

Description of Three New Species of Tabanidae (Diptera) From the Fiji Archipelago and a Revised Key to the Tabanidae of Eastern Melanesia and Samoa (Excluding New Caledonia)

JOHN F. BURGER

*Department of Zoology, Spaulding Hall, University of New Hampshire, Durham,
New Hampshire 03824-2617 USA; email: jfb@cisunix.unh.edu*

Abstract. Three new species of Tabanidae, two species of *Tabanus*: *T. atrostriatus*, **n. sp.**, *T. koroyanituensis*, **n. sp.** and one species of *Cydistomyia*: *C. fijiensis*, **n. sp.** are described from Fiji, and a revised key to the Tabanidae of Eastern Melanesia and Samoa is presented.

INTRODUCTION

Burger (1991) reviewed the Tabanidae of Eastern Melanesia and Samoa, not including New Caledonia, describing three new species, two from Fiji and one from the Solomon Islands, and providing a list of taxa and a key to species. Beginning in 2002, an initiative to document the arthropod diversity of the Fijian Islands (Fijian Bioinventory of Arthropods) was begun, supplemented by surveying from the NSF-funded Fiji Terrestrial Arthropod Survey, and has accumulated and processed 361 specimens of Tabanidae representing 10 species in three genera, including three undescribed species that are described and illustrated in this paper. A revised key to the species of Tabanidae occurring in Eastern Melanesia and Samoa is presented that includes the new species.

MATERIALS AND METHODS

Material examined derives from the extensive Malaise trapping surveys of the Schlinger Foundation and the NSF-funded Fiji Arthropod Survey since 2002. Types and vouchers of all taxa will be repatriated to the Fiji National Insect Collection in Suva.

SYSTEMATICS

Cydistomyia fijiensis Burger, new species (Figs. 1, 2)

Diagnosis. A slender dark brown to black- brown species with narrow gray hind margins on abdominal tergites, enlarged slightly into low median spots.

Description. Holotype female. Length: 9.6 mm. *Head.* Frons narrow, index 6.6, narrowed in the middle, dark brown to black-brown tomentose. Frontal callus narrowly triangular at base, dorsal extension narrow, extending most of distance to vertex, vertex depressed. Subcallus dark brown tomentose. Frontoclypeus brown tomentose, except shining yellow-brown above tentorial pits. Beard sparsely black pilose. Antennae dark brown, flagellum with strong dorsal tooth, apical flagellomeres

about 1.4 times longer than basal flagellomere. Maxillary palpi dark brown, apical palpomere slender, scarcely enlarged basally. Eyes (relaxed) with a single narrow green stripe across middle of eye on dark background.

Thorax. Thorax, including scutellum dark brown. Pleuron black pilose.

Legs. Femora brown. Tibiae dark brown. Tarsi black-brown.

Wing. Costal cell brown tinted, remainder of wing subhyaline. Fork of vein R_4 and R_5 with very short spur.

Abdomen. Abdomen dark brown to black-brown. Abdominal tergites 1–6 with very narrow pale haired hind margins, slightly enlarged medianly on tergites 2–5 into low gray tomentose spots. Sternites 2–5 with narrow pale haired hind margins.

