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Sergey G Ermilov, Andrey A Yurtaev. New species of Plateremaeoidea (Acari, Oribatida) from Mexico. *Acarologia*, 2023, 63 (2), pp.390-410. 10.24349/0qv6-5yy2 . hal-04055931

HAL Id: hal-04055931

<https://hal.science/hal-04055931>

Submitted on 3 Apr 2023

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Previous volumes (2010-2021): 250 € / year (4 issues)

Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France

ISSN 0044-586X (print), ISSN 2107-7207 (electronic)



The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under the reference ID 1500-024 through the « Investissements d'avenir » programme (Labex Agro: ANR-10-LABX-0001-01)



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New species of Plateremaeoidea (Acari, Oribatida) from Mexico

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Original research

ABSTRACT

Two new species of plateremaeoid oribatid mites from the genera *Jacotella* and *Plateremaeus*, *J. alexandrovskiyi* n. sp. and *P. sedovi* n. sp., are described from leaf litter of secondary semi-evergreen tropical forest in Mexico. The description of *J. alexandrovskiyi* is based on adult and tritonymphal instars, *P. sedovi* on adult and larval instars. Identification keys to known species of *Jacotella* and *Plateremaeus* are provided.

Keywords oribatid mites; *Jacotella*; *Plateremaeus*; taxonomy; morphology; identification key; Neotropical region

Zoobank <http://zoobank.org/OFE5E694-9682-44E8-B35E-077F3859898D>

Introduction

During taxonomic identification of oribatid mites (Acari, Oribatida) of the superfamily Plateremaeoidea (system according to Norton and Behan-Pelletier 2009; Schatz *et al.* 2011) collected from Mexico, we found two new species belonging the genera *Jacotella* Banks, 1947 (Gymnodamaeidae) and *Plateremaeus* Berlese, 1908 (Plateremaeidae). The primary goal of the paper is to describe these two new species under the names *Jacotella alexandrovskiyi* n. sp. and *Plateremaeus sedovi* n. sp.

The description of *J. alexandrovskiyi* is based on adult and tritonymphal instars. At present, the juvenile instars of *Jacotella* are known only in two species (Seniczak and Seniczak 2011; Ermilov and Liao 2021): *J. neonominata* Subías, 2004 (all instars are studied) and *J. puyuma* Ermilov and Liao, 2021 (tritonymph). The morphological comparison for juveniles of Gymnodamaeidae was provided by Bayartogtokh and Ermilov (2013), with subsequent additions in Ermilov and Salavatulin (2022). The description of *P. sedovi* is based on adult and larval instars. At present, the juvenile instars of *Plateremaeus* are unknown; hence, data on the larva of *P. sedovi* is the first information on juveniles in this genus. The juvenile instars in Plateremaeidae are known only in one species (Seniczak *et al.* 2020): *Lopheremaeus mirabilis* (Csiszár, 1962) (all instars are studied). The additional goals of the paper are to compare known tritonymphs within *Jacotella* and larvae within Plateremaeidae, and to present identification keys to adults of known species of *Jacotella* and *Plateremaeus*.

Jacotella was proposed by Banks (1947), with *Gymnodamaeus quadricaudiculus* Jacot, 1937 as type species. The genus comprises 10 known species, which have collectively a semicosmopolitan distribution (Subías 2022). The main generic traits have been summarized by Paschoal (1983) and Walter (2009). *Plateremaeus* was proposed by Berlese (1908), with *Damaeus ornatisissimus* Berlese, 1888 as type species. The genus comprises 10 known species (see the Discussion section below), which are distributed collectively in the Afrotropical, Australasian, Neotropical, and Oriental regions (Subías 2022). The main generic traits have been summarized by Paschoal (1987).


Presently, two species of *Jacotella* and three species of *Plateremaeus* were registered in the Mexican fauna (e.g., Palacios-Vargas and Iglesias 2004; Vázquez-González *et al.* 2016; Subías

Received 13 February 2023

Accepted 27 March 2023

Published 30 March 2023

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Academic editor

Pfingstl, Tobias

<https://doi.org/10.24349/0qv6-5yy2>

ISSN 0044-586X (print)

ISSN 2107-7207 (electronic)



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How to cite this article Ermilov S. G. and Yurtaev A. A. (2023), New species of Plateremaeoidea (Acari, Oribatida) from Mexico. *Acarologia* 63(2): 390-410. <https://doi.org/10.24349/0qv6-5yy2>

2022): *J. ornata* (Balogh and Csiszár, 1963), *J. quadricaudicula* (Jacot, 1937), *P. berlesei* Balogh and Mahunka, 1978, *P. costulatus* Balogh and Mahunka, 1978, and *P. ornatissimus* (Berlese, 1888).

Material and methods

Specimens

Our work is based on materials, which belong to collections of the Tyumen State University Museum of Zoology, Tyumen, Russia (Gashev *et al.* 2005).

Observation and documentation

Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the notogaster (in juveniles: gastronomic region). Notogastral (in juveniles: gastronomic) width refers to the maximum width of the notogaster (in juveniles: gastronomic region) in dorsal view. Lengths of body setae were measured in lateral aspect. All body measurements are presented in micrometers. Formulas for leg setation are given in parentheses according to the sequence trochanter-femur-genu-tibia-tarsus (famulus included). Formulas for leg solenidia are given in square brackets according to the sequence genu-tibia-tarsus. Drawings were made with a camera lucida using a Leica transmission light microscope “Leica DM 2500”. SEM micrographs were made with the aid of a JEOL–JSM-6510LV SEM microscope.

Terminology

Morphological terminology used in this paper mostly follows that of Grandjean: see Travé and Vachon (1975) for references; Norton (1977) for leg setal nomenclature; and Norton and Behan-Pelletier (2009) for overview.

Abbreviations

Prodorsum: *r* = ridge; *P* = propodolateral apophysis; *ro*, *le*, *in*, *bs*, *ex* = rostral, lamellar, interlamellar, bothridial, and exobothridial setae, respectively. *Notogaster/gastronomic region*: *LaE*, *PnE*, *DnE* = larval, protonymphal and deutonymphal exuvial scalp, respectively; *c*, *da*, *dm*, *dp*, *lp*, *h*, *p* = setae; *ia*, *im*, *ip*, *ih*, *ips* = lyrifissures/cupules; *gla* = opisthonotal gland opening. *Gnathosoma*: *a*, *m*, *h* = subcapitular setae; *or* = adoral seta; *a.s.* = axillary sacculae; *d*, *l*, *sup*, *inf*, *cm*, *acm*, *ul*, *su*, *vt*, *lt* = palp setae; ω = palp solenidion; *cha*, *chb* = cheliceral setae; *Tg* = Trägårdh’s organ. *Epimeral and lateral podosomal regions*: *Cl* = Claparède’s organ; *1a–1h*, *2a–2f*, *3a–3f*, *4a–4j* = epimeral setae; *Sp* = posterior tubercle of parastigmatic enantiophysis; *dis* = discidium. *Anogenital region*: *g*, *ag*, *an*, *ad* = genital, aggenital, anal, and adanal setae, respectively; *iad* = adanal lyrifissure/cupule. *Legs*: *Tr*, *Fe*, *Ge*, *Ti*, *Ta* = trochanter, femur, genu, tibia, and tarsus, respectively; *trp* = trochanteral process; *sac* = sacculae; *d*, *l*, *v*, *bv*, *ev*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv*, *pl* = setae; ω , σ , ϕ = solenidia. *Instar*: *La* = larva; *Tn* = tritonymph; *Ad* = adult.

Taxonomy

Jacotella alexandrovskiyi n. sp.

Zoobank: [F59E346B-A1F0-4CDD-9398-E8F5E18FBEE1](https://zoobank.org/F59E346B-A1F0-4CDD-9398-E8F5E18FBEE1)

(Figures 1–5)

