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Contribution to the knowledge of oribatid mites of the genus *Austrocarabodes* (Acari, Oribatida, Carabodidae) of Madagascar

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Original research

ABSTRACT

This work includes taxonomic and faunistic data on carabodid mites (Oribatida, Carabodidae) collected from the Montagne d'Ambre National Park, North Madagascar. A new species of the genus *Austrocarabodes* is described; *A. madagascarensis* **n. sp.** differs from *A. similis* and *A. spathulatus* by the presence of foveolae on the body surface. Supplementary descriptions of *Austrocarabodes parapustulatus* Mahunka, 2009 and *A. planisetus* Mahunka and Mahunka-Papp, 2011 which were originally described from Madagascar, are presented. The species *Austrocarabodes spathulatus* Mahunka, 1978 is recorded in Madagascar for the first time.

Keywords carabodid mites; systematics; morphology; Ethiopian region
Zoobank http://zoobank.org/EE774540-B219-471F-9B45-90741B34D35D

Introduction

This work is based on oribatid mite (Acari, Oribatida) material, which was collected from the Montagne d'Ambre National Park (Madagascar), and includes data on the family Carabodidae. In the course of taxonomic identification we found four carabodid species, all representatives belonging to the genus *Austrocarabodes* Hammer, 1966 (the nominative subgenus); of these, one species is new to science. The primary goal of our paper is to describe and illustrate a new species under the name *Austrocarabodes madagascarensis* **n. sp.** and to present supplementary descriptions of two other Madagascar species, *Austrocarabodes parapustulatus* Mahunka, 2009 and *A. planisetus* Mahunka and Mahunka-Papp, 2011, adding new figures, SEM micrographs and information about some morphological structures and their measurements, identification of leg setae and solenidia and gnathosoma, which will assist with identification of these species in future.

Austrocarabodes was proposed by Hammer (1966) with *Carabodes ensifer* Sellnick, 1931 as type species. The genus comprises five subgenera and 96 species, which have a cosmopolitan distribution (Subías 2020). The nominative subgenus is largest, including 78 species (Subías 2020). The main subgeneric traits of *A.* (*Austrocarabodes*) were summarized by Hammer (1966), Mahunka (1986), Hugo (2008), and Hugo-Coetzee (2011). Identification keys for selective species of *Austrocarabodes* were presented by Balogh and Balogh (1988, 2002), Mahunka (2009), Hugo-Coetzee (2011), and Ermilov and Tolstikov (2015).

At present, 10 species of *A.* (*Austrocarabodes*) have been recorded in Madagascar (Balogh 1960, 1962; Mahunka 1993, 1996, 2009, 2011; Mahunka and Mahunka-Papp 2011): *A. albidus* (Balogh, 1960), *A. blancharti* Mahunka, 2009, *A. cellularis* (Balogh, 1962), *A. lateoalveolatus*

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Mahunka, 2009, *A. lunaris* (Balogh, 1962), *A. mixtus* Mahunka, 1996, *A. parapustulatus*, *A. planisetus*, *A. pustuloreticulatus* Mahunka, 2009, and *A. semilunatus* Mahunka, 2011. All listed species are known only from this island (possibly, they are endemics).

Materials and methods

The studied carabodid mites were collected in the Montagne d'Ambre National Park, North Madagascar during long-term official cooperation between the Moravian Museum in Brno (Czech Republic) and Université d'Antananarivo (Madagascar) in 2010–2014.

Specimens (all were studied and measured) 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. Notogastral width refers to the maximum width of the notogaster 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.

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

The following abbreviations are used: *lam* = lamella; *tlam* = translamella; *tu* = tutorium; *ro*, *le*, *in*, *bs*, *ex* = rostral, lamellar, interlamellar, bothridial and exobothridial setae, respectively; *bo* = bothridium; *hp* = humeral process; *c*, *da*, *dm*, *dp*, *la*, *lm*, *lp*, *h*, *p* = notogastral setae; *ia*, *im*, *ip*, *ih*, *ips* = notogastral lyrifissures; *gla* = opisthonotal gland opening; *a*, *m*, *h* = subcapitular setae; *v*, *l*, *d*, *cm*, *acm*, *ul*, *sul*, *vt*, *lt* = palp setae; ω = palp and leg solenidion; *cha*, *chb* = cheliceral setae; *Tg* = Trägårdh's organ; *PdI*, *PdII* = pedotecta I and II, respectively; *dis* = discidium; *cvr* = circumventral ridge; *1a*, *1b*, *1c*, *2a*, *3a*, *3b*, *3c*, *4a*, *4b*, *4c* = epimeral setae; *AP* = anal plate; *g*, *ag*, *an*, *ad* = genital, aggenital, anal and adanal setae, respectively; *iad* = adanal lyrifissure; *po* = preanal organ; *Tr*, *Fe*, *Ge*, *Ti*, *Ta* = leg trochanter, femur, genu, tibia and tarsus, respectively; *pa* = porose area; σ, φ = leg solenidia; ε = leg famulus; *v*, *ev*, *bv*, *l*, *d*, *ft*, *tc*, *it*, *p*, *u*, *a*, *s*, *pv* = leg setae.

Systematics

Superfamily Carabodoidea

Family Carabodidae

Genus *Austrocarabodes* Hammer, 1966

Type species *Carabodes ensifer* Sellnick, 1931

Austrocarabodes (*Austrocarabodes*) *madagascarensis* n. sp.

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(Figures 1–4)

Diagnosis — Body size: 381–448 × 215–265. Body with dense cerotegumental microridges. Notogaster sparsely foveolate, specific rows and congestions of foveolae also presented on prodorsum and in anogenital region. Translamella absent. Tutoria with tip curved medially. Rostral setae phylliform, dilated mediodistally, erect, lamellar setae narrowly phylliform, with spines and barbs, interlamellar setae narrowly phylliform, barbed; all setae comparatively

