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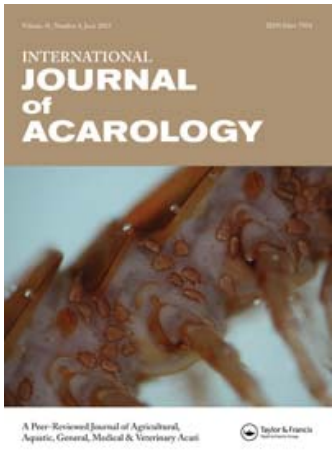

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Reinstatement of the genus Colopalpus Pritchard and Baker (1958) and re-description of Colopalpus matthyssei Pritchard and Baker (1958), the type species of the genus (Acari, Tenuipalpidae)

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Reinstatement of the genus *Colopalpus* Pritchard and Baker (1958) and re-description of *Colopalpus matthyssei* Pritchard and Baker (1958), the type species of the genus (Acari, Tenuipalpidae)

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We discuss the taxonomic history of the genus *Colopalpus* Pritchard and Baker 1958, and redescribe the female, male and deutonymph of the type species, *C. matthyssei* (Pritchard and Baker). We provide previously unknown morphological data for *C. matthyssei*, in addition to complementary information on the morphology of *C. nambii* (Castro and Feres) obtained using low temperature scanning electron microscopy (LT-SEM). Our results show that both *C. matthyssei* and *C. nambii* share characters with the genera Tenuipalpus and Brevipalpus. Based on these findings, we propose that *Colopalpus* be reinstated as a valid genus. We discuss the characters shared by *Colopalpus*, Tenuipalpus and Brevipalpus, and also provide a list of species that are transferred to the genus *Colopalpus*.

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Keywords: *Tenuipalpus*; *Brevipalpus*; flat mites; taxonomy; systematics; Philippines

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Introduction

The genus *Colopalpus* (Acari, Tenuipalpidae) was erected by Pritchard and Baker (1958, p. 258) with *Tenuipalpus matthyssei* as the type species, collected from *Melanolepis multiglandulosa* (Reinw. ex Blume) Rchb.f. and Zoll. (Euphorbiaceae) from Laguna, The Philippines. These authors noted that *Colopalpus* resembles *Brevipalpus* Donnadieu in the shape of the body and its dorsal chaetotaxy, and that it resembles *Tenuipalpus* Donnadieu due to the dorsal opisthosomal setae *h2* being elongate and flagelliform. Pritchard and Baker (1958) used the presence of a single genito-ventral plate in the female to distinguish *Colopalpus* from these two genera.

The diagnosis provided by Pritchard and Baker (1958) includes: body elongate-ovate with sculptured dorsum; palpus two-segmented, proximal segment without setae, and the second with two long setae; rostral shield well developed, medially incised; propodosoma with three pairs of dorsal setae (*v2, sc1, sc2*); dorsal opisthosoma with three pairs of dorsocentrals, a par of humerals and five pairs of dorsolaterals (i.e. setae *c1, c3, d1, d3, e1, e3, f3, h1, h2* present); the dorsosublaterals absent (i.e. setae *c2, d2, e2, f2* absent); female with large genito-ventral plate, bearing two pairs of genital setae (setae *g1, g2*) and the one pair of medioventral opisthosomals (i.e. setae *ag*); with two pairs of anal setae (i.e. pseudanal setae *ps1, ps2*). Male with three pairs of genito-anal setae (i.e. setae *g1, g2, ps2*; however, there are actually four pairs of setae, as the modified *ps1* setae were overlooked).

Subsequently, several species were described in, or transferred from *Tenuipalpus* to, the genus *Colopalpus*. Manson (1963) described *C. pedrus* from Honduras; Baker and Tuttle (1972) transferred *T. eriophyoides* Baker to *Colopalpus*; Collyer (1973) described *C. elegans* from New Zealand and *C. mansoni* from Australia; Flechtmann (1976) described *C. oxalis* from Brazil; Corpuz-Raros (1978) described *C. philippinensis* from The Philippines; Maninder and Ghai (1978) described *C. punjabensis* from India; Mitrofanov and Strunkova (1979) transferred *T. dubinini* Reck, *T. rosae* Kadzhaja, *Gnathopalpus tauricus* Mitrofanov and Strunkova, and *T. crassus* Andre to *Colopalpus*. Eventually, *Colopalpus* was made a junior synonym of *Tenuipalpus* by Meyer (1979) in her major revision of the family, discussed below.

In this paper, we re-describe *T. matthyssei*, the type species of the genus *Colopalpus*, with additional data (e.g. leg chaetotaxy and setal measurements). Additional morphological characters confirmed through of the study of LT-SEM imaging are presented for *T. nambii* Castro and Feres. Based on the study of these species, we consider *Colopalpus* Pritchard and Baker (1958) to be a valid genus and remove it from synonymy with *Tenuipalpus*. We also discuss the distinct characteristics of both genera *Colopalpus* and *Tenuipalpus* that differentiate these two genera. Furthermore, a list is provided of the species reinstated or moved to *Colopalpus*.

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Material and methods

Measurements for the holotype are given in micrometres (*μm*), with the range of measurements for the paratypes shown in parentheses. Body size was measured by *v2–h1* (length) and *sc2–sc2* (width) (Saito et al. 1999). The numbers of leg setae are written as the total number of setae followed by number of solenidia in parentheses. Leg chaetotaxy is adapted from Lindquist (1985) and Seeman and Beard (2011). Photographs were obtained by using a Zeiss Axioscope™ microscope (Carl Zeiss Inc., Thornwood, NY) with differential interference contrast (DIC) 100x Plan Apochromatic objective with a NA 1.4.

Specimens of *T. nambii* were collected on *Sterculia striata* St. Hil. and Naud. (Sterculiaceae; formerly Malvaceae sensu lato), from the type locality São João do Iracema, São Paulo, Brazil. These specimens were maintained in 70% ethanol and were later used for low temperature SEM (LT-SEM) studies, utilizing the technique outlined by Bolton et al. (2014). Specimens were secured on 15 mm × 30 mm copper plates using ultra smooth, round (12 mm diameter), carbon adhesive tabs (Electron Microscopy Sciences, Inc., Hatfield, PA, USA). The specimens were frozen conductively, in a Styrofoam box, by placing the plates on the surface of a pre-cooled (−196°C) brass bar whose lower half was submerged in liquid nitrogen (LN2). After 20–30 s, the holders containing the frozen samples were transferred into a Quorum PP2000 cryo-prep chamber (Quorum Technologies, East Sussex, UK) attached to an S-4700 field emission scanning electron microscope (Hitachi High Technologies America, Inc., Dallas, TX, USA). The specimens were etched inside the cryotransfer system to remove any surface contamination (condensed water vapour) by raising the temperature of the stage to −90°C for 10–15 min. Following etching, the temperature inside the chamber was lowered below −130°C, and the specimens coated with a 10 nm layer of platinum using a magnetron sputter head equipped with a platinum target. The specimens were transferred to a pre-cooled (−130°C) cryostage in the LT-SEM for observation and an accelerating voltage of 5 kV was used for viewing. Images were captured using a 4 pi Analysis System (Durham, NC, USA). Adults, immatures and eggs of *Tenuipalpus* sp. and *Brevipalpus* sp. mounted for LT-SEM were compared to *Colopalpus*.

Family **Tenuipalpidae** Berlese, 1913
Genus ***Colopalpus*** Pritchard and Baker, 1958, **stat. rev.**
Type species: ***Colopalpus matthyssei*** Pritchard and Baker, 1958

Manson (1963, p. 222); Baker and Tuttle (1972, p. 35); Collyer (1973, p. 915); Mitrofanov (1973, p. 509); Chaudhri et al. (1974, p. 98); Flechtmann (1976, p. 63); Corpuz-Raros (1978, p. 216); Maninder and Ghai (1978, p. 111); Mitrofanov and Strunkova (1979, p. 59); Meyer (1979, p. 3); Al-Gboory (1987, p. 155); Mesa et al. (2009, p. 6).

Generic diagnosis

Female: Body elongate-ovate; prodorsum with three pairs of setae (*v2, sc1, sc2*); dorsal opisthosoma with nine or ten pairs of setae (*c1, c3, d1, d3, e1, e3, f3, h1, h2* present; setae *f2* present or absent); opisthosomal setae *h2* flagelliform and inserted on different plane to other hysterosomal setae. Gnathosoma not covered by the rostrum. Palps 1–3 segmented. Seta *d* on femora, genua and tibiae inserted in dorsal position (not lateral). Ventral integument smooth or striated; genital and ventral plates may be developed or not, but when developed they are fused into one genito-ventral plate. Tarsus I-II bearing elongate proral setae, *pζ′–pζ″*, each inserted on a lateral tubercle. *Male*: opisthosoma not distinctly narrower than the propodosoma; body shape resembles male *Brevipalpus*; form of dorsal setae similar to those of female. Egg simple, oblong and without a wax-like ribbed shell cover.

Remarks

This generic definition is based on characteristics found in *C. matthyssei*, *C. pedrus* Manson, *C. nambii* (Castro and Feres), *C. zahirii* (Khanjani and Seeman), and *C. mansoniculus* (Ghai and Shenhmar). The female body-shape for these species is elongate-ovate. Males are known only for *C. mathyssei, C. zahirii* and *C. mansoniculus*, and have a body-shape resembling that of *Brevipalpus* males.

