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A new genus and three new species of eriophyoid mites from New Zealand *Coprosma* (Rubiaceae)

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Abstract

A new genus and three new species of eriophyoid mites of the family Eriophyidae are described and illustrated from various *Coprosma* species in New Zealand: *Calareolata* **gen. nov.**, *Calareolata coprosmae* **sp. nov.**, *Cosetacus mamangi* **sp. nov.** and *Aculus robustalucidus* **sp. nov.**. A key to the eriophyoid mites associated with *Coprosma* species in the world is provided.

Keywords: Acari, Eriophyoidea, taxonomy, *Coprosma*, Rubiaceae, New Zealand

Introduction

The Eriophyoidea is a large mite superfamily with more than 4,400 described species placed in over 350 genera and three families according to the latest estimate (Zhang *et al.* 2011). In recent years, this superfamily has received intensive studies with more new species described than in other mite superfamilies (Lam & Zhang 2016; Li & Zhang 2016; Liu & Zhang 2016). The number of described species had reached beyond 5000 (Zhang 2017). In New Zealand, only 125 species of Eriophyoidea have been described so far (Xue & Zhang 2008; Xue *et al*. 2015). Many more new eriophyoid species are waiting to be discovered and described.

Eriophyoidea is the lineage most highly adapted for plant feeding among the Acari, with repeated independent evolution from narrow to extreme host specificity in a vast array of eriophyoid taxa (Lindquist 1996a). The genus *Coprosma* belongs to the family Rubiaceae in the major group Angiosperms (flowering plants). This is a highly diverse taxon, presently composed of 248 species (The Plant List on-line database 2013). There are approximately 60 species of *Coprosma* in New Zealand, and this genus forms many wild hybrids. Only nine species of the Eriophyoidea have been reported from *Coprosma* plants worldwide. In this paper, we present descriptions of a new genus and three new eriophyoid species found on *Coprosma* species in New Zealand, summarize the main information on the eriophyoid mites associated with this plant genus, and provide a key to species of these mites.

Material and methods

Retrieval of published information was largely based on Amrine Jr. & Stasny (1994) and the database developed by Amrine Jr. & de Lillo (2010). The morphological terminology used here follows Lindquist (1996b) and the generic classification follows Amrine *et al.* (2003). Specimens were examined with a Leica DM4500B (Germany) research microscope with phase contrast and semi-schematic drawings were made; photos were taken with Nikon (Japan) research microscope with differential interference contrast. Specimens were measured according to de Lillo *et al.* (2010). The holotype (if designated) female measurement precedes the range of specimens (given in parentheses). All measurements are in micrometers (μm), and are lengths when not otherwise specified. Most type specimens are deposited as slide mounted specimens in NZAC (New Zealand Arthropod Collection, Auckland, New Zealand).

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One paratype of *Aculus robustalucidus* **sp. nov.** from the type locality will be deposited in BMNH and another in ANIC. Institutional acronyms follow Zhang (2018).

Results

Family Eriophyidae Nalepa
Subfamily Nothopodinae Keifer
Tribe Colopodacini Mohanasundaram
Genus *Calareolata* gen. nov.

Type species. *Calareolata coprosmae* **sp. nov.**

Diagnosis. Body fusiform. Prodrosum: scapular tubercles placed far ahead of rear shield margin; setae (*sc*) projecting up. Legs: all coxal setae present; tibiae reduced in size but distinct, without setae; empodium entire; tarsal solenidion (*ω*) knobbed. Opisthosoma: opisthosomal ridges absent; opisthosomal annuli differentiated into wider and fewer dorsal annuli and narrower and more numerous ventral annuli.

Etymology. The genus designation is derived from the combination of *Cal-* (beautiful, Greek) and *areolata* (netted), alluding to the simple and elegant network when the admedian lines are transected by three transverse lines on the prodorsum; the gender is feminine.

Remarks. The new genus is placed in Colopodacini, Nothopodinae, Eriophyidae, Eriophyoidea. It is the twelfth genus in Colopodacini. It is similar to *Colopodacus* Keifer, 1960, but can be differentiated from the latter by the presence of annuli of coxal genital region (coxal genital region lacking annuli in *Colopodacus*), dorsal opisthosoma smooth (dorsal opisthosoma with a median ridge in *Colopodacus*), tibiae very small but distinct (tibiae absent in *Colopodacus*). It is also similar to *Calliparus* Li, Wang & Wei, 2010, but can be differentiated from the latter by scapular tubercles ahead of rear shield margin (scapular tubercles on shield rear margin in *Calliparus*), scapular setae (*sc*) projecting upward (scapular setae (*sc*) directed postero-laterally in *Calliparus*).

Calareolata coprosmae sp. nov.
(Figs. 1–2)

Description. FEMALE: (n=15). Body fusiform, 160–210 long, 70–75 wide, 60–65 thick. Gnathosoma 20–25, projecting obliquely downwards, pedipalp coxal setae (*ep*) 2–3, dorsal pedipalp genual setae (*d*) 4–5, cheliceral stylets 20–21. Prodorsal shield 44–45 long, 68–70 wide, median line absent, admedian lines complete, with three transverse lines between them, with the posterior one V-shaped; anterior shield lobe absent. Scapular tubercles well ahead of rear shield margin, 32–33 apart, scapular setae (*sc*) 6–8, projecting upward. Coxigenital region with 5–6 semiannuli between coxae and genitalia. Coxal plate I smooth, coxal plate II smooth, anterolateral setae on coxisternum I (*1b*) 5–6, 9–10 apart, proximal setae on coxisternum I (*1a*) 20–22, 12–13 apart, proximal setae on coxisternum II (*2a*) 35–38, 25–28 apart. Granules situated in lateral rows on epicoxal areas. Prosternal apodeme 5–6. Legs I 23–25, femur 9–10, basiventral femoral setae (*bv*) 7–8; genu 3–4, antaxial genual setae (*l''*) 23–25; tibia 2, paraxial tibial setae (*l'*) absent; tarsus 6–7, paraxial, fastigial, tarsal setae (*ft'*) 18–20, antaxial, fastigial, tarsal setae (*ft''*) 22–25, paraxial, unguinal, tarsal setae (*u'*) 4–5; tarsal empodium (*em*) 4–5, simple, 3-rayed, tarsal solenidion (*ω*) 5–6, knobbed. Legs II 20–22, femur 8–10, basiventral femoral setae (*bv*) 10–12; genu 2–3, antaxial genual setae (*l''*) 8–10; tibia 2; tarsus 5–6, paraxial, fastigial, tarsal setae (*ft'*) 5–6, antaxial, fastigial, tarsal setae (*ft''*) 18–20, paraxial, unguinal, tarsal setae (*u'*) 3–4; tarsal empodium (*em*) 4–5, simple, 3-rayed, tarsal solenidion (ω) 5–6, knobbed. Opisthosoma dorsally with 24–26 semiannuli, smooth, ventrally with 57–64 semiannuli, with linear microtubercles. Setae *c2* 30–32, on ventral semiannulus 8–10, 55–60 apart; setae *d* 40–46, on ventral semiannulus 22–25, 35–38 apart; setae *e* 8–10, on ventral semiannulus 37–39, 35–40 apart; setae *f* 15–17, on 7th–8th ventral semiannulus from rear, 20–21 apart. Setae *h1* absent, *h2* 50–55. Female genitalia 16–18 long, 22–23 wide, coverflap with 3–4 longitudinal ridges, setae *3a* 8–10, 16–19 apart.