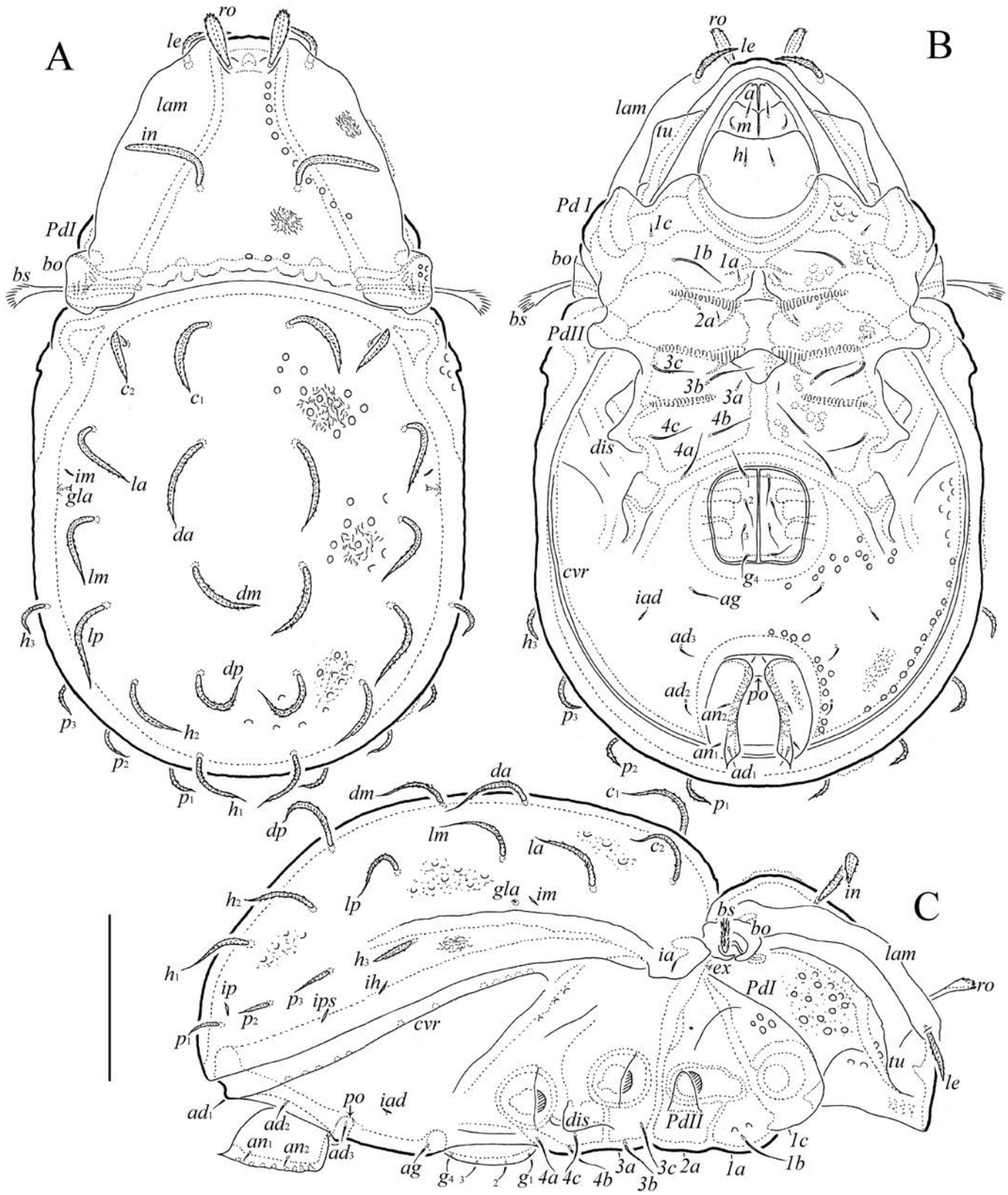

Figure 1 *Austrocarabodes madagascarensis* **n. sp.**, adult: a – dorsal view; b – ventral view (legs omitted); c – lateral view (gnathosoma and legs omitted). Scale bar 100 μm.

long, barbed, *in* longest. Bothridial setae unilaterally dilated and spinose. Notogastral setae comparatively long (posterior setae shorter), narrowly phylliform, with short attenuate tips, barbed. Epimeral setae *1a*, *1c*, *2a* and *3a* minute, others longer, setiform, slightly barbed. Genital, aggenital and adanal setae setiform, slightly barbed. Anal setae short, setiform, erect, roughened. Lateral phylliform seta *l''* presented only on genua I, II.

Description — Measurements – Species of medium size. Body length: 448 (holotype: female), 381–448 (15 paratypes, all females); notogaster width: 265 (holotype), 215–265 (15 paratypes). Body ratio (length/width): 1.6–1.8.

Integument (Figs 1a-c, 2a-d, 3a, 3c, 3d, 4a-d) – Body color brown to dark brown. Body covered by thick layer of gel-like cerotegument and cerotegumental microridges and some microgranules. Body surface partially microtuberculate. In addition, notogaster sparsely foveolate, foveolae (their diameter up to 8) also partially presented on prodorsum (in basal part and as one pair of longitudinal rows in inner parts of lamellae), on lateral sides of prodorsum (between lamellae and tutoria and on tutoria), in anterolateral parts of ventral plate (pedotecta I and regions close to subcapitular mentum), in anogenital region (posterior and lateral to genital aperture, anterior and lateral to anal aperture, and as one row close to circumventral ridge), and on antiaxial sides of all leg femora and of trochanters III, IV. Epimeral region with some muscle sigillae.

Prodorsum (Figs 1a-c, 3a, 3c, 3d, 4a, 4c, 4d, 4g) – Rostrum broadly rounded. Lamellae long (slightly shorter than prodorsum), with distal triangular projection. Translamella not observed. Tutoria long, ridge-like, with tip clearly curved medially. With elongate depression (separated by transverse ridge) between lamellae and tutoria, and one depression ventrally to tutoria. Rostral setae (32–36) phylliform, dilated mediodistally, erect, barbed, inserted on tubercles. Lamellar setae (36–41) narrowly phylliform, with strong spines and small barbs, directed anteromedial. Interlamellar setae (65–77) narrowly phylliform, barbed, directed lateral. Bothridial setae (32–41) with elongate, unilaterally dilated and heavily spinose heads (sometimes setae appear clavate in dorsal view). Bothridia slightly interrupted ventrally, with inner tooth. Exobothridial setae vestigial.

Notogaster (Figs 1a, 1c, 3a, 3c, 4a, 4b, 4d, 4h) – Anterior notogastral margin slightly convex medially. Humeral processes poorly developed. Fourteen pairs of notogastral setae (p_1–p_3, h_3, 28–30; others 49–61) narrowly phylliform, with short attenuate tips, barbed. Lyrifissures and opisthonotal gland openings distinct.

Gnathosoma (Figs 2e-g, 4f, 4g) – Subcapitulum longer than wide (90–98 × 73–77). Subcapitular setae (12) setiform, roughened. Postpalpal setae (8) bacilliform, slightly barbed mediodistally. Palps (49–53) with setation 0–2–1–3–9(+ω). Solenidion of palptarsi long, bacilliform. Chelicerae (98–106) with two setiform, barbed setae (*cha*, 36; *chb*, 12). Trägårdh's organ of chelicerae elongate triangular.

Lateral podosomal and epimeral regions (Figs 1b, 1c, 3b, 3c, 4g) – Pedotecta II trapezoid in ventral view. Discidia triangular, rounded distally. With typical epimeral setation 3–1–3–3. Epimeral setae *1a*, *1c*, *2a* and *3a* short (4–6), setiform, smooth, *1b*, *3b*, *3c*, *4a*, *4b* and *4b* (28–32) setiform, slightly barbed.

Anogenital region (Figs 1b, 1c, 3b, 3c, 4b, 4f) – With one pair of short, longitudinal ridges lateral to genital aperture and posterior to epimere IV. Four pairs of genital (14–16), one pair of aggenital (14–18) and three pairs of adanal (14–18) setae setiform, slightly barbed. Two pairs of anal setae (6–8) setiform, erect, roughened. Adanal lyrifissures visible, removed from anal aperture and located anterolateral to adanal setae ad_3. Circumventral ridge developed.

Legs (Figs 2a-d, 3b, 3c) – Claw of each leg strong, sparsely barbed dorsally and with tooth ventrobasally. One porose area on all femora distinct, porose areas on trochanters III, IV not observed. Formulas of leg setation and solenidia: I (1–4–3–4–16) [1–2–2], II (1–4–3–3–15) [1–1–2], III (2–3–1–2–15) [1–1–0], IV (1–2–2–2–11) [0–1–0]; homology of setae and solenidia indicated in Table 1. Famulus of tarsi I short, erect, blunt-ended. Solenidion φ_1 on tibiae I very long, setiform; other solenidia shorter, thickened, blunt-ended to bacilliform. Seta *l''* on femora I, II and *l'* on femora III and genua III thickened, seta *l''* on genua I, II phylliform.

