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FIJI ARTHROPODS IV

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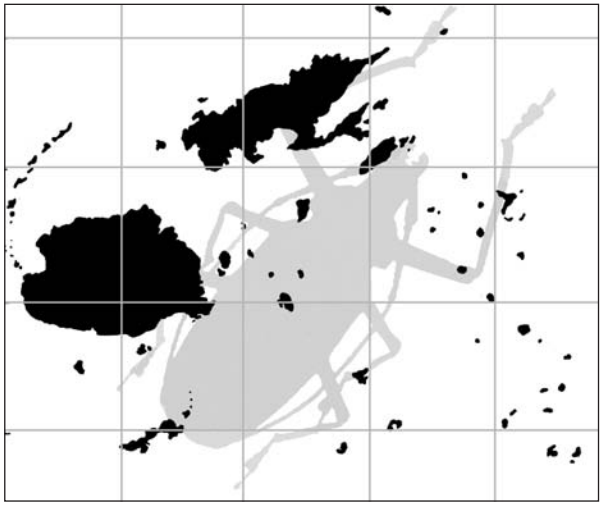

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FIJI ARTHROPODS

Editors' Preface

We are pleased to present the fourth issue of *Fiji Arthropods*, a series offering rapid publication and devoted to studies of terrestrial arthropods of the Fiji Group and nearby Pacific archipelagos. Most papers in this series will be the results of collecting and research on the Fijian fauna deriving from the NSF-funded "Terrestrial Arthropods of Fiji" project. Five co-PIs and 18 specialists (see Fiji Arthropods I, p. 18) form the core team of scientists who have agreed to publish new taxa that result from collecting during this survey. However, as space allows, we welcome papers from any scientist who is currently working on arthropod taxonomy in Fiji.

This issue contains results of discoveries of new species of Diptera in the families Keroplatidae (Evenhuis), Anisopodidae (Thompson), Rhagionidae (Webb), and Asilidae (Evenhuis). Manuscripts are currently in press or in preparation on Saldidae, Lauxaniidae, Pipunculidae, Keroplatidae, Mycetophilidae, Dolichopodidae, Tabanidae, Muscidae, and Asilidae and will appear in future issues.

The editors thank the Government of Fiji (especially the Ministries of Environment and Forestry), the National Science Foundation (DEB 0425970), and the Schlinger Foundation for their support of this project. Types of new species deriving from this study and voucher specimens will be deposited in the Fiji National Insect Collection, Suva.

All papers in this series are available free of charge as pdf files downloadable from the following url:

http://hbs.bishopmuseum.org/fiji/fiji-arthropods/

We encourage interested authors to contact us before submitting papers.

—Neal L. Evenhuis, Co-editor, neale@bishopmuseum.org
Daniel J. Bickel, Co-editor, danb@austmus.gov.au

Fiji Arthropods IV. Edited by Neal L. Evenhuis & Daniel J. Bickel. *Bishop Museum Occasional Papers* 86: 3–9 (2006).

Two new species of *Proceroplatus* Edwards (Diptera: Keroplatidae) from Fiji[1,2]

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Abstract. Two new species of the platyurine keroplatid genus *Proceroplatus*, *P. pectinatus*, **n. sp.** and *P. moala*, **n. sp.,** from Fiji are described and illustrated. These mark the first records of the genus from these islands. *Proceroplatus pectinatus* is only the second species known in the genus possessing pectinate antennae. A key to the species of Australasian/Oceanian *Proceroplatus* is given.

INTRODUCTION

The genus *Proceroplatus* Edwards is comprised of 35 previously described species distributed primarily pantropically with the majority of species known from the Neotropical region (Papavero, 1978). The genus is known only from three described species in the Australian/Oceanian regions: *P. graphicus* Skuse (Australia), *P. priapus* Matile, and *P scalprifer* Matile (the latter two from New Caledonia). Matile (1988) alluded to several undescribed species from Papua New Guinea, which are not treated here. His keys to New Caledonian taxa can be used to identify *Proceroplatus* and closely related genera in the southern Pacific and Melanesia.

Examination of numerous keroplatids collected in an extensive Malaise-trapping program throughout the larger islands of the Fiji archipelago supported by the Schlinger Foundation (started in 2002) and the National Science Foundation (started in 2004) have revealed two new species: *P. pectinata*, n. sp. and *P. moala*, n. sp. These are the first records of the genus from Fiji and the first named taxa in Melanesia. The genus is apparently locally uncommon in this region as a total of only 28 specimens for both species have been seen thus far among thousands of keroplatids and mycetophilids collected in the Fiji Malaise trapping programs; and the type series of other three described species from surrounding areas (Australia, New Caledonia) are relatively small.

