A list of *Yuukianura* Yosii, 1955 species of the world (Collembola: Neanuridae: Neanurinae: Lobellini), with description of a new species of unusual ecology from Santo Island (Vanuatu)

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ABSTRACT
We redefine the genus *Yuukianura* Yosii, 1955, and we give an updated list of its nine species. Four of these species initially described in other genera are transferred to *Yuukianura*: *Lobella* (*Lobella*) *yasudai* Yosii, 1966, *Lobella pacifica* Yosii, 1971, *Protanura hawaiiensis* Bellinger & Christiansen, 1974, and *Pseudocolonavis rosea* Kim & Lee, 2000. Two species described as *Yuukianura* (*Yuukianura cavicola* Yosii, 1956 and *Y. nomurai* Yosii, 1956) are considered as Lobellini *incertae sedis*. A new species, *Yuukianura judithae* n. sp., is described from Santo Island in Vanuatu, Melanesia. It differs from other species of the genus by a combination of characters including total lack of eyes, two chaetae on the ocular tubercle (Ocp absent), (5+5) dorsal chaetae on Th. I, (3+S) chaetae in chaetal group DL of Th. II-III, two chaetae in group Di of Abd. I-IV (Di3 absent) and untoothed claw. The species also shows three characters unusual for Neanurinae Boerner, 1901: a strong reduction of tibiotarsal chaetotaxy, the absence of macrochaeta De1 on Abd. I-IV and the presence of conspicuous button-hole structures dorsally on head, Abd. I and Abd. IV. The new species occurs in both forest and cave habitats, not in mangrove or seashore habitats, in contrast to most members of the genus. In caves, it often lives in large number on guano piles of bats or swiftlets, and is the first record of a Neanuridae Yosii, 1956 in such an habitat.

KEY WORDS
Generic diagnosis,
species list,
pattern of muscular insertions,
pseudopores,
button-holes,
new combinations,
new species.

RÉSUMÉ
Liste des espèces de Yuukianura *Yosii, 1955 du monde (Collembola: Neanuridae: Neanurinae: Lobellini), avec la description d'une nouvelle espèce de l'île de Santo (Vanuatu) à l'écologie inhabituelle.*
Nous redéfinissons le genre *Yuukianura* Yosii, 1955, et nous donnons une liste mise à jour de ses neuf espèces. Quatre de ces espèces initialement décrites dans d'autres genres sont transférées dans *Yuukianura*: *Lobella* (*Lobella*) *yasudai* Yosii, 1966, *Lobella pacifica* Yosii, 1971, *Protanura hawaiiensis* Bellinger & Christiansen, 1974, et *Pseudocolonavis rosea* Kim & Lee, 2000. Deux autres espèces décrites comme *Yuukianura* (*Yuukianura cavicola* Yosii, 1956 et *Y. nomurai* Yosii, 1956) sont considérées comme des Lobellini *incertae sedis*. Une nouvelle espèce, *Yuukianura judithae* n. sp., est décrite de l'île de Santo au Vanuatu, Mélanésie. Elle diffère des autres espèces du genre par la combinaison de caractères suivante : yeux complètement absents, deux soies sur le tubercule oculaire (Ocp absent), (5 + 5) soies dorsales sur Th. I, (3 + S) soies dans le groupe DL de Th. II-III, deux soies dans le groupe Di d'Abd. I-IV (Di3 absent) et une griffe inerme. L'espèce possède en outre trois caractères inhabituels pour un Neanurinae Boerner, 1901 : une forte réduction de la chétotaxie tibiotarsale, l'absence du macrochète De1 sur Abd. I-IV et la présence de structures en boutonnières bien visibles dorsalement sur la tête, Abd. I et Abd. IV. La nouvelle espèce se rencontre à la fois en sols forestiers et en grottes, mais pas en mangroves ni en habitats littoraux, contrairement à la plupart des espèces du genre. En grotte, elle est souvent très abondante sur les accumulations de guano de chauves-souris ou de salanganes, et représente la seule citation d'un Neanuridae Yosii, 1956 dans un tel habitat.

MOTS CLÉS
Diagnose générique, liste d'espèces, patrons d'insertions musculaires, pseudopores, boutonnières, combinaisons nouvelles, espèce nouvelle.

INTRODUCTION

The SANTO 2006 expedition aimed at inventorying the marine and terrestrial fauna of the Santo Island (Vanuatu) in the Pacific (Bouchet *et al.* 2011). A rich fauna of Collembola was collected by biologists of the karst team, who sampled during one month the limestone terrains of the eastern half of the island (Weiner *et al.* 2009; Deharveng & Bedos 2011; Bedos *et al.* 2011; Deharveng *et al.* 2011a, b; Lips *et al.* 2011). Neanuridae Yosii, 1956 were abundant and diversified, with several species new to science. Among them, a new species of *Yuukianura* Yosii, 1955 was frequent both in forest litter and on guano in caves. In this last habitat, it occurred in very large populations. This new species is described here as *Yuukianura judithae* n. sp. and its unusual ecology is discussed. At this occasion, we redefine the genus *Yuukianura* and we list its world species, four of which are new combinations.

MATERIAL AND METHODS

Specimens were collected by hand on guano piles of six caves, and by extraction of forest litter, more rarely of soil, using Berlese-Tullgren funnel, in many sites across the Santo island. Specimens were preserved in 95% ethanol, then cleared in lactic acid and mounted on slides in Marc André II. They were examined using a Leica DMLB2 microscope with DIC. Drawings were made with a drawing tube and improved with Photoshop Elements 9. Measurements were made using ProgRes camera and software on a stereomicroscope Leica MZ16 (length measurement of specimens in alcohol) and on the microscope with a ocular micrometrer (other measurements on specimens on slides).

Notation

Chaetal types, tubercles, chaetal groups and chaetotaxy of body and appendages after Deharveng (1983a) and Deharveng & Weiner (1984), detailed chaetotaxy of tergites in Table 1 adapted from Cassagnau (1968) and Palacios-Vargas & Simón Benito (2007), ventral side of head, abdominal sternites and antennae after Smolis (2008).

Abbreviations

Body parts

Abd.	abdomen;
Ant.	antenna;
Cx	coxa;
Fe	femur;
psp	pseudopore;
Scx2	subcoxa 2;
Ti	tibiotarsus;
Th.	thorax;
Tr	trochanter;
VT	ventral tube.

Groups of chaetae

Ag	antegenital;
An	anal;
Fu	furcal;
Ve	ventroexternal;
Vi	ventrointernal;
VL	ventrolateral.