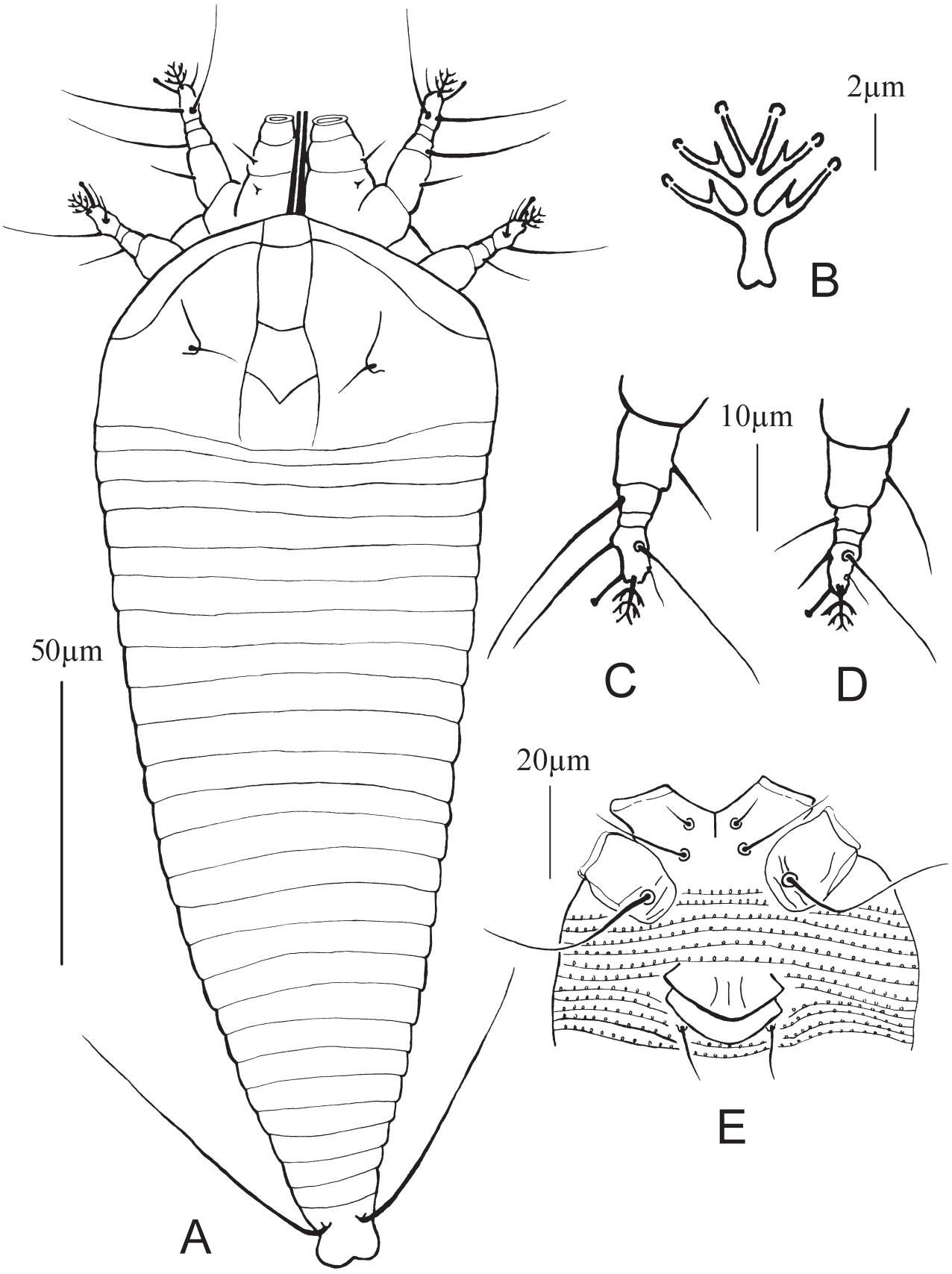

FIGURE 1. *Calareolata coprosmae* **sp. nov.** A—dorsal view of female; B—empodium; C—leg I; D—leg II; E—coxae and female genitalia.