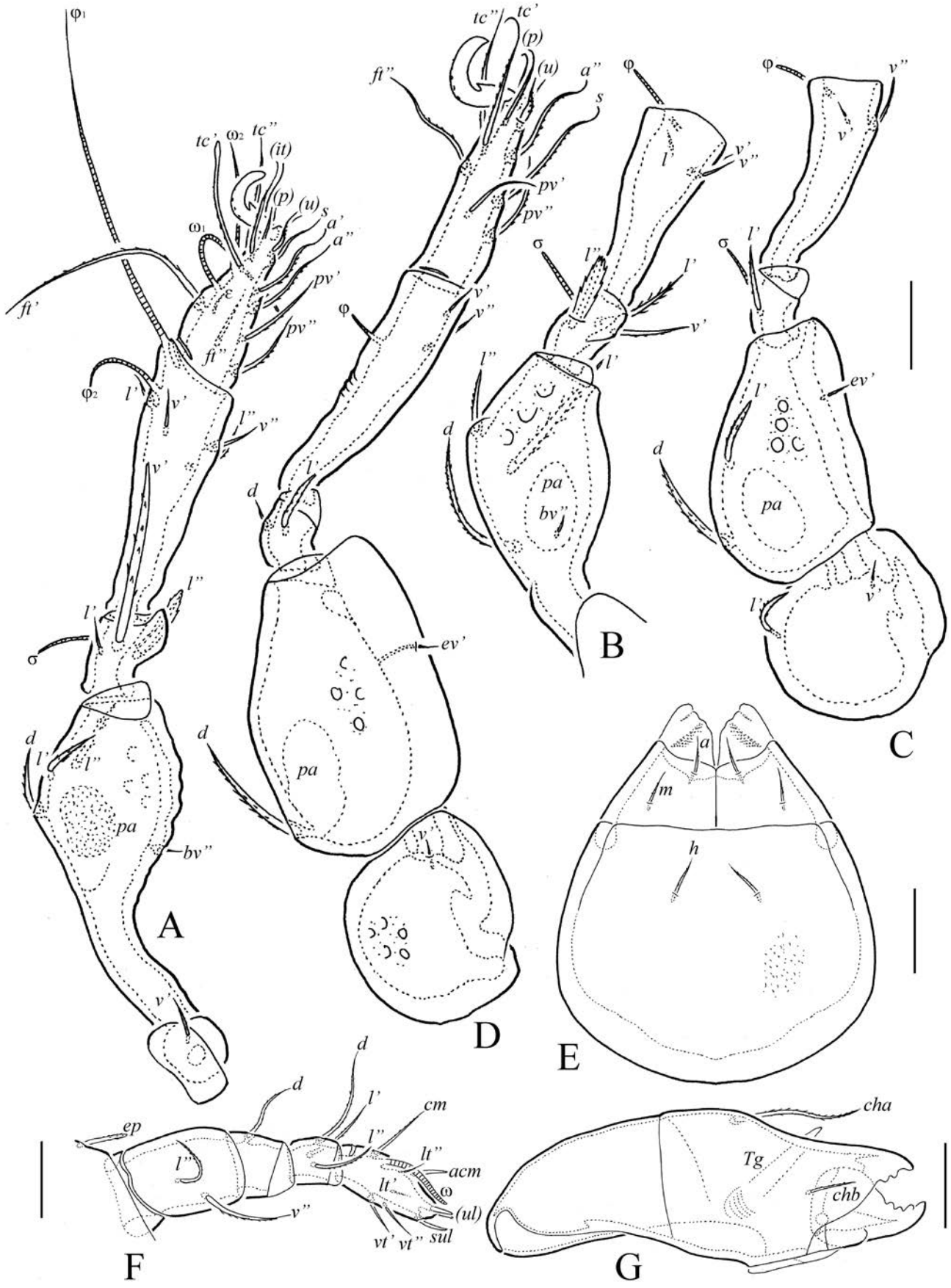

Figure 2 *Austrocarabodes madagascarensis* **n. sp.**, adult: a – leg I, left, paraxial view; b – femur, genu and tibia of leg II, right, antiaxial view; c – leg III, without tarsus, left, antiaxial view; d – leg IV, left, antiaxial view; e – subcapitulum, ventral view; f – palp, right, antiaxial view; g – chelicera, right, antiaxial view. Scale bar 20 μm (a–e; g), scale bar 10 μm (f).

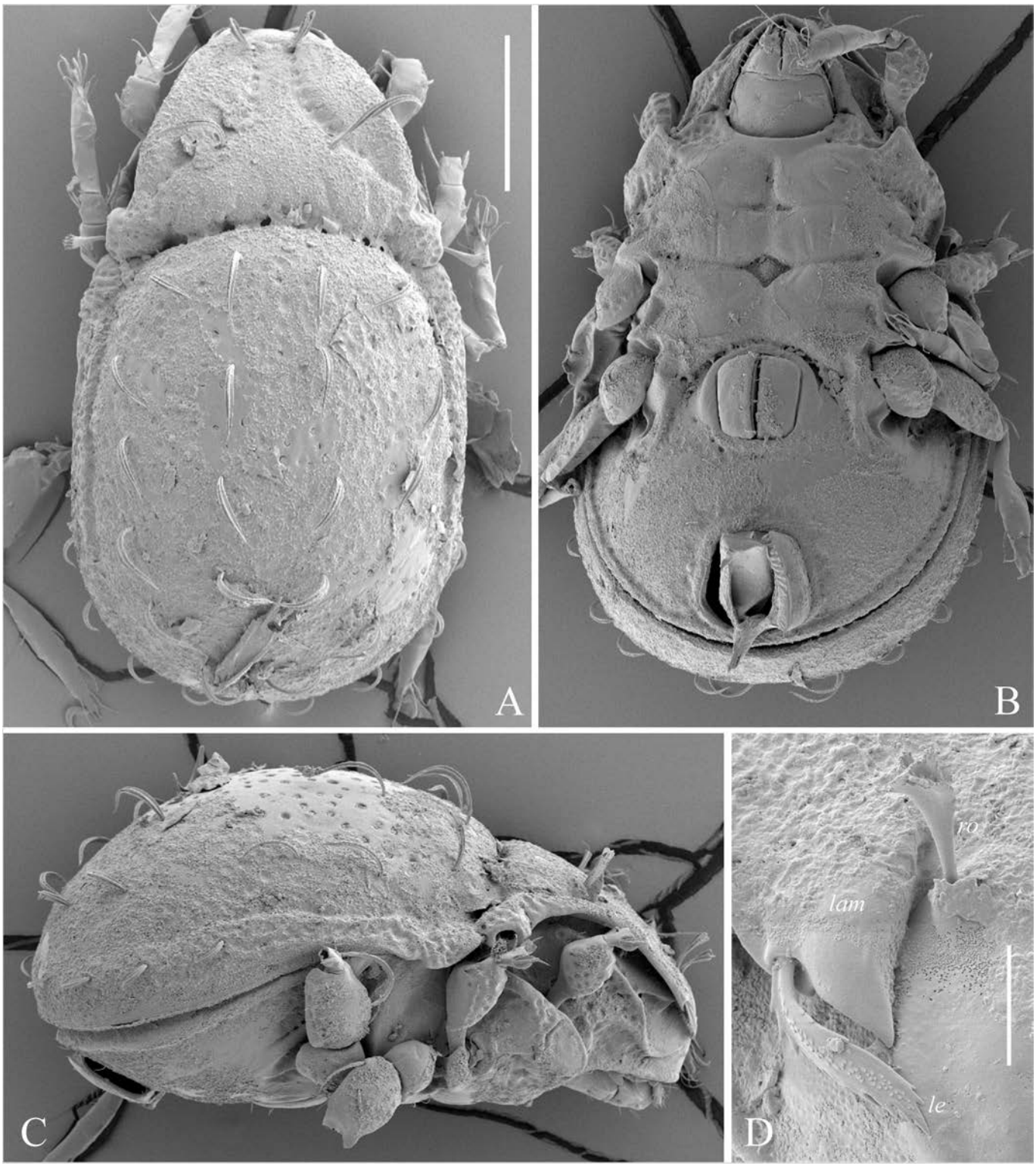

Figure 3 *Austrocarabodes madagascarensis* **n. sp.**, adult, SEM micrographs: a – dorsal view; b – ventral view; c – lateral view; d – rostral and lamellar setae and distal part of lamella, dorsoanterior view. Scale bar 100 μm (a–c), scale bar 20 μm (d).