Tubercles

Af	antenno-frontal;
CL	clypeal;
De	dorsoexternal;
Di	dorsointernal;
DL	dorsolateral;
L	lateral;
Oc	ocular;
So	subocular.

Types of chaetae

M	macrochaeta;
m	mesochaeta;
mic	microchaeta;
mou	blunt chaetae on Ant. IV;
ms	s-microchaeta;
or	organite of antenna IV;
S	S-chaeta;
x	labial papilla x.

SYSTEMATICS

Family NEANURIDAE Yosii, 1956
Subfamily NEANURINAE Boerner, 1901
Tribe Lobellini Cassagnau, 1983

Genus *Yuukianura* Yosii, 1955

Yuukianura Yosii, 1955: 225.

TYPE SPECIES. — *Protanura aphoruroides* Yosii, 1953, by original designation.

DISTRIBUTION. — Tropical and East Asia (China, Japan, Malaysia, Nepal, North and South Korea), Pacific islands (Hawaii, New Caledonia, Tonga, Vanuatu), Australia, Great Britain (introduced).

NEW DIAGNOSIS. — Lobellini elongate, parallel-sided and flattened. Body colour red, yellow or white. Eyes 3 + 3 or absent, rarely pigmented. Abdominal segments subequal in length. Mouthparts thick, maxillary head with three strong teeth and 2 lamellae, a longer ciliated one and usually a shorter pointed one, mandible thick, triangular, with a few strong intermediate teeth and a short subdistal whip. Labium and labrum short, truncated. Labral formula 2,2 when observed. Chaetotaxy of body and appendages not polychaetotic. Dorsal macrochaetae straight and long, usually smooth. Dorsal tubercles inconspicuous except those of Abd. VI. Line Di1-De1 crossed by line Di2-De2 on posterior area of head. Chaetae Di shift laterally close to De on Abd. V. Abd. VI bilobed. No cryptopygy.

REMARKS

In the lateral shift of chaetae Di on Abd. V, the genus *Yuukianura* Yosii, 1955 is most similar to the monospecific genus *Riozura* Cassagnau, 1983 from Pakistan with its species *R. yoshibai* (Yosii, 1963), originally described in the genus *Lobella* Boerner, 1906. This last genus differs from the former in a slightly reduced mandibular head and a more convex and non-parallel body shape.

Only three described species are listed as *Yuukianura* in the reference website of World Collembola maintained by Bellinger *et al.* (2016): *Y. aphoruroides* (Yosii, 1953), *Y. halophila* Yosii, 1955 and *Y. szeptyckii* Deharveng & Weiner, 1984. In fact, five other species described or cited in various genera or subgenera (*Coecoloba* Yosii, 1956, *Lobella* Boerner, 1906, *Neanura* MacGillivray, 1893, *Protanura* Boerner, 1906, *Pseudocolonavis* Salmon, 1964) are transferred here to *Yuukianura*, as they exhibit most important diagnostic features of the genus, i.e. a flat parallel habitus with poorly developed tubercles, complex mouthparts and a lateral shift of chaetae Di towards the De group on Abd. V. With the new species *Yuukianura judithae* n. sp. described here, nine species can be unambiguously assigned to *Yuukianura*. Two additional species described as *Yuukianura* do not match the generic diagnosis of the genus and are too insufficiently described to be placed in another genus of Lobellini. They are considered here as *incertae sedis*. These 11 species (nine *Yuukianura* and two *incertae sedis*) are listed below.

Yuukianura aphoruroides (Yosii, 1953)

Protanura aphoruroides Yosii, 1953: 69. — Massoud 1967: 292.

Yuukianura aphoruroides – Yosii 1955: 384.

Lobella (*Yuukianura*) *aphoruroides* – Yosii 1959: 13.

Lobella (*Lobella*) *aphoruroides* – Yosii 1977: 150.

TYPE COUNTRY. — Japan.

DISTRIBUTION. — Great Britain (Deharveng & Greenslade 1992, in earthworm-rearing beds), Japan, Malaysia (Goto 1955, Yosii 1959), China (Stach 1964).

Yuukianura halophila Yosii, 1955

Yuukianura halophila Yosii, 1955: 384.

Protanura halophila – Massoud 1967: 292.

Lobella halophila – Yosii 1971: 283.

Lobella (*Lobella*) *halophila* – Yosii 1977: 150.

Lobella (*Yuukianura*) *halophila* – Yoshii & Sawada 1997: 17

TYPE COUNTRY. — Japan.

DISTRIBUTION. — Japan.

Yuukianura tongana Yosii, 1964

Lobella (*Yuukianura*) *tongana* Yosii, 1964: 9.

Coecoloba tongana – Massoud 1967: 296.

Lobella tongana – Yosii 1971: 283.

Protanura tongana – Bellinger & Christiansen 1974: 33.

TYPE COUNTRY. — Tonga islands.

DISTRIBUTION. — Tonga islands.

Yuukianura yasudai (Yosii, 1966) n. comb.

Lobella (*Lobella*) *yasudai* Yosii, 1966: 479.

TYPE COUNTRY. — Nepal.

DISTRIBUTION. — Nepal.

Remark
This species presents the following characters that are diagnosic of *Yuukianura*: a flat parallel habitus with poorly developed tubercles, complex mouthparts and a lateral shift of chaetae Di towards the De group on Abd. V. For this reason, we propose to transfer it to that genus, as *Yuukianura yasudai* n. comb.

Yuukianura pacifica (Yosii, 1971) n. comb.

Lobella pacifica Yosii, 1971: 281.

Lobella (*Lobella*) *pacifica* – Yosii 1977: 150.

Type country. — Japan.

Distribution. — Japan.

Remark
This species presents the following characters that are diagnosic of *Yuukianura*: a flat parallel habitus with poorly developed tubercles, complex mouthparts and a lateral shift of chaetae Di towards the De group on Abd. V. For this reason, we propose to transfer it to that genus, as *Yuukianura pacifica* n. comb.

Yuukianura hawaiiensis
(Bellinger & Christiansen, 1974) n. comb.

Protanura hawaiiensis Bellinger & Christiansen, 1974: 31.

Neanura (*Protanura*) *hawaiiensis* Christiansen & Bellinger, 1992: 81.

Type country. — Hawaii.

Distribution. — Hawaii.

Remark
This species presents the following characters that are diagnosic of *Yuukianura*: a flat parallel habitus with poorly developed tubercles, complex mouthparts and a lateral shift of chaetae Di towards the De group on Abd. V. For this reason, we propose to transfer it to that genus, as *Yuukianura hawaiiensis* n. comb.