Colopalpus matthyssei Pritchard and Baker, 1958: 258 – **stat. rev.**

Colopalpus matthyssei Pritchard and Baker, 1958: 258; Meyer (1979, p. 3); Mitrofanov and Strunkova (1979, p. 59); Rimando (1962, p. 47).

Diagnosis

Female: Prodorsal setae *v2, sc1* and *sc2* long and strongly barbed; setae *sc2* inserted at level between the eyes; dorsal opisthosomal setae short, setiform and smooth; ventral integument smooth and delimited by soft furrows; *1a* setae elongate, *4a* setae short and similar in length to other ventral setae; *d* seta on femora, genua and tibiae inserted in dorsal position. *Male*: setae similar to those of female; opisthosoma not distinctly narrower than prodorsum; genito-ventral plate with two unusual circular folds resembling suckers; tarsi I and II each with two elongate solenidia (*ω′* paraxial, *ω″* antiaxial). *Deutonymph*: prodorsal setae similar to those of adults; dorsal opisthosomal setae *c1, d1* and *d3* long, thick and strongly barbed; other dorsal opisthosomal setae minute; eyes not visible.

Material examined

Holotype: female collected on *Melanolepis multiglandulosa* (Reinw. ex Blume) Rchb. f. and Zoll. (Euphorbiaceae) from Laguna, The Philippines, 5 August 1955, coll. J. G. Matthysse,

deposited in National Insect and Mite Collection, National Museum of Natural History, Smithsonian Institution, located at the SEL-USDA, Beltsville, Maryland, USA (USNM, no. 2343–01). Paratypes: three females, seven males and two deutonymphs with the same data as the holotype (USNM, nos. 2343–03–04, nos. 2343–06–08). Paratypes: four males with the same data as the holotype, deposited in the Collection of Acari, Departamento de Zoologia e Botânica, UNESP, São José do Rio Preto, State of São Paulo, Brazil (DZSJRP no. 9513).

Re-description

Female (n = 4) (holotype: Figures 1–5). Body measurements: length *v2–h1* 175 (175–180); width *sc2–sc2* 85 (85–90), *c3–c3* 100 (100–105), *e3–e3* 67 (65–72).

Dorsum (Figures 1 and 2). Prodorsum smooth medially and faintly striate laterally. Setae *sc2* inserted laterad and level with eyes. Prodorsal setae long, thick and strongly barbed. Opisthosomal pores vestigial. Opisthosomal setae short and smooth; setae *h2* inserted on a lower plane to the

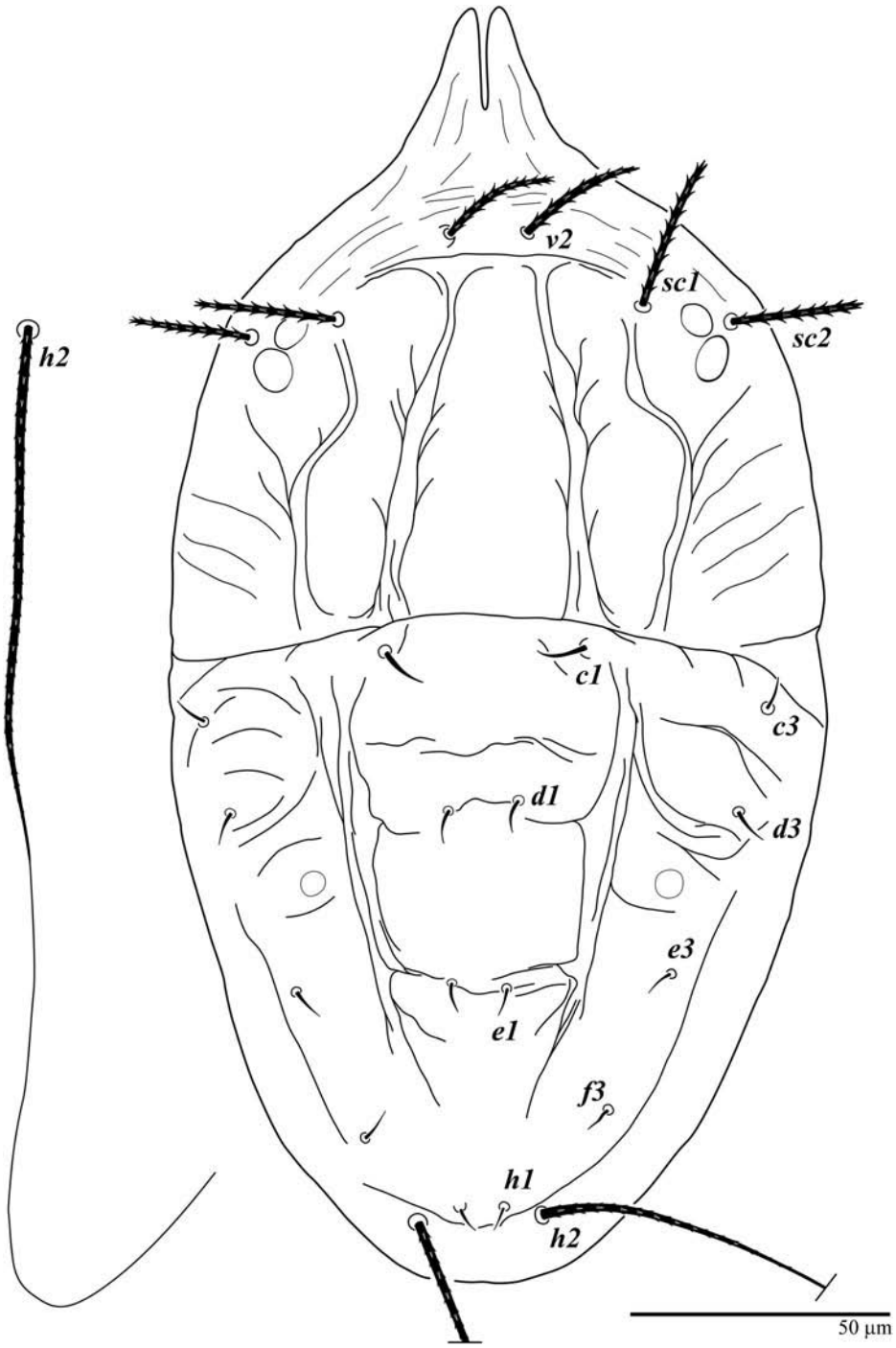

Figure 1. *Colopalpus matthyssei* Pritchard and Baker (Female): dorsum, with detail of *h2* seta.

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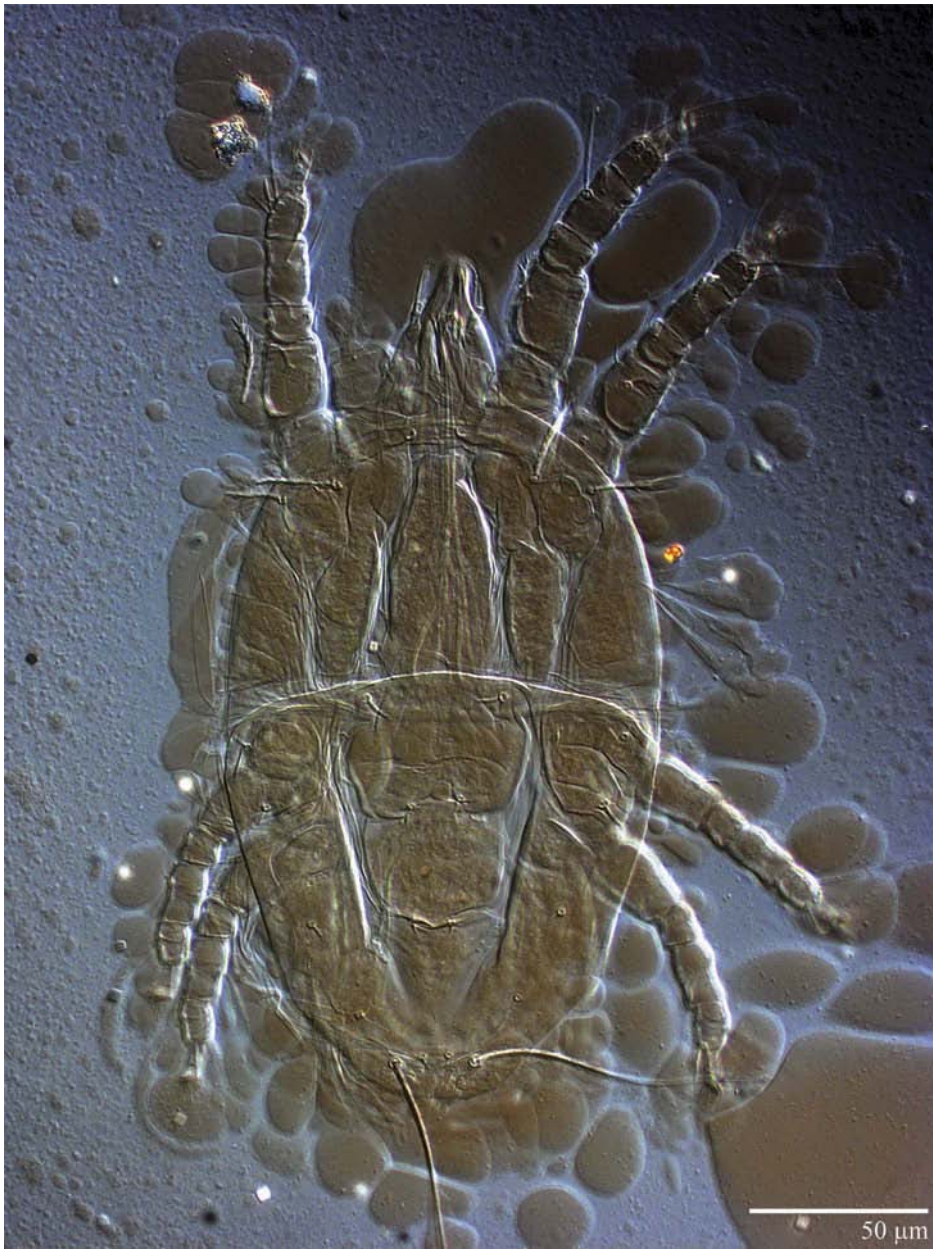

Figure 2. *Colopalpus matthyssei* Pritchard and Baker (Female): dorsum.