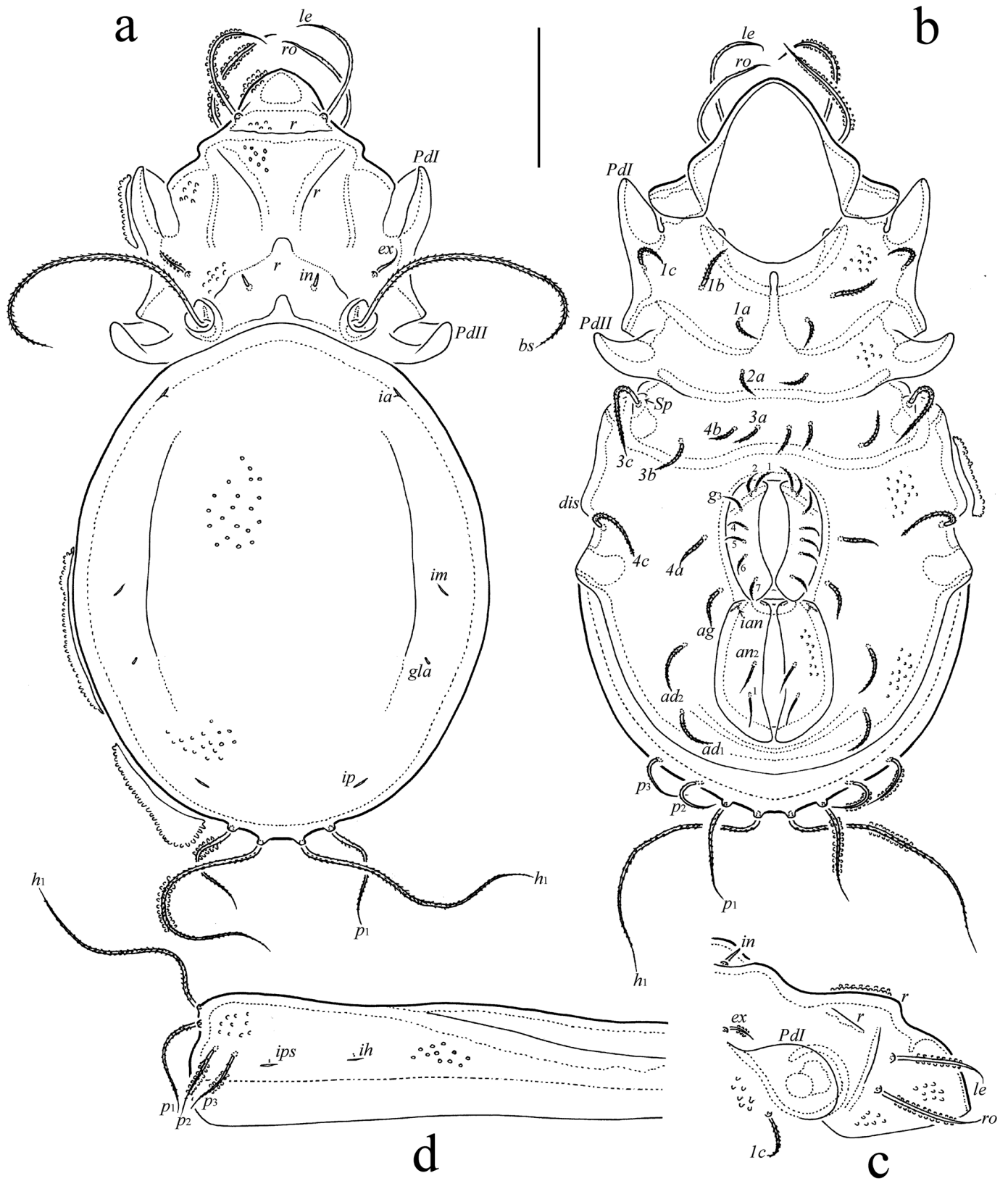


Figure 1 *Jacotella alexandrovskiyi* n. sp., adult: a – dorsal view (legs omitted); b – ventral view (gnathosoma and legs omitted); c – anterior part of prodorsum, lateral view; d – notogaster, lateral view. Scale bar 100 μ m.

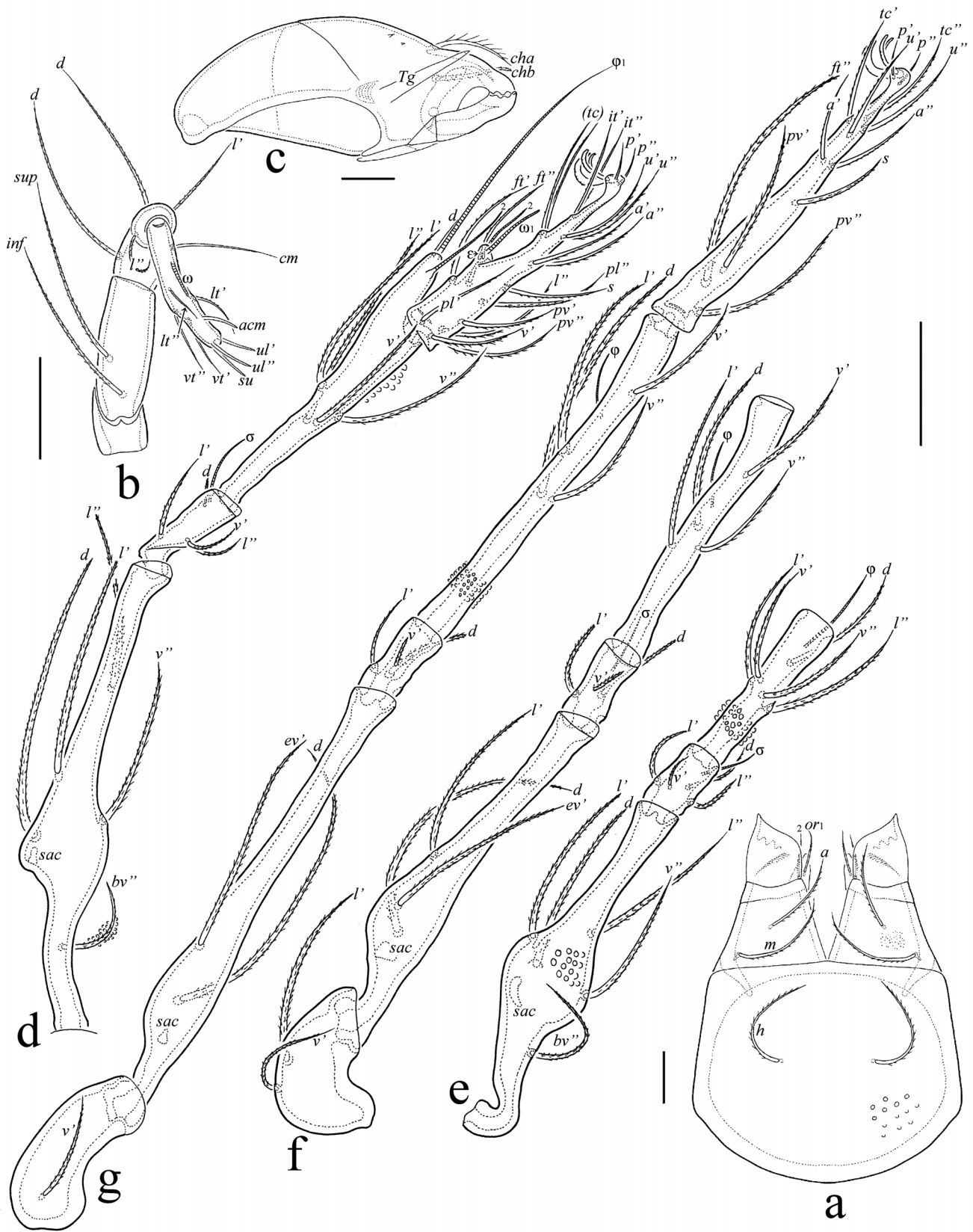


Figure 2 *Jacotella alexandrovskiyi* n. sp., adult: a – subcapitulum, ventral view; b – palp, right, antiaxial view; c – chelicera, left, paraxial view; d – leg I, without trochanter, left, paraxial view; e – leg II, without tarsus and trochanter, left, ventral view; f – leg III, without tarsus, left, ventral view; g – leg IV, left, ventral view. Scale bars 50 μ m (d–g), 20 μ m (a–c).

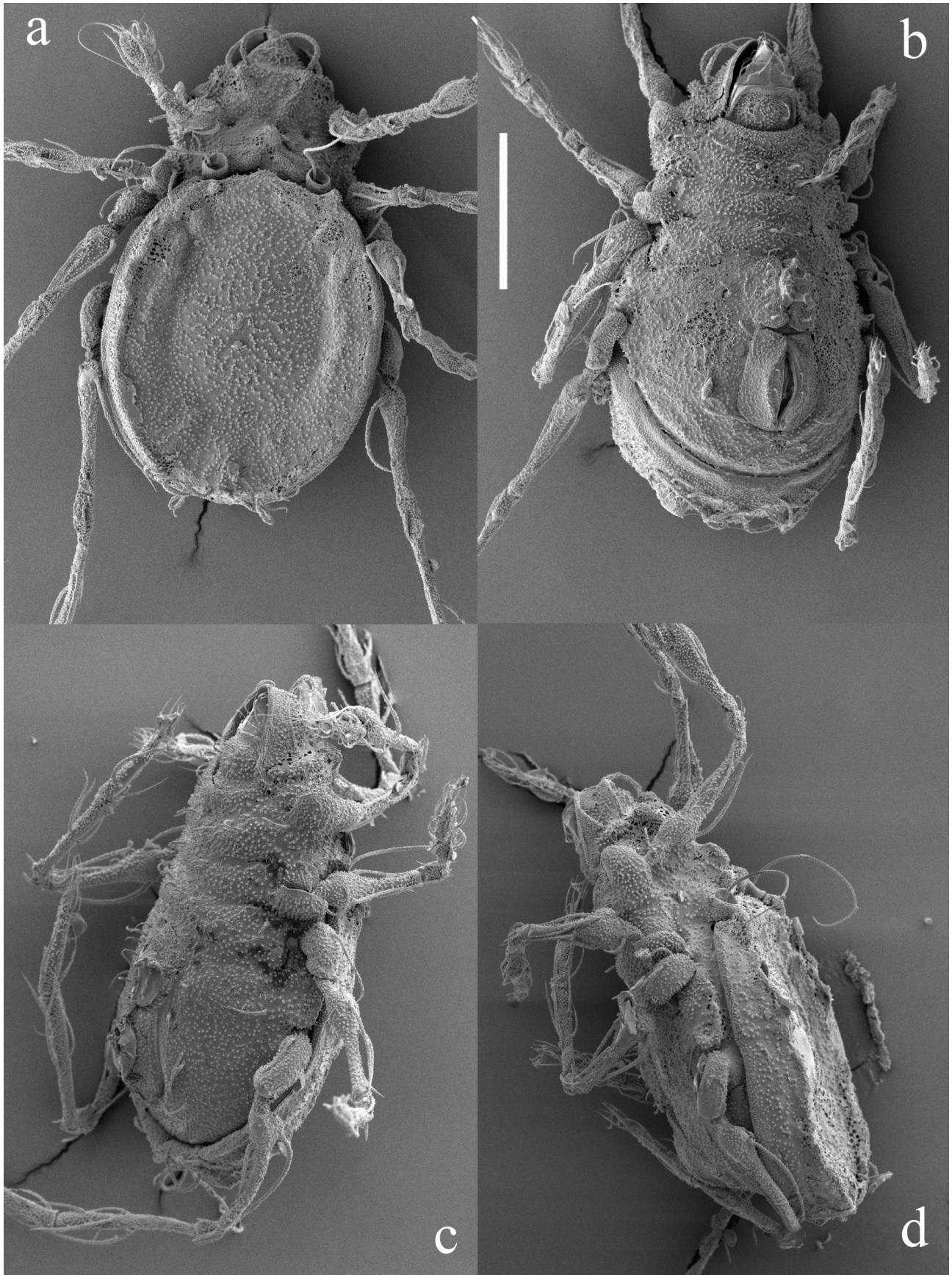


Figure 3 *Jacotella alexandrovskiyi* n. sp., adult, SEM micrographs: a – dorsal view; b – ventral view; c – left ventrolateral view; d – left lateral view. Scale bar 200 μ m.