Yuukianura szeptyckii
Deharveng & Weiner, 1984

Yuukianura szeptyckii Deharveng & Weiner, 1984: 50.

Type country. — North Korea.

Distribution. — North Korea, Japan (Tanaka & Hasegawa 2010).

Yuukianura rosea (Kim & Lee, 2000) n. comb.

Pseudocolonavis rosea Kim & Lee, 2000: 180.

Type country. — South Korea.

Distribution. — South Korea.

Remarks
Yuukianura rosea n. comb. was described in the genus *Pseudocolonavis* Salmon, 1964, which is a synonym of *Friesea* von Dalla Torre, 1895 as its type species is *Friesea fagei* Denis, 1932. The species is insufficiently described, but the diagnostic features of *Yuukianura* listed above are present: a flat parallel habitus with poorly developed tubercles, complex mouthparts and a lateral shift of chaetae Di towards the De group on Abd. V. For this reason, we propose to transfer it to that genus, as *Yuukianura rosea* n. comb.

Yuukianura judithae n. sp.
(Figs 1-6; Table 1)

Type material. — **Holotype**. ♀ on slide: Vanuatu: Sanma: Santo Island: Sara, Gouffre de Rotal, 9.IX.2006, cave, on bat guano, by hand, Josiane Lips leg. (167.0584667E, 15.2528S; alt. 250 m) (SK06-09-13).
Paratypes. Same data as holotype, by hand, 12 specimens on slides (3 ♂, 8 ♀, 1 juveniles) and about 400 in alcohol (SK06-09-11, SK06-09-12 and SK06-09-13); same data as holotype, Berlese extraction of guano, one specimen on slide and about 600 in alcohol, (SK06-09-06, SK06-09-08, SK06-09-09 and SK06-09-10). — 21.VIII.2005, cave, guano, by hand, Josiane Lips leg. Four specimens on slides and about 16 in alcohol (SK05-Lips44).

Material deposit. — Five paratypes on slides and 20 paratypes in alcohol in the Laboratory of Ecología y Sistemática de Microartrópodos, Faculty of Sciences, Universidad Nacional Autónoma de México; 20 paratypes in alcohol in the Department of Invertebrate Biology, Evolution and Conservation, Institute of Environmental Biology, University of Wrocław (Poland); holotype and remaining paratypes in the Muséum national d'Histoire naturelle, Paris (France).

Other material. — **Vanuatu**. Sanma: Aoré island, 4.IX.2006, forest, litter, Berlese extraction, Josiane Lips and Vincent Prié leg. five specimens (SK06-04-02 and SK06-04-08, 167.1611E, 15.55651667S; alt. 15 m). — Santo Island. Boutmas, Grotte Fapon (166.9648833E, 15.33101667S; alt. 380 m), on guano in the cave, 28.X.2005, by hand, Franck Brehier leg., about 30 specimens (SK05-Brehier06); same data, 5.IX.2006 and 12.IX.2006, by hand, Josiane Lips leg, about 40 specimens (SK06-05-03 and SK06-12-02); same data, 8.IX.2006, by hand, Louis Deharveng and Cahyo Rahmadi leg., 2 specimens (SK06-08-09); same data, 5.IX.2006, Berlese extraction, Louis Deharveng and Anne Bedos leg., 4 specimens (SK06-05-07 and SK06-05-08). — Boutmas, dolines of the Grotte Fapon system, 5.IX.2006, litter, Berlese extraction, Louis Deharveng and Anne Bedos leg., 2 specimens (SK06-05-10); same data, 8.IX.2006, litter, Berlese extraction after sifting, Louis Deharveng and Cahyo Rahmadi leg., 2 specimens (SK06-08-17). — Boutmas, near Mérié pond, 27.IX.2006, forest, litter, Berlese extraction, Louis Deharveng and Anne Bedos leg., 14 specimens (SK06-27-13). — Boutmas, Wanror (166.9541167E, 15.39305S; alt. 370 m), 12.IX.2006, forest, litter and rotten wood, Berlese extraction, Josiane Lips leg., 13 specimens (SK06-12-08, SK06-12-10 and SK06-12-12). — Funafus, Gouffre Tarius (167.0201167E, 15.53066667S; alt. 250 m), 14.IX.2006, cave, by hand and Berlese extraction of guano, Josiane Lips leg., 16 specimens (SK06-14-09 and SK06-14-13). — Loru (167.145204E, 15.141810S), 24.IX.2006, forest, litter, Berlese extraction and sifting, Louis Deharveng and Anne Bedos leg., 18 specimens

FIG. 1. — *Yuukianura judithae* n. sp.: **A**, specimens on a dropping of fresh guano; **B**, a specimen in dorsal view, length: 2 mm.

(SK06-24-14 and SK06-24-18). — Matantas (166.924E, 15.177S; alt. 45 m), 14.IX.2006, forest, litter, Berlese extraction, Louis Deharveng and Anne Bedos leg., 83 specimens (SK06-14-24, SK06-14-26, SK06-14-27, SK06-14-31 and SK06-14-33). — Nambel, near Grotte d'Amarur (167.0610833E, 15.45783333S; alt. 229 m), 6.IX.2006, forest, litter, Berlese extraction, Cahyo Rahmadi leg., 11 specimens (SK06-06-06, SK06-06-08, SK06-06-10 and SK06-06-11). — Natawa, small blue hole near the Nanda Blue Hole (167.169E, 15.31283333S; alt. 13 m), 13.IX.2006, forest, soil, Berlese extraction and washing, Louis Deharveng and Anne Bedos leg., 6 specimens (SK06-13-17 and SK06-13-20). — Natawa, on the hill (167.183167E, 15.2962S), 21.IX.2006, forest, litter and soil, Berlese extraction, Louis Deharveng and Anne Bedos leg., 45 specimens (SK06-21-14, SK06-21-16, SK06-21-17, SK06-21-19, SK06-21-20, SK06-21-22, SK06-21-26, SK06-21-28 and SK06-21-29). — Surunda, CTRAV (167.2070E, 15.4502S; alt. 30 m), 2.IX.2006, garden, litter, Berlese extraction, Louis Deharveng and Anne Bedos leg., 2 specimens (SK06-02-17b). — Penaoru, 11-13.XI.2006, forest, pitfall trap, 2 specimens (VAN06-P157).

ETYMOLOGY. — The new species is named in honour of Judith Najt, for her important contribution to the knowledge of Neanuridae Collembola.