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other opisthosomal setae. Setal measurements: *v2* 24 (24–27), *sc1* 25 (29–30), *sc2* 20 (21–22), *c1* 10 (9–10), *c3* 5 (4–6), *d1* 5 (6–7), *d3* 7 (7–8), *e1* 5 (4–5), *e3* 5 (4–6), *f3* 4 (4–5), *h1* 4 (4–5), *h2* 185 (175–220).

Venter (Figure 3). Integument smooth and delimited by longitudinal and transversal soft furrows. All setae fine and smooth. Setae *3a* and *4a* short; *4a* inserted anterad genito-ventral shield. Genito-ventral shield well delimited; *ag, g1* and *g2* setae similar in length, inserted on genito-ventral shield; two pairs of pseudanal setae, *ps1* and *ps2* present. Setal measurements: *1a* 95 (74–97), *1b* 23 (23–25), *1c* 13 (13–17), *2b* 22 (18–24), *2c* 14 (14–16), *3a* 9 (8–12), *3b* 15 (14–17), *4a* 10 (11–12), *4b* 12 (12–14), *ag* 11 (10–12), *g1* 10 (9–12), *g2* 12 (10–13), *ps1* 10 (11–12), *ps2* 10 (10–11).

Gnathosoma (Figure 4). Gnathosoma extends to genua I. Ventral setae *m* present, distance between setae *m-m* 14 (12–14). Palps 2-segmented, distal segment bearing one long, slightly barbed *d* seta and one long solenidion *ul′* 14 (12–15).

Legs (Figure 5). Setation (from coxae to tarsi): I 2–1–4–3–5–8(1), II 2–1–4–3–5–8(1), III 1–2–2–0–2–5, IV 1–1–1–0–2–5; femora, tibiae and genua I and II, each with one

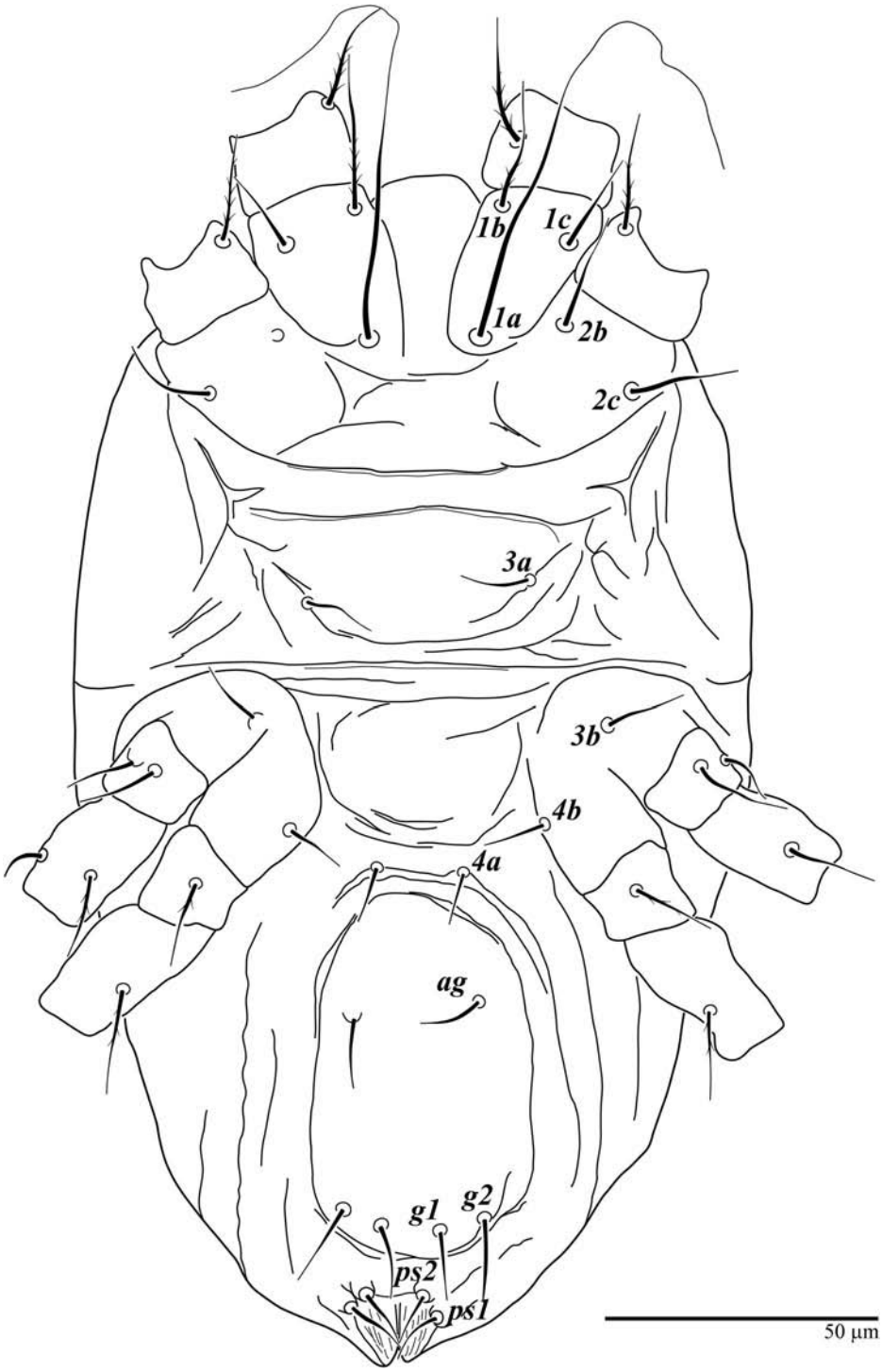

Figure 3. *Colopalpus matthyssei* Pritchard and Baker (Female): venter.

barbed dorsal setae; tibiae I and II with long barbed setae *v′* and *v″*; tarsi I and II each with long *ft′* setae, one antiaxial solenidion (*ω″*), and two elongate eupathidia, *pζ′*–*pζ″* inserted on distinct lateral tubercles.

Male (*n* = 11) (Figures 6–9). Body measurements: length *v2–h1* 150–160; width *sc2–sc2* 70–80, *c3–c3* 75–85, *e3–e3* 45–55.

Dorsum (Figures 6 and 7). Prodorsum smooth medially and faintly striate laterally. Dorsal opisthosoma divided into two shields by a transverse suture posterad *d3-d3* and at level of leg IV (the point at which the body folds upwards during copulation): anterior shield bears setae *c1, c3, d1* and *d3*; posterior shield, tapering posteriorly, bears setae *e1, e3, f3, h1, h2*. Shape of the dorsal setae similar those of female, except *h1* and *e3* slightly barbed. Setal

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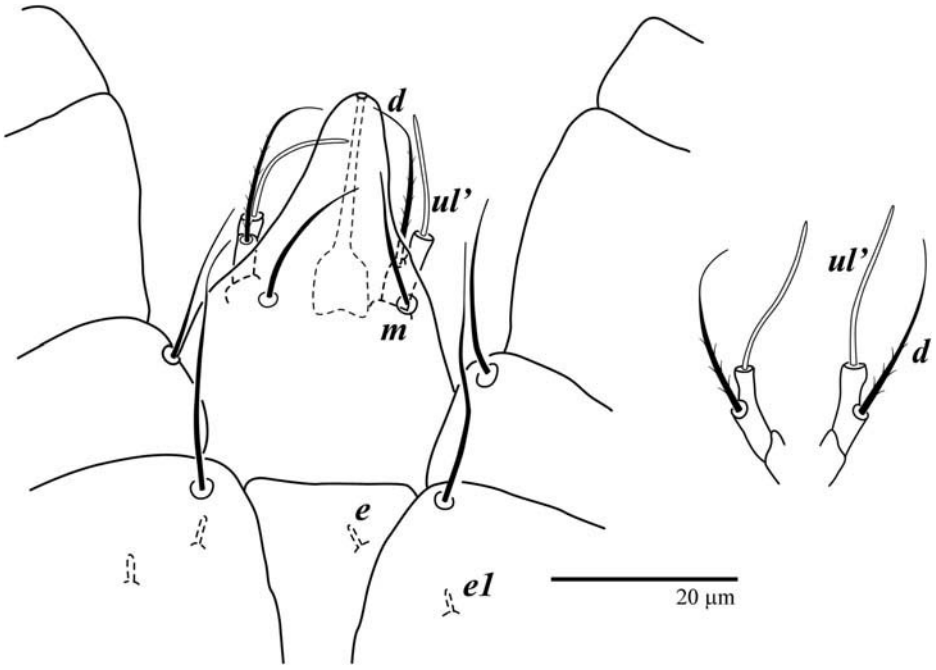

Figure 4. *Colopalpus matthyssei* Pritchard and Baker (Female): hypostome and palpi.