Types. Holotype ♀, FIJI: **Viti Levu:** Naitasiri Province, 4 km WSW Colo-i-Suva Village. 372 m. Mount Nakobalevu, 18°055'S, 178°424'E. 24 Apr–12 May 2004, Malaise, E.I. Schlinger, M. Tokota'a (FBA065296). *Paratypes:* 41 ♀. 4 ♀, same data as holotype (FBA065297–065300). 8 ♀, same data, except 17 Mar–9 Apr 2003 (FBA 097936–097943). 2 ♀, same data, except 9–30 May 2003 (FBA094152, 094155); 2 ♀, same data, except 14–28 Jul 2003 (FBA094537, 095259); 4 ♀, same data, except 12–25 Feb 2003 (FBA101383–101386); 12 ♀, same data, except 25 Feb–17 Mar 2003 (FBA102769–102770, 102772–102773, 102779–102781, 102784, 103359, 103363–103364, 103366). **Taveuni:** 3 ♀, Cakaudrove Prov., Soqulu House in Soqulu Estate, 140 m, 14–21 Nov 2002, Malaise, E.I. Schlinger, M. Tokota'a, 16.833°S, 180°W (FBA099818, 099820, 099822). **Vanua Levu:** 3 ♀, Macuata Province, Dogotuki, 2.5 km E. of Nasavu River, 7 Jul 2003, Malaise, M.E. Irwin, E.I. Schlinger, M. Tokota'a (FBA078508, 079166–079167); 3 ♀, Macuata Province, Rokosalase, 26 Mar–9 Apr 2004, M.E. Irwin, E.I. Schlinger, M. Tokota'a, Malaise in forest, 179°01'147"E, 16°31'891"S, 105 m. (FBA046677–046679). Holotype will be deposited in FNIC. Paratypes deposited in FNIC, BPBM, and UNHC.

Remarks. The paratypes are essentially the same as the holotype female, except length of the body varies from 8.8–11.2 mm. This species is most closely related to *Cydistomyia pacifica* (Ricardo), but differs in having a slightly broader frons, much darker brown thorax and black-brown abdomen and black haired beard and pleuron.

Etymology. This species is named for the Fiji Archipelago, from which the type series was collected.

Tabanus atrostriatus Burger, new species

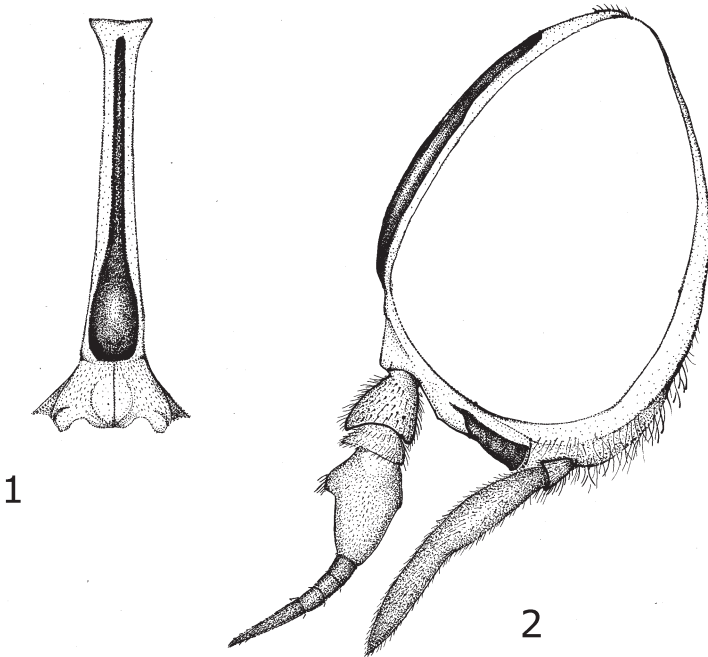
(Figs. 3–5)

Diagnosis. A medium-sized black, gray and yellow-brown species, mesoscutum black with gray sublateral stripes, wings hyaline with very faint cloud at fork of veins R_4 and R_5 , abdominal tergites with gray hind margins enlarged into median triangles on tergites 2–3 and sternites yellowish with broad black median longitudinal stripe.

Description. Holotype female. Length 13.6 mm. *Head.* Frons relatively narrow, index 7.4, distinctly widened above, width at vertex 1.5 times width at base, gray tomentose with a darkened area medianly, frontal callus narrowly quadrate basally, with narrow dorsal extension. Subcallus yellowish gray tomentose. Frontoclypeus and genae light gray tomentose. Beard white. Antenna with scape and pedicel yellowish, black setose, flagellum black, basal flagellomere with strong dorsal tooth. Maxillary palpi with apical palpomere gray tomentose and black setose, stout basally, sharply pointed apically. Eyes (relaxed) black, without discernible pattern.