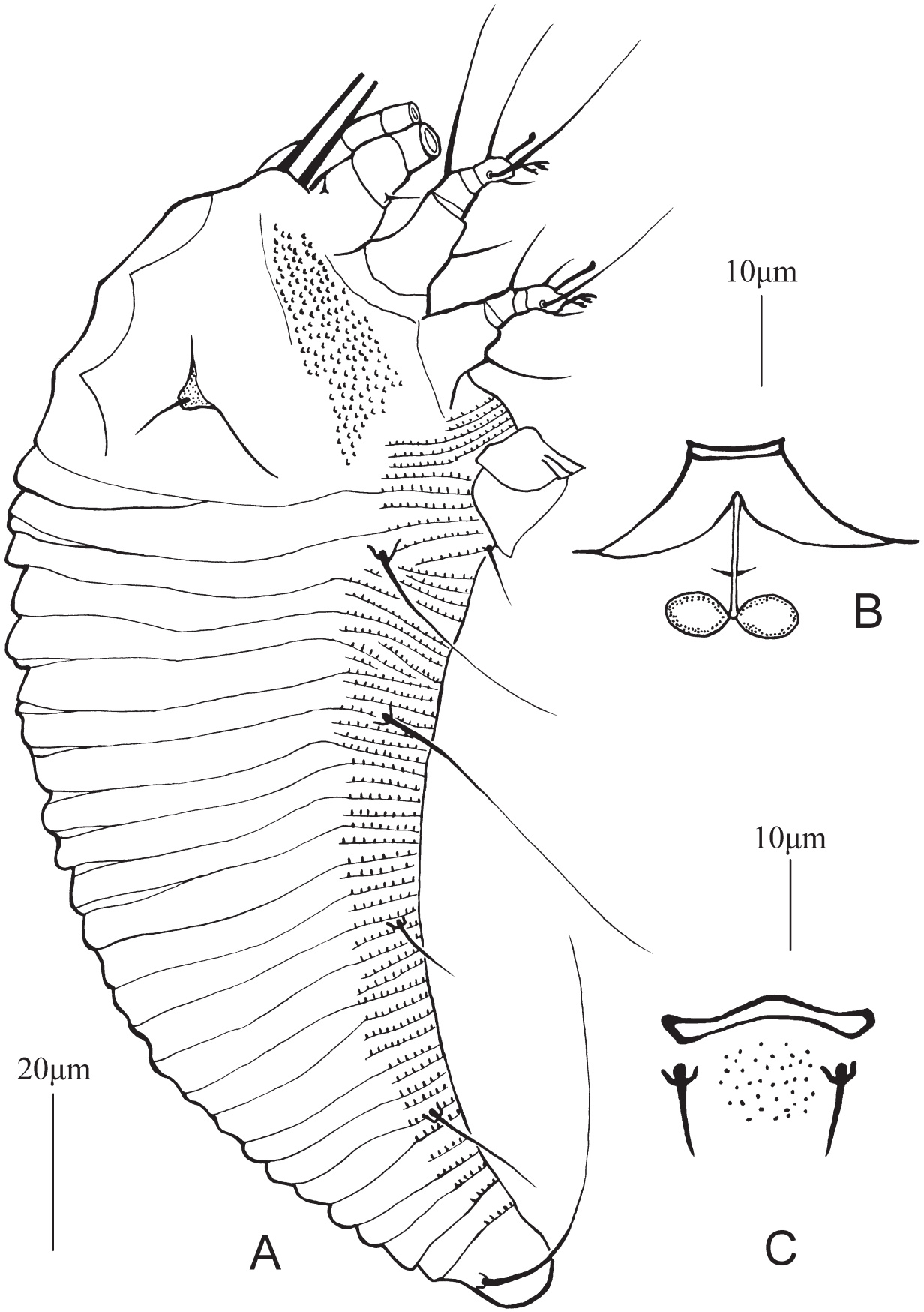

FIGURE 2. *Calareolata coprosmae* **sp. nov.** A—lateral view of female; B—female internal genitalia; C—male genital region.

MALE: (n=2, dorsal view). Body 130–205 long, 50–70 wide. Gnathosoma 20, projecting obliquely downwards, pedipalp coxal setae (*ep*) 2, dorsal pedipalp genual setae (*d*) 4–5, cheliceral stylets 18–20. Prodorsal shield 42–45 long, 65–68 wide, ornamentation is similar with female; anterior shield lobe absent. Scapular tubercles ahead of rear shield margin, 30–33 apart, scapular setae (*sc*) 5–7, projecting centrad. Coxigenital region with 6 semiannuli between coxae and genitalia. Coxal plate I smooth, coxal plate II smooth, anterolateral setae on coxisternum I (*1b*) 5–7, 10 apart, proximal setae on coxisternum I (*1a*) 17–18, 10–12 apart, proximal setae on coxisternum II (*2a*) 35–37, 27–28 apart. Granules situated in lateral rows on epicoxal areas. Prosternal apodeme 5. Legs I 21–25, femur 8–9, basiventral femoral setae (*bv*) 7–8; genu 3, antaxial genual setae (*l''*) 20–23; tibia 2, paraxial tibial setae (*l'*) absent; tarsus 5–6, paraxial, fastigial, tarsal setae (*ft'*) 15–17, antaxial, fastigial, tarsal setae (*ft''*) 20–22, paraxial, unguinal, tarsal setae (*u'*) 4–5; tarsal empodium (*em*) 4–5, simple, 3-rayed, tarsal solenidion (*ω*) 4–5, knobbed. Leg II 20–22, femur 7–8, basiventral femoral setae (*bv*) 10–12; genu 3, antaxial genual setae (*l''*) 8; tibia 2; tarsus 5, paraxial, fastigial, tarsal setae (*ft'*) 5, antaxial, fastigial, tarsal setae (*ft''*) 16–17, paraxial, unguinal, tarsal setae (*u'*) 3–4; tarsal empodium (*em*) 4, simple, 3-rayed, tarsal solenidion (*ω*) 5–6, knobbed. Opisthosoma dorsally with 24–26 semiannuli, smooth, ventrally with 62–64 semiannuli, with linear microtubercles. Setae *c2* 27–30, on ventral semiannulus 7, 40–50 apart; setae *d* 30–40, on ventral semiannulus 17–20, 25–35 apart; setae *e* 8–10, on ventral semiannulus 31–34, 18–19 apart; setae *f* 12–15, on 7th–8th ventral semiannulus from rear, 18–20 apart. Setae *h1* absent, *h2* 40–45. Male genitalia 22 wide, setae *3a* 8, 15–18 apart.

Type material. A single slide of syntype specimens with 15 females and two males (NZAC02016569), from *Coprosma areolata* Cheeseman (Rubiaceae), Murphy's Bush, Manurewa, Auckland, New Zealand, December 25, 2002, coll. N.A. Martin.

Relation to host. This species is vagrant on a lower part of the leaf surface. No damage to the host plant was observed.

Etymology. The specific designation *coprosmae* is derived from the generic name of the host plant and is a noun in the genitive case.

Subfamily Cecidophyinae Keifer
Tribe Colomerini Newerd et Keifer
Genus *Cosetacus* Keifer

***Cosetacus mamangi* sp. nov.**
(Figs. 3–4)

Description. FEMALE: (n=5). Body fusiform, 160–200 long, 55–60 wide, 50–55 thick. Gnathosoma 20–23, projecting obliquely downwards, pedipalp coxal setae (*ep*) 3–4, dorsal pedipalp genual setae (*d*) 5–6, cheliceral stylets 20–21. Prodorsal shield 28–30 long, 50–55 wide, median line, admedian lines and submedian lines absent, with isolated short parallel lines present laterally in two ranks and transverse lines below longitudinal lines on each side; anterior shield lobe absent. Scapular tubercles on the rear shield margin, 30–31 apart, scapular setae (*sc*) 40–45, projecting posteriorly. Coxigenital region with 4–5 semiannuli between coxae and genitalia. Coxal plate I with granules and short lines, coxal plate II with granules and short lines, anterolateral setae on coxisternum I (*1b*) 5–6, 9–10 apart, proximal setae on coxisternum I (*1a*) 10–12, 10–12 apart, proximal setae on coxisternum II (*2a*) 28–30 long, 24–25 apart. Granules situated in lateral rows on epicoxal areas. Prosternal apodeme absent. Legs I 28–30, femur 9–10, basiventral femoral setae (*bv*) 8–9; genu 4–5, antaxial genual setae (*l''*) 23–25; tibia 5–6, paraxial tibial setae (*l'*) absent; tarsus 7–8, paraxial, fastigial, tarsal setae (*ft'*) 7–8; antaxial, fastigial, tarsal setae (*ft''*) 18–20; paraxial, unguinal, tarsal setae (*u'*) 3–4; tarsal empodium (*em*) 3–4, simple, 3-rayed, tarsal solenidion (*ω*) 5–6, knobbed. Legs II 26–28, femur 9–10, basiventral femoral setae (*bv*) 9–10; genu 3–4, antaxial genual setae (*l''*) 8–10; tibia 4–5; tarsus 7–8; paraxial, fastigial, tarsal setae (*ft'*) 5–6; antaxial, fastigial, tarsal setae (*ft''*) 18–20; paraxial, unguinal, tarsal setae (*u'*) 3–4; tarsal empodium (*em*) 3–4, simple, 3-rayed, tarsal solenidion (*ω*) 7–8, knobbed. Opisthosoma dorsally with 61–65 elliptical semiannuli, ventrally with 59–61 elliptical semiannuli, with linear microtubercles. Setae *c2* 40–50, on ventral semiannulus 9–10, 55–60 apart; setae *d* 60–70, on ventral semiannulus 20–22, 35–38 apart; setae *e* 9–10, on ventral semiannulus 34–37, 18–20 apart; setae *f* 18–19 on 7th–8th ventral semiannulus from rear, 20–21 apart. Setae *h1* absent, *h2* 60–65. Female genitalia 15–18, 22–23 wide, coverflap with granules, two tiny indistinct circles on the genital coverflap, setae *3a* 10–12, 18–19 apart.