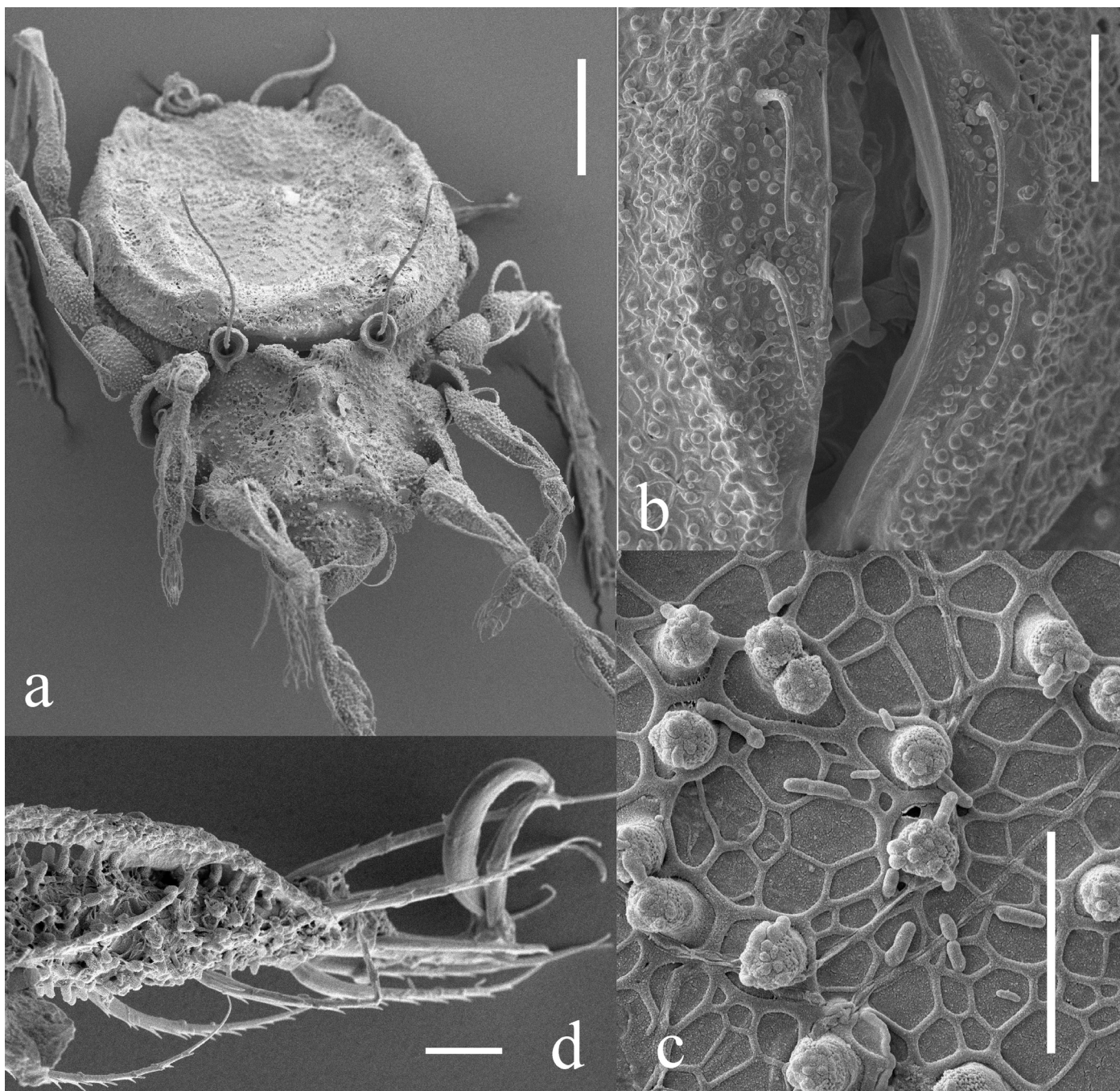


Figure 4 *Jacotella alexandrovskiyi* n. sp., adult, SEM micrographs: a – dorsoanterior view; b – anal setae; c – notogastral cerotegument; d – anterior part of leg IV, left, antiaxial view. Scale bars 100 µm (a), 20 µm (b), 10 µm (c, d).

Diagnosis

Adult

Body length: 570–645. Body surface microsculpturing tuberculate, covered by tubercular cerotegument. Bothridial seta very long, subflagellate, densely barbed. Central part of notogaster depressed. Four pairs of setae present: h_1 and p_1 long, subflagellate, densely barbed; p_2 and p_3 medium-sized, slightly thickened, pointed apically, densely barbed; h_1 longest, p_2 ,

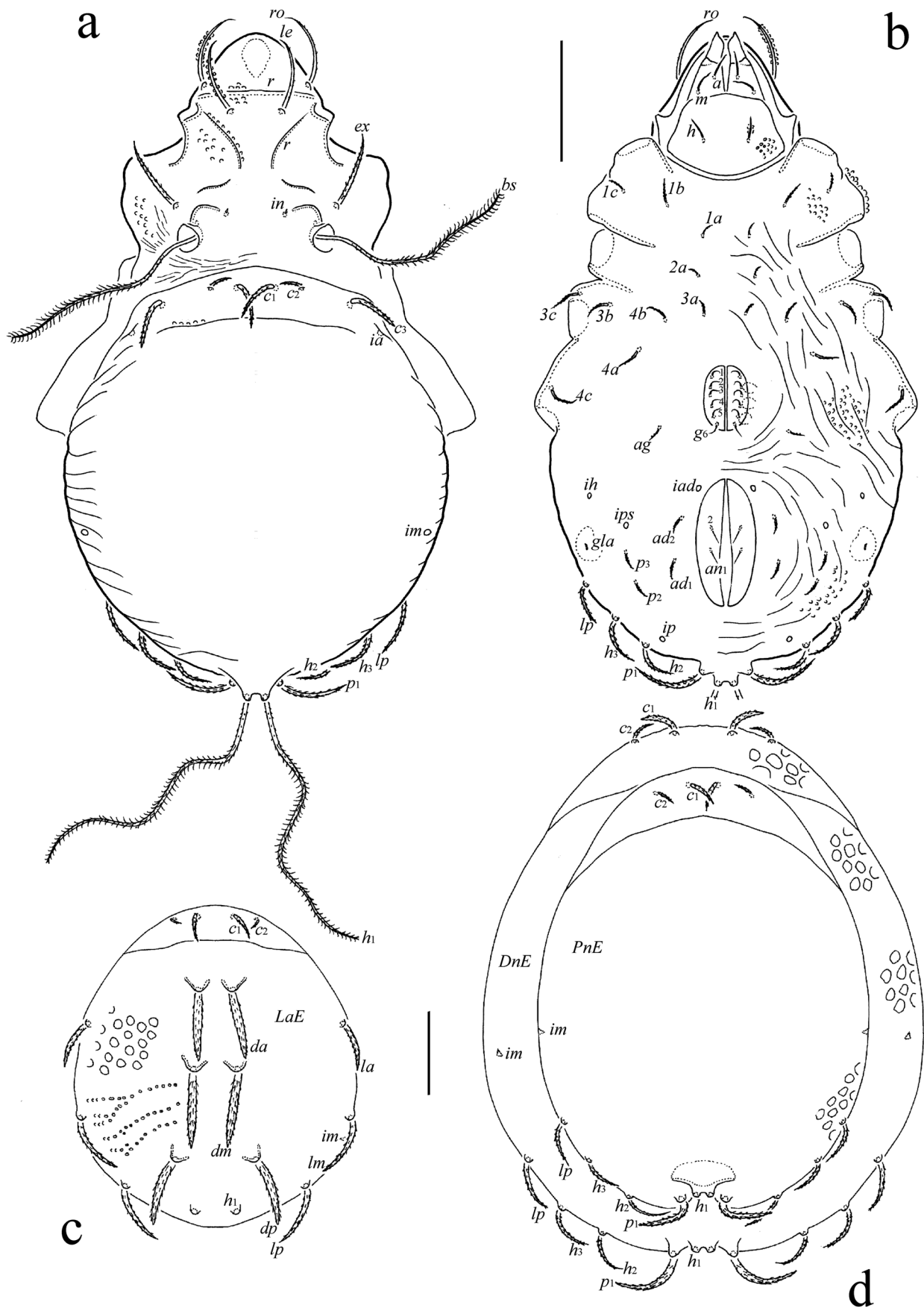


Figure 5 *Jacotella alexandrovskiyi* n. sp., tritonymph (a, b) and its exuvial scalps (c, d): a – dorsal view (legs omitted); b – ventral view (legs omitted); c – larval exuvial scalp; d – proto- and deutonymphal exuvial scalps. Scale bars 100 µm (a, b), 50 µm (c, d).

p_3 shortest. Epimeral, aggenital and adanal setae slightly thickened, pointed apically, densely barbed; anal seta setiform, roughened. Discidium developed. Two pairs of adanal setae present. All leg femora with sacculae.

Tritonymph

Bothridial seta and gastronotic seta h_1 very long, subflagellate, with short, dense cilia; other gastronotic ($c_1, c_2, c_3, lp, h_2, h_3, p_1, p_2, p_3$) and exuvial (except broken h_1) setae medium-sized or short, slightly thickened, pointed apically, densely barbed. Exobothridial seta comparatively long. Two pairs of adanal setae present.

Description of adult

Measurements — Body length: 630 (holotype, female), 570–645 (10 paratypes: five males and five females); body width: 360 (holotype), 330–375 (10 paratypes). No differences between males and females in body size.

Integument — (Figs 3a–d, 4a–d) – Body color brown. Body and legs covered by thick layer of gel-like cerotegument comprising tubercular structures (diameter up to 7); band-like and reticulate cerotegumental ornamentations absent on notogaster. Body surface densely microtuberculate. Setae often with cerotegument.

Prodorsum — (Figs 1a, 1c, 3a, 3c, 3d, 4a) – Rostrum rounded. Interbothridial region with broad inverse V-shaped ridge-like structure; two diagonal ridges present, each located between interbothridial ridge-like structure and insertion of lamellar seta; transverse ridge located between insertions of lamellar setae (Figs 1a, 3a). Enantiophysis absent. Rostral and lamellar setae (90–94) slightly thickened, pointed apically, roughened; interlamellar seta (11) spiniform, smooth; bothridial seta (206–213) subflagellate, densely barbed; exobothridial seta (22–26) setiform, roughened.