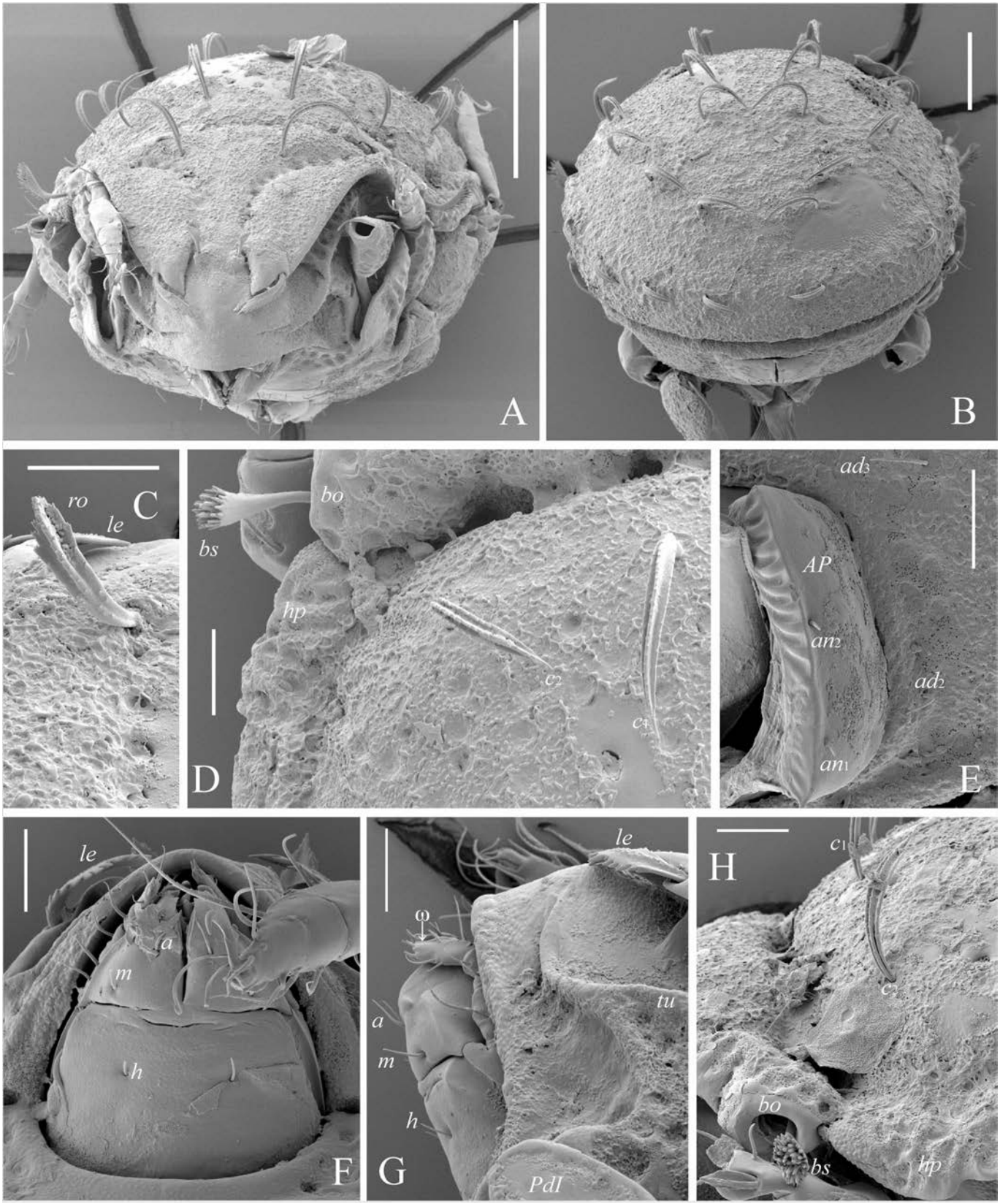

Figure 4 *Austrocarabodes madagascarensis* **n. sp.**, adult, SEM micrographs: a – anterior view; b – posterior view; c – rostral seta; d – bothridial seta, humeral process, some notogastral setae and part of sejugal region, dorsal view; e – part of anoadanal region; f – gnathosoma, ventral view; g – gnathosoma and anterolateral part of prodorsum, lateral view; h – bothridial seta, bothridium, humeral process, some notogastral setae and sejugal region, lateral view. Scale bar 100 μm (a), scale bar 50 μm (b), scale bar 20 μm (c–h).

Material examined — Holotype (female) and 15 paratypes (15 females): North Madagascar, Montagne d'Ambre National Park, circuit Ampijoroana, evergreen rain forest, 12°31'28''S, 49°09'52"E, 950 m a.s.l., sifting of leaf litter sample under big unidentified tree, Winkler apparatus extraction, 13.I.2014 (R. Ravebolun and L. Rabotenoson).

Type deposition — The holotype and three paratypes are deposited in the collection of the Senckenberg Institute, Görlitz, Germany. Twelve paratypes are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia. All specimens are preserved in ethanol with a drop of glycerol.

Etymology — The name of the new species, *madagascarensis*, refers to the place of origin, Madagascar.

Remarks — In the presence of dilated mediodistally rostral setae and long, narrowly phylliform (with short attenuate tips) notogastral setae, *Austrocarabodes madagascarensis* **n. sp.** is morphologically most similar to *Austrocarabodes similis* Mahunka, 1978 from Mauritius and *A. spathulatus* Mahunka, 1978 from Réunion, but differs from both by the presence of foveolae on the body surface (versus foveolae completely absent).

Austrocarabodes (*Austrocarabodes*) *parapustulatus* Mahunka, 2009

(Figures 5–7)

Supplementary description — Measurements – Species of medium size. Body length: 464–531 (10 specimens, all females); notogaster width: 215–249 (10 specimens). Species distinctly elongated, body ratio (length/width): 2.0–2.3.

Integument (Figs 5a-c, 6a-d, 7a-e) – Body color light brown to brown. Body covered by thick layer of gel-like cerotegument and cerotegumental microgranules. Body surface partially punctate. In addition, prodorsum (between lamellae) and notogaster tuberculate, tubercles (their diameter up to 8) partially forming polygonal ornamentation on the notogaster; anogenital region (except median part), subcapitular mentum, dorsolateral (bothridia, lateral parts of lamellae) and lateral (between lamellae and tutoria and on tutoria) sides of prodorsum, anterolateral parts of ventral plate (pedotecta I and regions close to subcapitular mentum), and antiaxial sides of all leg femora and of trochanters III, IV foveolate (diameter of foveolae up to 8). Epimeral region with some muscle sigillae.

Prodorsum (Figs 5a-c, 6a-d, 7a, 7c, 7e) – Rostrum broadly rounded. Lamellae long (slightly shorter than prodorsum), rounded distally. Translamella developed. Tutoria long, ridge-like. With elongate depression (separated by transverse ridge) between lamellae and tutoria, and one depression ventrally to tutoria. Rostral (41–45) and interlamellar (41–45) setae narrowly phylliform, barbed; *ro* inserted on tubercles located anterior to translamella, directed forward, *in* directed lateral. Lamellar setae (41–45) narrowly phylliform, with strong spines and small barbs, directed anteromedial. Bothridial setae (45–53) with elongate, unilaterally dilated and

Table 1 Leg setation and solenidia of adult *Austrocarabodes madagascarensis* **n. sp.**, *A. parapustulatus* Mahunka, 2009 and *A. planisetus* Mahunka and Mahunka-Papp, 2011.

Leg	*Tr*	*Fe*	*Ge*	*Ti*	*Ta*
I	*v'*	*d* , *(l)* , *bv"*	*(l)* , *v'* , σ	*(l)* , *(v)* , φ_1, φ_2	*(ft)* , *(tc)* , *(it)* , *(p)* , *(u)* , *(a)* , *s* , *(pv)* , ε, ω_1, ω_2
II	*v'*	*d* , *(l)* , *bv"*	*(l)* , *v'* , σ	*l'* , *(v)* , φ	*(ft)* , *(tc)* , *(it)* , *(p)* , *(u)* , *(a)* , *s* , *(pv)* , ω_1, ω_2
III	*l'* , *v'*	*d* , *l'* , *ev'*	*l'* , σ	*(v)* , φ	*(ft)* , *(tc)* , *(it)* , *(p)* , *(u)* , *(a)* , *s* , *(pv)*
IV	*v'*	*d* , *ev'*	*d* , *l'*	*(v)* , φ	*ft"* , *(tc)* , *(p)* , *(u)* , *a"* , *s* , *(pv)*

Note: Roman letters refer to normal setae, Greek letters to solenidia (except ε = famulus). Single prime (') marks setae on anterior and double prime (") setae on posterior side of the given leg segment. Parentheses refer to a pair of setae.