Matile (1996) gave biological notes on the first pectinate species discovered in the genus, *P. belluus* Matile from Panama, where the immatures of the species were found to be myrmecophagous in the ant-plant *Besleria* (Gesneriaceae). The biology of the pectinate species recorded here is as yet unknown but could be similar as ant-plants of the family Rubiaceae (*Hydnophytum* and *Myrmecodia*) do exist in the areas where the flies were trapped (E. Sarnat, pers. comm.).

MATERIALS AND METHODS

The material examined in this study derives primarily from specimens collected under the auspices of the NSF-funded "Fiji Arthropods Survey" and the Schlinger Foundation-fund-

1. Contribution No. 2006-006 to the NSF-Fiji Arthropod Survey.
2. Contribution No. 2006-005 to the Pacific Biological Survey.

ed "Fiji Biodiversity of Arthropods" study, primary types of which will be deposited in the Fiji National Insect Collection, Suva (FNIC). Descriptive terminology follows Matile (1996) and Søli *et al*. (2000).

SYSTEMATICS

KEY TO THE SPECIES OF AUSTRALASIAN/OCEANIAN *PROCEROPLATUS* EDWARDS

1. Base of vein Rs with distinct cloud of yellowish brown infuscation extending basally almost to level of humeral crossvein 2
–. Small spot of infuscation at base of vein Rs, infuscation not extending to humeral crossvein ... (New Caledonia) 4

2. Cell m1 with clear spot in middle of infuscation (Fig. 4); band of infuscation in cells cup and a1 interrupted ... (Australia) ..... **graphicus** Skuse
–. Cell m1 without clear spot (Figs. 5–6); band of infuscation in cells cup and a1 not interrupted ... (Fiji) 3

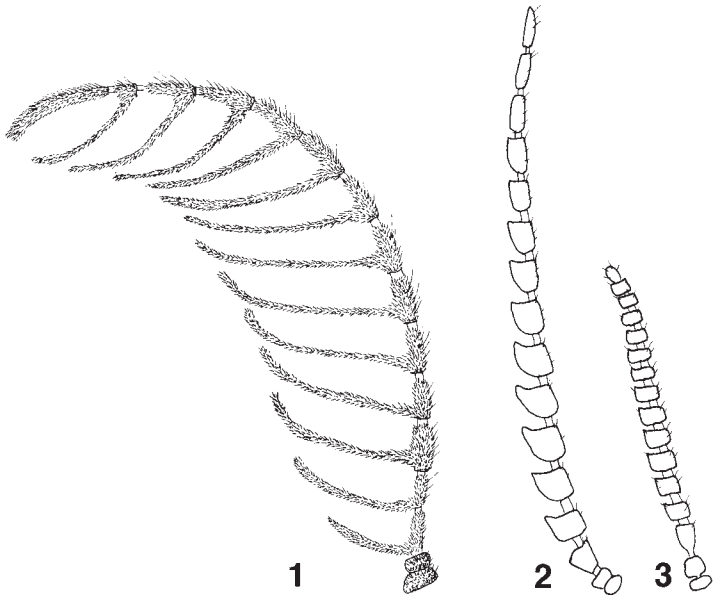
3. Antenna pectinate (Fig., 1); infuscation in apical portion of cell cua1 connected to that in cell cup; infuscation in cell r5 separate from vein R_4 (Fig. 5); hypopygium with bidentate gonostylus, tooth on medial surface acute (Fig. 8) .... **pectinatus** Evenhuis, **n. sp.**
–. Antennae elongate moniliform (Figs. 2–3); infuscation in apical portion of cell cua1 separate from that in cell cup; infuscation in cell r5 almost reaching vein R_4 (Fig. 6); hypopygium with gonostylus enlarged apically into flange-like structure in association with bluntly dentate spine, tooth on medial surface thick, truncate apically (Fig. 9) ..... **moala** Evenhuis, **n. sp.**

4. Face and palpi brown to brownish black; gonostylus with apex elongate, hook-shaped ..... **scalprifer** Matile
–. Face and palpi yellowish; gonostylus with apex foreshortened, acute apically, not hook-shaped ..... **priapus** Matile

Proceroplatus pectinatus Evenhuis, **new species**
(Figs. 1, 5, 8)

Diagnosis: Is closest to *P. moala,* n. sp. but can be distinguished from it by the pectinate antennae and the bidentate apex of the gonostylus. The only other known *Proceroplatus* species with pectinate antennae, *P. belluus*, from Panama, differs from *P. pectinatus* in having wing patterning without clear areas in the apical portion of the radial area.