Notogaster — (Figs 1a, 1d, 3a, 3d, 4a) – Dorsal side flat, with depressed central part (Fig. 3a). Exuvial scalps absent in all specimens. Humeral process not developed. Four pairs of setae present: h_1 (161–180) and p_1 (75–82) subflagellate, densely barbed, inserted on distinct tubercles; p_2 and p_3 (both 49–52) slightly thickened, pointed apically, densely barbed. Opisthonotal gland opening and all lyrifissures distinct.

Gnathosoma — (Figs 2a–c) – Subcapitulum size: 135–146 × 97–109; subcapitular setae (a : 37–41; m, h : 45–49) setiform, barbed; adoral seta (15–19) setiform, roughened. Axillary sacculae absent. Palp length: 86–94; setation: 0–2–1–3–9(+ ω); postpalpal seta (7) spiniform, roughened. Chelicera length: 127–135; cheliceral seta cha (34) setiform, shortly ciliate dorsally; chb (30) slightly thickened, rounded apically, densely barbed.

Epimeral and lateral podosomal regions (Figs 1b, 1c, 3b–d) – Epimeral setal formula: 3–1–3–3; setae ($1a, 2a, 3a, 4a$: 22–30; $1b, 1c, 3b$: 30–34; $4b$: 26–34; $3c, 4c$: 52–60) slightly thickened, pointed apically, densely barbed. Tubercle Sa of parastigmatic enantiophysis not observed; Sp slightly developed. Discidium triangular, with rounded top.

Anogenital region (Figs 1b, 3b, 3c, 4b) – Seven pairs of genital setae present, all (22–26) setiform, densely barbed; aggenital (26–30) and adanal (34–37) setae slightly thickened, pointed apically, densely barbed; anal seta (22–26) setiform, roughened; two pairs of adanal setae present. Anal lyrifissure slightly visible; adanal lyrifissure not observed.

Legs — (Figs 2d–g, 3a–d, 4a, 4d) – Heterotridactylous; claws slightly barbed on dorsal side. Tibia I with dorsodistal cylindrical apophysis bearing two solenidia and seta. Femora I–IV with sacculae (instead porose area). Formulas of leg setation and solenidia: I (1–5–4–5–20) [1–2–2], II (1–5–4–5–16) [1–1–2], III (2–3–3–4–15) [1–1–0], IV (1–2–3–4–12) [0–1–0]; homology of setae and solenidia indicated in Table 1. Famulus on tarsus I sunken in cup-like cuticular deepening; seta s on tarsus I setiform, barbed (not eupathidial). Solenidion ϕ_1 on tibia I subflagellate; other solenidia rod-like.

Description of tritonymph

Measurements — Body length: 525–555 (three tritonymphs); gastronotum width: 300–330 (three tritonymphs).

Integument — (Figs 5a–c) – Body color grey yellowish. Body and legs covered by thick layer of gel-like cerotegument comprising tubercular structures (diameter up to 4). Gastronotum (except dorsocentral part), ventral side of body, lateral and basal parts of prodorsum folded. Setae with or without cerotegument. Exuvial scalps with reticulate ornamentation.

Prodorsum — (Fig. 5a) – Rostrum rounded. Dorsal side with two diagonal ridges in central part and one transverse ridge anteriorly to insertions of lamellar setae. Rostral (71–75), lamellar (71–75) and exobothridial (60–64) setae slightly thickened, pointed apically, *ro* and *le* roughened, *ex* densely barbed; interlamellar seta (4) spiniform, smooth; bothridial seta (206–225) subflagellate, with short, dense cilia.

Gastronotic region — (Figs 5a, 5b) – Gastronotum carrying exuvial scalps of previous instars; nymphal scalps with two pairs of strong posterior apophyses bearing setae *h*₁ and *p*₁; larval exuvial scalp with nine, proto- and deutonymphal scalps with seven pairs of setae, of them, *h*₁ broken, others medium-sized or short, thick (*da*, *dm*, *dp* in larval scalp) or slightly thickened, pointed apically, densely barbed. Ten pairs of gastronotic setae present: seta *h*₁ (225–236) subflagellate, with short, dense cilia; others (*c*₁, *c*₃: 52–60; *c*₂: 22–26; *lp*: 37–49; *h*₂, *h*₃: 41–56; *p*₁: 60–64; *p*₂, *p*₃: 26–30) slightly thickened, pointed apically, densely barbed. Opisthonotal gland opening and all cupules well visible.

Gnathosoma — (Fig. 5b) – Subcapitulum size: 120–124 × 94–97; subcapitular setae (*a*, *m*, *h*: 26–30) setiform, barbed; adoral seta (11) setiform, roughened. Axillary saccule absent. Palp length: 79; setation: 0–2–1–3–9(+ω); postpalpal seta (7) spiniform, smooth. Chelicera length: 116–120; cheliceral seta *cha* (30) setiform, shortly ciliate dorsally; *chb* (26) setiform, barbed.

Epimeral and lateral podosomal regions — (Fig. 5b) – Epimeral setal formula: 3–1–3–3; setae (*1a*, *2a*, *3a*: 15–19; others: 26–30) setiform, densely barbed.

Anogenital region — (Fig. 5b) – Genital and setae (15–19) setae setiform, roughened; aggenital (15–19) and adanal (26–34) setae setiform, densely barbed. Adanal cupule distinct.

Legs— Single claw of each leg strong, slightly roughened on dorsal side. Saccule and porose area on segments not observed. Formulas of leg setation and solenidia: I (1–5–4–5–18) [1–2–2], II (1–5–4–5–15) [1–1–2], III (2–3–3–4–15) [1–1–0], IV (1–2–3–4–12) [0–1–0]; homology of setae and solenidia indicated in Table 1. Famulus on tarsus I emergent.

Material examined

Holotype (female), 10 paratypes (five males and five females) and three tritonymphs: Mexico, 20°33'N, 87°13'W, Quintana Roo, Municipio de Solidaridad, vicinities of Playa del Carmen,

Table 1 Leg setation and solenidia of tritonymph and adult *Jacotella alexandrovskiyi* n. sp.

	<i>Tr</i>	<i>Fe</i>	<i>Ge</i>	<i>Ti</i>	<i>Ta</i>
Leg I					
<i>Tn</i>	<i>v</i> '	<i>d</i> , (<i>l</i>), <i>bv</i> "', <i>v</i> "'	<i>d</i> , (<i>l</i>), <i>v</i> ' , σ	(<i>l</i>), (<i>v</i>), <i>d</i> φ ₁ , φ ₂	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), (<i>pl</i>), ε, ω ₁ , ω ₂
<i>Ad</i>	<i>v</i> '	<i>d</i> , (<i>l</i>), <i>bv</i> "', <i>v</i> "'	<i>d</i> , (<i>l</i>), <i>v</i> ' , σ	(<i>l</i>), (<i>v</i>), <i>d</i> φ ₁ , φ ₂	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), <i>v</i> ' , (<i>pl</i>), <i>l</i> "', ε, ω ₁ , ω ₂
Leg II					
<i>Tn</i>	<i>v</i> '	<i>d</i> , (<i>l</i>), <i>bv</i> "', <i>v</i> "'	<i>d</i> , (<i>l</i>), <i>v</i> ' , σ	<i>d</i> , (<i>l</i>), (<i>v</i>), φ	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), <i>l</i> "', ω ₁ , ω ₂
<i>Ad</i>	<i>v</i> '	<i>d</i> , (<i>l</i>), <i>bv</i> "', <i>v</i> "'	<i>d</i> , (<i>l</i>), <i>v</i> ' , σ	<i>d</i> , (<i>l</i>), (<i>v</i>), φ	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), <i>l</i> "', ω ₁ , ω ₂
Leg III					
<i>Tn</i>	<i>l</i> ' , <i>v</i> '	<i>d</i> , <i>l</i> ' , <i>ev</i> '	<i>d</i> , <i>l</i> ' , <i>v</i> ' , σ	<i>d</i> , <i>l</i> ' , (<i>v</i>), φ	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>)
<i>Ad</i>	<i>l</i> ' , <i>v</i> '	<i>d</i> , <i>l</i> ' , <i>ev</i> '	<i>d</i> , <i>l</i> ' , <i>v</i> ' , σ	<i>d</i> , <i>l</i> ' , (<i>v</i>), φ	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>)

leaf litter under trees and bushes in secondary semi-evergreen tropical forest (data and collector unknown; collection of the Tyumen State University Museum of Zoology, Tyumen, Russia; Gashev *et al.* 2005).

Type deposition

The holotype is deposited in the collection of the Senckenberg Museum of Natural History, Görlitz, Germany; 10 paratypes and three tritonymphs are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia. All specimens are preserved in 70% solution of ethanol with a drop of glycerol.

Etymology

The species is named in honor of our friend and colleague, well-known soil scientist Dr. Alexander L. Alexandrovskiy (Institute of Geography, Russian Academy of Sciences, Moscow, Russia).

Remarks

The adult of *Jacotella alexandrovskiyi* n. sp. differs from all representatives of the genus by the presence of very long (versus distinctly shorter), subflagellate (versus with slightly or well developed head) bothridial seta. *Jacotella ornata* (Balogh and Csiszár, 1963), which is known from the Neotropical region and India, and *J. puyuma* Ermilov and Liao, 2021, which is known from Taiwan, have almost setiform bothridial seta with slightly developed elongate head due cerotegument, however, the new species differs from both by the presence of two pairs (versus three) of adanal setae. Also, *J. ornata* has specifically band-like cerotegument (versus absent) on the notogaster and five (versus seven) pairs of genital setae; *J. puyuma* smaller (length: 365–415 versus 570–645) and has (versus absent) specific ridge-like structures in the central part of notogaster and deep depression in anterior part of the prodorsum.

The tritonymphal instar in *Jacotella* is known for *J. neonominata* (see Seniczak and Seniczak 2011) and *J. puyuma* (see Ermilov and Liao 2021). The tritonymph of *J. alexandrovskiyi* differs from those in both species by the length and morphology of bothridial (very long, subflagellate, with short, dense cilia versus distinctly shorter, fusiform, barbed), exobothridial (long, thickened versus minute, spiniform) and gastronotic (h_1 very long, subflagellate, others medium-sized or short, slightly thickened versus c_3 very long, subflagellate, others medium-sized or short, phylliform except long seta h_1 in *J. puyuma*), and exuvial (da , dm , dp medium-sized, thick c_1 , c_2 , la , lm , lp , h_2 , h_3 , p_1 shorter, slightly thickened versus da , dm , dp , c_1 , c_2 , la , lm , lp , h_2 , h_3 , p_1 mostly short, phylliform) setae, and the number (two pairs versus three pairs) of adanal setae.