DISTRIBUTION AND ECOLOGY. — The genus *Yuukianura* includes several forms linked to wet habitats along streams or seashore of Asian and Pacific regions, with a single species recorded from caves until now: *Y. hawaiiensis* n. comb. from Hawaii (Christiansen & Bellinger 1992). The new species described here, *Yuukianura judithae* n. sp., is very frequent in forest soil and litter at least on the karstic part of Santo island. But it can cope as well with cave environment where it is found foraging in very large number on fresh guano of bats or swiftlets (Deharveng *et al.* 2011a, b; fig. 1A), an ecology unknown so far in other Neanuridae of the world. The species was found in six different caves of the island, often in very large populations. Conversely, the new species was not collected from seashore habitats of the same island (Thibaud 2009), nor from the mangroves sampled by the first author, which are the most usual habitats for species

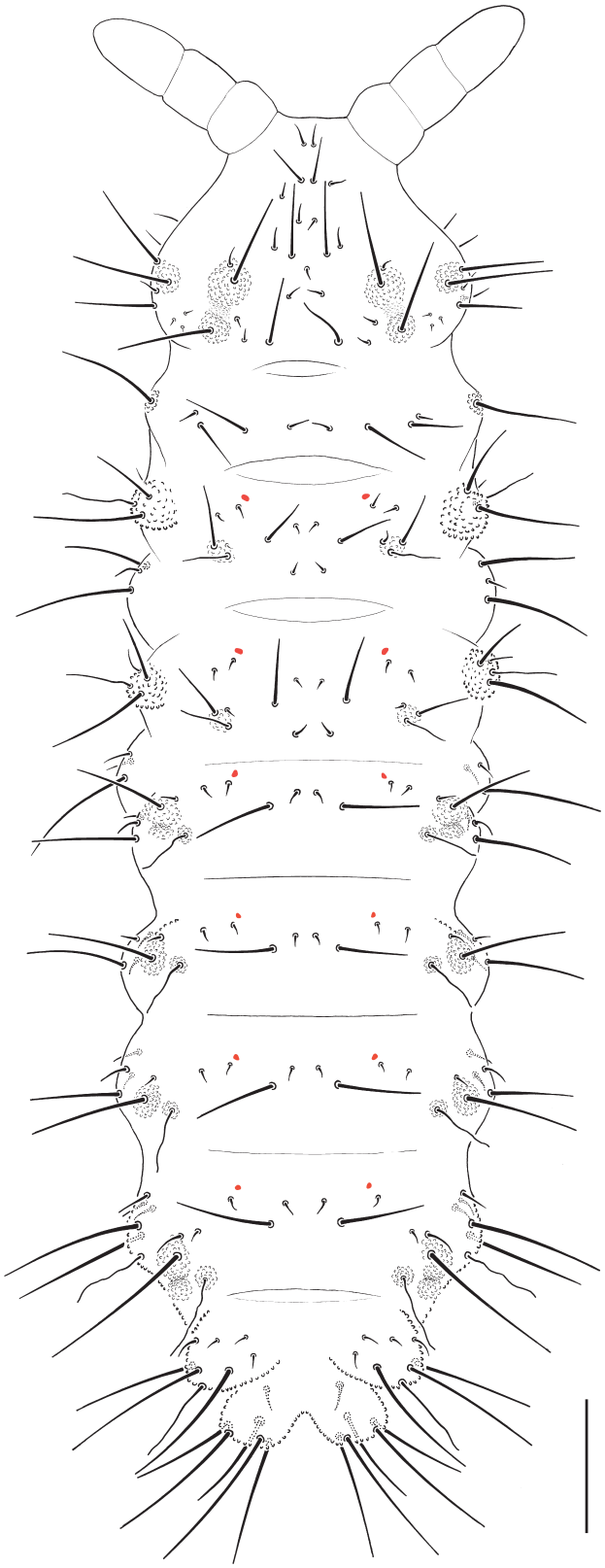

Fig. 2. — *Yuukianura judithae* n. sp. in dorsal view with tubercles and chaetae figured. Pseudopores as red spots. Granules not at scale. Scale bar: 200 µm.

of genus (Deharveng & Bedos 2011). The gut of the specimens from the type locality contained diverse figured material, including often many scales that probably come from Tineidae moths, frequently present as larvae in the guano, and as adults on the guano. The assumed adaptive shift from seashore or wet habitats to forest litter and moreover to guano, an extreme habitat in many respects (Mulec *et al.* 2016), implies considerable ecophysiological changes, and is noticed here for the first time among Collembola.

Description

General

Length (antennae excluded): 2003 (1800-2250) µm measured in ethanol (n = 12). Holotype: 2.2 mm measured in ethanol, 2.8 mm measured on slide. Colour whitish alive and in alcohol, body elongate, narrow, parallel-sided and flattened (Fig. 1). Eyes absent.

Cuticular ornementation (Fig. 3)

Granulation and tubercles. Body cuticle with fine and regular secondary granules, smaller than chaetal sockets. Tubercles inconspicuous or indicated by weak integument swellings associated to slight modification of the granulation (secondary granules slightly larger or less regularly arranged, and more prominent in tubercles). No tertiary granulation, no reticulations. Tubercles Oc well developed on head, De and (L + So) faint but distinct. On the tergites, tubercles faint or absent on Th. I; from Th. II to Abd. IV, tubercles Di not differentiated, De poorly differentiated and small, DL more distinct, L poorly differentiated. On Abd. I-V, tubercles De shifted towards DL.

Buttonhole structures distinct on head, Abd. I and Abd. IV, indicated by a fuzzy group of enlarged granules between Oc and De tubercles on head, and an additional small boss postero-external to De and DL tubercles on tergites.

Pseudopora of large size, oval to triangular, finely porous, present on head, subcoxae 2, tergites and sternites according to a fix pattern: one ventrally on head near each antennal basis; one basally on subcoxa 2, often difficult to detect; 011/1111 by half-tergite from Th. II to Abd. IV; 1 + 1, 1 + 1, 1 + 1/0, 1, 0, 1 + 1, 1 by sternite from Th. I to Abd. V (uneven on Abd. II and V).

Chaetal morphology

Ordinary chaetae well differentiated in macrochaetae and usually short mesochaetae, similar on body and appendages. Macrochaetae long, straight, smooth or extremely feebly scaled, acuminate (lateral ones) to finely sheathed and blunt (dorsal to dorso-lateral ones, Fig. 3B). Mesochaetae smooth or minutely scaled (appearing smooth at optical resolution), relatively long, acuminate, some straight (like Di2 on tergites) and some bent (like De2, De3 on Th. II-III). S-chaetae of tergites subequal, thinner and more hyaline than ordinary chaetae, distinctly shorter than closest macrochaetae (Fig. 2), 2 + ms, 2/1,1,1,2,1 by half tergite from Th. II to Abd. V. Antennal S-chaetae of various morphology, described below.