Thorax. Mesoscutum blackish with diffuse sublateral and lateral gray stripes. Pleuron light gray tomentose and predominantly white pilose. Scutellum dark gray tomentose.

Legs. Fore coxae gray tomentose and white pilose. Fore and mid femora yellowish, mid femo-



Figs. 1, 2. Female, *Cydistomyia fijiensis*, n. sp. **1.** Frons. **2.** Lateral view of head.

ra blackish at base, hind femora black with yellowish apex. Tibiae yellowish, fore tibiae darkened apically. Fore tarsi black, mid and hind tarsi yellowish basally, darkened apically.

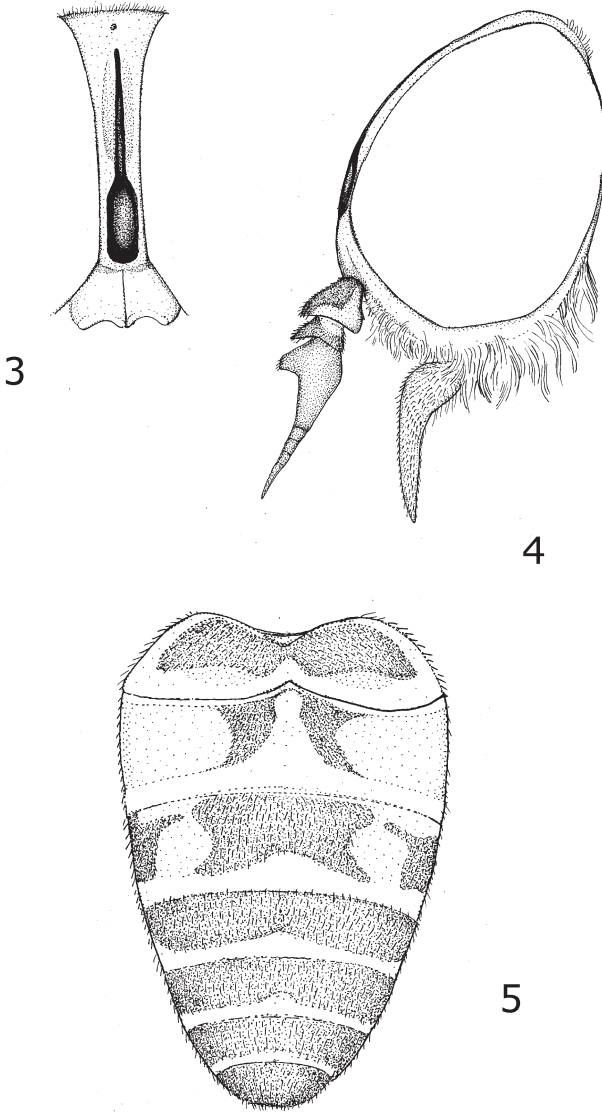
Wing. Hyaline. Fork of veins R_4 and R_5 with faint cloud, without spur.

Abdomen. Tergites with gray posterior margins, expanded into median triangles on tergites 2 and 3. Tergites 1–3 with large yellow-brown sublateral spots, remainder of tergites black. Sternum with broad black median longitudinal stripe, sternites 1–4 yellowish brown laterally, remainder of sternites black.