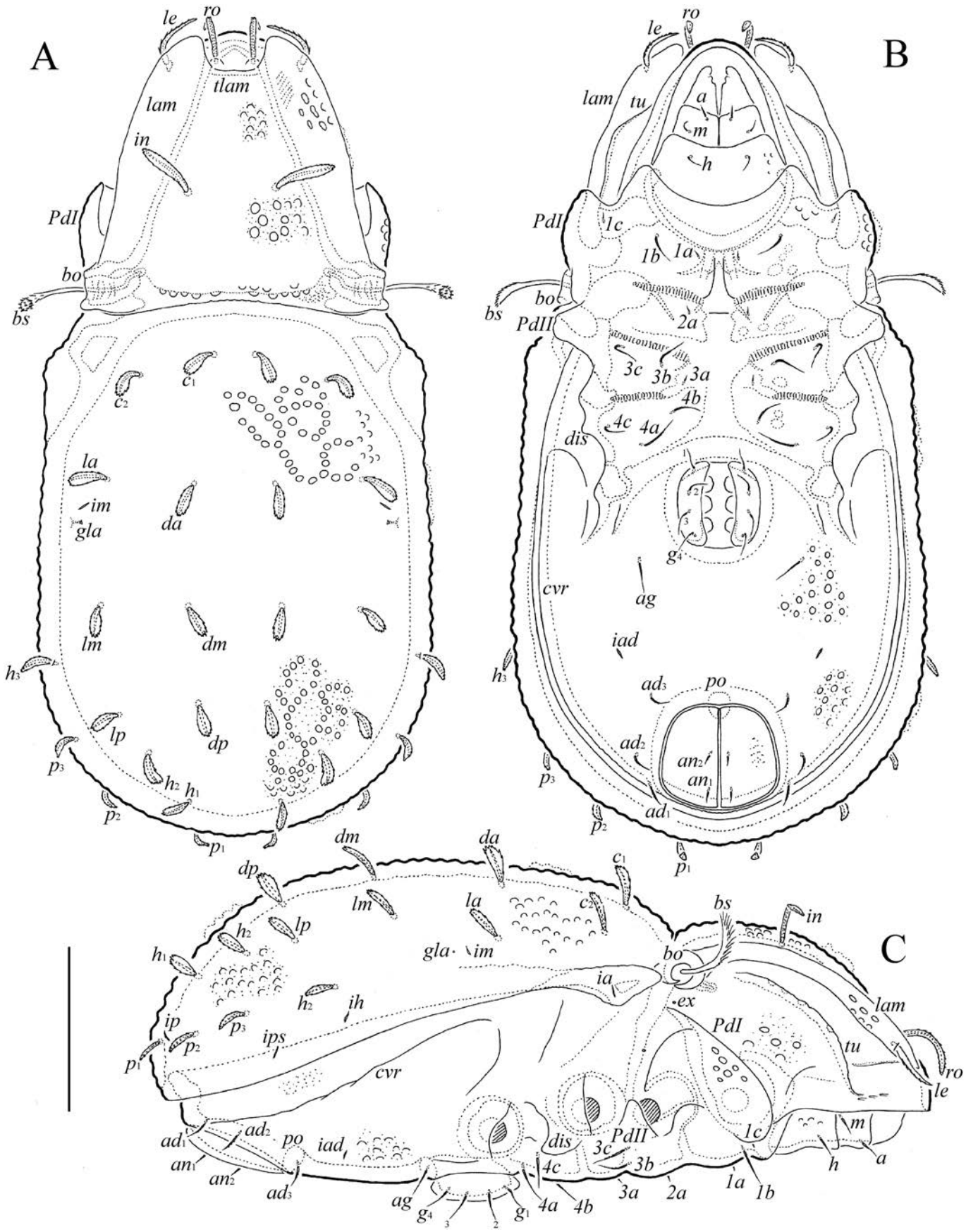

Figure 5 *Austrocarabodes parapustulatus* Mahunka, 2009, adult: a – dorsal view; b – ventral view (legs omitted); c – lateral view (legs omitted). Scale bar 100 μm.

heavily spinose heads (sometimes setae appear clavate in dorsal view). Bothridia slightly interrupted ventrally, with inner tooth. Exobothridial setae represented by alveoli.

Notogaster (Figs 5a, 5c, 6a, 6c, 7a-e) – Anterior notogastral margin straight. Humeral processes poorly developed. Fourteen pairs of notogastral setae (p_1–p_3, h_3, 16–20; others

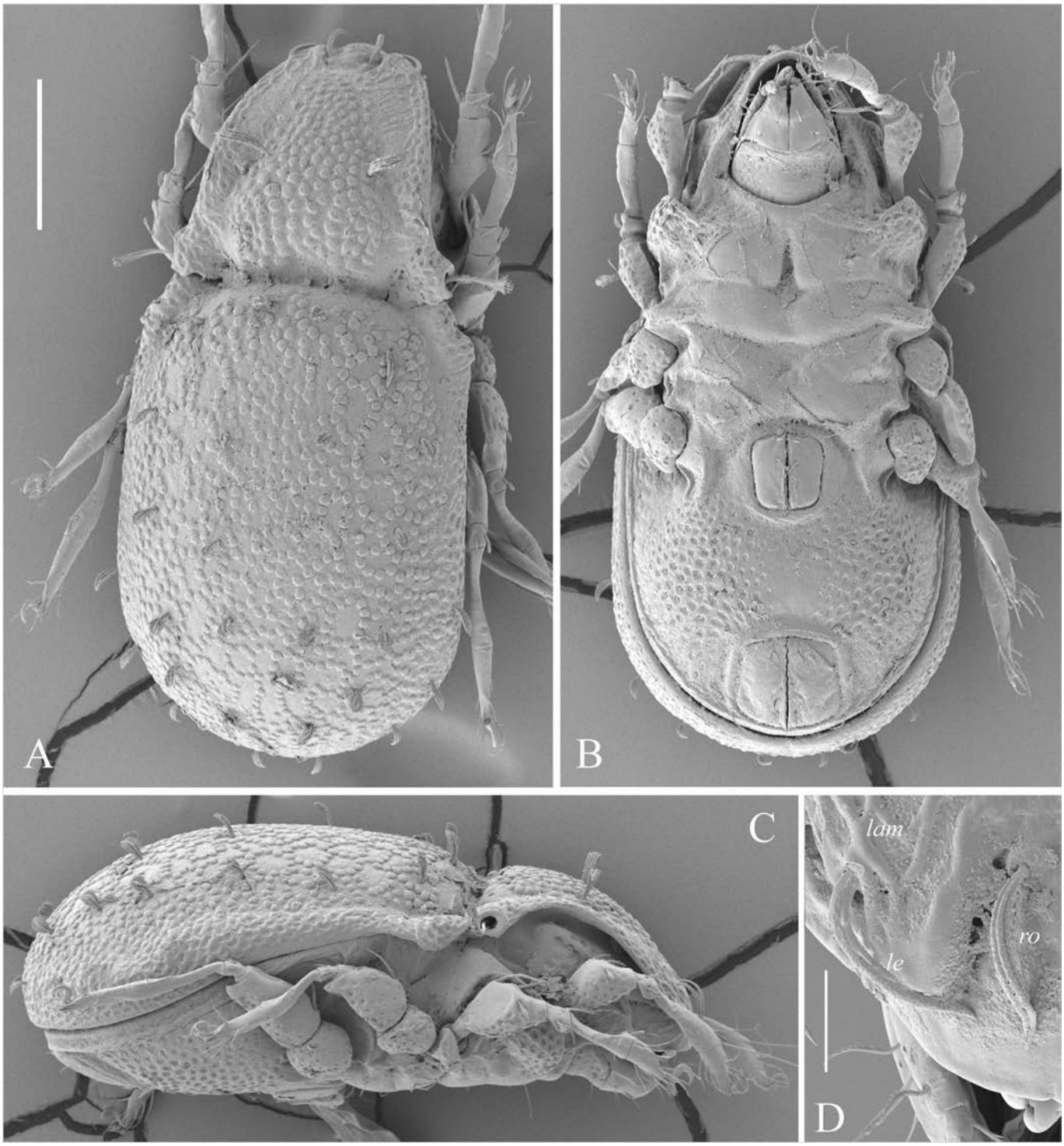

Figure 6 *Austrocarabodes parapustulatus* Mahunka, 2009, adult, SEM micrographs: a – dorsal view; b – ventral view; c – lateral view; d – rostral and lamellar setae and distal part of lamella, dorsoanterior view. Scale bar 100 µm (a–c), scale bar 20 µm (d).

20–28) phylliform, dilated mediodistally, barbed. Lyrifissures and opisthonotal gland openings distinct.

Gnathosoma (Figs 5b, 5c, 6b, 6c) – Generally, similar to *Austrocarabodes madagascarensis* **n. sp.** Subcapitulum longer than wide (94–102 × 82–86). Subcapitular setae (12) setiform, roughened. Postpalpal setae (8) bacilliform, slightly barbed mediodistally. Palps (53–57) with setation 0–2–1–3–9(+ω). Solenidion of palptarsi long, bacilliform. Chelicerae (106–114) with