Description: Lengths: Body: 3.8–4.2 mm; wing; 3.5–4.0 mm. **Male**. *Head*. Occiput brownish black. Three ocelli near middle of frons, outer pair large, medial punctiform. Ocellar calli black. Frons dark brown. Antennae (Fig. 1): scape and pedicel discoid, scape brownish black, pedicel yellow. Flagellum: segments 1–13 with long and simple pectinations bearing dense fine setae, terminal segment (14) recurved towards, and almost as long as, pectination of penultimate segment (13). First fla-



FIGURES 1–3. *Proceroplatus* antennae. **1**. *P. pectinatus*, n. sp. **2**. *P. moala*, n. sp., male, vestiture removed. **3**. *P. moala*, n. sp., female, vestiture removed.

gellomere yellow, the following brownish yellow, the pectinations brown, narrowly yellow at base. Face brownish yellow, palpi brownish black, last palpomere yellow.

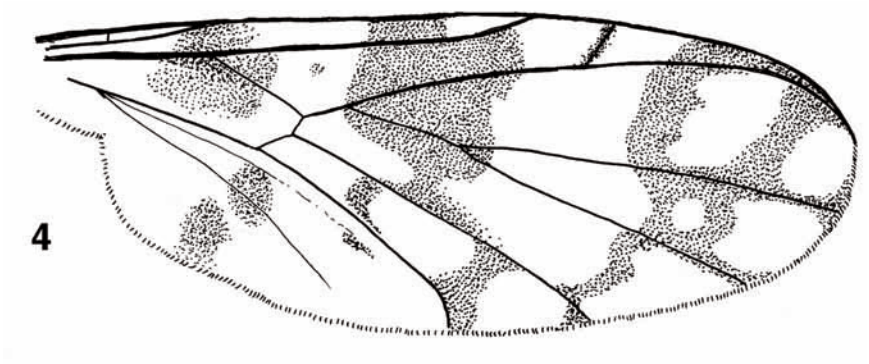
Thorax. Prothorax, scutum, scutellum, and mediotergite yellow. pleurae and laterotergite yellow, anepisternum brownish, with group of small dorsal setae, katepisternum light brown. Laterotergite with long erect posterodorsal setae. Halteres yellow.

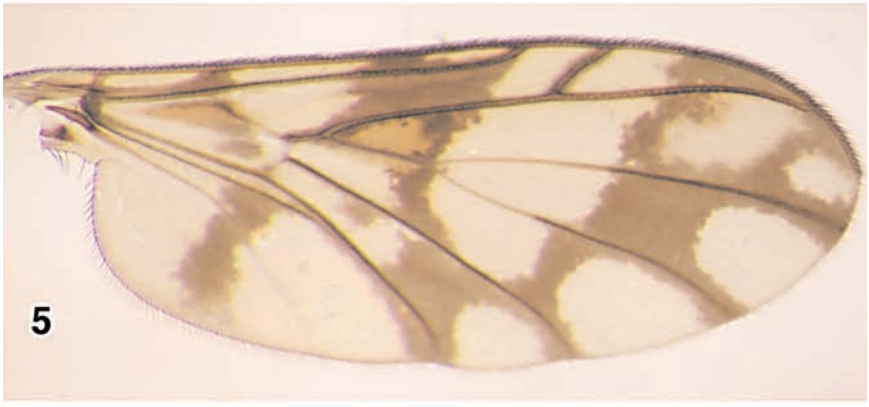
Legs. Yellow, tarsi darkened. Spurs black, those on fore and outer ones on mid and hind legs minute, inner ones on mid and hind legs very long. Protarsus longer than tibia (5.5:4).