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measurements: *v2* 23–28, *sc1* 26–33, *sc2* 21–25, *c1* 7–9, *c3* 4–6, *d1* 6–8, *d3* 7–9, *e1* 5–6, *e3* 6–8, *f3* 4–7, *h1* 4–6, *h2* 155–220.

Venter (Figure 8). Cuticle on ventral propodosoma smooth and delimited by folds. Setae *3a* and *4a* short. Coxae I and II well delimited and separate; coxal fields III and IV fused. Genito-ventral shield bearing two unusual circular structures that resemble suckers; setae *g1, g2, ps2* aligned along medial margin of the genito-anal valves. Setae *ps1* modified and inserted posterior to the genito-anal valves. Setal measurements: *1a* 60–75, *1b* 19–25, *1c* 12–14, *2b* 25–30, *2c* 10–13, *3a* 8–11, *3b* 9–10, *4a* 6–8, *4b* 7–10, *ag* 7–9, *g1* 12–16, *g2* 9–11, *ps1* 8–10, *ps2* 9–10.

Gnathosoma. Similar to that of female.

Legs (Figure 9). Setation (from coxae to tarsi): I 2–1–4–3–5–8(2), II 2–1–4–3–5–8(2), III 1–2–2–0–2–5, IV 1–1–1–0–2–5; tarsi I and II each with two elongate solenidia (ω' paraxial, inserted ventro-laterally; ω'' antiaxial); other setae, and eupathidia similar to those of female.

Deutonymph ($n = 2$). (Figures 10 and 11). The two studied specimens are different in size, probably because one is an immature male (smaller specimen) and the other a female (female specimen illustrated). Body measurements: length *v2–h1* 135–160; width *sc2–sc2* 65–75, *c3–c3* 75–85, *e3–e3* 50–57.

Dorsum. Prodorsal setae similar to female; opisthosomal setae *c1, d1* and *d3* thick, strongly barbed and similar to prodorsal setae; other opisthosomal setae are minute; setae *h2* are missed on both the studied specimens. Setal measurements: *v2* 18–22, *sc1* 25–26, *sc2* 22–25, *c1* 35–43, *c3* 3–4, *d1* 45–46, *d3* 30–35, *e1* 2, *e3* 2, *f3* 2, *h1* 2.

Venter. Cuticle covered with fine, mostly transverse striae, except smooth area posterior to coxa IV. Setae *1a, 1b, 1c, 2b, 2c, 3a, 3b, 4a, 4b, ag, g1, ps1* and *ps2* present; setae *g2* absent.

Gnathosoma. Similar to that of female.

Legs. Setation (from coxae to tarsi): I 2–1–3–3–5–8(1), II 2–1–3–3–5–8(1), III 1–1–2–0–2–5, IV 1–0–1–0–2–3. The analysed specimens' legs are not in good condition, and the actual number of setae on some segments may differ from that provided here.

Colopalpus nambii (Castro and Feres 2013) – **comb. nov.**

Tenuipalpus nambii Castro and Feres 2013:48: holotype female collected on *Sterculia striata* St. Hil. and Naud. (Sterculiaceae; formerly Malvaceae sensu lato) from São João de Iracema, São Paulo State, Brazil, March 2008, coll. P.R. Demite, deposited in the Collection of Acari, Departamento de Zoologia e Botânica, UNESP, São José do Rio Preto, State of São Paulo, Brazil (DZSJRP no. 9513).

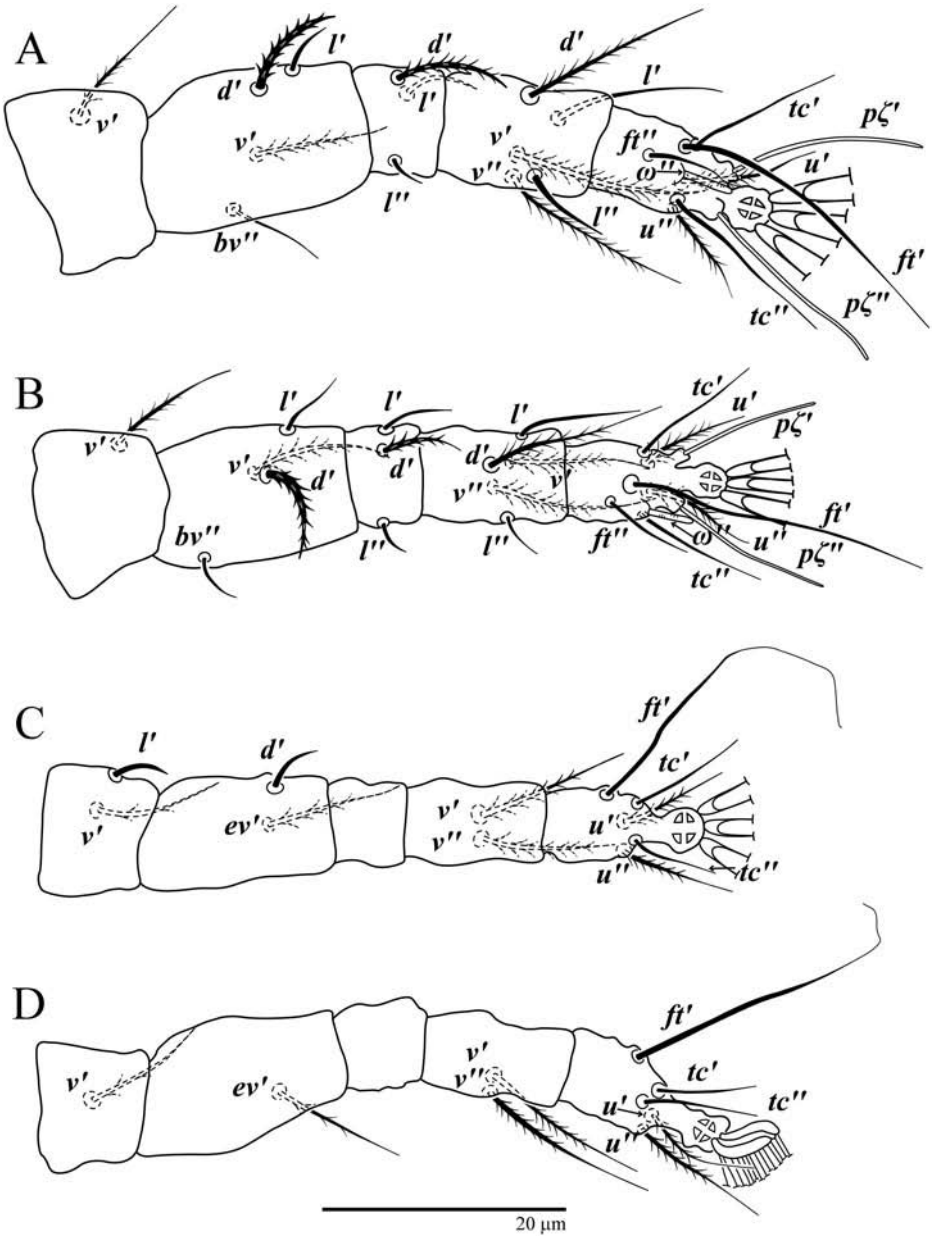

Figure 5. *Colopalpus matthyssei* Pritchard and Baker (Female): (A) leg I; (B) leg II; (C) leg III; (D) leg IV. (Right legs).

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Diagnosis

Female: Body elongate-ovate; with 13 pairs of dorsal setae (*f2* present); ventral integument smooth; gnathosoma elongate and not completely covered by the rostrum; palps 2-segmented; *d* setae on femora, genua and tibiae inserted in dorsal position; tarsi I and II each with setae *pζ′–pζ″* inserted on tubercles. *Deutonymph: sc2* setae inserted posterad level of eyes; setae *h2* short and inserted slightly ventrally. Additional information can be found in Castro and Feres (2013).

Remarks

Castro and Feres (2013) described *C. nambii* from Brazil based only on the females. Here, we present additional morphological characters for this species based on new observations of females, deutonymphs and eggs that were imaged using LT-SEM.