Plateremaeus sedovi n. sp.

Zoobank: [AB0C5C94-471C-4DF6-967A-D5CCC5C673CD](https://doi.org/10.24349/0qv6-5yy2)

(Figures 6–10)

Diagnosis

Adult

Body length: 870–975. Body surface microsculpturing tuberculate, covered by tubercular and shortly filamentous cerotegument; subcapitular mentum, dorsal part of prodorsum, lateral part of epimere I, and leg femora I–IV and trochanters III, IV partially foveolate. Rostrum rounded, without lateral teeth. Enantiophysis absent. Bothridial seta long, thickened, slightly barbed, distally bent having unilateral short cilia creating illusion of a slightly developed head. Five pairs of medium-sized, setiform, barbed notogastral setae (lp , h_1 , h_2 , p_2 , p_3) present; h_1 longest. Epimeral setal formula: 8–6–6–10. Epimeral and adanal setae slightly thickened, pointed apically, roughened; genital, aggenital and anal setae setiform, slightly roughened. Seven

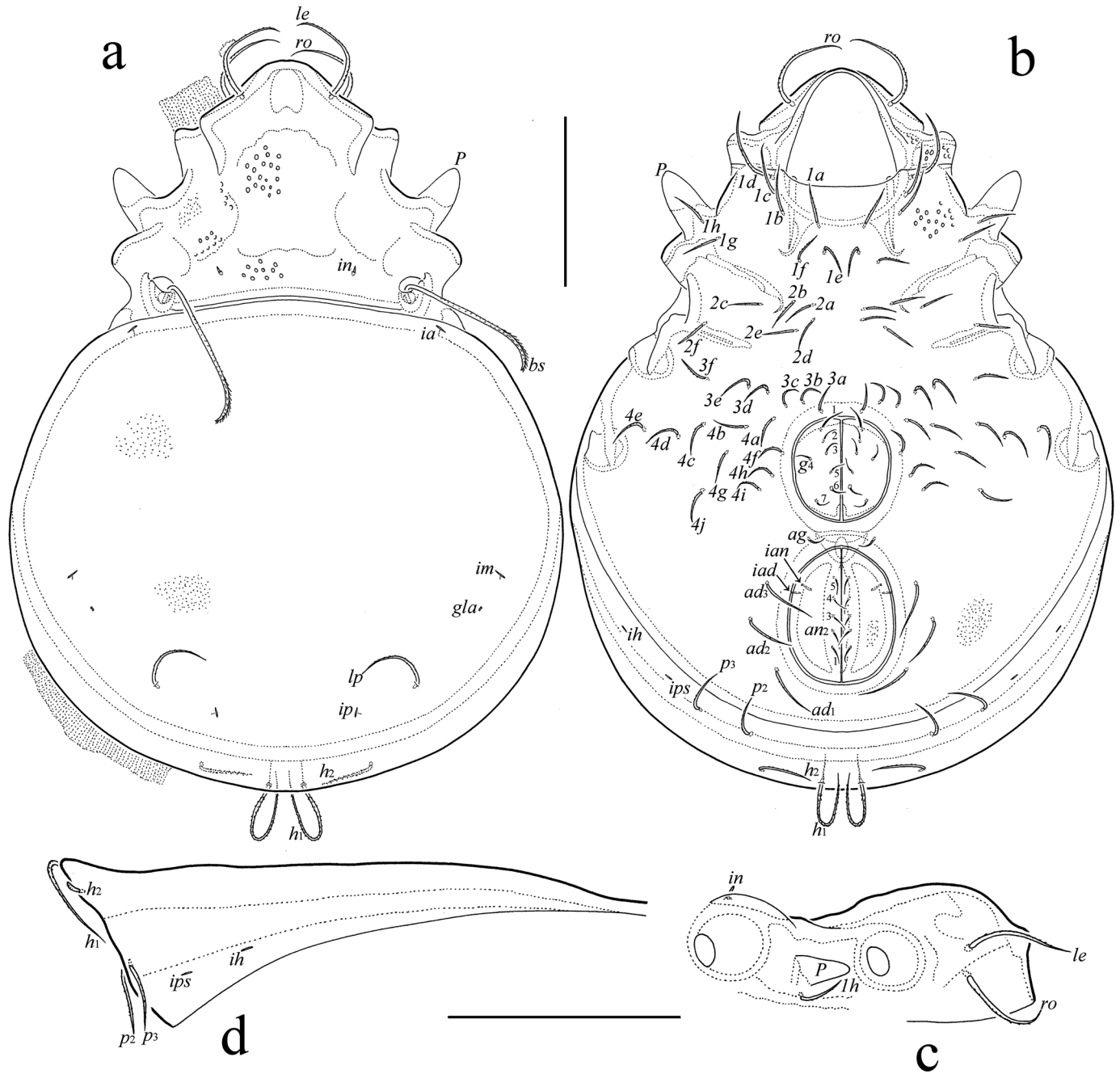


Figure 6 *Plateremaeus sedovi* n. sp., adult: a – dorsal view (legs omitted); b – ventral view (gnathosoma and legs omitted); c – anterior part of prodorsum, lateral view; d – notogaster, lateral view. Scale bar 200 μm.

pairs of genital setae present. Adanal setae *ad₂* and *ad₃* located close to anal aperture. Leg trochanters III, IV with dorsodistal process.

Larva

Subcapitular mentum and partially prodorsum reticulate; gastronotum, epimeral and anogenital regions folded. Bothridial seta with large, fusiform, barbed head. Eight pairs of gastronotic setae (*c₁*, *c₂*, *dm*, *dp*, *lp*, *h₁*, *h₂*, *h₃*) present: *h₃* represented by small alveolus; *lp*, *h₁* long,

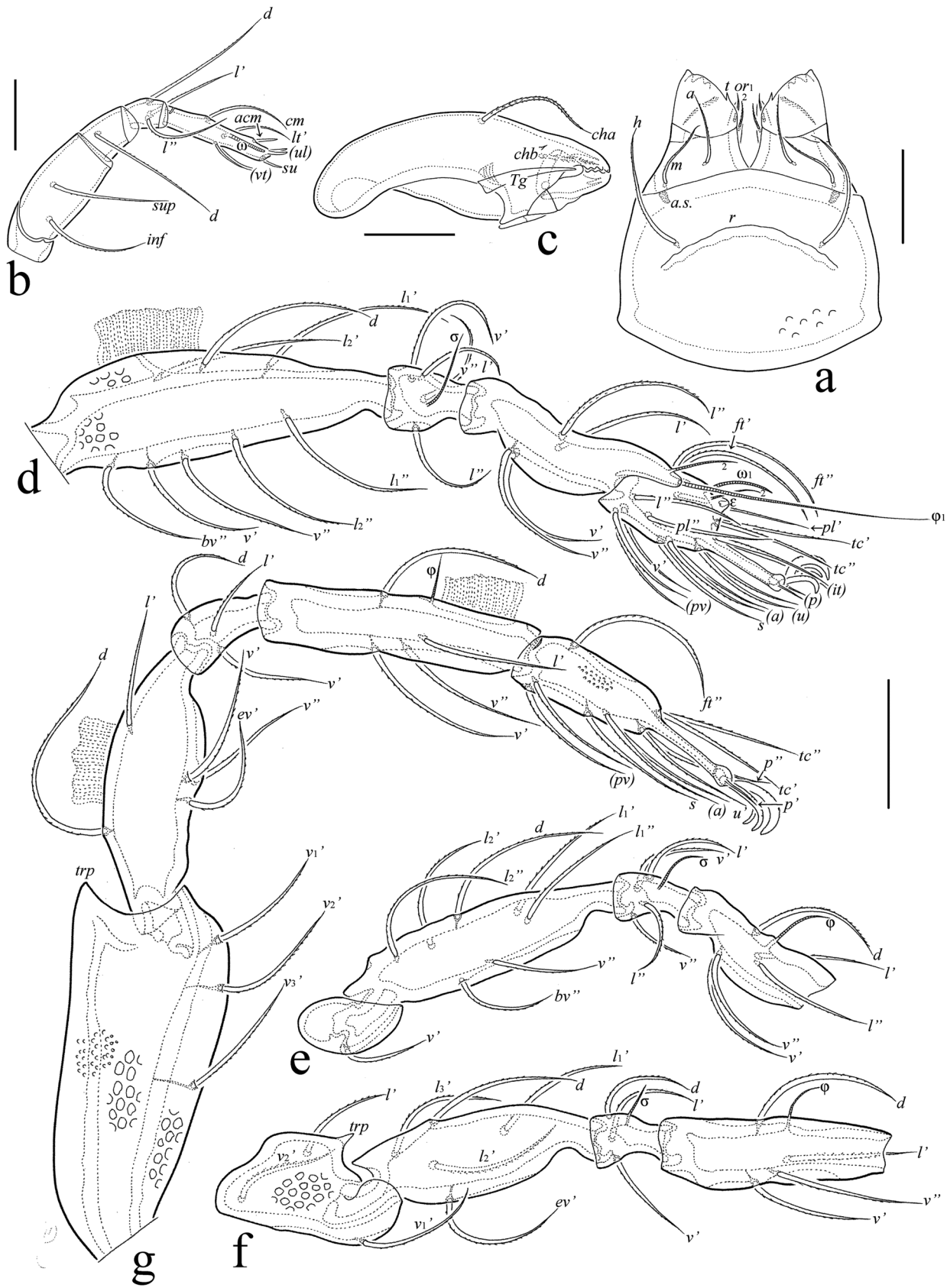


Figure 7 *Plateremaeus sedovi* n. sp., adult: a – subcapitulum, ventral view; b – palp, right, antiaxial view; c – chelicera, left, paraxial view; d – leg I, without trochanter, right, antiaxial view; e – leg II, without tarsus, right, antiaxial view; f – leg III, without tarsus, right, paraxial view; g – leg IV, left, antiaxial view. Scale bars 100 μ m (d–g), 50 μ m (a, c), 20 μ m (b).