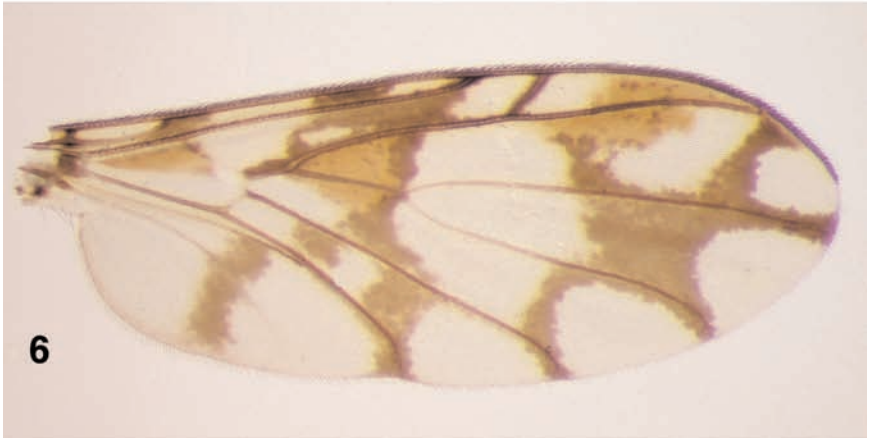
Wing (Fig. 5). Grayish yellow hyaline with brown and yellow pattern of infuscations. Cell c with infuscation basally extending to end of Sc. Band of brown infuscation from C to M_{1+2}, continuing to CuA_1 via thin band, with yellowish color at base of cell r5. Vein R_4 ending in costa, infuscated brown. Apical band of brown infuscation from apex of C to CuA_2, with two clear spots in cell r5 and apical hemispherical clear areas in cells m1, m2, and cua1. Thin basal band of brown infuscation from middle of CuA_2 to posterior wing margin. Cell bm with two spots of infuscation, yellowish spot of color from Rs extending basally toward base of cell bm+cu, smaller brown spot below it. Sc ending in C at origin of Rs. Infuscation at apex of cell cua1 distinctly connected to that in cell cup.

Abdomen. Tergite I yellow, II yellow, apex slightly brownish, III brown, indistinctly yellow slightly before posterior margin, IV yellow dorsally, with narrow, postbasal brown band, V yellow, VI–VII brown, dark yellow basally. Sternites with same pattern as tergites.

Hypopygium (Fig. 8). Yellow basally, brown apically. Ninth tergite shorter than gonocoxite, wider than long, concave basally, slightly convex apically. Cerci wide, subtriangular with rounded corners. Gonocoxite simple, with wide triangular ventral notch, with long hairs at posteromesal corner. Gonostylus long, thin, with long bidentate apex, mesal surface of gonocoxite with long, thin







FIGURES 4–6. *Proceroplatus* wings. **4**. *P. graphicus* Skuse (redrawn from Skuse). **5**. *P. pectinatus*, n. sp. **6**. *P. moala*, n. sp.

spine-like tooth, basally with long thin mesally directed projection, projection with blunt apex.

Female. As in male except: flagellomeres and pectinations slightly more compact.

Types. Holotype ♂ (FBA501127) and 4♂ paratypes (FBA501128, 501148–501149) from FIJI: **Taveuni**: 5.3 km SE Tavuki Village, Mt Devo, 1054 m, 14–28 Jan 2005, Malaise, P. Vodo. *Other paratypes*: **Taveuni**: 2♂, 3.2 km NW Lavena Village, Mt Koronibuabua, 234 m, 16.855°S, 179.801°W, 4–18 Jan 2004, Malaise, B. Soroalau (FBA092534–092535); 3♂, 3♀, 5.6 km SE Tavuki Village, Devo Peak, 1187 m, 11 Feb–22 Mar 2005, Malaise, P. Vodo (FBA501129, 501141–501145); 1♂, Tavuki Village, Devo Peak, 734 m, 16.831°S, 179.98°W, 14 Jul–14 Aug 2004, Malaise, p. Vodo (FBA091482). **Viti Levu**: 1♂, 4 km NW Lami Town, Mt Korobaba, 260 m, 13 Dec 2004–3 Jan 2005, 18.104°S, 178.301°E, Malaise, K. Koto (FBA501146). Holotype to be deposited in FNIC. Paratypes in FNIC and BPBM.

Remarks. This is only the second species of *Proceroplatus* with pectinate antennae. The other species, *P. belluus*, was described by Matile (1996) from Panama, which is the undescribed *Proceroplatus* with pectinate antennae that Matile (1981) was referring.

Proceroplatus moala Evenhuis, **new species**
(Figs. 2–3, 6, 7, 9)

Diagnosis: Closest to *P. scalprifer* but can be separated from it by the yellowish infuscation in cell bm (absent or restricted to faint dot in *P. scalprifer*) and the shape of the gonostylus with an enlarged diamond-shaped plate-like structure apically (apex of gonostylus in *P. scalprifer* large, tooth-like). It can be separated from the other known Fijian species, *P. pectinatus* by the elongate moniliform antennal segments and hypopygial shapes.