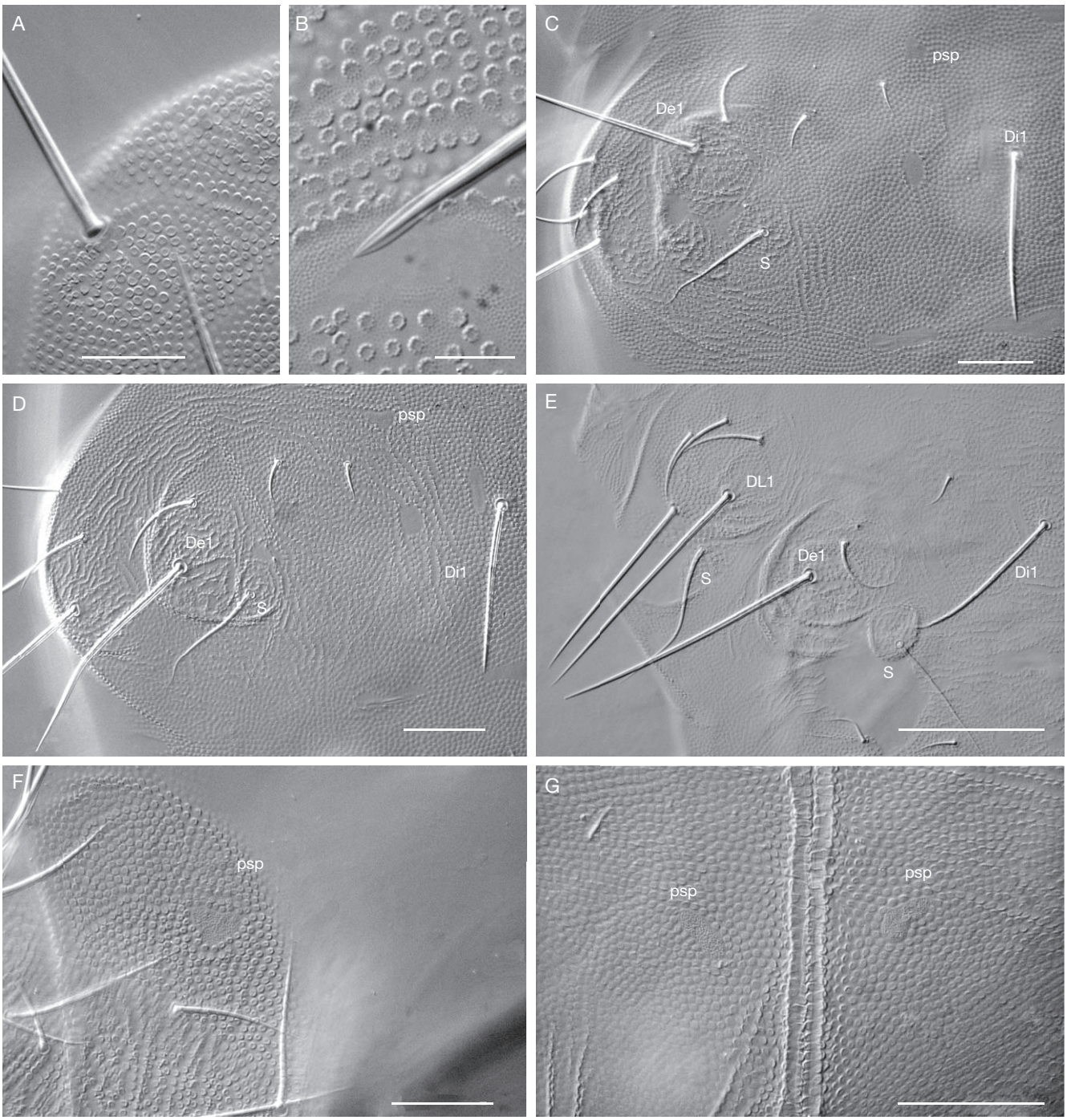

Fig. 3. — *Yuukianura judithae* n. sp.: **A**, tubercle L on Th. I constituted of slightly enlarged secondary granules; **B**, distal part of a narrowly sheathed macrochaeta (Di1 on head); **C**, De-DL area of Abd. I with its button-hole structure; **D**, De-DL area of Abd. II without button-hole structure; **E**, De-DL-L area of Abd. IV with its button-hole structure and 2 chaetae S; **F**, pseudopore on the ventral side of head near antennal basis; **G**, pseudopores on the sternite of Th. III. Abbreviations: see Material and methods. Scale bars: A, F, 25 µm, B, 10 µm, C-E, G, 50 µm.

Antennae (Fig. 4A, B)

Ant. I with 7 smooth mesochaetae. Ant. II with 11 subequal mesochaetae. Ant. III with 18 ordinary chaetae and the five S-chaetae of the Ant. III organ (2 minute, swollen and curved S-chaetae in a poorly marked cuticular fold, two subequal guard S-chaetae shorter than S1-8 of Ant. IV, the dorsal one shifted distally into Ant. IV, and one ventral mic). Ant. IV with flat, often ill-differentiated apical trilobed bulb and 8 thickened S-chaetae, S3-8 subequal, S1-2 longer and thinner; subapical organ minute. Ventrally, chaetae arrangement similar to the one illustrated by Smolis (2008) for *Endonura* Cassagnau, 1979, but with an additional chaeta cp, one of the basal cp larger and similar to chaetae brs, and distal hyaline-triangular chaetae stronger.