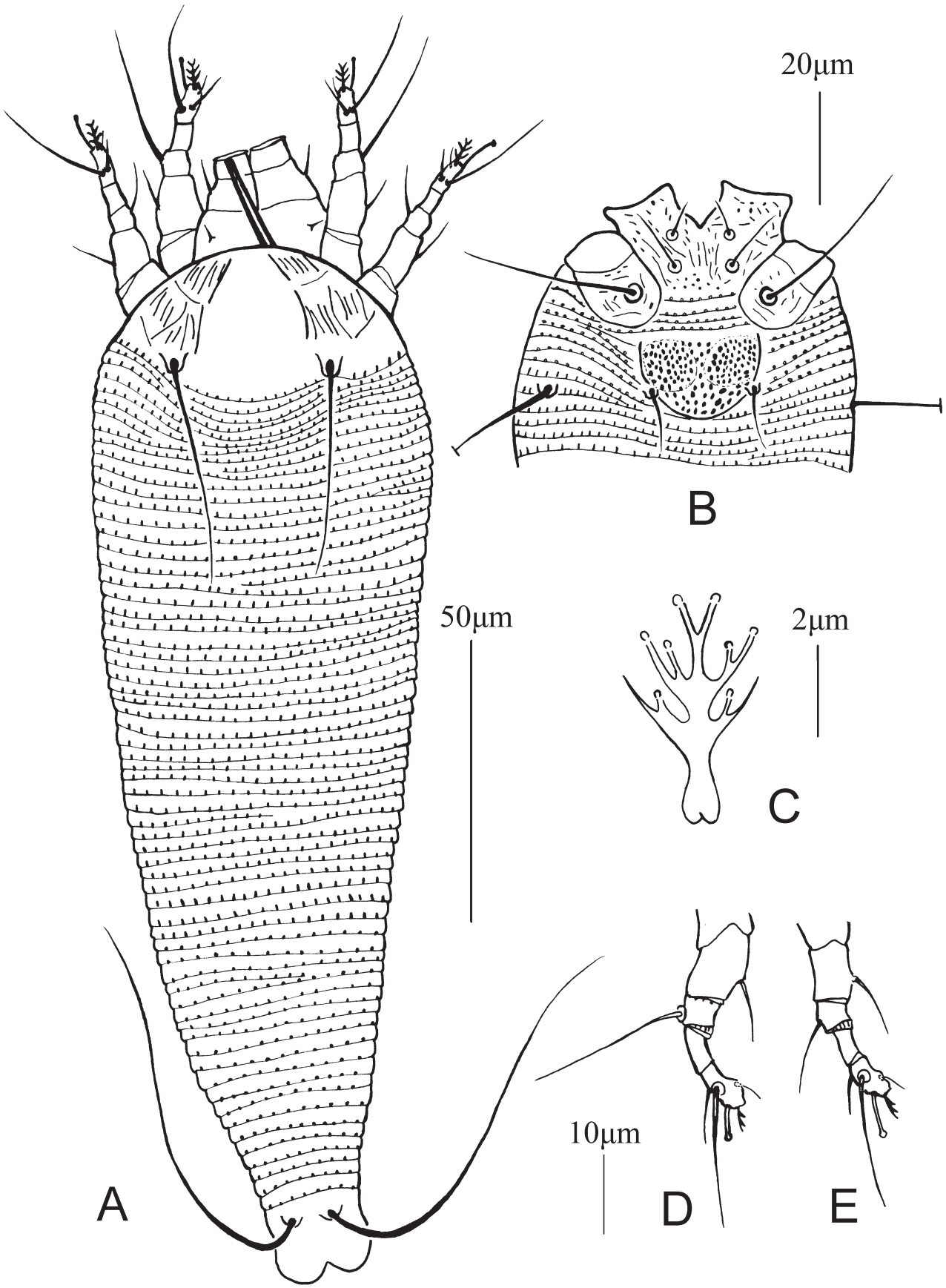

FIGURE 3. *Cosetacus mamangi* **sp. nov.** A—dorsal view of female; B—coxae and female genitalia; C—empodium; D— leg I; E—leg II.