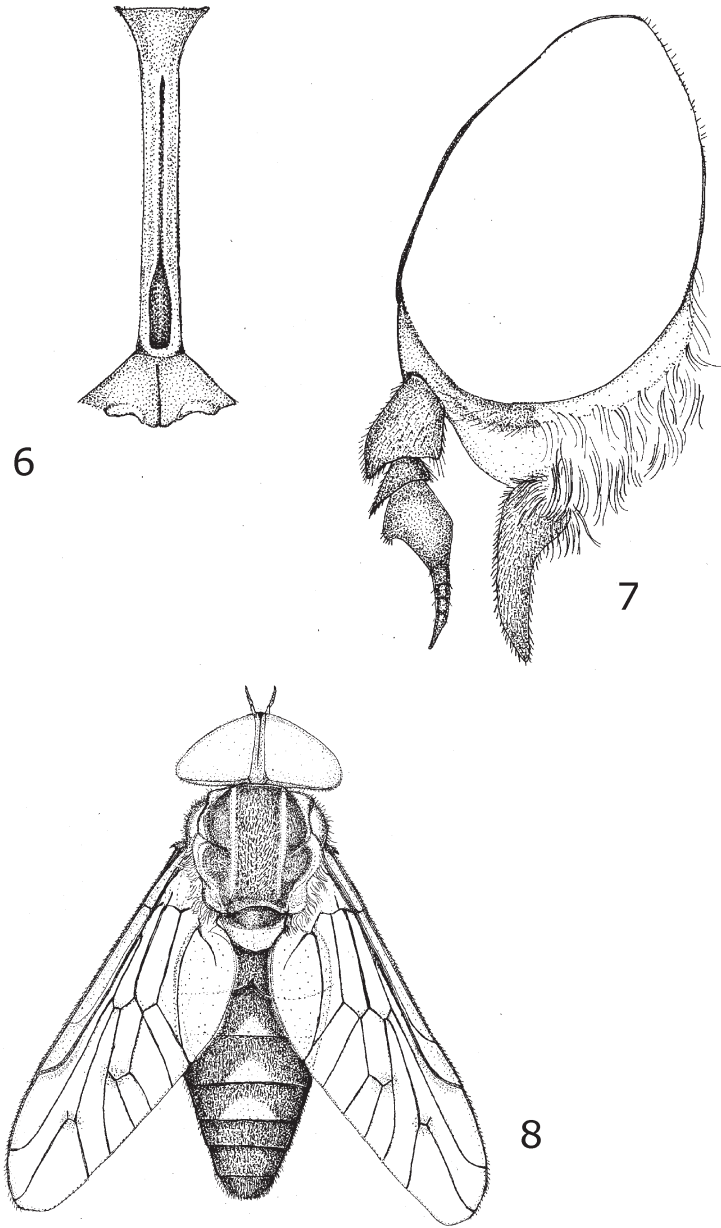
Types. Holotype ♀, FIJI: **Kadavu:** Kadavu Province, 0.26 km SW Solodamu Village, Moanakaka Forest Reserve, 19°04'39"S, 178°07'15.6"E. 60 m. 11 Apr–2 May 2004, Malaise, E.I. Schlinger, M. Tokota'a.(FBA087991). Holotype will be deposited in FNIC.

Remarks. *T. atrostriatus* is perhaps most closely related to *Tabanus fijianus* Ricardo, but differs in having a narrower frons and frontal callus, lighter gray markings on the mesoscutum and pleuron, wings without strong dark clouds on the crossveins and fork of veins R_4 and R_5 , abdominal triangles smaller and gray tomentose, hind margins of tergites with strong gray hind marginal bands, and sternum with a conspicuous broad black median longitudinal stripe.

Etymology. This species is named for the broad black median longitudinal stripe on the abdominal sternum.



Figs. 3-5. Female, *Tabanus atrostriatus*, n. sp. **3.** Frons. **4.** Lateral view of head. **5.** Dorsal surface of abdomen.



Figs. 6-8. Female, *Tabanus koroyanituensis*, n. sp. **6.** Frons. **7.** Lateral view of head. **8.** Dorsal surface of abdomen.

Tabanus koroyanituensis Burger, new species
(Figs. 6–8)

Diagnosis. A medium-sized black and gray species with frontoclypeus, mesopleuron and posterior half of scutellum light gray tomentose and white pilose, and abdominal tergites 2–4 with large light gray triangles.

Description. Holotype female. Length 13.2 mm. *Head.* Frons narrow, index 8, distinctly widened above, about one-third broader at vertex as at base, gray tomentose basally, becoming black at vertex. Frontal callus narrow at base, extending dorsally nearly 3/4 distance to vertex. Subcallus brownish gray tomentose. Upper parafacials dark black-brown and black pilose, forming dark band passing beneath antennae, lower parafacials gray tomentose and white pilose. Beard white. Scape of antenna enlarged and elongate dorsally, black-brown, black setose, flagellum black, basal flagellomere with strong dorsal tooth, 1.4 times longer than tall, apical flagellomeres together equal in length to basal flagellomere. Maxillary palpi with apical palpomere stout basally, strongly tapered apically, light gray tomentose and white pilose basally, becoming blackish and with scattered black setae apically, about 2.6 times longer than broad at base. Eyes (relaxed) with central area dark green with a single transverse purple band.