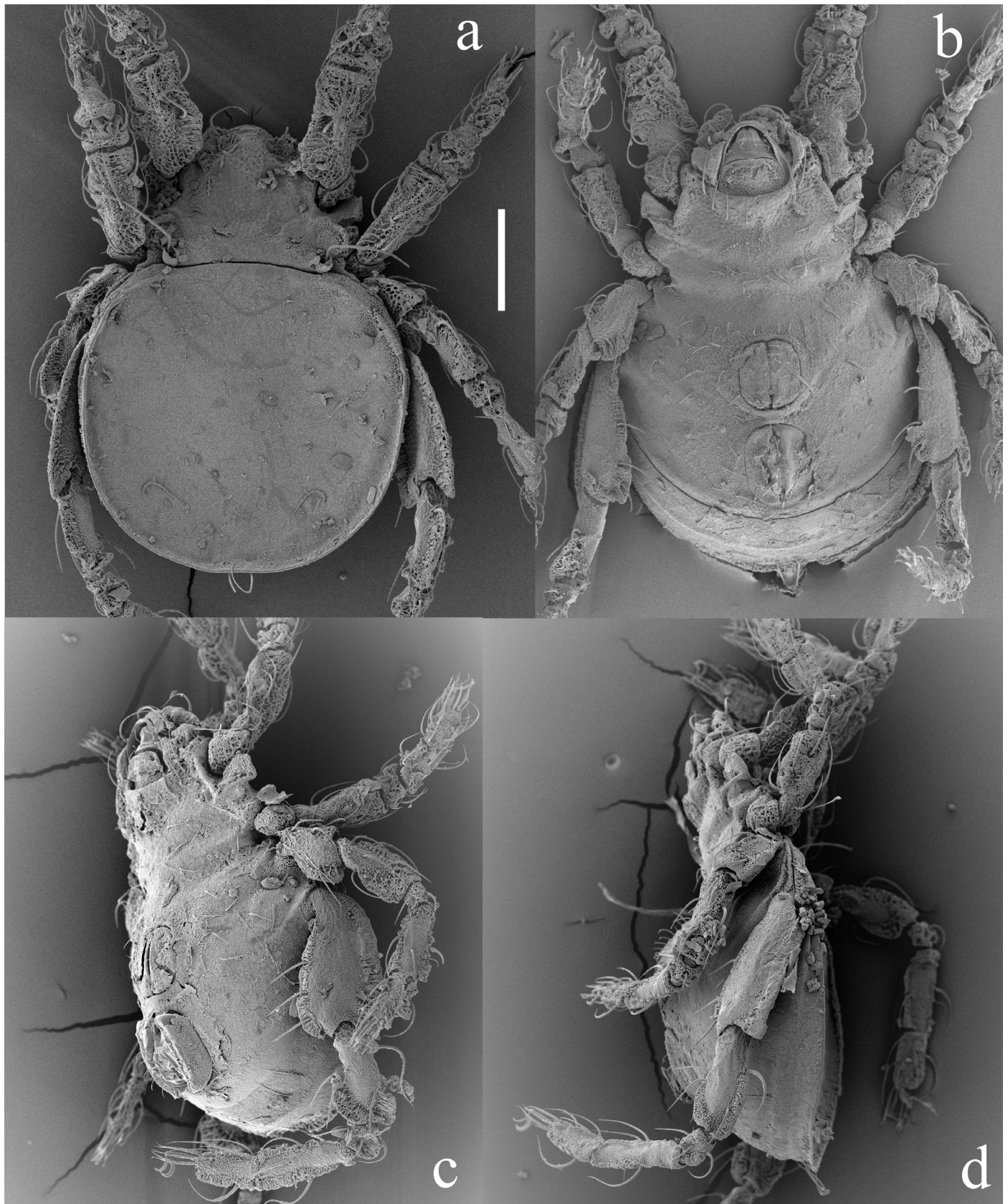


Figure 8 *Plateremaeus sedovi* n. sp., adult, SEM micrographs: a – dorsal view; b – ventral view; c – left ventrolateral view; d – left lateral view. Scale bar 200 μ m.

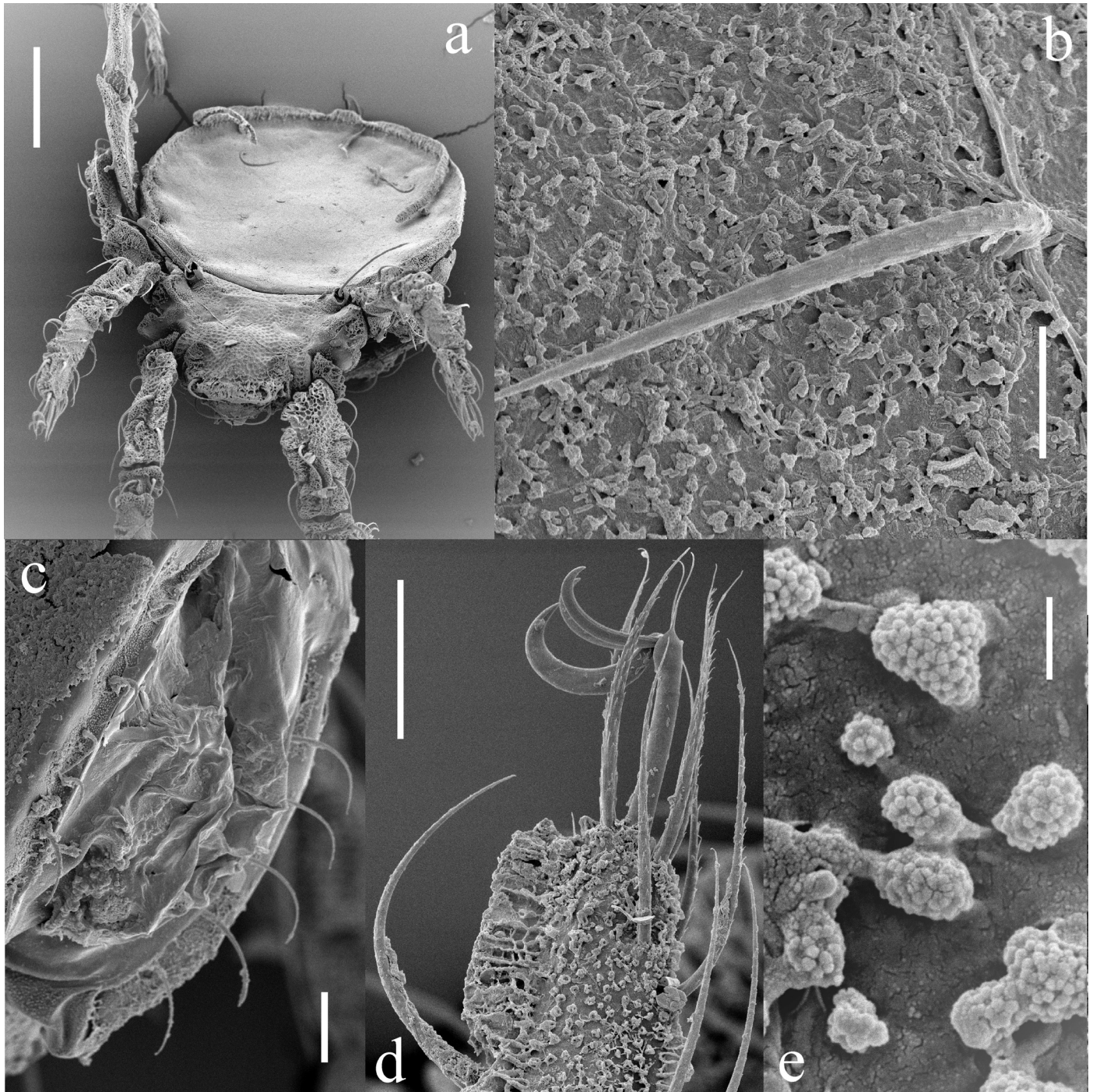


Figure 9 *Plateremaeus sedovi* n. sp., adult, SEM micrographs: a – dorsoanterior view; b – cerotegument and seta *2e* on epimere II; c – anal setae; d – anterior part of leg IV, left, antiaxial view; e – notogastral cerotegument. Scale bars 200 μ m (a), 50 μ m (d), 20 μ m (c), 10 μ m (b), 1 μ m (e).

subflagellate, barbed; others medium-sized, setiform, barbed.

Description of adult

Measurements — Body length: 900 (holotype: male), 870–975 (eight paratypes: four males and four females); body width: 675 (holotype), 660–675 (eight paratypes). No differences