The body shape of the female is elongate-ovate, and the dorsal integument is covered with wax and small spherical structures (Figure 12A and B). The mites are yellow in colour when alive. All dorsal setae are setiform and slightly

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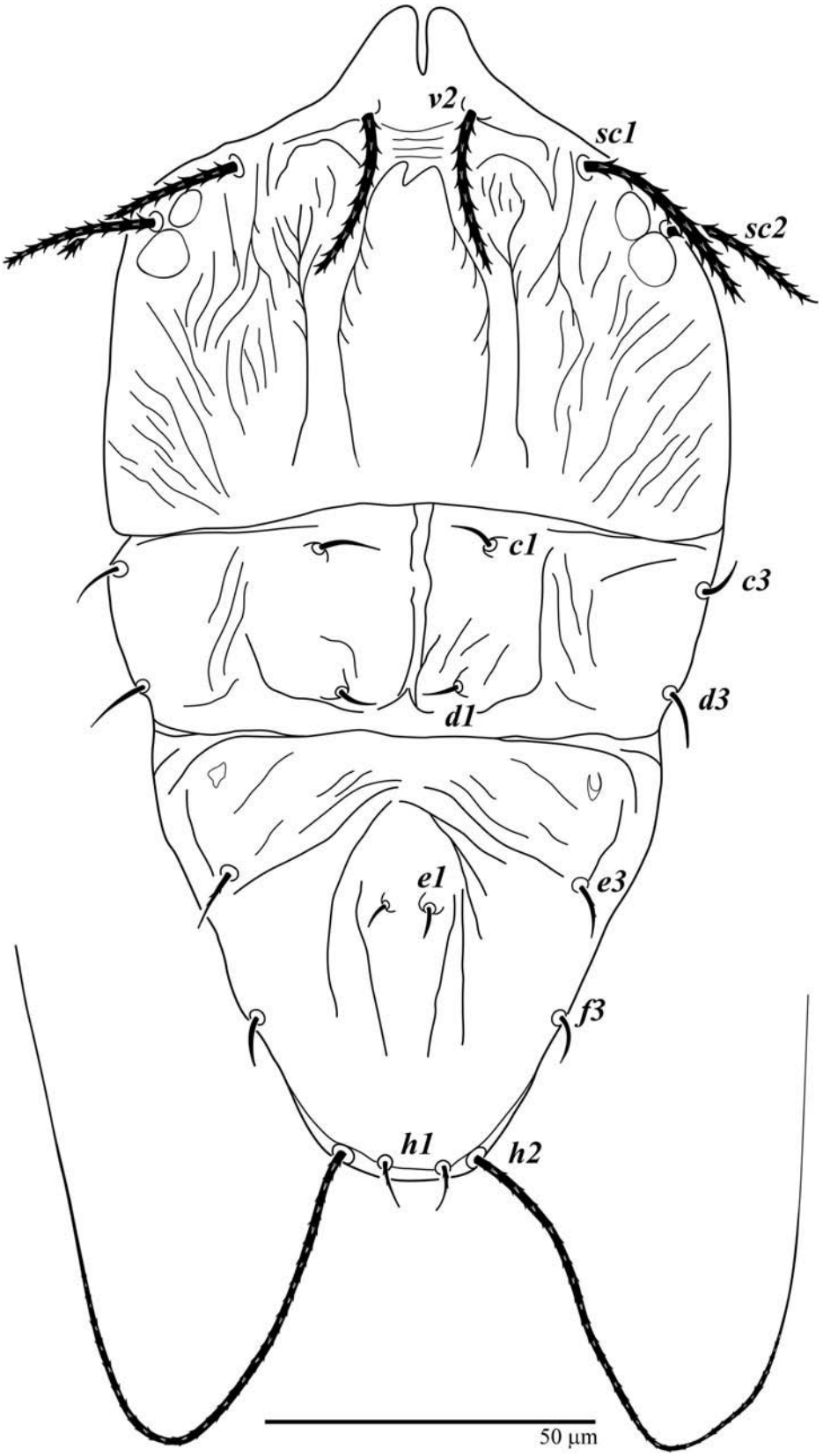

Figure 6. *Colopalpus matthyssei* Pritchard and Baker (Male): dorsum.

Figure 7. *Colopalpus matthyssei* Pritchard and Baker (Male): dorsum.

barbed (except *h2* elongate and flagelliform). The setae *sc2* are inserted at a level between the eyes on adult female. The ventral integument is smooth (Figure 13A). The genito-ventral shield is developed, undivided and smooth.

The gnathosoma of *C. nambii* is elongate and not completely covered by the rostrum. The palps are 2-segmented, bearing one slightly barbed *d* seta on first segment and one elongate solenidion on second segment (Figures 13B and 14A). The *d* seta on femora, genua and tibiae is inserted in dorsal position. The tarsi I and II with setae *pζ″–pζ‴* are inserted on tubercles (Figure 14A and B).

The eggs are yellow in colour, smooth and oblong. Most of the eggs were found individually on the trichome tips (Figure 15A), and this behaviour may be a strategy to protect the eggs from predation.

The prodorsal setae on deutonymph, *v2* and *sc1* are minute, while the setae *sc2* are of similar length to those of the female and inserted posterior to level with the eyes.

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Figure 8. *Colopalpus matthyssei* Pritchard and Baker (Male): venter.

The setae *c1, d1, e1, c3, d3* and *e3* are minute. The setae *f2, f3, h1* and *h2* are similar in length; setae *h2* are not flagelliform (Figures 15B and 16). We were unable to verify the form of setae *h2* on *C. matthyssei* because these setae are missing on the available specimens.

The use of LT-SEM imaging allowed the verification of characters otherwise not observable using phase contrast and differential interference contrast (DIC) microscopy. These data helped us verify and better understand some characters shared by *C. matthyssei* and *C. nambii*.

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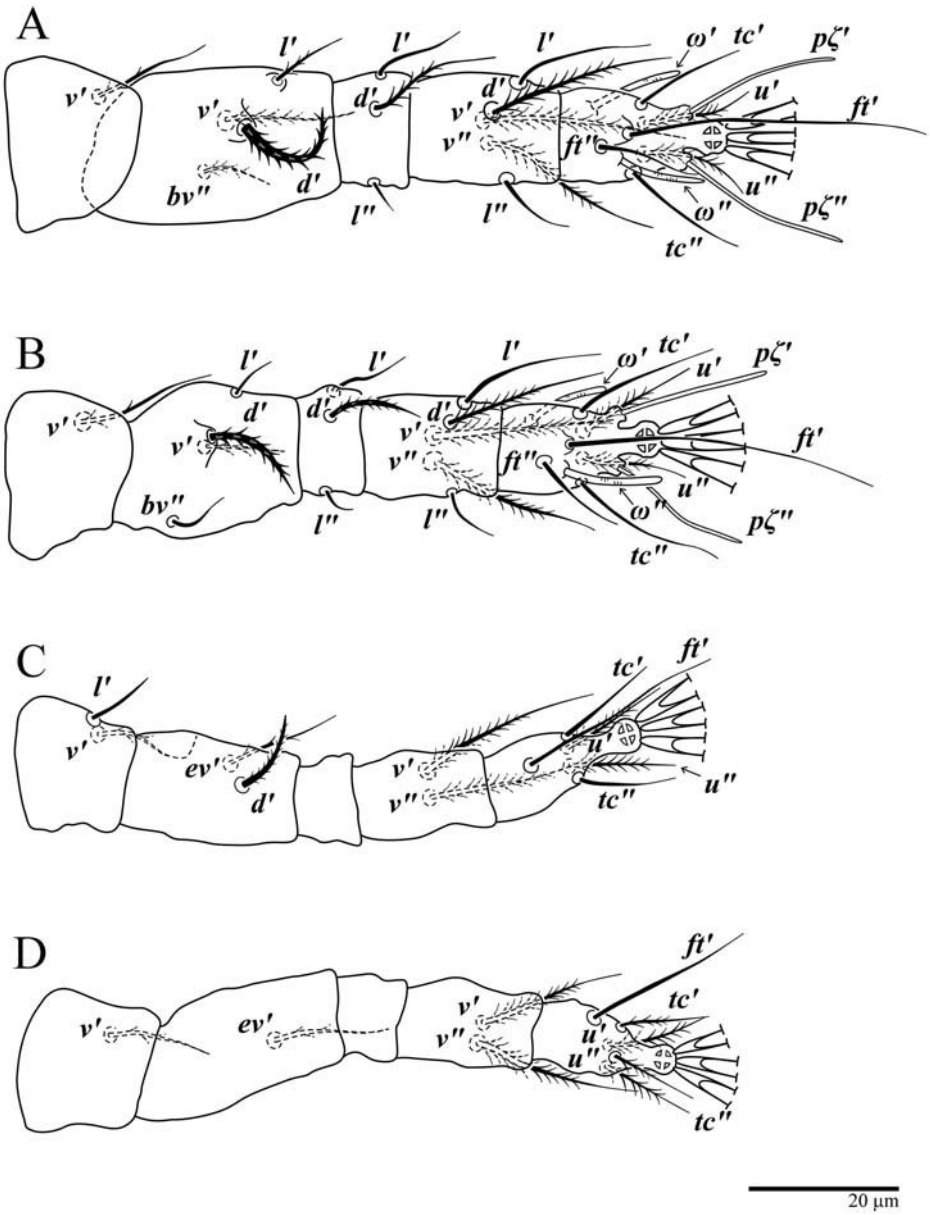

Figure 9. *Colopalpus matthyssei* Pritchard and Baker (Male): (A) leg I; (B) leg II; (C) leg III; (D) leg IV. (Right legs).