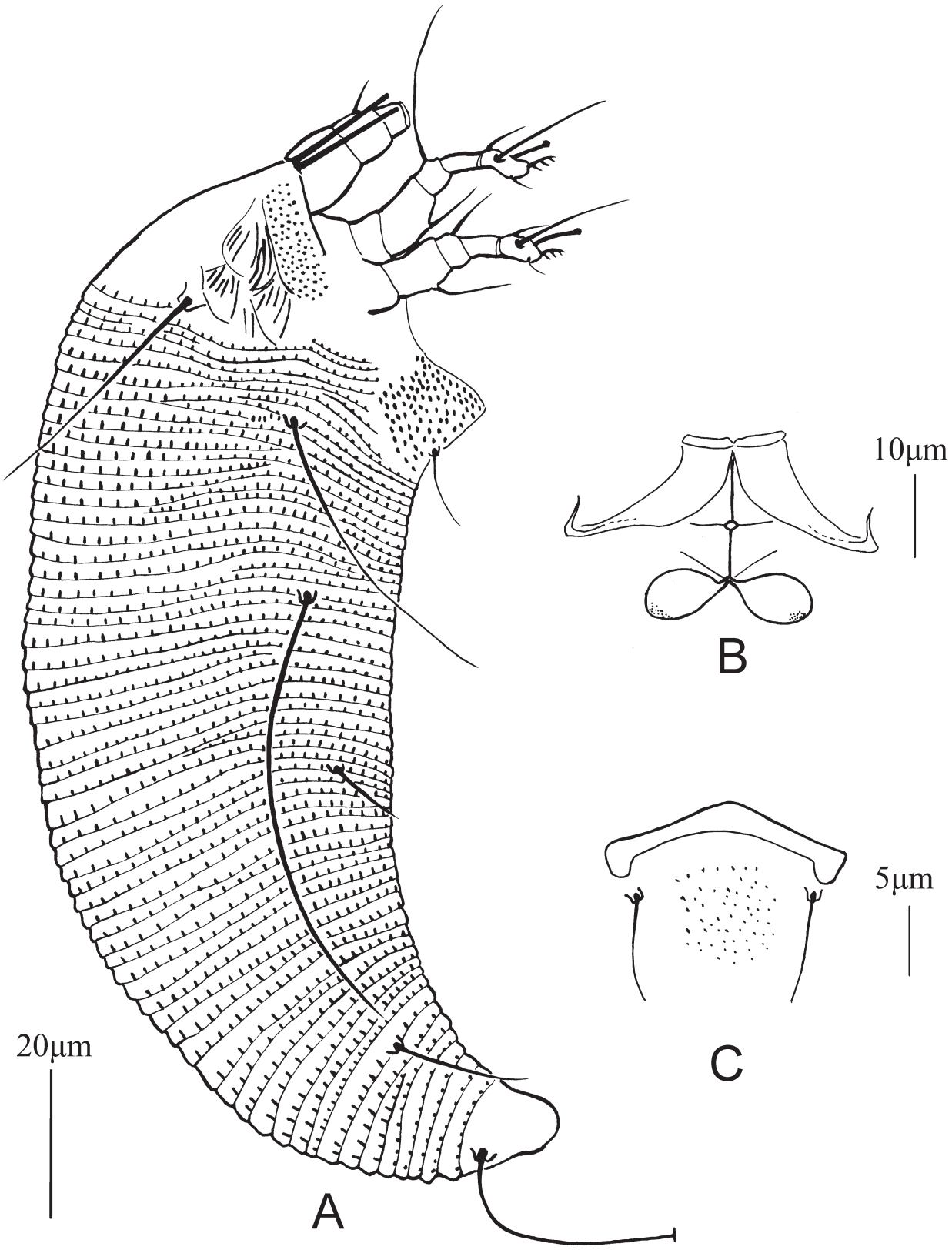

FIGURE 4. *Cosetacus mamangi* **sp. nov.** A—lateral view of female; B—female internal genitalia; C—male genital region.

MALE: (n=1, dorsal view). Body 190 long, 60 wide. Gnathosoma 23, projecting obliquely downwards, pedipalp coxal setae (*ep*) 3, dorsal pedipalp genual setae (*d*) 5, cheliceral stylets 20. Prodorsal shield 32 long, 52 wide,

ornamentation is similar to female; anterior shield lobe absent. Scapular tubercles on the rear shield margin, 28 apart, scapular setae (*sc*) 40, projecting posteriorly. Coxigenital region with 4 semiannuli between coxae and genitalia. Coxal plate I with granules and short lines, coxal plate II with granules and short lines, anterolateral setae on coxisternum I (*1b*) 5, 10 apart, proximal setae on coxisternum I (*1a*) 10, 11 apart, proximal setae on coxisternum II (*2a*) 25, 22 apart. Granules situated in lateral rows on epicoxal areas. Prosternal apodeme absent. Legs I 29, femur 10, basiventral femoral setae (*bv*) 8; genu 4, antaxial genual setae (*l''*) 22; tibia 5, paraxial tibial setae (*l'*) absent; tarsus 8, paraxial, fastigial, tarsal setae (*ft'*) 12; antaxial, fastigial, tarsal setae (*ft''*) 17; paraxial, unguinal, tarsal setae (*u'*) 4; tarsal empodium (*em*) 3, simple, 3-rayed, tarsal solenidion (*ω*) 5, knobbed. Legs II 26, femur 10, basiventral femoral setae (*bv*) 8; genu 3, antaxial genual setae (*l''*) 6; tibia 4; tarsus 8; paraxial, fastigial, tarsal setae (*ft'*) 5; antaxial, fastigial, tarsal setae (*ft''*) 21; paraxial, unguinal, tarsal setae (*u'*) 3; tarsal empodium (*em*) 4, simple, 3-rayed, tarsal solenidion (*ω*) 7, knobbed. Opisthosoma dorsally with 56 elliptical semiannuli, ventrally with 55 elliptical semiannuli. Setae *c2* 40, on ventral semiannulus 12, 46 apart; setae *d* 60 on ventral semiannulus 20, 30 apart; setae *e* 7, on ventral semiannulus 31, 17 apart; setae *f* 18 on 7th ventral semiannulus from rear, 20 apart. Setae *h1* absent, *h2* 65. Male genitalia 15 wide, setae *3a* 8, 13 apart.

Type material. A single slide of syntypes with 5 females and one male (NZAC02016570) from *Coprosma arborea* Kirk (Rubiaceae), Destruction Gully track, Waitakere Ranges, Auckland, New Zealand, December 12, 1999, coll. N.A. Martin.

Relation to host. This species is in leaf rosette gall caused by a scale insect.

Etymology. The specific designation *mamangi* is the Maori name of the host plant. It is used here as a noun in apposition.

Differential diagnosis. This new species is similar to *Cosetacus camelliae* (Keifer, 1945), but can be differentiated from the latter by having the design of prodorsal shield with median and admedian lines absent (*vs*. prodorsal shield design with median and complete admedian lines in *C. camelliae*), the coxal plates with granules and short lines (*vs*. coxal plates smooth), and the genital plate with only granules (*vs*. genital plate with 2 ranks of short lines).

Subfamily Phyllocoptinae Nalepa
Tribe Anthocoptini Amrine et Stasny
Genus *Aculus* Keifer

***Aculus robustalucidus* sp. nov.**
(Figs. 5–6)

Description. FEMALE: (n=10, dorsal view). Body fusiform, 240 (233–240) long, 100 (95–105) wide. Gnathosoma 30 (25–30), projecting obliquely downwards, pedipalp coxal setae (*ep*) 2 (2–3), dorsal pedipalp genual setae (*d*) 8 (7–8), cheliceral stylets 25 (24–25). Prodorsal shield 56 (55–57) long, 100 (90–100) wide, median line absent, admedian lines incomplete and absent in anterior part, with granules between admedian lines in posterior part, submedian line I incomplete and present in posterior part but II is complete, with granules between submedian lines in posterior part, with other granules on lateral parts in the middle; anterior shield lobe broad-based 14 (14–15). Scapular tubercles on the rear shield margin, 40 (40–45) apart, scapular setae (*sc*) 7 (7–8), projecting posteriorly. Coxigenital region with 8 (8–10) semiannuli between coxae and genitalia. Coxal plate I with granules, coxal plate II smooth, anterolateral setae on coxisternum I (*1b*) 8 (7–8) long, 15 (15–16) apart, proximal setae on coxisternum I (*1a*) 10 (10–12), 12 (12–13) apart, proximal setae on coxisternum II (*2a*) 30 (30–35), 33 (31–33) apart. Granules situated in lateral rows on epicoxal areas. Prosternal apodeme absent. Legs I 40 (36–40), femur 13 (12–13), basiventral femoral setae (*bv*) 8 (8–9); genu 6 (5–6), antaxial genual setae (*l''*) 25 (22–25); tibia 10 (10–11); paraxial tibial setae (*l'*) 5 (3–5), located at 1/4 from dorsal base; tarsus 7 (6–7); paraxial, fastigial, tarsal setae (*ft'*) 16 (16–17); antaxial, fastigial, tarsal setae (*ft''*) 22 (22–23); paraxial, unguinal, tarsal setae (*u'*) 3 (3–4); tarsal empodium (*em*) 3 (3–4), simple, 3-rayed; tarsal solenidion (*ω*) 6 (5–6), knobbed. Legs II 34 (34–35); femur 11 (10–11), basiventral femoral setae (*bv*) 8 (8–9); genu 5 (4–5), antaxial genual setae (*l''*) 5 (4–5); tibia 9 (8–9); tarsus 8 (7–8); paraxial, fastigial, tarsal setae (*ft'*) 4 (3–4); antaxial, fastigial, tarsal setae (*ft''*) 20 (20–21); paraxial, unguinal, tarsal setae (*u'*) 3 (3–4); tarsal empodium (*em*) 3 (3–4), simple, 3-rayed; tarsal solenidion (*ω*) 5 (5–6), knobbed. Opisthosoma