Thorax. Mesoscutum dark blackish brown, gray tomentose and white pilose laterally, bearing sublateral grayish stripes on anterior half, gradually fading out posteriorly. Scutellum strongly bicolored, black on anterior half, light gray tomentose on posterior half. Pleuron light gray tomentose and white pilose.

Legs. Fore coxae gray tomentose and white pilose on basal half, black and black pilose apically. Femora black and black pilose, mid and hind femora with some white hair basally, tibiae and tarsi black except mid tibiae with obscure brownish tones basally.

Wing. Predominantly hyaline except for obscure smoky coloration along apical margin and on crossveins, fork of veins R₄ and R₅ with short spur and with distinct dark cloud.

Abdomen. Black to brown-black except for the following pale grayish markings: posterior margin of tergite 1, posterior margins of tergites 2–4, large median triangles on tergites 2–4, and posterior margins of sternites 2–4.

Types. Holotype ♀, FIJI: **Viti Levu:** Vuda Province, 1 km E Abaca Village, Koroyanitu National Park, 800 m, Savuione Trail, 17°40'S, 177°33'E, 12–19 Nov 2002, Malaise, E.I. Schlinger, M. Tokota'a (FBA 084132). *Paratype:* FIJI: **Taveuni:** 1 ♀, Cakadrove Province, Devo Peak Radio Tower, Malaise in rainforest, 31 Oct– 21 Nov 2002. M.E. Irwin, E.I. Schlinger, M. Tokota'a. 16°51'S, 179°58'E, 1200 m (FBA 004572). Holotype and paratype will be deposited in FNIC.

Remarks. The paratype female is essentially the same in size and coloration as the holotype. This species is most closely related to *Tabanus lamiensis* Burger but differs in being larger, having a narrower frons, basal flagellomere not strongly compressed, strong lateral and dorsolateral gray markings on the mesoscutum, strongly bicolored scutellum, abdominal tergites 2–4 with large gray median triangles and anterior half of wing not strongly darkened.

Etymology. This species is named for Koroyanitu National Park, where the holotype female was collected.

REVISED KEY TO THE TABANIDAE OF EASTERN MELANESIA AND SAMOA

- 1. Basicosta densely covered with strong setulae similar to those on costa ... (*Tabanus* Linnaeus) 5
- Basicosta bare or nearly so (occasionally a few irregularly scattered setulae may be present) 2