Description: Lengths: Body: 3.5–4.0 mm; wing; 3.3–3.8 mm. **Male**. *Head*. Occiput brownish black. Three ocelli near middle of frons, outer pair large, medial punctiform. Ocellar calli black. Frons dark brown. Antennae (Fig. 2): scape and pedicel discoid, scape brownish black, pedicel yellow. Flagellum: moniliform, brown, segments 1–8 slightly produced distally on frontal surface; segments 9–14 cylindrical. Face brownish yellow, palpi brownish black.

Thorax. Prothorax, scutum, scutellum, and mediotergite yellow. Pleurae and laterotergite yellow, anepisternum brownish, with group of small dorsal setae, katepisternum light brown. Laterotergite with long erect posterodorsal setae. Halteres yellow.

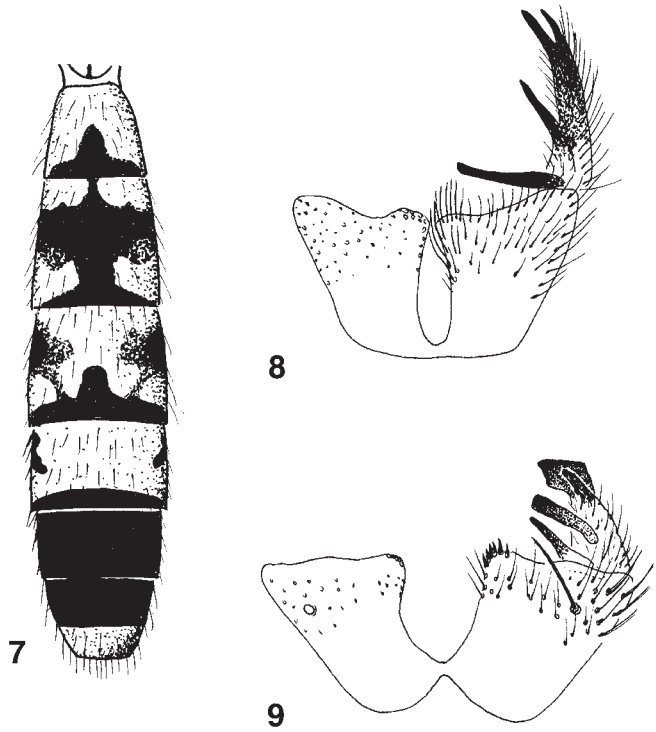
Legs. Yellow, tarsi darkened. Spurs black, those on fore and outer ones on mid and hind legs minute, inner ones on mid and hind legs very long. Protarsus slightly shorter than tibia.

Wing (Fig. 6). Grayish yellow hyaline with brown and yellow pattern of infuscations. Cell c with infuscation basally extending to end of Sc. Band of brown infuscation from C to M_{1+2}, continuing to CuA_1 via thin band, with yellowish color at base of cell r5. Vein R_4 ending in costa, infuscated brown. Apical band of brown infuscation from apex of C to CuA_2, with two clear spots in cell r5 and apical hemispherical clear areas in cells m1, m2, and cua1, yellowish color also connecting brown band in cell r4 with vein R_4. Cell bm+cu with one spot of infuscation, yellowish spot from Rs extending basally toward base of cell bm+cu. Sc ending in C at origin of Rs. Infuscation in cell cua1 not distinctly connected with that in cell cup (at most thinly connected by suffusion of vein CuA_1).

Abdomen (Fig. 7). Tergite I yellow with brown triangular spot posteromedially, II yellow basally and subapically with brown pattern medially, III–IV yellow with brown spot dorsolaterally and posteromedially, V–VI brown, VII yellow. Sternites with same pattern as tergites.

Hypopygium (Fig. 9). Yellow. Ninth tergite shorter than gonocoxite, wider than long, concave basally, slightly convex apically. Cerci wide, subtriangular with rounded corners. Gonocoxite simple, with wide triangular ventral notch, with short spicules at posteromesal corner. Gonostylus subtriangular, with short bifid apex, mesal projection tooth-like, lateral projection diamond-shaped, spade-like; mesal surface of gonocoxite with strap-like projection, truncate apically, basally with thin tapered mesally directed projection, projection with sharp apex.

Female. As in male except antennal flagellomeres shorter.



FIGURES 7–9. **7**. *Proceroplatus moala,* n. sp., abdomen, dorsal view. **8–9.** *Proceroplatus* male genitalia. **8**. *P. pectinatus*, n. sp. **9**. *P. moala*, n. sp.