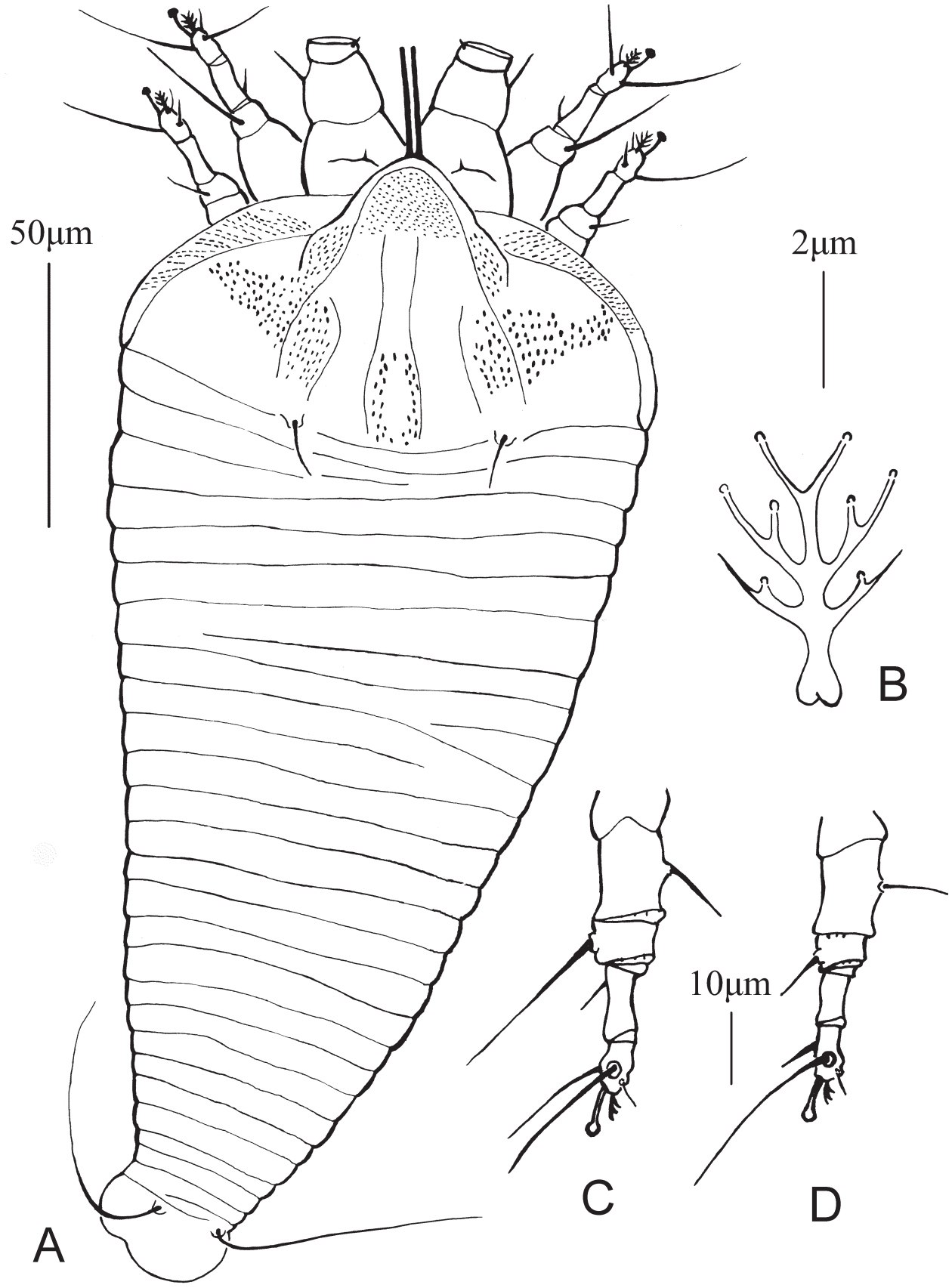

FIGURE 5. *Aculus robustalucidus* **sp. nov.** A—dorsal view of female; B—empodium; C—leg I; D—leg II.