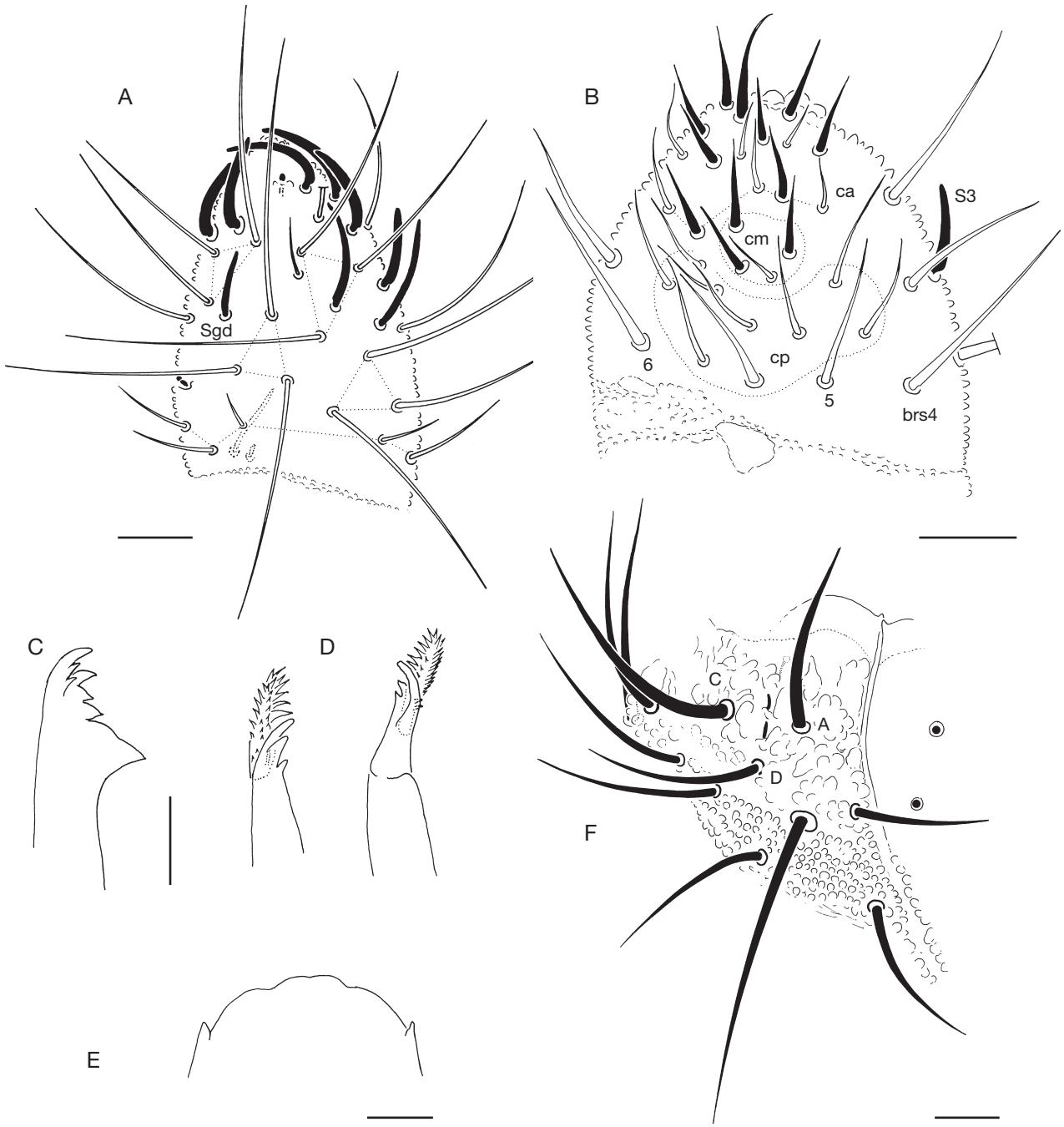

FIG. 4. — *Yuukianura judithae* n. sp.: **A**, dorsal side of Ant. III-IV; **B**, ventral side of Ant. IV of another specimen (triangular-pointed ventral chaetae filled in black); **C**, mandible head; **D**, maxilla head; **E**, labrum distal edge; **F**, labium. Abbreviations: see Material and methods. Scale bars: 20 µm.

Mouthparts (Fig. 4C-F)

Mandible head strong with 7 teeth, the basal one bigger but less sclerotized than others, the three distal ones in a parallel plan, the right mandible mirror of the left one. Maxilla head with 3 thick teeth and one lamella with about 20-30 cilia arranged on one side in several rows. Buccal cone short. Labrum truncated, its apical edge sinuous; labral formula 0/2,2. Labium truncated, with 4 basal, 3 distal, 4 lateral chaetae and 2 x-papilla. The distal chaetae A and C are thicker than others.

Head chaetotaxy and tubercles (Figs 2, 5; Table 1)

Only 3 + 3 distinct tubercles: Oc rather large, without chaeta Ocp; De, small and bearing only the macrochaeta De1, and (L + So) as a small tubercle with 4 chaetae (Table 1). Buttonhole present posteriorly to tubercle Oc. Chaetal group DL reduced to 3 short mes, without tubercles, that cannot be homologized. Chaeta D shifted close to chaeta F. Ventral head chaetotaxy not examined in detail.