Based on these new data, we have transfered *C. nambii* from *Tenuipalpus* to *Colopalpus.*

Discussion

Colopalpus *and relative genera*

In the description of *Colopalpus*, Pritchard and Baker (1958) indicated the similarity of this genus to the genera *Brevipalpus* and *Tenuipalpus*. These authors indicated the presence of a single genito-ventral shield in the female of *Colopalpus* as a distinct character separating it from these other genera. However, we observed that the development and shape of the genito-ventral plate is variable in *Colopalpus* and *Tenuipalpus*, and to separate these two genera it may be necessary to use a combination of features. Besides the similar body shape of females and males, *Colopalpus* shares with *Brevipalpus* the dorsal position of the *d* setae on femora, genua and tibiae (*d* are inserted in lateral position in *Tenuipalpus*, Figure 17). In addition, *Colopalpus* shares the elongate, flagelliform *h2* setae and pad-like true claws and empodium with

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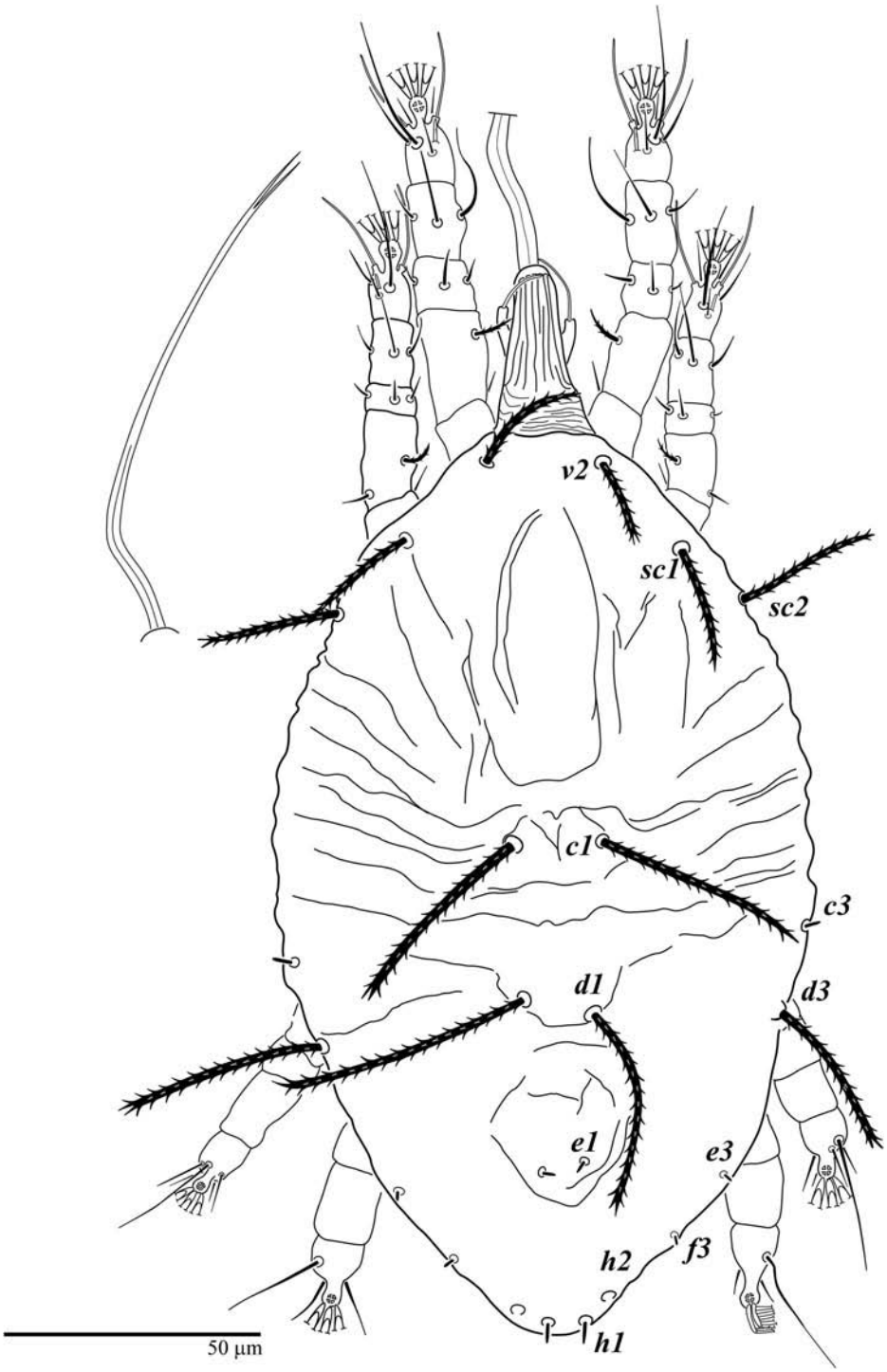

Figure 10. *Colopalpus matthyssei* Pritchard and Baker (Deutonymph): dorsum, with details of legs and chelicerae.

Tenuipalpus. Lastly, we observed that the eggs of *C. nambii* are oblong and smooth, and enclosed in a thin wax-like coating (as seen in hatched egg Figure 18B), similar to many observed eggs of *Brevipalpus* species (as seen in Figure 18D where thin coating is cracked); whereas the eggs of *Tenuipalpus* spp. are enclosed in a thick wax-like ribbed or striated case (as seen in Figure 18F) that is produced into a flange at one end of the egg during oviposition (Figure 18E). Further observations of eggs of other *Colopalpus* species would be necessary for the understanding and potential use of this characteristic in diagnosis.

Figure 11. *Colopalpus matthyssei* Pritchard and Baker (Deutonymph): dorsum.

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***Synonymy of* Colopalpus *as* Tenuipalpus**

Baker and Tuttle (1972) transferred *T. eriophyoides* to *Colopalpus*, based on body shape and presence of a single genito-ventral shield of the female, even though the male has a distinctly narrow opisthosoma. Meyer (1979) concluded that the inclusion of *T. eriophyoides* in *Colopalpus* would open it up to the placement of other species having a narrow opisthosoma within the genus, including species of *Tenuipalpus*. If so, then the only remaining character that would separate *Colopalpus* from *Tenuipalpus* would be the single genito-ventral shield. Meyer considered this character to be variable, and synonymized the two genera instead of simply moving *T. eriophyoides* to a different genus. As the males of *C. matthyssei, T. mansoniculus* and *T. zahirii* all have a body shape similar to that of *Brevipalpus*, we believe that species in which the male bears a distinctly narrow hysterosoma, like that found in *T. eriophyoides*, cannot be placed in *Colopalpus*.

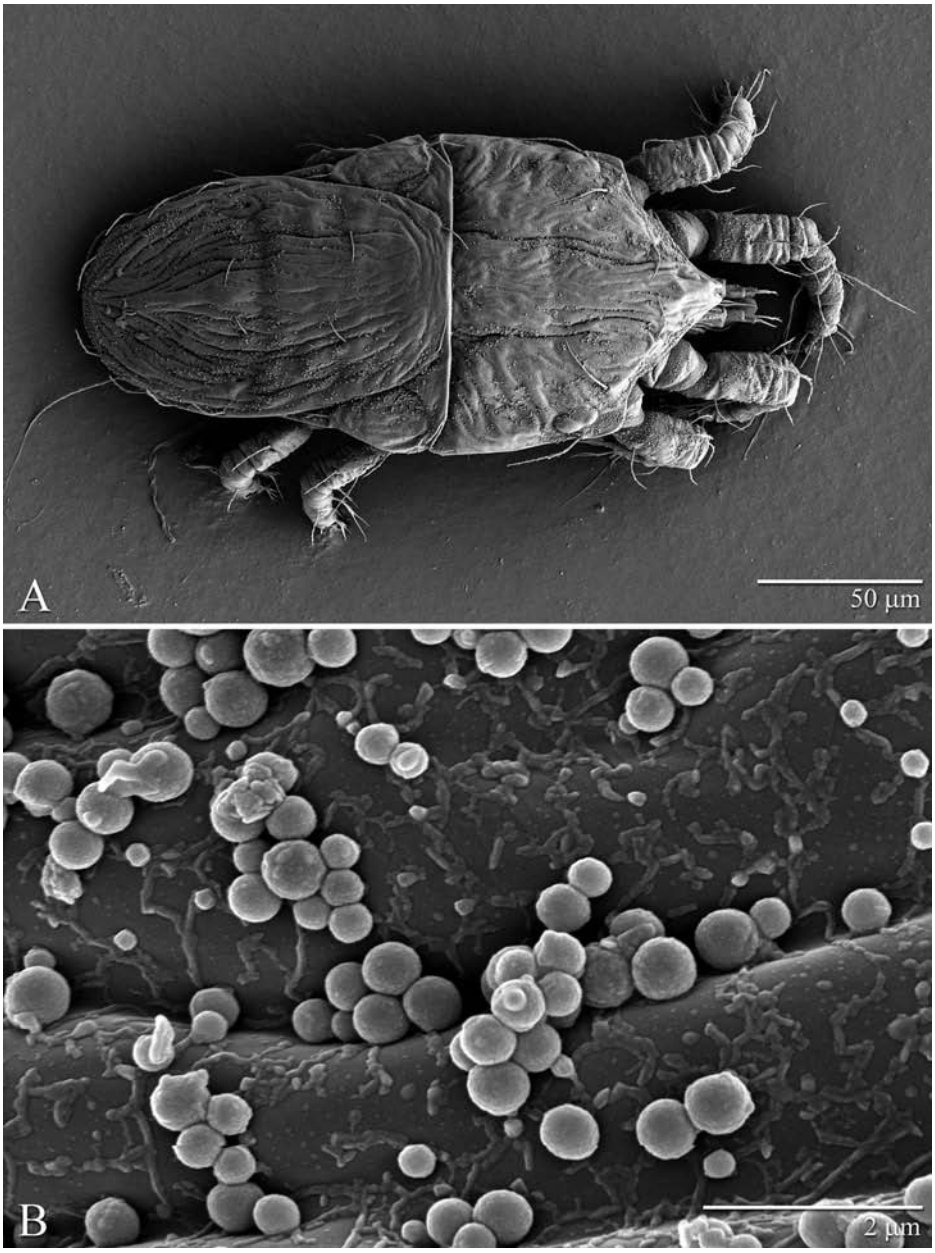

Figure 12. *Colopalpus nambii* (Castro and Feres) (Female): (A) dorsum; (B) detail of dorsal integument.