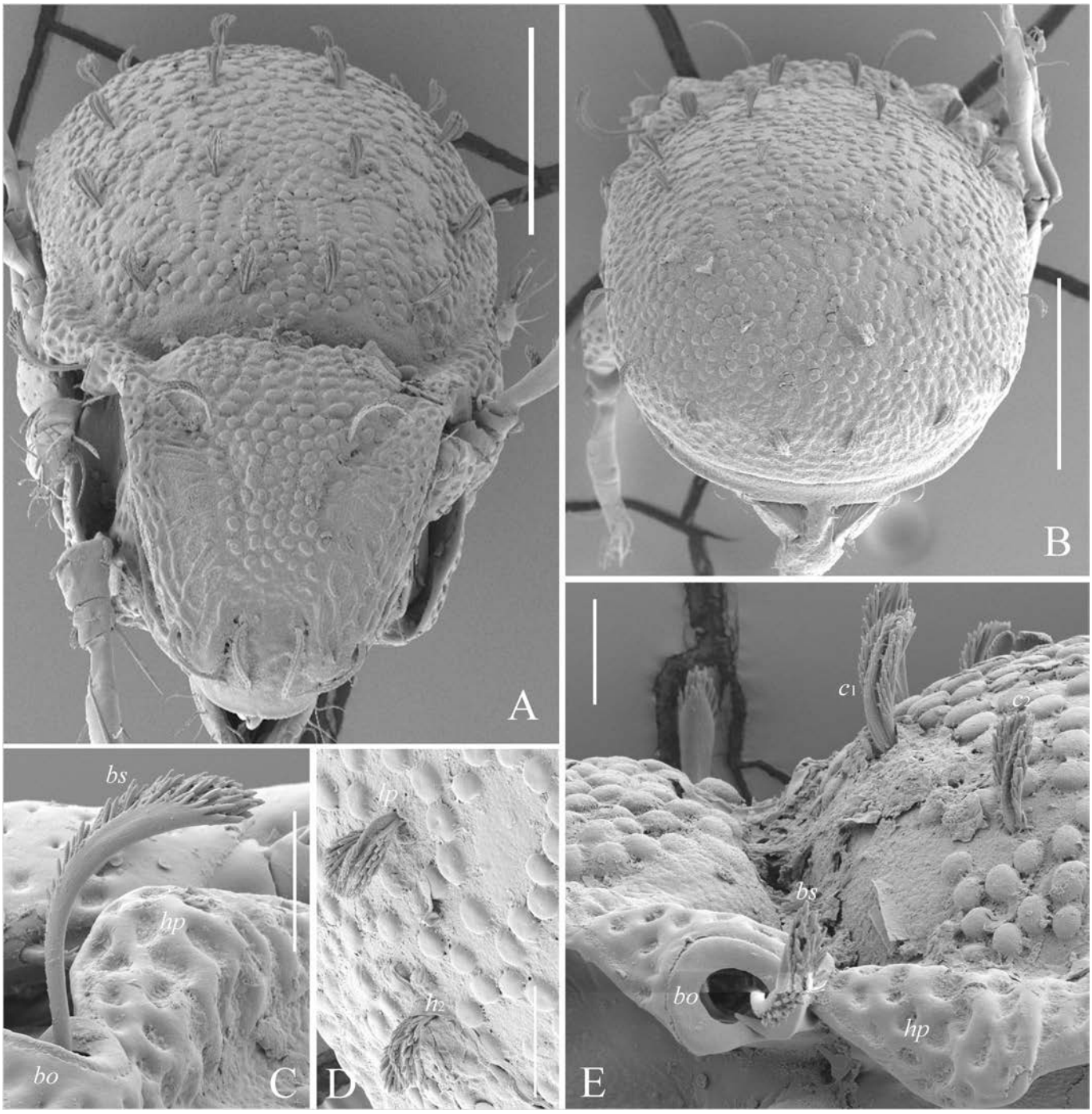

Figure 7 *Austrocarabodes parapustulatus* Mahunka, 2009, adult, SEM micrographs: a – dorsoanterior view; b – dorsoposterior view; c – bothridial seta and humeral process, dorsal view; d – some notogastral setae, dorsal view; e – bothridial seta, bothridium, humeral process, some notogastral setae and sejugal region, lateral view. Scale bar 100 μm (a, b), scale bar 20 μm (c–e).

two setiform, barbed setae (*cha*, 36–41; *chb*, 12–16). Trägårdh's organ of chelicerae elongate triangular.

Lateral podosomal and epimeral regions (Figs 5b, 5c, 6b, 6c) – Pedotecta II trapezoid in ventral view. Discidia triangular, rounded distally. With typical epimeral setation 3–1–3–3. Epimeral setae *1a*, *1c*, *2a* and *3a* short (4–6), setiform, smooth, *1b*, *3b*, *3c*, *4a*, *4b* and *4b* (28–36) setiform, slightly barbed.

Anogenital region (Figs 5b, 5c, 6b, 6c, 7b) – With one pair of short, longitudinal ridges lateral to genital aperture and posterior to epimere IV. Four pairs of genital (20), one pair of aggenital (20) and three pairs of adanal (14–16) setae setiform, slightly barbed. Two pairs of anal setae (8–12) setiform, erect, roughened. Adanal lyrifissures visible, removed from anal aperture and located anterolateral to adanal setae ad_3. Circumventral ridge developed.

Legs (Figs 6b, 6c) – Generally, similar to *Austrocarabodes madagascarensis* **n. sp.** (Table 1), but seta *l''* on femora I, II and genua I, II, and seta *l'* on femora III and genua III, IV phylliform.

Material examined — Ten specimens (10 females): North Madagascar, Montagne d'Ambre National Park, circuit Ampijoroana, evergreen rain forest, 12°31'28''S, 49°09'52"E, 950 m a.s.l., sifting of leaf litter sample under big unidentified tree, Winkler apparatus extraction, 13.I.2014 (R. Ravebolun and L. Rabotenoson).

Material deposition — All specimens (preserved in ethanol with a drop of glycerol) are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Remarks — Our specimens of *A. parapustulatus* from Madagascar are similar in general appearance to those according to the original description (Mahunka 2009). However, we observed the following:

1. Region between lamellae completely tuberculate in our specimens (versus tubercles presented only mediobasally in the original description). We believe this difference represent intraspecific variability.
2. Mahunka (2009) noted, that "…ventral plate smooth…" (p. 105), but his Figure 31 (p. 106) shows the presence of rounded structures in the anogenital region. We confirm that the anogenital region of the species is indeed foveolate (not smooth).

Thus, based on the supplementary description and original description (Mahunka 2009), the diagnosis for *A. parapustulatus* is as follows:

Body size: 439–531 × 208–249, species distinctly elongated. Prodorsum and notogaster (partially forming polygonal ornamentation) tuberculate, anogenital region foveolate. Translamella present. Rostral and interlamellar setae narrowly phylliform, barbed, lamellar setae narrowly phylliform, with spines and barbs; all setae comparatively long, similar in length, barbed, *ro* inserted anterior to translamella. Bothridial setae unilaterally dilated and spinose. Notogastral setae comparatively short (posterior setae shortest), phylliform, dilated mediodistally, barbed. Epimeral setae *1a*, *1c*, *2a* and *3a* minute, others longer, setiform, slightly barbed. Genital, aggenital and adanal setae setiform, slightly barbed. Anal setae short, setiform, erect, roughened. Lateral phylliform seta *l''* presented on femora I, II and genua I, II, *l'* on femora III and genua III, IV.

Austrocarabodes (*Austrocarabodes*) *planisetus* Mahunka and Mahunka-Papp, 2011

(Figures 8–10)

Supplementary description — Measurements – Species of medium size. Body length: 464–514 (seven specimens, two males and five females); notogaster width: 249–298 (seven specimens). Body ratio (length/width): 1.7–1.8.

Integument (Figs 8a-c, 9a-d, 10a, 10b, 10d, 10f) – Body color light brown to brown. Body covered by thick layer of gel-like cerotegument and cerotegumental microridges and some