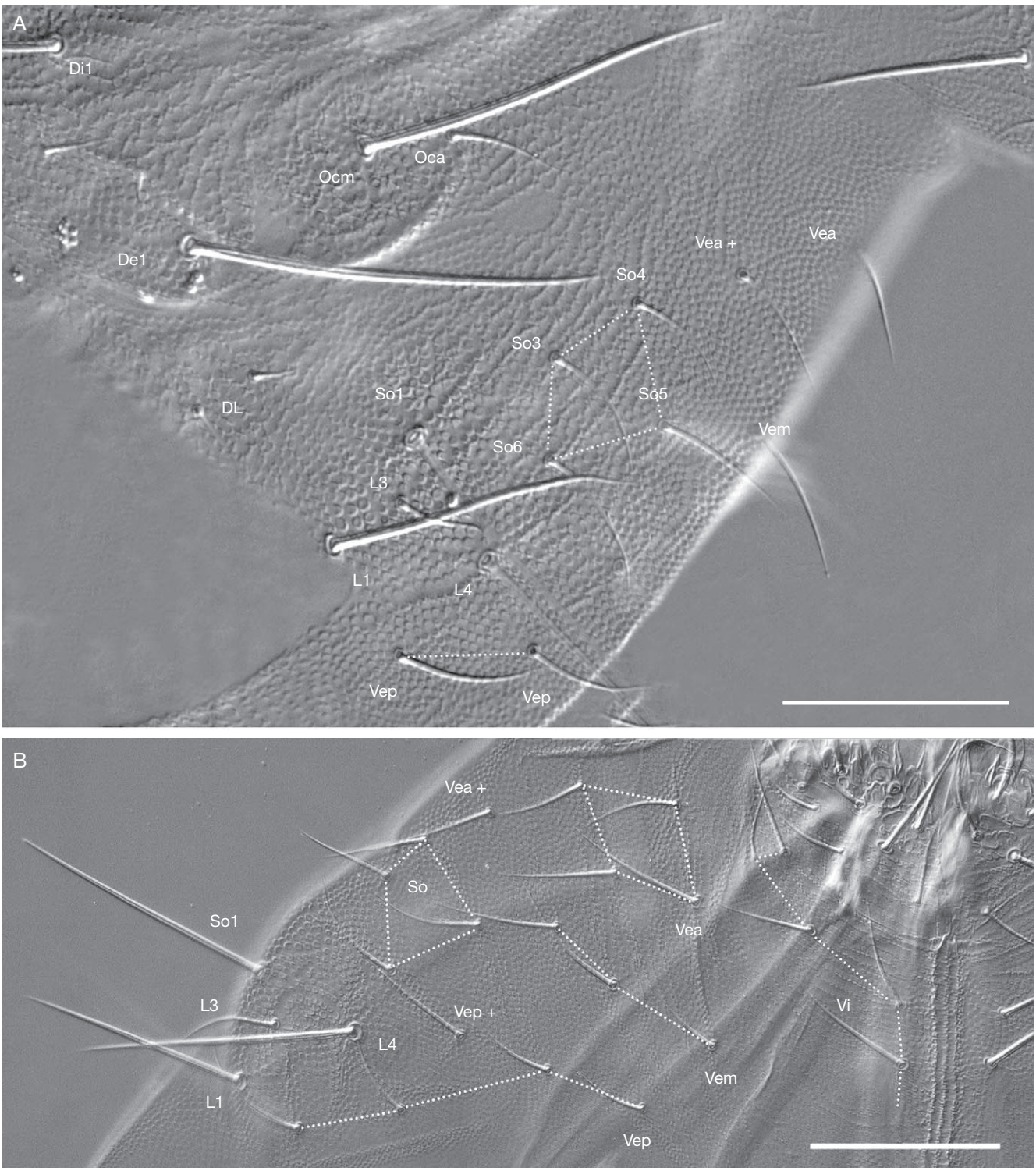

FIG. 5. — *Yuukianura judithae* n. sp.: **A**, chaetotaxy of lateral area on head; **B**, chaetotaxy of ventral side of head. Abbreviations: see Material and methods. Scale bars: 100 µm.

Body chaetotaxy and tubercles (Figs 2, 3, 6A; Table 1)
Di with 2 chaetae on Th. I, 3 chaetae on Th. II-III with Di2 and Di3 short, subequal, equally distant from Di1. Abd. I-IV with 2 chaetae Di, macrochaeta De1 absent, S-chaeta of the De group on a separate micro-tubercle adjacent to DL. Abd. IV with an additional S-chaetae located among the L group of chaetae. On Abd. V tubercles Di shift laterally and fused to (De + DL + L), resulting in 1 + 1 large tubercles on the tergite. Tubercles De and DL very close on Abd. I-IV. Female with 3 + 3 antegenital, 9-14 circumgenital and 1 + 1 genital chaetae. Male with 3 + 3 antegenital, 16-17 circumgenital and 4 + 4 genital

TABLE 1. — Chaetotaxy of *Yuukianura judithae* n. sp. Abbreviations: see Material and methods. Symbols: **(+)**, secondary granules are slightly enlarged in the corresponding chaetal group; *, chaetal homology uncertain.

Dorsal head chaetotaxy

Chaetal group	Tubercles	Number of chaetae	Type of chaetae	Chaetae
CL (unpaired)	(+)	6	M	F
			m	D, G
An	–	3	M	B
			m	C,E
Fr (unpaired)	(+)	3	m	A,O
Oc	+	2	m	Oca
			M	Ocm
Di, De	–	3	M	Di1
			m	Di1, Di2
De	+	1	M	De1
DL	–	3	m	3*
L+So	(+)	4	M	L1, L4, So1
	–	4	m	L3
			m	So3 to So6

Tergite chaetotaxy

Thorax	Di	De	DL	L
I	2 (M + m)	2 (M, m)	1 (M)	–
			3 (2 M, m) + S	
II	3 (M, 2 m)	4 (M, 3 m) + S	+ ms	3 (2 M, m)
III	3 (M, 2 m)	4 (M, 3 m) + S	3 (2 M, m) + S	3 (M, 2 m)
Abdomen				
I	2 (M, m)	(2 (m) + S) + (2 (M, m))		3-4 (M, 2-3 m)
II	2 (M, m)	(2 (m) + S) + (2 (M, m))		4 (M, 3 m)
III	2 (M, m)	(2 (m) + S) + (2 (M, m))		4-5 (M, 3-4 m)
IV	2 (M, m)	(1 (m) + S) + (3 (M, 2 m))		5 (2 M, 3 m) + S
V	———	7 (3 M, 4 m) + S	———	4 (1-2 M, 2-3 m)
VI	———	——— 6 ———		———

Sternite and appendage chaetotaxy

	Scx2	Cx	Tr	Fe	Ti
Th. I	0	3	6	11-12	14-(15)
Th. II	2	7	6	11	14-(15)
Th. III	2	8	6	9-10	13-(14)

Abd. I	VT: 4
Abd. II	Ve: 4-5 (Ve1 absent)
Abd. III	Ve: 4-5; Fu: 4 m, 0 mic
Abd. IV	Ve: 7 (Vei1 absent); VL: 5
Abd. V	Ag: 3; VL: 1
Abd. VI	Ve: 14; An: 3 mic

chaetae. No ventral modified chaetae on abdomen in the male. Abd. VI tergites with 6 + 6 chaetae arranged on 1 + 1 large, prominent, square and slightly divergent tubercles; each anal valve with 3 mic An, the internal one close to anal orifice often difficult to detect.

Legs (Fig. 6B; Table 1)

Legs with reduced chaetotaxy of tibiotarsi and femora (Table 1). Tibiotarsus without differentiated tenent hairs, with ventral chaetae B4 and B5 subequal, acuminate, longer than inner edge of claw. Femur II-III with a very minute dorsal microchaeta. Unguis with ventro-basal granulation, no internal undulations and no inner tooth.

Variations (Table 1)

Slight variations in chaetotaxy were observed on tibiotarsi, femora, lateral chaetae of Abd I-III, chaetae Ve of Abd. II-III and number of circumgenital chaetae. They are mentioned in Table 1.