Types: Holotype ♂ (FBA 501133) and 2♂, 2♀ paratypes (FBA501131–501132, 501134) from FIJI: **Viti Levu**: Koroyanitu Eco Park, 1 km E. Abaca Village, 800 m, Savuione trail, 16–29 Nov 2004, Malaise, L. Tuimereke. *Other paratypes*: **Gau**: 2♂, 4.0 km SE Navukailagi Village, Mt. Delaco, 400 m, 17°37'S 177°59'E, 7–19 Apr 2005, Malaise, U. Racule (FBA505003–505004). **Viti Levu**: 1♂, 4 km NW Lami Town, Mt. Korobaba, 250 m, 15 Nov–1 Dec 2004, Malaise 4, K. Koto (FBA501136); 1♂, same data, 400 m, 1–13 Dec 2004, Malaise 3, K. Koto (FBA 501135); 1♀, 2 km E Navai Village, old trail to Mt Tomaniivi, 700 m, 18 Oct–5 Nov 2004, 17.521°S, 178.000°E, Malaise 3, E. Namatalau (FBA501139); 1♀, same data, 17.521°S, 179.998°E, 700 m, 30 Oct–23 Nov 2004, Malaise 4 (FBA501137); 1♀ Nadarivatu, 850 m, 8–13.1963, C.M. Yoshimoto (BPBM). Holotype to be deposited in FNIC. Paratypes in FNIC and BPBM.

Etymology. The species is named for Moala Tokota'a who has been working for the Schlinger Foundation and NSF projects since 2002 in assisting with logistics, collecting, and conservation education with Fijian villagers. His superb collecting efforts have been essential to the success of this project. The name is treated as a noun in apposition.

ACKNOWLEDGEMENTS

This study was supported in part by National Science Foundation grant DEB 0425790 and funding from the Schlinger Foundation. Both of these agencies and the Government of Fiji (especially the Ministries of Environment and Forestry) are thanked for their generous support.

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Papavero, N. 1978. Family Keroplatidae (Ceroplatidae, incl. Macroceridae). *Catalogue of the Diptera of the Americas South of the United States* **19C**: 1–78.

Søli, G., Vockeroth, J.R., & Matile, L. 2000. Families of Sciaroidea, pp. 49–92. *In*: Papp, L. & Darvas, B. (eds.), *Contributions to a manual of Palaearctic Diptera (with special reference to flies of economic importance).* Appendix. Science Herald, Budapest.

Fiji Arthropods IV. Edited by Neal L. Evenhuis & Daniel J. Bickel. *Bishop Museum Occasional Papers* 86: 11–21 (2006).

New *Mesochria* species (Diptera: Anisopodidae) from Fiji, with notes on the classification of the family

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Abstract. Two new species of *Mesochria* from Fiji are described and illustrated: *M. schlingeri* Thompson, **n**. **sp**. and *M. vulgaris* Thompson, **n**. **sp**. A key to genera of Anisopodidae and key to the species of *Mesochria* species are provided, along with notes on the classification of the family.

INTRODUCTION

Wood gnats (family Anisopodidae) are common flies in forests as their name implies (*Sylvicola* Harris, the type genus, means "lover of woods" in Latin). They are found on all continents except Antarctica and on most major islands (Indonesia, Madagascar, New Zealand, Philippines, West Indies), but are less numerous on smaller, "oceanic" islands, with species only being recorded from the Canaries, Lord Howe, Maderia, New Caledonia, Samoa, Seychelles, and now Fiji. One species has been introduced into the Hawaiian Islands (Thompson & Rogers 1992). In the Pacific, only the genera *Sylvicola* (introduced into Hawai'i, otherwise in Australia and New Zealand), *Mycetobia* Meigen (New Caledonia) and *Mesochria* Enderlein (Samoa, Fiji) occur.

Only 10 specimens of *Mesochria* representing 9 species have been reported since the group was described about a hundred years ago. In the first years of the current Fiji biological survey, 73 specimens representing two new species were collected. The difference is the use of modern collecting techniques like Malaise fly traps along with an organizational structure to get the material to specialists for study rather than leaving samples to accumulate in some museum backlog.

Unfortunately, there is little published information on the biology of *Mesochria* and not much more on its sister-group, *Mycetobia*. One species of *Mesochria* was reared from "a pupa found in rotting banana fibre" in Ghana, western Africa (Keilin & Tate 1940). The biology of a number of species of *Mycetobia* are now known. They are saprophagous and live in fermenting saps runs or slime fluxes from wounds in trees or in tree holes (Keilin 1919, Keilin & Tate 1940, Krivosheina 1997b).