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Conclusion

Our results show that *Colopalpus* can be differentiated from *Brevipalpus* by the shape of the setae *h2*, the lack of uncinate true claws on the tarsi and the single genito-ventral shield (when developed). Likewise, the main differences between *Colopalpus* and *Tenuipalpus* are the body shape of the females and males, the position of the *d* setae on segments of legs and the characteristics of the eggs. This combination of morphological features places *Colopalpus* as apparently intermediate between *Brevipalpus* and *Tenuipalpus*, and based on these characteristics, we consider *Colopalpus* to be a valid genus of the family Tenuipalpidae.

Other species of Colopalpus

Based on our examination of type specimens of *T. pedrus*, a recent description of *T. zahirii,* and a re-description of *T. mansoniculus,* we consider these species to be better placed within the genus *Colopalpus*. Other species currently placed in the genus *Tenuipalpus* may need to be transferred to *Colopalpus*. We highly recommend that a

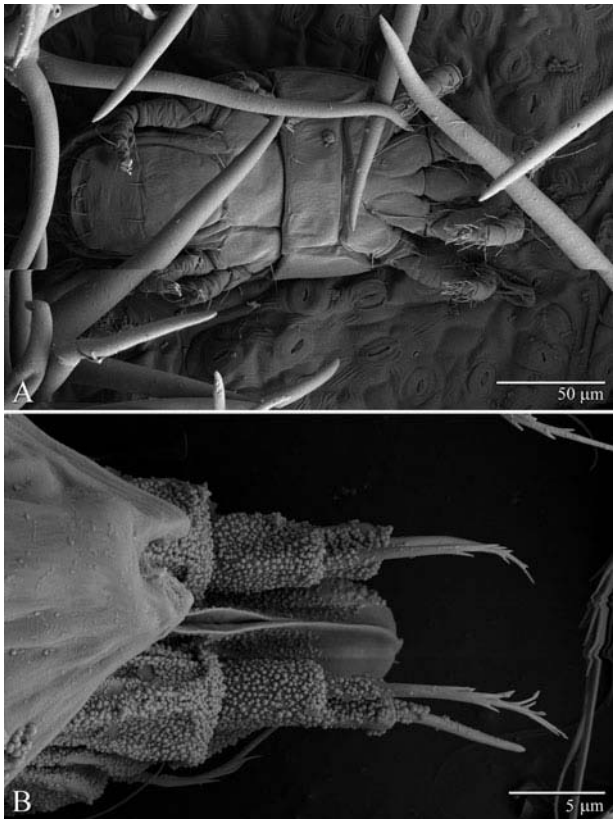

Figure 13. *Colopalpus nambii* (Castro and Feres) (Female): (A) venter; (B) palps.

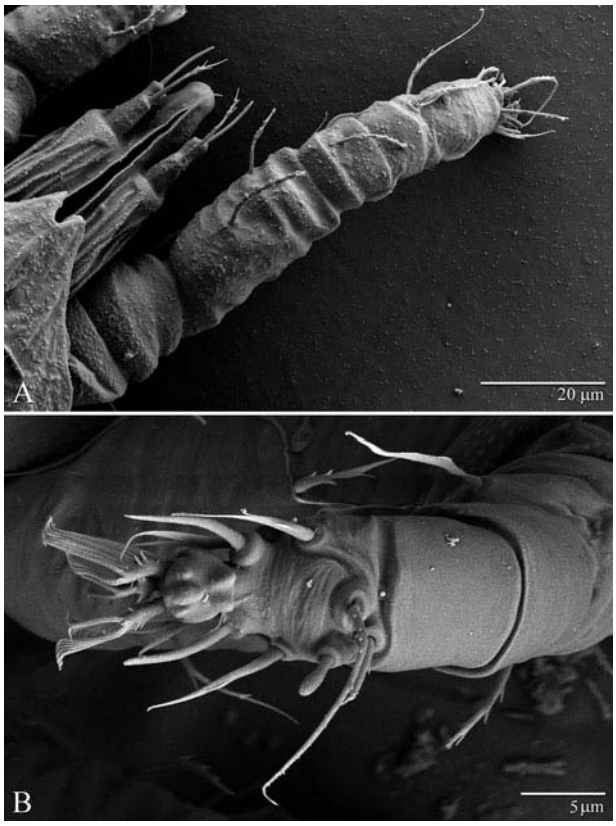

Figure 14. *Colopalpus nambii* (Castro and Feres) (Female): (A) gnathosoma and leg I; (B) detail of tarsus II.

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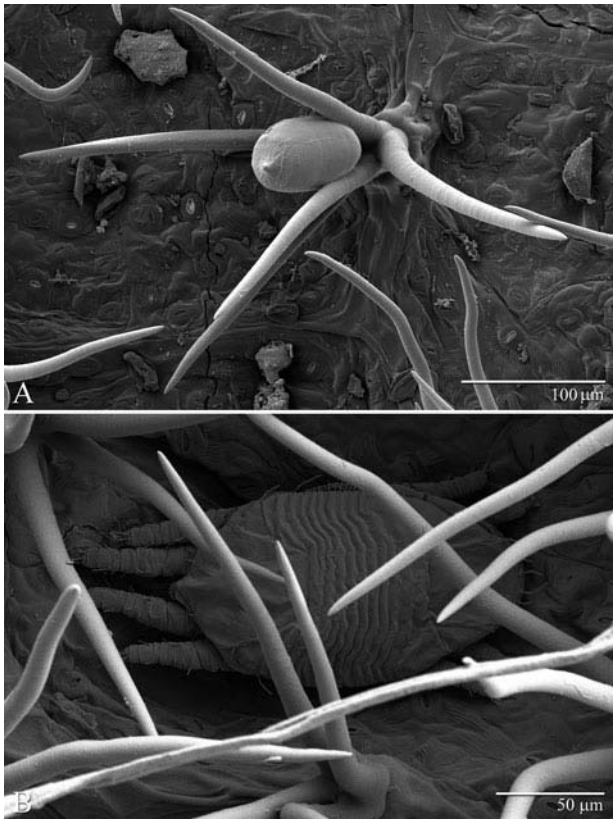

Figure 15. *Colopalpus nambii* (Castro and Feres) (A) egg on trichome. (B) deutonymph, dorsal view.

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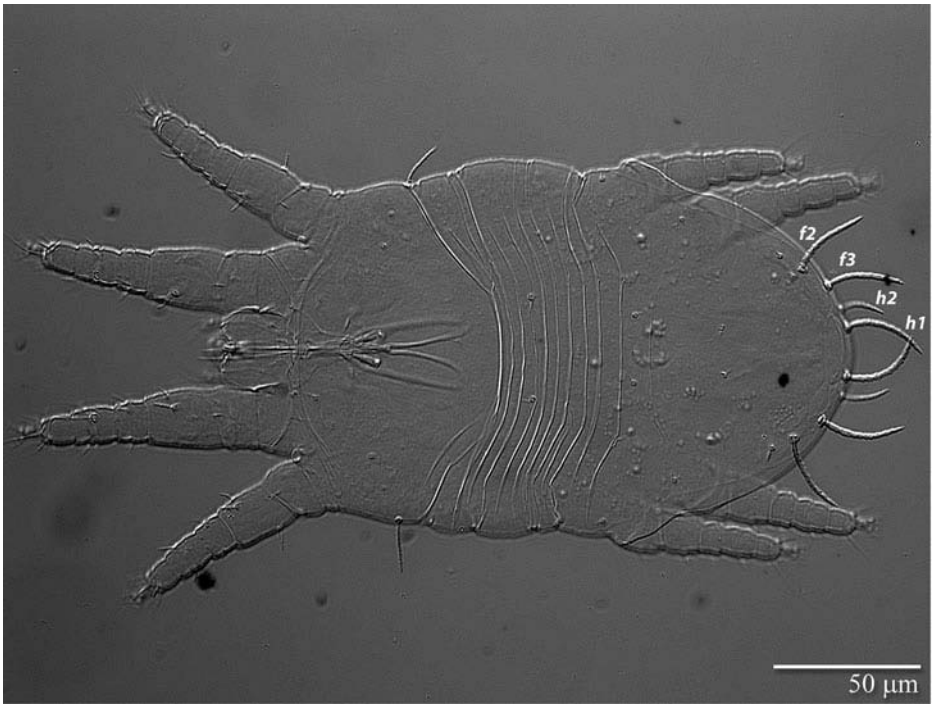

Figure 16. *Colopalpus nambii* (Castro and Feres) (Deutonymph): dorsal view. Note the *h2* setae short and inserted slightly ventrally.