REMARKS

Yuukianura judithae n. sp. can be separated from other species of the genus by the combination of lack of eyes, 2 chaetae on the ocular tubercle (Ocp absent), (5 + 5) chaetae on Th. I; (3 + S) chaetae in chaetal group DL of Th. II-III, 2 chaetae in chaetal group Di of Abd. I-IV (Di3 absent) and untoothed claw. The species exhibits also three remarkable features, rare in Neanurinae, but not documented in several other *Yuukianura* species: a strong reduction of tibiotarsal and to a lesser degree of femoral chaetotaxy; the absence of macrochaeta De on Abd. I-IV; and the presence of conspicuous buttonhole structures dorsally. Regarding the first character, only one species of Neanurinae, *Paranura sexpunctata* (Axelson, 1902), from the tribe Paranurini, is known to present a reduction of tibiotarsal chaetae as strong as that of *Y. judithae* n. sp. (Deharveng 1983a). The absence of macrochaeta De on Abd. I-IV is retrieved in *Y. yasudai* n. comb. and *Y. tongana*. Buttonhole structures have been reported in the same positions (head, Abd. I and Abd. IV) on the body of another Lobellini, *Coecoloba plumleyi* Deharveng, 1983 from Niugini, and of a few other Neanurinae of other tribes (Deharveng 1983b).

Lobellini *incertae sedis*

"*Yuukianura*" *cavicola* Yosii, 1956 *incertae sedis*

Yuukianura cavicola Yosii, 1956a: 621.

Protanura cavicola – Massoud 1967: 292.

Lobella (*Lobellina*) *cavicola* – Yosii 1977: 149.

TYPE COUNTRY. — Japan.

DISTRIBUTION. — Japan.

REMARKS

Mouthparts are complex, but the lateral shift of chaetae Di on Abd. V is less marked than in *Yuukianura*, and information on lateral S-chaetae arrangement is lacking. It is currently impossible to assign this species to *Yuukianura* or any other genus of Lobellini.

"*Yuukianura*" *nomurai* Yosii, 1956 *incertae sedis*

Yuukianura nomurai Yosii, 1956b: 43.

Protanura nomurai – Massoud 1967: 288.

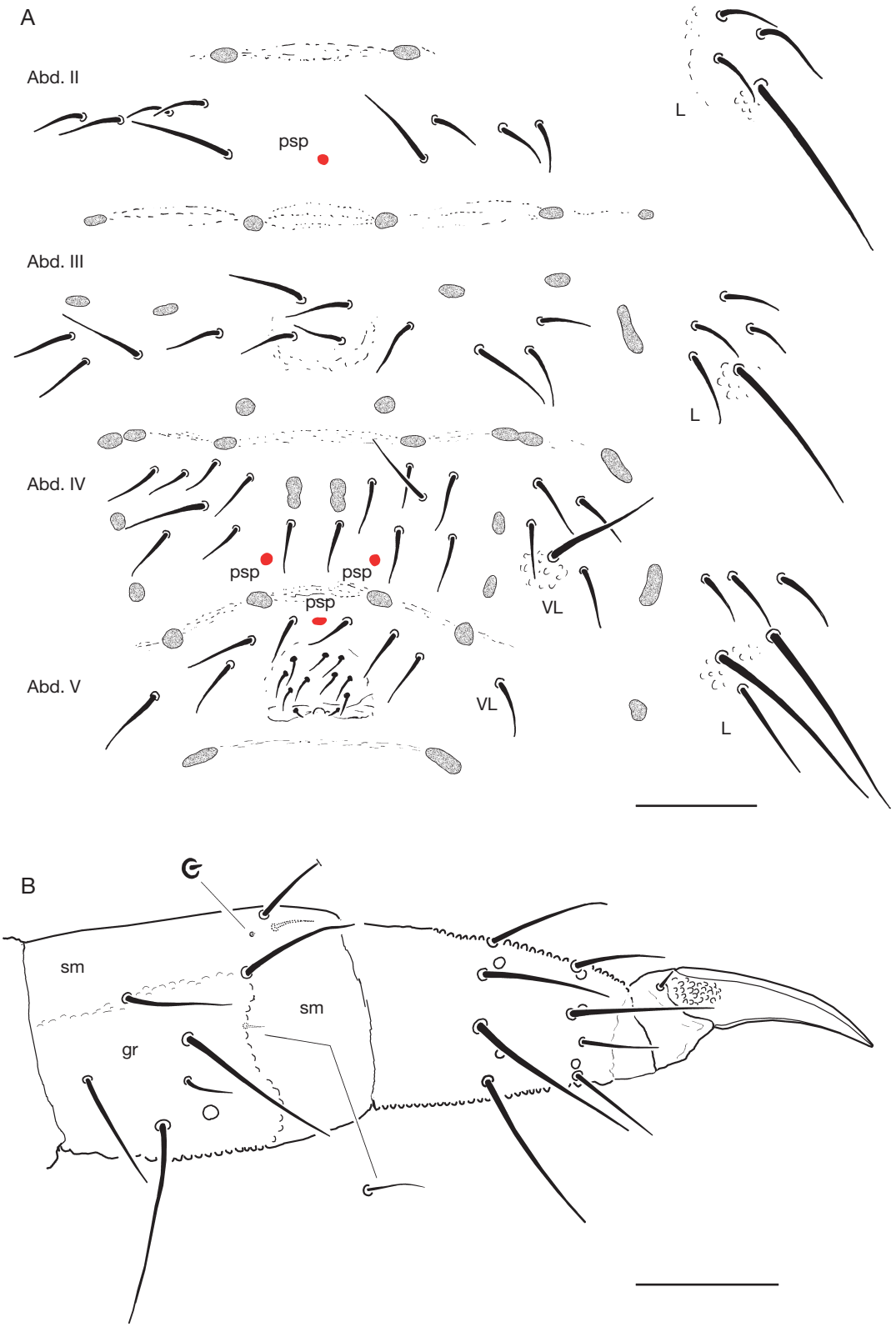

FIG. 6. — *Yuukianura judithae* n. sp.: **A**, ventral chaetotaxy of abdomen; areas devoid of secondary granulations (interpreted here as muscular insertions) as grey spots; pseudopores (**psp**) as red spots; **B**, chaetotaxy of tibiotarsus III. Abbreviations: **gr**, area with secondary granules; **sm**, smooth area devoid of secondary granules; other abbreviations: see Material and methods. Scale bars: 100 µm.

Lobella (*Lobella*) *nomurai* – Yosii 1977: 150.

Propeanura nomurai – Deharveng & Weiner 1984: 43.

Type country. — Japan.

Distribution. — Japan.

Remarks

This species is not a *Yuukianura*, as its chaetae Di are not shift laterally on Abd. V. Its mouthparts are not described. It is currently impossible to assign it safely to any other genus of Lobellini.

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