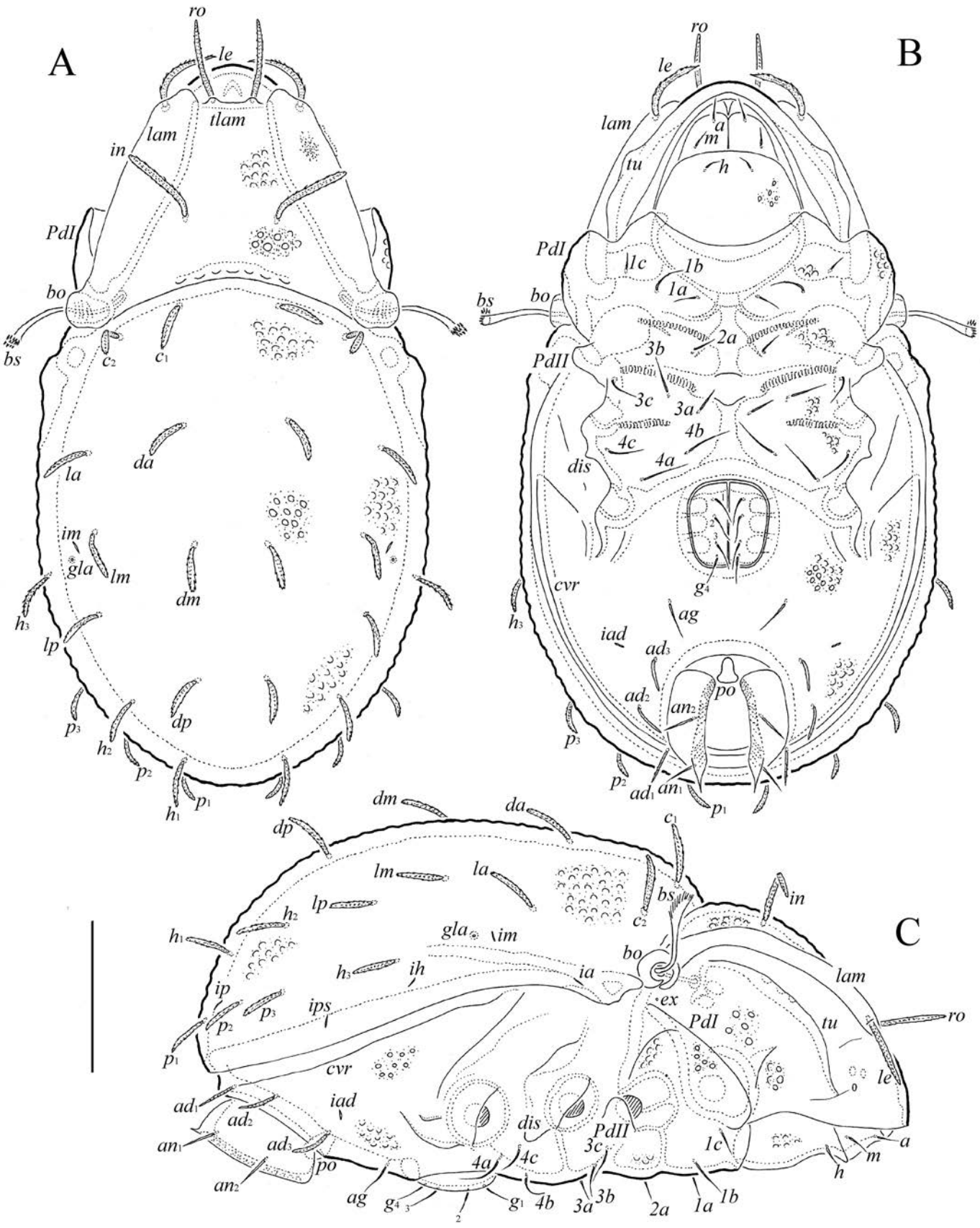

Figure 8 *Austrocarabodes planisetus* Mahunka and Mahunka-Papp, 2011, adult: a – dorsal view; b – ventral view (legs omitted); c – lateral view (legs omitted). Scale bar 100 μm.

microgranules. Prodorsum (between lamellae), notogaster, epimeres (poorly visible under light microscope) and anogenital region densely tuberculate (diameter of tubercles up to 8); subcapitular mentum, lateral sides of prodorsum (between lamellae and tutoria and on tutoria), anterolateral parts of ventral plate (pedotecta I and regions close to subcapitular mentum), and antiaxial sides of all leg femora and of trochanters III, IV foveolate (diameter of foveolae up to 8). Epimeral region with some muscle sigillae.

Prodorsum (Figs 8a-c, 9a-d, 10a-d) – Rostrum broadly rounded. Lamellae long (slightly shorter than prodorsum), rounded distally. Translamella slightly developed. Tutoria long, ridge-like. With elongate depression (separated by transverse ridge) between lamellae and tutoria, and one depression ventrally to tutoria. Rostral setae (49–53) weakly phylliform, erect, barbed, inserted on tubercles located on translamella. Lamellar setae (49–53) narrowly phylliform, with strong spines and small barbs, directed anteromedial. Interlamellar setae (49–53) narrowly phylliform, barbed, *in* directed lateral. Bothridial setae (49–53) with elongate, unilaterally dilated and heavily spinose heads (sometimes setae appear clavate in dorsal view). Bothridia slightly interrupted ventrally, with inner tooth. Exobothridial setae represented by alveoli.

Notogaster (Figs 8a, 8c, 9a, 9c, 10a-c) – Anterior notogastral margin slightly convex medially. Humeral processes poorly developed. Fourteen pairs of notogastral setae (p_1–p_3, h_1–h_3, 24–32; others 36–45) narrowly phylliform, barbed. Lyrifissures and opisthonotal gland openings distinct.

Gnathosoma (Figs 8b, 8c, 9b, 9c) – Generally, similar to *Austrocarabodes madagascarensis* **n. sp.** Subcapitulum longer than wide (106–114 × 82–86). Subcapitular setae (12–16) setiform, roughened. Postpalpal setae (10) bacilliform, slightly barbed mediodistally. Palps (57–61) with setation 0–2–1–3–9(+ω). Solenidion of palptarsi long, bacilliform. Chelicerae (131–143) with two setiform, barbed setae (*cha*, 45; *chb*, 20). Trägårdh's organ of chelicerae elongate triangular.

Lateral podosomal and epimeral regions (Figs 8b, 8c, 9b, 9c, 10d) – Pedotecta II trapezoid in ventral view. Discidia triangular, rounded distally. With typical epimeral setation 3–1–3–3. Epimeral setae *1a*, *1c*, *2a* and *3a* (16–20) shorter than *3b*, *3c* and *4a* (24–28) and *1b*, *4b* and *4b* (32–36), all setiform, slightly barbed.

Anogenital region (Figs 8b, 8c, 9b, 9c, 10f) – With one pair of short, longitudinal ridges lateral to genital aperture and posterior to epimere IV. Four pairs of genital (24–28) and one pair of aggenital (28) setae setiform, slightly barbed. Three pairs of adanal setae (24–36) weakly phylliform, barbed. Two pairs of anal setae (20–24) setiform, erect, slightly barbed. Adanal lyrifissures visible, removed from anal aperture and located anterolateral to adanal setae ad_3. Circumventral ridge developed.

Legs (Figs 9b, 9c, 10a) – Generally, similar to *Austrocarabodes madagascarensis* **n. sp.** (Table 1).

Material examined — Seven specimens (two males and five females): North Madagascar, Montagne d'Ambre National Park, circuit Ampijoroana, evergreen rain forest, 12°31'28''S, 49°09'52"E, 950 m a.s.l., sifting of leaf litter sample under big unidentified tree, Winkler apparatus extraction, 13.I.2014 (R. Ravebolun and L. Rabotenoson).

Material deposition — All specimens (preserved in ethanol with a drop of glycerol) are deposited in the collection of the Tyumen State University Museum of Zoology, Tyumen, Russia.

Remarks – Our specimens of *A. planisetus* from Madagascar are similar in general appearance to those according to the original description (Mahunka and Mahunka-Papp, 2011). However, some differences were observed:

1. Mahunka and Mahunka-Papp (2011) noted, that "…epimeral surface smooth…" (p. 130). We studied our specimens under a light microscope and also found no tubercles (only some unclear tubercles were poorly visible in lateral view). However, the SEM of mites showed that epimeres are in fact densely tuberculate (Fig 9b).
2. Mahunka and Mahunka-Papp (2011) did not discuss surface of the anogenital region. In our specimens this region has tubercles.