MATERIALS AND METHODS

Material was seen in, borrowed from, or deposited in the following institutions: American Museum of Natural History, New York (AMNH); the Natural History Museum, London

1. Contribution No. 2006-007 to the NSF-Fiji Arthropod Survey.

(BMNH); Bishop Museum, Honolulu (BPBM); Departamento de Biologia, Universidade de São Paulo, Ribeirão Preto (DBUSP); Fiji National Insect Collection, Suva (FNIC); Institut Recherche Scientifique de Madagascar, Tananarive (IRSM); Musee Royal de l'Afrique Centrale, Tervueren (MRAC); Muzeum i Instytut Zoologii, Polska Akademia Nauk, Warsaw (PAN); National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM); Zoölogisch Museum, Amsterdam (ZMAN).

Morphological terminology and abbreviations follows McAlpine (1981) as modified by Thompson (1999). In the material examined section, the use of ellipses (...) follows standard English practice and merely indicates that the missing information is the same as that in the preceeding record. For measurements, the number of specimens measured is given within parentheses, followed by the range with the average within parentheses; the measurements are in millimeters.

SYSTEMATICS

Classification of Anisopodidae (*sensu lato*)

The classification used here is conservative and follows from Edwards' *Genera Insectorum* treatment (Edwards 1928b). As is unfortunately typical today, some workers over split the wood gnats into numerous genera, tribes, subfamilies and families. European workers split the family into two (Anisopodidae, Mycetobiidae) and split *Mycetobia* into 3 genera (*Mycetobia*, *Trichomycetobia* Mamaev, *Xeromycetobia* Mamaev) (Krivosheina 1997a,b, Mamaev 1987). Amorim & Tozoni (1994) go further and recognize 3 families (Olbiogastridae split from Anisopodidae) and 11 genera. They overlooked the work of Mamaev, so if one accepts his splitting of the Palaearctic species of *Mycetobia* into three genera, then the split classification would recognize 15 genera distributed among 3 families, 4 named subfamilies and 4 named tribes, for 155 extant species.

Amorim and Tozoni (1994) provided a cladistic analysis, which demonstrated that the traditional concepts are monophyletic. The difference between the traditional classification of Edwards and theirs is merely the splitting of genera, and, hence, elevation of the traditional generic taxa to higher ranks (*Olbiogaster* Osten Sacken = Olbiogastridae Hennig, *Anisopus* = Anisopodidae, etc.). This follows from Hennig's proposal of ranking taxa based on their age of origin. As there are no accepted scientific methods for ranking taxa and forming classifications, I justify the use of the broad based traditional arrangement of Edwards on utilitarian grounds. Broader groups are more informative and useful for general users. Specialized cladistic information can be encoded with the use of subgenera and informal groupings, such as series and species groups.

There may be more problems with the work of Amorim and Tozoni than those of ranking. A closer look at their treatment of mycetobiine wood gnats reveals a few errors. Their desire to have a classification fit their zoogeographic analysis forced them to combine the Neotropical and New Caledonia *Mycetobia* species with the Dominican amber *Mesochria* into a new genus *Neomesochria* Amorim & Tozoni. Their cladogram listed the following synapomorphies for the mycetobiine genera: *Mycetobia*, meron "reduced;" *Neomesochria*, base of M absent or "virtually absent;" *Mesochria*, eyes "fully holoptic" in both males and females and R_{2+3} fused apically with R_1. Then, in their brief diagnosis of *Neomesochria* (no description given), they declare that "it is distinct in having the base