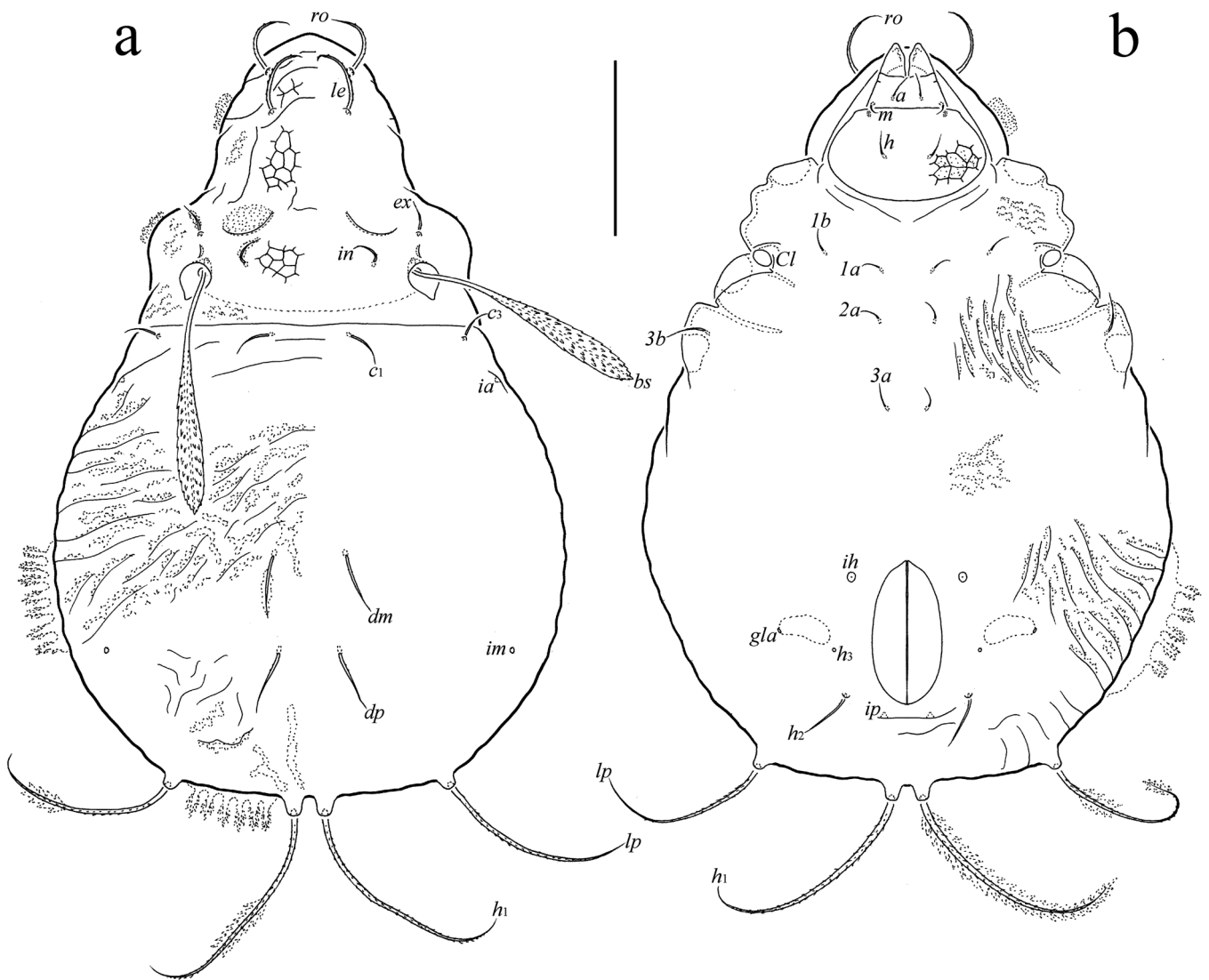


Figure 10 *Plateremaeus sedovi* n. sp., larva: a – dorsal view (legs omitted); b – ventral view (legs omitted); c – larval exuvial scalps; d – proto- and deutonymphal exuvial scalps. Scale bar 100 μ m.

between males and females in body size.

Integument — (Figs 8a–d, 9a, 9b, 9d, 9e) – Body color brown to dark brown. Body and legs covered by thick layer of gel-like cerotegument comprising microgranular and shortly filamentous structures; reticulate cerotegumental pattern absent. Body surface densely microtuberculate; subcapitular mentum, dorsal part of prodorsum, lateral part of epimere I, and leg femora I–IV and trochanters III, IV partially foveolate (diameter up to 7). Setae with or without cerotegument.

Prodorsum — (Figs 6a, 6c, 8a, 8c, 8d, 9a) – Rostrum rounded, without lateral teeth. Centrodorsal part of prodorsum slightly depressed (Fig. 8a). Enantiophysis absent. Propodolateral apophysis large, thorn-like. Rostral and lamellar setae (135–150) setiform, roughened; interlamellar seta (9–11) spiniform, smooth; bothridial seta (195–202) thickened, slightly barbed, distally bent having unilateral short cilia creating illusion of a slightly developed head; exobothridial seta absent.

Notogaster — (Figs 6a, 6d, 8a, 8d, 9a) – Dorsal side flat. Exuvial scalps absent in all specimens. Humeral process not developed. Five pairs of setae present, all (*lp*: 82–90; *h*₁: 176–187; *h*₂, *p*₂, *p*₃: 60–67) setiform, barbed. Opisthonotal gland opening and all lyrifissures distinct.

Gnathosoma — (Figs 7a–c) – Subcapitulum size: 165–169 × 142–150; subcapitular rutellum mediodistal tooth; subcapitular mentum with broad transverse ridge; subcapitular (*a*, *m*: 45–49; *h*: 79–86) and adoral (19) setae setiform, roughened. Axillary saccule present. Palp length: 101–105; setation: 0–2–1–3–8(+ω); postpalpal seta (7) spiniform, roughened. Chelicera length: 161–169; cheliceral setae (*cha*: 75–82; *chb*: 30–32) setiform, barbed.

Epimeral and lateral podosomal regions — (Figs 6b, 6c, 8b–d) – Epimeral setal formula: 8–6–6–10; setae (*lb*: 52–60; *lc*: 64–67; *ld*: 97–106; others: 41–45) slightly thickened, pointed apically, roughened. Tubercles of parastigmatic enantiophysis and discidium absent.

Anogenital region — (Figs 6b, 8b, 8c, 9c) – Genital, aggenital and anal setae (22–30) setiform, slightly roughened; adanal seta (64–67) slightly thickened, pointed apically, roughened; seven pairs of genital setae present; adanal setae *ad*₂ and *ad*₃ located close to anal aperture. Anal and adanal lyrifissures slightly visible.

Legs — (Figs 7d–g, 8a–d, 9a, 9d) – Heterotridactylous; claws slightly barbed on dorsal side. Tibia I with dorsodistal cylindrical apophysis bearing two solenidia. Trochanter III with small tooth-like dorsodistal triangular process; trochanter IV with large triangular dorsodistal triangular process. Femora I–IV and trochanters III, IV without porose area and saccule. Formulas of leg setation and solenidia: I (1–8–4–4–20) [1–2–2], II (1–7–4–5–16) [1–1–2], III (3–5–3–4–15) [1–1–0], IV (3–5–3–4–12) [0–1–0]; homology of setae and solenidia indicated in Table 2. Famulus on tarsus I sunken in cup-like cuticular deepening; seta *s* on tarsus I setiform, roughened (not eupathidial). Solenidion φ₁ on tibia I subflagellate; other solenidia rod-like.

Description of larva

Measurements — Body length: 435–450 (three larvae); gastronotum width: 270–300 (three larvae).

Integument — (Figs 10a, 10b) – Body color grey yellowish. Body and legs covered by thick layer of gel-like cerotegument comprising amorphous, granular and bacillar structures; bacillar structures often additionally covered by small cerotegumental scales. Prodorsum partially reticulate; gastronotum and ventral side of body folded. Setae with or without cerotegument.

Prodorsum — (Fig. 10a) – Rostrum rounded. Rostral and lamellar setae (49–60) setiform,

Table 2 Leg setation and solenidia of larva and adult *Plateremaeus sedovi* n. sp.

	<i>Tr</i>	<i>Fe</i>	<i>Ge</i>	<i>Ti</i>	<i>Ta</i>
Leg I					
<i>La</i>	–	<i>d</i> , <i>bv</i> ''	(<i>l</i>), σ	(<i>l</i>), <i>v</i> ' , φ ₁	(<i>ft</i>), (<i>tc</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), (<i>pl</i>), ε, ω ₁
<i>Ad</i>	<i>v</i> '	<i>d</i> , (<i>l</i> ₁), (<i>l</i> ₂), <i>bv</i> '' , (<i>v</i>)	(<i>l</i>), (<i>v</i>), σ	(<i>l</i>), (<i>v</i>), φ ₁ , φ ₂	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), <i>v</i> ' , (<i>pl</i>), <i>l</i> ' , ε, ω ₁ , ω ₂
Leg II					
<i>La</i>	–	<i>d</i> , <i>bv</i> ''	(<i>l</i>), σ	<i>d</i> , <i>l</i> ' , <i>v</i> ' , φ	(<i>ft</i>), (<i>tc</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), ω ₁
<i>Ad</i>	<i>v</i> '	<i>d</i> , (<i>l</i> ₁), (<i>l</i> ₂), <i>bv</i> '' , <i>v</i> ''	(<i>l</i>), (<i>v</i>), σ	<i>d</i> , (<i>l</i>), (<i>v</i>), φ	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>), <i>l</i> ' , ω ₁ , ω ₂
Leg III					
<i>La</i>	–	<i>d</i> , <i>ev</i> '	<i>d</i> , <i>l</i> ' , σ	<i>d</i> , <i>v</i> ' , φ	(<i>ft</i>), (<i>tc</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>)
<i>Ad</i>	<i>l</i> ' , <i>v</i> ₁ ' , <i>v</i> ₂ '	<i>d</i> , <i>l</i> ₁ ' , <i>l</i> ₂ ' , <i>l</i> ₃ ' , <i>ev</i> '	<i>d</i> , <i>l</i> ' , <i>v</i> ' , σ	<i>d</i> , <i>l</i> ' , (<i>v</i>), φ	(<i>ft</i>), (<i>tc</i>), (<i>it</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>)
Leg IV					
<i>Ad</i>	<i>v</i> ₁ ' , <i>v</i> ₂ ' , <i>v</i> ₃ '	<i>d</i> , <i>l</i> ' , <i>ev</i> ' , (<i>v</i>)	<i>d</i> , <i>l</i> ' , <i>v</i> '	<i>d</i> , <i>l</i> ' , (<i>v</i>), φ	<i>ft</i> ' , (<i>tc</i>), (<i>p</i>), (<i>u</i>), (<i>a</i>), <i>s</i> , (<i>pv</i>)

slightly barbed; interlamellar (30 – 41) and exobothridial (22–30) setae setiform, roughened, *ro* and *le* thicker than *in* and *ex*; bothridial seta (131–139) fusiform, barbed.

Gastronotic region — (Fig. 10a, 10b) – Eight pairs of gastronotic setae present: h_3 represented by small alveolus; *lp* (94–105) and h_1 (157–176) long, subflagellate, barbed; others (c_1 , c_3 : 30–41; *dm*, *dp*: 41–52; h_2 : 37–49) setiform, barbed. Opisthonotal gland opening and cupules (*ia*, *im*, *ip*, *ih*) well visible.