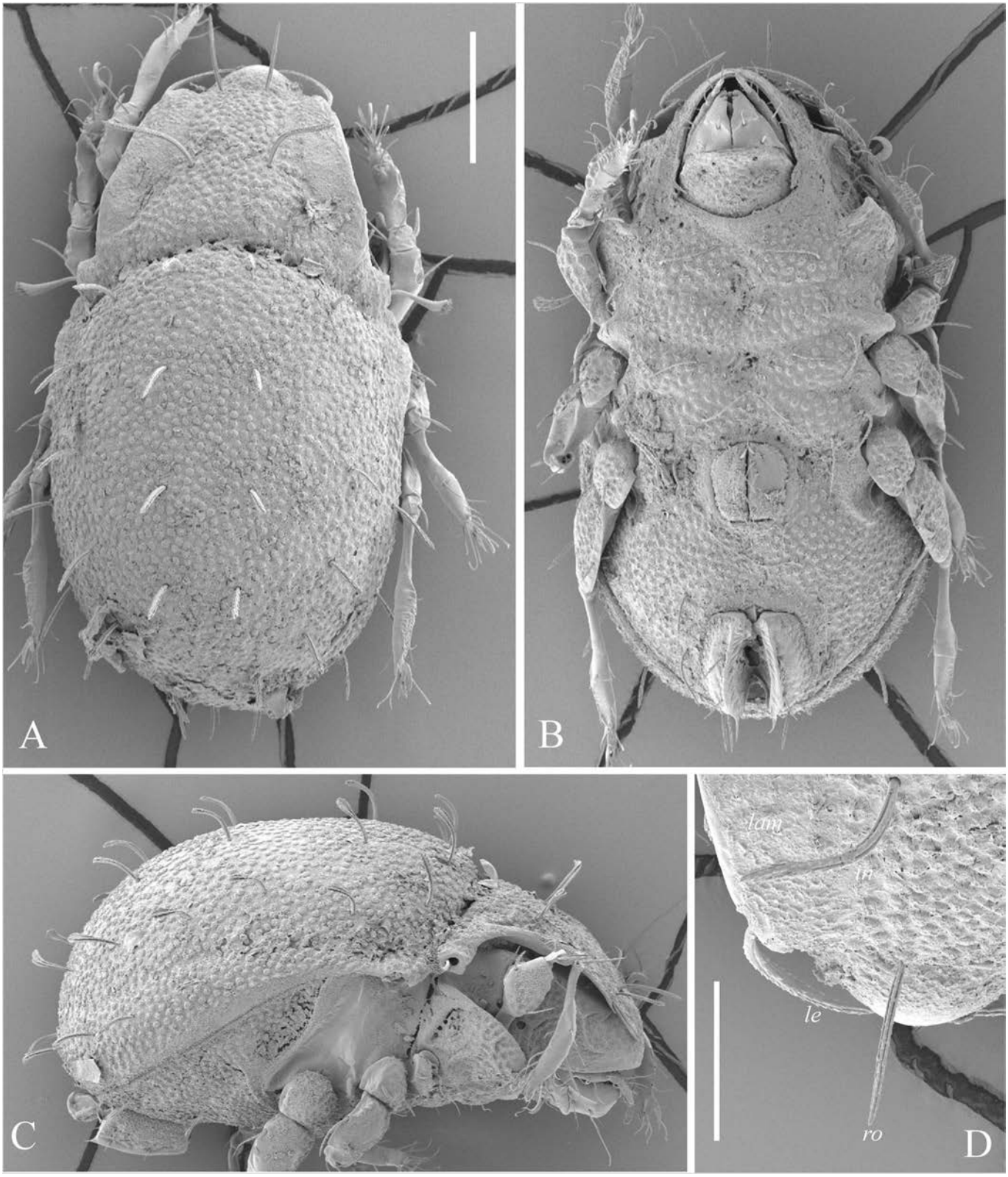

Figure 9 *Austrocarabodes planisetus* Mahunka and Mahunka-Papp, 2011, adult, SEM micrographs: a – dorsal view; b – ventral view; c – lateral view; d – rostral, lamellar and interlamellar setae, dorsal view. Scale bar 100 μm (a–c), scale bar 50 μm (d).

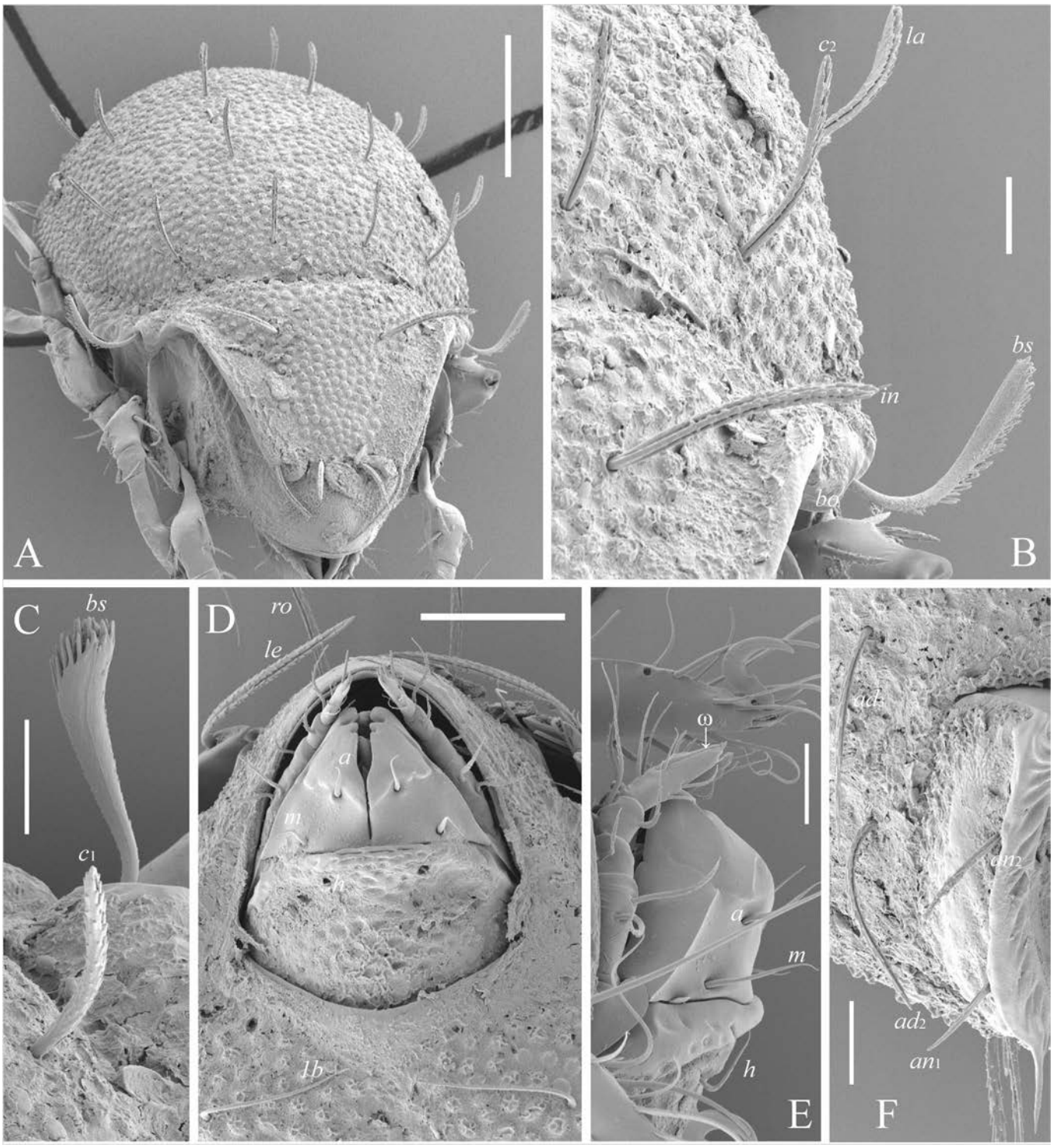

Figure 10 *Austrocarabodes planisetus* Mahunka and Mahunka-Papp, 2011, adult, SEM micrographs: a – dorsoanterior view; b – interlamellar and bothridial and some notogastral setae, dorsoanterior view; c – bothridial seta and notogastral seta, dorsal view; d – anterior part of body, ventral view; e – gnathosoma and medioanterior part of leg tarsus I, lateral view; f – part of anoadanal region. Scale bar 100 µm (a), scale bar 50 µm (d), scale bar 20 µm (b, c, e, f).

Thus, based on the supplementary description and original description (Mahunka and Mahunka-Papp, 2011), the diagnosis for *A. planisetus* is as follows:

Body size: 421-540 × 249–346. Prodorsum, notogaster, epimeres and anogenital region densely tuberculate. Translamella present. Rostral setae weakly phylliform, erect, lamellar setae narrowly phylliform, with spines and barbs, interlamellar setae narrowly phylliform, barbed; all setae comparatively long, similar in length, barbed, *ro* inserted on translamella. Bothridial setae unilaterally dilated and spinose. Notogastral setae comparatively short (posterior setae shortest), narrowly phylliform, barbed. Epimeral setae *1a*, *1c*, *2a* and *3a* shortest, *4a* and *4b* longest, all setiform, slightly barbed. Genital and aggenital setae setiform, slightly barbed. Adanal setae weakly phylliform, barbed. Anal setae setiform, erect, slightly barbed. Lateral phylliform seta *l''* present only on genua I, II.

New record

Austrocarabodes (*Austrocarabodes*) *spathulatus* Mahunka, 1978: 1 ex. (with same locality data as for above listed species). Previous known distribution: Réunion.

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