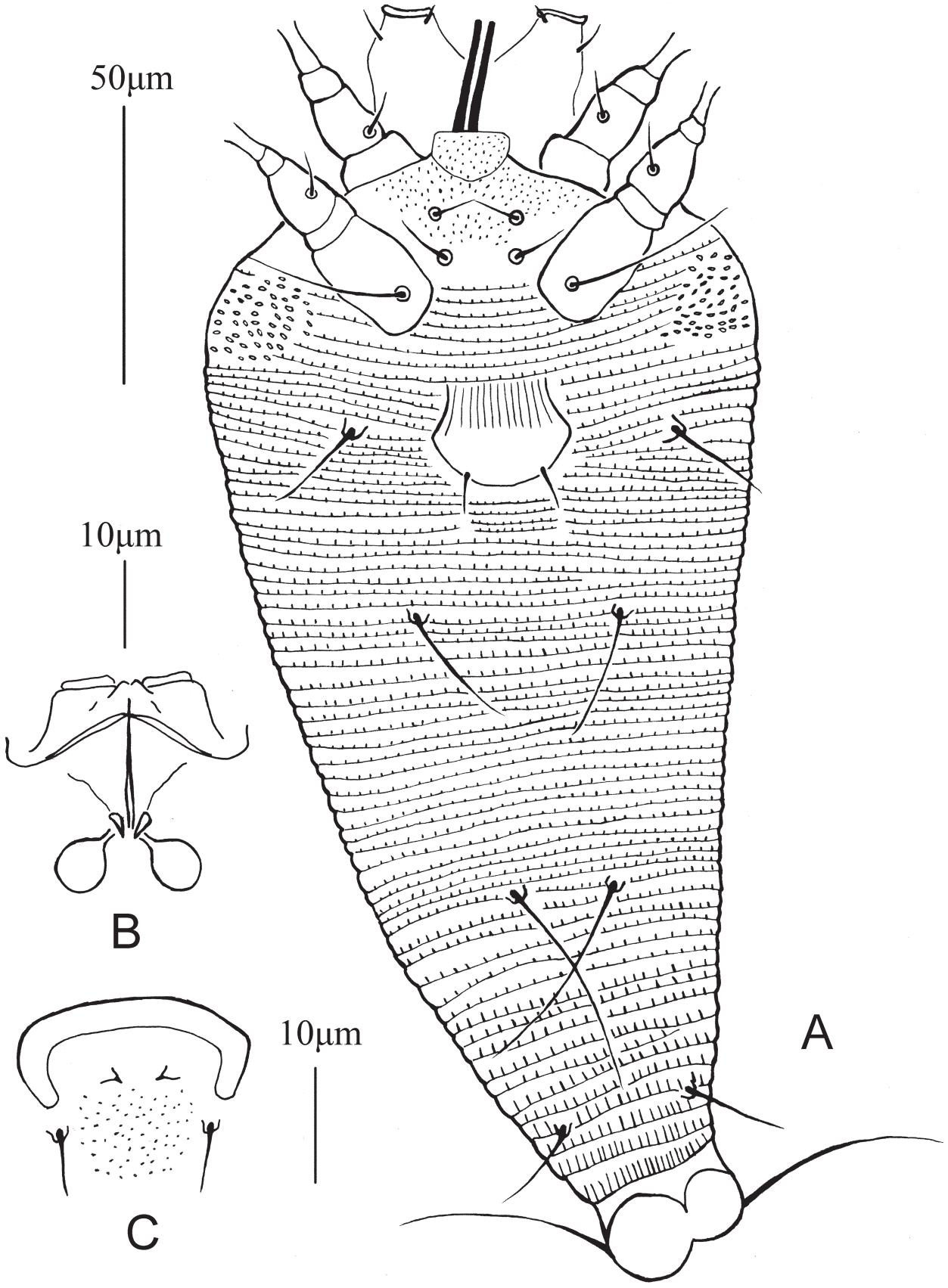

FIGURE 6. *Aculus robustalucidus* **sp. nov.** A—ventral view of female; B—female internal genitalia; C—male genital region.

dorsally with 27 (27–28) semiannuli, smooth, ventrally with 69 (68–69) semiannuli, with small and rounded microtubercles set on rear annular margins. Setae *c2* 17 (17–20), on ventral semiannulus 13 (13–15), 60 (60–65) apart; setae *d* 26 (26–27), on ventral semiannulus 29 (27–29), 38 (38–39) apart; setae *e* 35 (35–43) on ventral semiannulus 51 (51–52), 18 (18–19) apart; setae *f* 20 (19–20), on 4th–5th ventral semiannulus from rear, 23 (23–25) apart. Setae *h1* absent, *h2* 50 (45–50). Female genitalia 18 (18–20) long, 22 (22–24) wide, coverflap with 12–13 longitudinal ridges, setae *3a* 7 (7–8), 15 (14–15) apart.

MALE: (n=3, dorsal view). Body 160–200 long, 80–85 wide. Gnathosoma 25–26, projecting obliquely downwards, pedipalp coxal setae (*ep*) 1–2, dorsal pedipalp genual setae (*d*) 6–7, cheliceral stylets 24–25. Prodorsal shield 47–48 long, 80–85 wide, ornamentation is similar with female; anterior shield lobe broad-based 10–11. Scapular tubercles on rear shield margin, 33–35 apart; scapular setae (*sc*) 6–7, projecting posteriorly. Coxigenital region with 8–9 semiannuli between coxae and genitalia. Coxal plate I with granules; coxal plate II smooth, anterolateral setae on coxisternum I (*1b*) 6–8, 12–13 apart; proximal setae on coxisternum I (*1a*) 8–10, 10–11 apart; proximal setae on coxisternum II (*2a*) 20–30, 27–29 apart. Granules situated in lateral rows on epicoxal areas. Prosternal apodeme absent. Legs I 34–35, femur 10–11, basiventral femoral setae (*bv*) 7–8; genu 4–5, antaxial genual setae (*l''*) 21–23; tibia 10–11; paraxial tibial setae (*l'*) 1–2, located at 1/4 from dorsal base; tarsus 5–6; paraxial, fastigial, tarsal setae (*ft'*) 15–16; antaxial, fastigial, tarsal setae (*ft''*) 18–21; paraxial, unguinal, tarsal setae (*u'*) 3–4; tarsal empodium (*em*) 2–3, simple, 3-rayed; tarsal solenidion (*ω*) 4–5, knobbed. Legs II 30–33, femur 10–11, basiventral femoral setae (*bv*) 7–8; genu 4–5, antaxial genual setae (*l''*) 4–5; tibia 8–9; tarsus 6–7; paraxial, fastigial, tarsal setae (*ft'*) 3–4; antaxial, fastigial, tarsal setae (*ft''*) 16–18; paraxial, unguinal, tarsal setae (*u'*) 3–4; tarsal empodium (*em*) 3–4, simple, 3-rayed; tarsal solenidion (*ω*) 4–5, knobbed. Opisthosoma dorsally with 25–26 semiannuli, smooth, ventrally with 55–56 semiannuli, with small and rounded microtubercles set on rear annular margins. Setae *c2* 13–14, on ventral semiannulus 13–15, 50–55 apart; setae *d* 13–15, on ventral semiannulus 22–23, 28–30 apart; setae *e* 33–35, on ventral semiannulus 38–39, 13–14 apart; setae *f* 15–17, on 4th–5th ventral semiannulus from rear, 27–28 apart. Setae *h1* absent, *h2* 30–32. Male genitalia 19–20 wide, setae *3a* 5–6, 14–16 apart.

Type material. **Holotype** female (NZAC02016571) from *Coprosma robusta* Raoul (Rubiaceae) in a native forest, Auckland Botanic Gardens, Manurewa, Auckland, New Zealand, November 6, 2014, coll. N.A. Martin (maybe leafroll mites); **Paratypes**: 7 females and 3 males in four slides (NZAC02016572, NZAC02016573, NZAC02016574, NZAC02016575), same data as for holotype. 2 females on two slides (NZAC02016576, NZAC02016577) from *Coprosma lucida* J.R. Forst. et G. Forst. (Rubiaceae), Alice Eaves Reserve, Orewa, Auckland, New Zealand, December 23, 2014, coll. N.A. Martin (collected with *Acalitus intertextus* Manson, 1984).

Relation to host. Leafroll or domatia galls on leaf undersurface.

Etymology. The specific designation *robustalucidus* is derived from the specific name of the two host plant species (*C. robusta* and *C. lucida*), and is treated here as a noun in apposition.