2. Scape of antenna and sometimes subcallus strongly swollen and polished; eyes (relaxed) green with dark transverse stripe; ocellar tubercle present; vein R₄ with long spur ... (*Japenoides* Oldroyd) 18
- Scape of antenna not polished or strongly swollen; without the above combination of characters 3
3. Scape of antenna relatively long and slender; proboscis slender, labella small; thorax and abdomen metallic blue-green, resembling muscoid flies ... (Solomon Is) ..
..... *Chasmia orthellioides* Mackerras
- Scape of antenna not especially elongate; proboscis stouter, labella large; not resembling blue-green metallic muscoid flies 4
4. Frons of ♀ relatively broad, index 3.5 or less; eyes usually distinctly pilose; male with upper enlarged eye facets distinctly pilose ... (*Dasybasis* Macquart) 19
- Frons of ♀ narrower, index 4 or greater; eyes of both sexes bare ... (*Cydistomyia* Taylor) 20
5. Subcallus shining black; slender 10–12 mm black species with contrasting yellow antennae and white tibiae ... (Solomon Is) **T. ceylonicus** Schiner
- Subcallus tomentose; tibiae not contrastingly white 6
6. Rather shining black species, with predominantly black shining frons obscuring frontal callus; eyes (relaxed) with transverse brown or purple band 7
- Not shining black species; frons predominantly tomentose; frontal callus variably developed 8
7. Small (9–10 mm) species; antenna dark brown to black, basal flagellomere strongly compressed, dorsal excision absent; frons narrow, index 8; eyes (relaxed) with purple transverse band on dark green ground ... (Fiji) **T. lamiensis** Burger
- Larger (14–15 mm) species; antenna yellowish, contrasting sharply with dark body, basal flagellomere more elongate, with well developed dorsal excision; frons medium width, index 5; eyes (relaxed) with brown transverse band ... (Solomon Is.) **T. gilingilensis** Mackerras
8. Stout blackish or brown-black species; vein R₄ of wing with long spur 9
- More slender, lighter colored species; vein R₄ of wing with or without short spur ... 10
9. Medium sized (14–15 mm) species; frons moderately broad, index 5; frontal callus well developed; basal flagellomere of antenna yellowish brown; beard black; pleural and abdominal hairs entirely black; abdomen without color pattern; eyes (relaxed) with purple, green-bordered band ... (Solomon Is) **T. choiseulensis** Mackerras
- Larger (16–18 mm) species; frons very narrow, index 11.4; frontal callus a narrow, linear line widely separated from eye margins; basal flagellomere of antenna dark reddish brown; beard white; pleuron white pilose; abdominal terga 2–5 with distinct pale yellow-haired bands; eyes (relaxed) dark green, without color pattern ... (Fiji) **T. yoshimotoi** Burger

10. Dark grayish species; basal flagellomere of antenna compressed, black; maxillary palpi short and stout; wings strongly suffused with brown; abdominal terga with narrow pale apical bands and low median triangles ... (Solomon Is.)
 **T. lenticuloides** Mackerras
 - Without the above combination of characters 11
11. Abdominal tergites with gray posterior margins expanded into median triangles on tergites 2 and 3, tergites 1–3 with large yellow-brown sublateral spots; sternum with broad black median stripe ... (Fiji) **T. atrostriatus** Burger, **n. sp.**
 - Abdominal tergites 1–3 without large yellow-brown sublateral spots; sternum without broad black median stripe 12
12. Mesoscutum with broad sublateral pale stripes (sometimes diffuse); abdomen with very large light gray or yellow triangles on some tergites..... 13
 - Mesoscutum without broad sublateral pale stripes, or, if stripes present, they are narrow; abdominal tergites without very large gray or yellow median triangles, if triangles present, they are very small 14
13. Abdominal tergites 2–4 with large light gray median triangles arising from pale hind margins; scutellum strongly bicolored, anterior half black, posterior half light gray .. (Fiji) **T. koroyanituensis** Burger, **n. sp.**
 - Abdominal tergites 2–5 with large yellow median triangles arising from yellow posterior margins; scutellum not bicolored ... (Fiji) **T. fijianus** Ricardo
14. Pale longitudinal stripes on mesoscutum narrow and indistinct; median triangles on abdominal tergites 2–5 small or absent, at most extending 1/3 length of tergite 2, barely discernible on posterior tergites; basal flagellomere of antenna with weak dorsal tooth ... (Vanuatu) **T. expulsus** Walker
 - Without the above combination of characters 15
15. Dark brown to blackish brown species; frons narrow, index 8; antenna long, subequal to anteroposterior width of head; pleuron pale, strongly contrasting with mesonotum; legs black; wings brownish.....(Samoa) ... **T. samoensis** Ferguson
 - Without the above combination of characters 16
16. Relatively large (16–18 mm) dark brown to reddish brown species; beard with mixed dark and white hairs; maxillary palpi relatively slender; fore femora dark brown to black; wings predominantly hyaline; abdominal terga with variably developed grayish white median triangles and apical fringes ... (Solomon Is, Vanuatu) **T. rubiventris** Macquart
 - Beard creamy to white; maxillary palpi stouter; femora brown to yellowish; wings usually suffused with brown anteriorly 17
17. Larger (13–16 mm) more tomentose species with relatively large black frontal callus; basal flagellomere of antenna with strong dorsal tooth; wings lightly suffused with brown; eyes (relaxed) with a transverse brown band ... (Solomon Is) **T. gressitti** Mackerras
 - Smaller (12–14 mm) more shining species; frontal callus narrower, light brown basally; basal flagellomere of antenna with obtuse dorsal angle; eyes (relaxed)