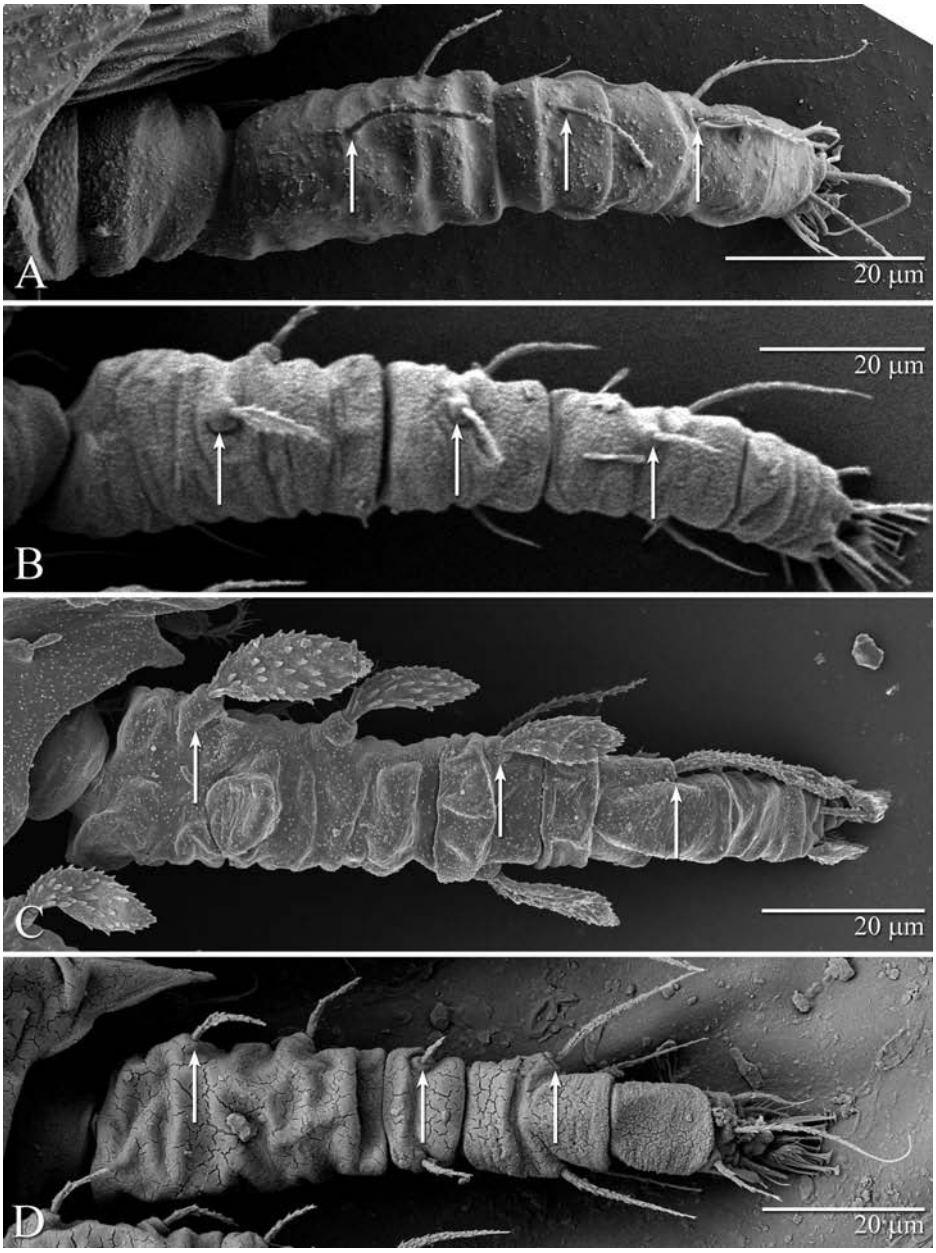

Figure 17. Leg I of females. The arrows indicate the position of *d* setae on femora, genua and tibiae: (A) *Colopalpus nambii* (Castro and Feres); (B) *Brevipalpus* sp.; (C) *Tenuipalpus* sp. (sensu stricto). (D) *Tenuipalpus granati* Sayed (sensu lato).

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detailed study of the type specimens of the species which appear to be intermediate between *Brevipalpus* and *Tenuipalpus* be conducted before making such decisions, since of the current descriptions and/or illustrations lack sufficient detail.

Species transferred here to *Colopalpus*

1. *Colopalpus matthyssei* Pritchard and Baker, 1958: 259 – **stat. rev.**
   Tenuipalpus matthyssei (Pritchard and Baker); Meyer 1979: 3.
2. *Colopalpus pedrus* Manson, 1963: 222 – **stat. rev.**
   Tenuipalpus pedrus (Manson); Meyer 1979: 3.
3. *Colopalpus mansoni* Collyer, 1974: 531 – **stat. rev.**
   Tenuipalpus mansoni (Collyer); Meyer 1979: 3.
   Tenuipalpus mansoniculus Ghai and Shenhmar, 1985: 117; replacement to *Colopalpus mansoni* Collyer (1973), name preoccupied by *Tenuipalpus mansoni* De Leon (1965). (Article 58.7 4th Edition International Code of Zoological Nomenclature).

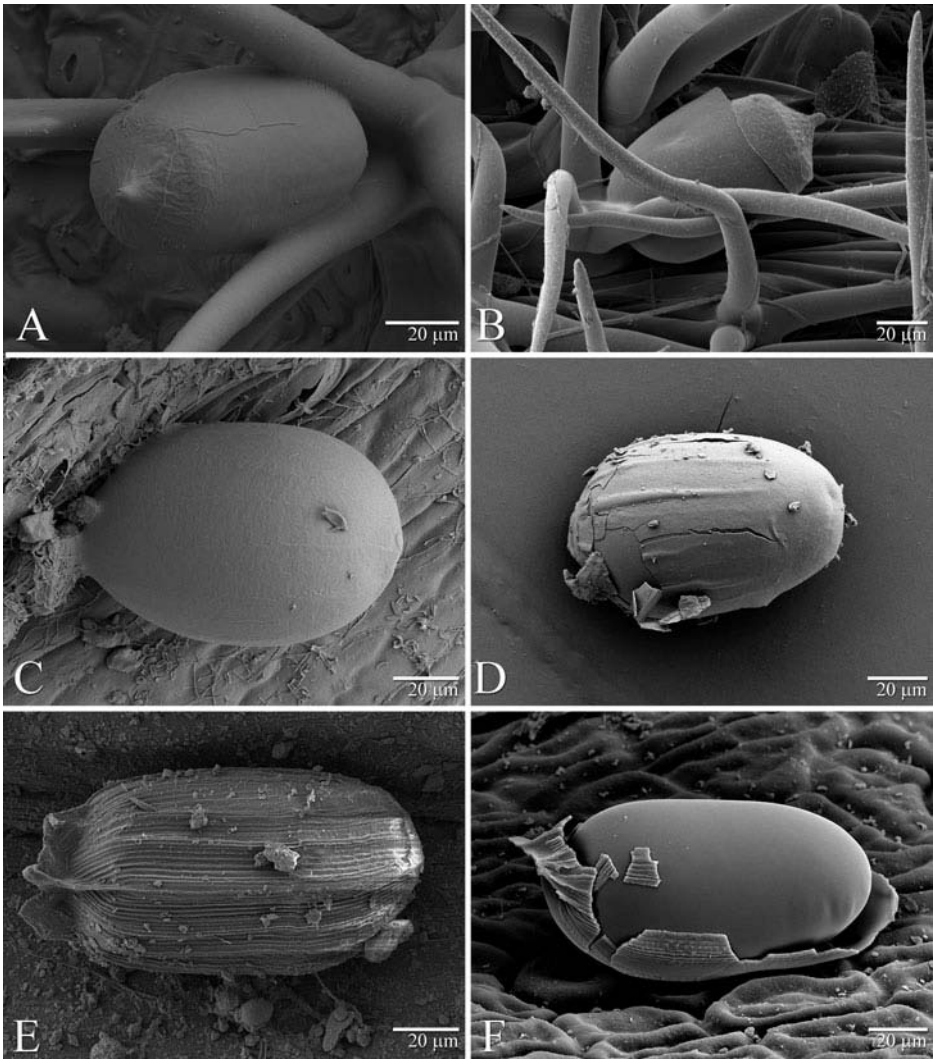

Figure 18. Eggs: (A–B) *Colopalpus nambii* (Castro and Feres); (C–D) *Brevipalpus* sp.; (E–F) *Tenuipalpus* sp.

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4. *Colopalpus nambii* (Castro and Feres 2013) – **comb. new.**
   Tenuipalpus nambii Castro and Feres 2013: 485.
5. *Colopalpus zahirii* (Khanjani and Seeman, 2013); (in Khanjani et al. 2013) **– comb. new.**
   Tenuipalpus zahirii Khanjani and Seeman, 2013: 389.

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