Differential diagnosis. This new species is similar to *Aculus parvifoli* (Meyer & Ueckermann, 1990) recorded from *Tapiphyllum parvifolium* (Sond.) Robyns (present valid name *Vangueria parvifolia* Sond.) (Rubiaceae), but can be differentiated from the latter by having the coxal plate I with granules and coxal plate II smooth (*vs*. coxal plates practically unornamented, rarely with a few lines in *A. parvifoli*), tarsal empodium (*em*) 3-rayed (*vs*. tarsal empodium (*em*) 4-rayed), and tergites smooth (*vs*. tergites with indistinct elongate microtubercles). This new species is also similar to *A. propinquae* (Manson, 1984) inhabiting *Coprosma propinqua* A. Cunn. (Rubiaceae), but can be differentiated from the latter by having the design of prodorsal shield with median and admedian lines present (*vs*. prodorsal shield design with median and admedian absent in *A. propinquae*), coxal plate I with granules while coxal plate II smooth (*vs*. coxal plates with granules), and the genital plate with short lines at base (*vs*. genital plate with granules at base).

Key to eriophyoid mite associated with *Coprosma* secies

1	Gnathosoma small in comparison to body, chelicerae straight or slightly curved	2
-	Gnathosoma large in comparison to body, chelicerae abruptly curved and bent down near their base	*Lambella cerina* (Lamb, 1953)
2	Tibiae I–II reduced or completely fused with tarsi	3
-	Tibiae I–II distinct from tarsi	4
3	Coxal setae *1b* present	*Calareolata coprosmae* **sp. nov.**
-	Coxal setae *1b* absent	*Disella rebeeveri* Xue and Zhang, 2008
4	Female genital apodeme bent up and shortened, usually appearing as a heavy transverse line in ventral view; female genitalia appressed to coxae or separating coxae more than normal	*Cosetacus mamangi* **sp. nov.**

-	Female genital apodeme usually extending forward for a moderate distance, not appearing as a heavy transverse bar in ventral view; female genitalia not appressed to or separating coxae	5
5	Body vermiform, annuli subequal dorsoventrally	6
-	Body usually more fusiform	9
6	Prosternal apodeme present	7
-	Prosternal apodeme absent	8
7	Median line complete	*Acalitus taurangensis* (Manson, 1965)
-	Median line absent	*Acalitus cottieri* (Lamb, 1952)
8	Prodorsal shield with granules around lateral shield	*Acalitus intertextus* Manson, 1984
-	Prodorsal shield without granules around lateral shield	*Acalitus dissimus* Manson, 1984
9	Scapular tubercles ahead of rear shield margin, scapular setae *sc* projecting upward	10
-	Scapular tubercles on rear shield margin, scapular setae *sc* projecting posteriorly	11
10	Coxal plate with impressed dash-like markings	*Phyllocoptes hazelae* Manson, 1984
-	Coxal plate unornamented	*Phyllocoptes coprosmae* Lamb, 1952
11	Prodorsal shield design with median and admedian lines present	*Aculus robustalucidus* **sp. nov.**
-	Prodorsal shield design with median line absent	*Aculops propinquae* (Manson, 1984)

TABLE 1. Eriophyoid mites associated with *Coprosma* plants around the world

Family	Subfamily	Tribe	Species	Host	References
Eriophyidae	Nothopodinae	Nothopodini	*Disella rebeeveri* Xue & Zhang, 2008	*Coprosma grandifolia* Hook.f.; *C. robusta* Raoul; *Hebe salicifolia* (G. Forst.) Pennell; *H. stricta* (Benth.) L. B. Moore; *Kunzea ericoides* (A. Rich.) J. Thomp.; *Schefflera digitata* J. R. Forst. & G. Forst.	Han & Zhang 2015
		Colopodacini	*Calareolata coprosmae* **sp. nov.**	*Coprosma areolata* Cheeseman	This paper
	Cecidophyinae	Colomerini	*Cosetacus mamangi* **sp. nov.**	*Coprosma arborea* Kirk	This paper
	Eriophyinae	Aceriini	*Acalitus cottieri* (Lamb, 1952)	*Coprosma cuneata* Hook.f.; *C. linariifolia* (Hook.f.) Hook.f.; *C. linariifolia*×*parviflora*; *C. parviflora* Hook.f.; *C. propinqua* A.Cunn.; *C. pseudocuneata* W.R.B.Oliv. ex Garn.-Jones & Elder; *C. robusta* Raoul; *C. tenuicaulis* Hook.f.	Lamb 1952; Manson 1984a
			Acalitus dissimus Manson, 1984	*Coprosma foetidissima* J.R.Forst. & G.Forst.; *C. lucida* J.R.Forst. & G.Forst.; *C. robusta* Raoul	Manson 1984a
			Acalitus intertextus Manson, 1984	*Coprosma acerosa* A.Cunn.; *C. intertexta* G. Simpson	Manson 1984a
			Acalitus taurangensis (Manson, 1965)	*Coprosma tenuicaulis* Hook. f.	Manson, 1984a
	Phyllocoptinae	Phyllocoptini	*Phyllocoptes coprosmae* Lamb, 1952	*Coprosma robusta* Raoul	Manson, 1984b
			Phyllocoptes hazelae Manson, 1984	*Coprosma australis* (A. Rich.) Robinson; *C. lucida* J.R.Forst. & G.Forst.[1]; *Neopanax simplex* (G. Forst.) Allan	Manson, 1984b
		Anthocoptini	*Aculops propinquae* (Manson, 1984)	*Coprosma propinqua* A.Cunn.	Manson, 1984b
			Aculus robustalucidus **sp. nov.**	*Coprosma lucida* J.R.Forst. & G.Forst.[1]; *C. robusta* Raoul	This paper
Diptilomiopidae	Diptilomiopinae		*Lambella cerina* (Lamb, 1953)	*Carpodetus serratus* J.R.Forst. & G.Forst; *Coprosma australis* (A. Rich.) Robinson; *C. lucida* J.R.Forst. & G.Forst.[1]; *C. robusta* Raoul	Manson, 1984b

[1]—Reported under a junior synonym *Coprosma australis* (A. Rich.) Robinson

Eriophyoidea—*Coprosma* relationships

In this paper, we summarize the main information on the eriophyoid mites found so far on *Coprosma* species. The number of eriophyoid species known on *Coprosma* plants has increased from 9 to 12 (Table 1). It is interesting to note that five of these eriophyoid species are monophagous (each found on one host species only), three species were found on two host species, and two mite species were recorded on three host species (Manson 1984a, 1984b). It is also worth noting that *Disella rebeeveri* Xue & Zhang, 2008 has been reported from plants belonging to four different plant orders (Han & Zhang 2015), and *Acalitus cottieri* (Lamb, 1952) has been recorded on eight species of hosts on *Coprosma* species (Lamb 1952; Manson 1984a).

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