without pattern; wings with darker brown suffusion anteriorly ... (Solomon Is, Santa Cruz Is, Vanuatu)..... **T. leveri** Mackerras & Rageau

- 18. Both subcallus and antennal scape strongly swollen and polished brown; basal flagellomere reddish brown basally, brownish apically; beard pale yellowish to white; maxillary palpi very slender....(Vanuatu, Fiji) **J. veitchi** (Bezzi)
 - Subcallus tomentose, not swollen; antennal scape polished black. Strongly contrasting with orange pedicel and basal flagellomere; apical flagellomeres black; beard dark brown to black; maxillary palpi stouter basally ... (Solomon Is) **J. ratcliffei** (Mackerras & Rageau)
- 19. Brownish species; flagellum of antenna long and slender, yellowish orange; wings irregularly darkened with brown anteriorly ... (Solomon Is) **D. anomala** Mackerras & Rageau
 - Grayish species; flagellum of antenna short, dark brown; wings hyaline....(Solomon Is) **D. melliccalosa** Mackerras & Rageau
- 20. Yellowish species with orange or yellowish brown coloration; antenna, palpi, and legs yellow or yellow-brown 21
 - Darker buff gray, brown, or black species 22
- 21. Frons relatively narrow (index 7); frontal callus brown ... (Fiji)..... **C. bezzii** Mackerras & Rageau
 - Frons broader (index 5.3–5.7); frontal callus yellow ... (Solomon Is) **C. sol** (Schuurmans Stekhoven)
- 22. Small (8–9 mm) grayish buff species; hairs on anterior 5 abdominal tergites nearly entirely creamy yellow ... (Solomon Is) **C. chainei** Daniels
 - Darker brown to black species; hairs on anterior abdominal tergites not predominantly creamy yellow 23
- 23. Larger (11–13 mm), yellowish brown to reddish, brown or black species; hairs on abdominal tergites of female mostly black or brownish 24
 - Smaller (8–10 mm), slender brown or black species; abdominal tergites with variable pattern of pale tomentum and hairs 27
- 24. Frons broad (index 4.5) ... (Solomon Is) **C. lorentzi** (Ricardo)
 - Frons narrow (index 7–9) 25
- 25. Beard creamy yellow; legs black; abdomen grayish black ... (Fiji) **C. limbatella** (Bezzi)
 - Beard black or with mixed black and pale hairs; legs and abdomen light to dark brown 26
- 26. Thorax very dark brown; abdomen black-brown to black; beard and pleuron black haired ... (Fiji)..... **C. fijiensis** Burger, **n. sp.**
 - Thorax and abdomen medium brown; beard and pleural hairs pale ... (Fiji) **C. pacifica** (Ricardo)

27. Frons relatively narrow (index 7); beard black; antenna black, unusually long, apical flagellomeres twice as long as basal flagellomere; maxillary palpi short and stout; proboscis unusually short, scarcely longer than maxillary palpi; vein R₄ without spur ... (Solomon Is) **C. teloides** Mackerras
- . Frons broader (index 5–5.7); beard creamy or white; antenna not entirely black and not unusually long; maxillary palpi relatively elongate and slender; proboscis not unusually short; vein R₄ with spur 28
28. Subcallus shining black; maxillary palpi dark brown to black; legs deep brown to black; abdominal tergites black, with narrow white apical bands ... (Solomon Is) **C. nigrina** Mackerras
- . Subcallus brown, tomentose; maxillary palpi creamy yellow; legs light brown; abdominal tergites brown with narrow yellowish apical bands ... (Solomon Is.) **C. nannoides** Mackerras

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