* n. sp.: **A**, ventral chaetotaxy of head and labium (paratype); **B**, ventral chaetotaxy of abdomen (paratype); **C**, mandibles; **D**, tibiotarsus of second leg (two different views). Abbreviations: see Material and methods. Scale bars: A, B, 0.05 mm; C, 0.025 mm; D, 0.01 mm.

Abdominal appendages

VT with 3 + 3 chaetae. Furcula well developed, tenaculum with 3 + 3 teeth, dens with 5 + 5 chaetae (Fig. 5B). Dens about two times longer than mucro.

REMARKS

Cephalachorutes judithae n. sp. has no eye. Other blind species have six (vs five in *C. judithae* n. sp.) chaetae on dens (*C. caecus* Bedos & Deharveng, 1991 and *C. centurionis* Bedos & Deharveng, 1991) or tenaculum and furca completely absent (*C. anneae* Queiroz & Mendonça, 2016). The mentioned species also have smaller S3 and S4-sensilla

on antennal organ III: 4,5 (vs two in *C. judithae* n. sp.) times shorter than S2. Five chaetae on dens and large S3, S4-sensilla are shared with *C. deharvengi* Najt & Weiner, 1997, which clearly differs with 5 + 5 eyes and shorter S-sensilla on Ant. IV.

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