Gnathosoma — (Fig. 10b) – Subcapitulum size: 90–94 × 84–86; subcapitular setae (*a*, *h*: 17–19; *m*: 9–11) setiform, roughened; adoral seta (7) setiform, smooth. Axillary saccule present. Palp length: 45; setation: 0–2–1–3–8(+ω); postpalpal seta (5) spiniform, smooth. Chelicera length: 94–101; cheliceral setae (*cha*: 34; *chb*: 15) setiform, barbed.

Epimeral and lateral podosomal regions — (Fig. 10b) – Epimeral setal formula: 3–1–2 (third seta of first epimere forms a protective scale over respective Claparède's organ); setae (*1a*, *2a*, *3a*: 11; *1b*: 15; *3b*: 22–26) setiform, roughened.

Anogenital region — (Fig. 10b) – Without structures and setae.

Legs — Single claw of each leg strong, slightly roughened on dorsal side. Saccule and porose area on segments not observed. Formulas of leg setation and solenidia: I (0–2–2–3–16) [1–1–1], II (0–2–2–3–13) [1–1–1], III (0–2–2–2–13) [1–1–0]; homology of setae and solenidia indicated in Table 2. Famulus on tarsus I emergent.

Material examined

Holotype (male), eight paratypes (four males and four females) and three larvae: Mexico, 20°33'N, 87°13'W, Quintana Roo, Municipio de Solidaridad, vicinities of Playa del Carmen, leaf litter under trees and bushes in secondary semi-evergreen tropical forest (data and collector unknown; collection of the Tyumen State University Museum of Zoology, Tyumen, Russia; Gashev *et al.* 2005).

Type deposition

The holotype is deposited in the collection of the Senckenberg Museum of Natural History, Görlitz, Germany; eight paratypes and three larvae are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia. All specimens are preserved in 70% solution of ethanol with a drop of glycerol.

Etymology

The species is named in honor of our friend and colleague, well-known soil scientist Dr. Sergey N. Sedov (National Autonomous University of Mexico, Mexico City, Mexico).

Remarks

In the presence of foveolae on prodorsum and in the absence of prodorsal enantiophysis, the adult of *Plateremaeus sedovi* n. sp. is similar to *Plateremaeus coralgablensis* (Paschoal, 1987) (see the Discussion section below), which is known from the U.S.A. (Florida), however, the new species differs from the latter by: larger body size (length: 870–975 versus 667–742); the density of the arrangement of prodorsal foveolae (sparse versus dense); the presence (versus absence) of foveolae on subcapitular mentum and in lateral part of epimere I; the absence (versus presence) of lateral cerotegumental reticulation in lateral part of the notogaster; the presence of five pairs (versus six) of anal setae; number of epimeral setae on epimeres II–IV (II with six pairs of setae, III+IV with 16 pairs of setae versus with seven and 17, respectively).

The larval instar in Plateremaeidae is known for *Lopheremaeus mirabilis* (see Seniczak *et al.* 2020). The larva of *P. sedovi* differs from that in the latter by longer interlamellar and exobothridial setae, the absence (versus presence) of gastronotic seta *da*, and the length and morphology of gastronotic setae *lp* and h_1 (long, subflagellate versus medium-sized, setiform).

Discussion

Allodamaeus was proposed by Banks (1947), with *Allodamaeus ewingi* Banks, 1947 as type species. Taxonomic history of the genus and main generic traits were presented by Paschoal (1987). The validity of the genus *Allodamaeus* is supported by some authors (e.g. Subías 2022). The genus comprises two species, which are distributed collectively in the Holarctic and Neotropical regions (Paschoal 1987). However, *Allodamaeus* and *Plateremaeus* are similar in general, differing (according to Paschoal 1987; Balogh and Balogh 1992) mainly only in the number of neutrichous anal setae (seven pairs versus six pairs). The problem is that some species of *Plateremaeus* have a variation in the number of anal setae (5–7 pairs) or less than seven pairs (e.g., see Balogh and Mahunka 1978; Ermilov & Starý 2021), therefore, the division of *Allodamaeus* and *Plateremaeus*, which is based on the number of anal setae, seems problematic. Balogh and Balogh (2002) included *Allodamaeus coralgablensis* Paschoal, 1987 in *Plateremaeus*, automatically synonymizing *Allodamaeus* to *Plateremaeus*. We agree with the opinion of Balogh and Balogh (2002) and consider both known species of *Allodamaeus* (*A. coralgablensis*, *A. ewingi*) within *Plateremaeus*.

Key to known species of *Jacotella*

1. Bothridial seta setiform or with slightly developed, elongate head 2
— Bothridial seta with large, compact head 5
2. Notogaster without system of cuticular or cerotegumental ridges in dorsocentral part 3
— Notogaster with system of cuticular or cerotegumental ridges in dorsocentral part 4
3. Bothridial seta subflagellate; epimeral, aggenital and adanal setae slightly thickened; central part of notogaster depressed; body length: 570–645 *Jacotella alexandrovskiyi* n. sp.
Distribution: Mexico.
— Bothridial seta with slightly developed elongate head due cerotegument; epimeral, aggenital and adanal setae slightly setiform; central part of notogaster not depressed; body length: 350–451 *Jacotella quadricaudicula* (Jacot, 1937). Distribution: Nearctic, Mexico.
4. Prodorsum and notogaster with dense microreticulate cerotegument; anterior part of prodorsum with depression; body length: 365–415 *Jacotella puyuma* Ermilov and Liao, 2021. Distribution: Taiwan.
— Prodorsum and notogaster without microreticulate cerotegument; anterior part of prodorsum without depression; body length: 560 *Jacotella ornata* (Balogh and Csiszár, 1963). Distribution: Neotropical, India.
5. Notogaster without system of cuticular or cerotegumental ridges in dorsocentral part 6
— Notogaster with system of cuticular or cerotegumental ridges in dorsocentral part 8
6. Notogaster with macroreticulate cerotegument; body length: 450–462
... *Jacotella reticulata* Ruiz, Kahwash and Subías, 1990. Distribution: western Mediterranean.
— Notogaster without macroreticulate cerotegument 7
7. Notogastral seta h_1 long, others (p_1, p_2, p_3) comparatively short, similar in length; body length: 450 *Jacotella austriaca* (Willmann, 1935). Distribution: Palaearctic.
— Notogastral setae h_1 long, p_1 medium-sized, both distinctly longer than short p_2 and p_3 ; body length: 366–520 *Jacotella glabra* (Mihelčič, 1957). Distribution: southern Palaearctic, India.
8. Notogaster (partially) and anogenital region with macroreticulate cerotegument; body length: 332–472 *Jacotella frondeus* (Kulijev, 1979). Distribution: southern Palaearctic, Ethiopia.

— Notogaster and anogenital region without macroreticulate cerotegument; body length: 353–545 *Jacotella neominata* Subías, 2004. Distribution: Mediterranean, Ethiopia.

Key to known species of *Plateremaeus*



1. Seven pairs of genital setae 2
 — Nine pairs of genital setae 6
2. Prodorsum partially foveolate 3
 — Prodorsum not foveolate 4
3. Prodorsal foveolae located sparsely; subcapitular mentum and lateral part of epimere I partially foveolate; notogaster without reticulate cerotegument; five pairs of anal setae; epimere II with six pairs of setae, III+IV with 16 pairs of setae; body length: 870–975
 *Plateremaeus sedovi* n. sp. Distribution: Mexico.
 — Prodorsal foveolae located densely; subcapitular mentum and lateral part of epimere I not foveolate; notogaster partially with reticulate cerotegument; six pairs of anal setae; epimere II with seven pairs of setae, III+IV with 17 pairs of setae; body length: 667–742
 *Plateremaeus coralgablenis* (Paschoal, 1987). Distribution: U.S.A. (Florida).
4. Prodorsal enantiophysis present; rostrum with two lateral thorn-like structures; notogastral seta *lp* located posterolaterally on notogaster; seven pairs of anal setae; body length: 818–1000
 *Plateremaeus ornatissimus* (Berlese, 1888). Distribution: Neotropical.
 — Prodorsal enantiophysis absent; rostrum without lateral thorn-like structures; notogastral seta *lp* located dorsally on notogaster; six pairs of anal setae 5
5. Bothridial seta mediodistally with dense cerotegument forming an illusory head; notogastral setae *lp* and *h*₁ slightly differ in length; body length: 686–701
 *Plateremaeus ewingi* (Banks, 1947). Distribution: Holarctic.
 — Bothridial seta subflagellate; notogastral seta *lp* distinctly longer than *h*₁; body length: 517–619
 *Plateremaeus latus* Balogh, 1988. Distribution: Sri Lanka.
6. Anterior part of notogaster without setae 7
 — Anterior part of notogaster with setae 8
7. Prodorsum and notogaster with reticulate cerotegument; bothridial seta clavate; five pairs of anal setae; adanal seta *ad*₃ removed from anal aperture; body length: 597–630
 *Plateremaeus yurtaevi* Ermilov and Starý, 2021. Distribution: Bolivia.
 — Prodorsum and notogaster without reticulate cerotegument; bothridial seta mediodistally with dense cerotegument forming an illusory head; six pairs of anal setae; adanal seta *ad*₃ located close to anal aperture; body length: 784
 *Plateremaeus novemsetosus* Balogh and Balogh, 1983. Distribution: Australasian.
8. Anterior part of notogaster with one pair of setae; bothridial seta mediodistally with dense cerotegument forming an illusory head; body length: 550–610
 *Plateremaeus anteriosetosus* Woas, 1992. Distribution: Peru.
 — Anterior part of notogaster with two pairs of setae; bothridial seta subflagellate 9
9. Prodorsal enantiophysis present; notogaster partially foveolate; notogastral setae in anterior part of notogaster minute; exobothridial seta short; body length: 737–786
 *Plateremaeus costulatus* Balogh and Mahunka, 1978. Distribution: Neotropical.
 — Prodorsal enantiophysis absent; notogaster not foveolate; notogastral setae in anterior part

of notogaster medium-sized; exobothridial seta medium-sized; body length: 632–689
 *Plateremaeus berlesei* Balogh and Mahunka, 1978. Distribution: Neotropical.

Acknowledgements

We thank two anonymous reviewers for valuable comments and Nikita Shulaev (Tyumen State University, Tyumen, Russia) for SEM micrographs. This research was partially supported by the cooperative agreement No. FEWZ-2021-0004 from the Russian Ministry of Science and Higher Education.

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