of bM completely absent. It can also be differentiated from *Mesochria* by the eyes not in contact above the antennae and R_{2+3} near but not apically fused to R_1. *Neomesochria*, gen. n. differs from *Mycetobia* in having R_{2+3} ending at C very near R_1." Unfortunately, these characteristics do not agree with reality. All species of *Mycetobia* and *Mesochria* also lack vein bM. This is, in fact, the synapomorphy for the subfamily, Mycetobiinae! The termination of R_{2+3}, a) whether in the Costa distant from R_1 (pleisomorphic), b) in the Costa "very near" to R_1, and c) fused to R_1 (apomorphic) is the character used for the traditional separation of *Mycetobia* (states a, b) and *Mesochria* (state c). As they correctly noted, this leaves *Mycetobia sensu* Edwards *et alia* without a synapomorphy. They noted that Edwards stated that the Palaearctic species of *Mycetobia* had the meron "reduced", and this condition was "not observed in *Neomesochria*." This may be a possible synapomorphy for *Mycetobia*, but without an illustration or more precise definition of "reduced", I could not evaluate it. What should also be noted is the same problem, lack of a synapomorphy, exists for their new genus, *Neomesochria*. That is, the intermediate condition of the termination of R_{2+3} (state b) is not synapomorphy. And they also included in their *Neomesochria*, the Dominican amber species (*neotropica*), which has R_{2+3} fused to R_1 (state c). The last character provided for their *Neomesochria* was the condition of the eyes (dichoptic versus holoptic). The nature of the eyes does not correlate with the wing venation. The two species described here clearly have the derived condition for the termination of R_{2+3}, but one is broadly dichoptic and the other is holoptic. So, until a better analysis* is done, I follow the traditional concepts of two sister taxa, *Mycetobia* and *Mesochria*, defined by the termination of R_{2+3}, which have been considered sister to *Valeseguya* Colless. The genera here recognized are defined in the key below, which is derived from Edwards (1928b). *Valeseguya* and *Carreraia* Correa were not known to Edwards, so they have been added to the key from the literature. *Valeseguya*, while placed in Anisopodidae by its author (Colless 1990), Amorim & Tozoni (1994), and Grimaldi (1991), is apparently now considered to represent a distinct family in the Scatopsoidea (Grimaldi & Engel 2005: 500–501, attributed to unpublished data of Amorim & Grimaldi).

Key to the genera of Anisopodidae, *sensu lato*

1. Media three-branched; discal cell (dm) present 4
–. Media two-branched; discal cell absent; metatibia with apical comb 2

2. R_{2+3} ending in R_1 [Afrotropical, Oriental, Oceania; fossil in Dominican amber] .... **Mesochria** Enderlein
–. R_{2+3} ending in Costa 3

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* For example, pupal characters should be analysed. Keilin and Tate (1940) present data on the pupae of *Sylvicola*, *Mesochria*, *Mycetobia* and *Olbiogaster*, as well as *Trichocera* Meigen as an outgroup. From that data one might propose the number of stout hooks on the 8th abdominal segment is a morphocline, with 3 pairs in *Olbiogaster*, 5 pairs in *Mesochria*, 7 pairs in *Syvicola* and 8 pairs in *Mycetobia*, and none in *Trichocera*, then 8 pairs would be a synapomorphy for *Mycetobia*.

The problem of a proper synapomorphy for *Mycetobia* remains. Hence, the status of the Neotropical and New Caledonia species of *Mycetobia* remains to be clarified. But *Mesochria neotropica* is here reconfirmed as a member of *Mesochria*, **revised status**.

3. Sc distinct, terminating in C; M_{1+2} present; A_1 distinct, terminating at wing margin ... (Holarctic, New Caledonia) ..... **Mycetobia** Meigen
–. Sc indistinct, not reaching C, terminating in costal cell; M_{1+2} absent, M_1 and M_2 arising separately from basal cell; A_1 indistinct, abbreviated, not reaching wing margin ... (Australia) ..... **Valeseguya** Colless

4. Wing membrane with macrotrichia, at least apically; metatibia with apical comb ... (Cosmopolitan)..... **Sylvicola** Harris
–. Wing without macrotrichia; metatibia without comb 5

5. R_{4+5} ending only a little before wing apex; katepisternum bare, shiny. Eye nearly bare ... (Cosmopolitan) ..... **Olbiogaster** Osten Sacken
–. R_{4+5} ending well before wing apex; katepisternum pilose, pollinose 6

6. Eye long, dense pilose; large, 17–18 mm ... (Chile) ..... **Lobogaster** Philippi
–. Eye bare; smaller, 11–12 mm ... (Brazil) ..... **Carreraia** Correa

Key to species of *Mesochria* Enderlein

The key to the species of *Mesochria* is based on the original descriptions which are in some cases very brief, especially those of Edwards. For example, Edwards's description of *medicorum* mentions only 4 characters then says "otherwise as in *scottiana*." Then the descriptions are incomplete, with de Meijere describing the coloration of the metaleg, not the mesoleg, and Edwards describing the coloration of the mesoleg only as the type lack metalegs! Also, halter color is not mentioned in 2 descriptions; number of scutellar bristles not mentioned in 3 descriptions, the last palpomere is described only in 3 descriptions, *et cetera*. Hence, while better characters are available, these could not be used as no specimens were available for study of the described species as they are only known from their respective types, which most museums will not loan.

1. Legs with dark brown to black annuli on meso- and/or metatibiae, may also be on femora 8
–. Legs unicolorous or at most with apical 1/5 of metatibia darkened 2

2. Flagellum entirely black 5
–. Flagellum bicolorous, with apical flagellomere white apically 3

3. M_2 absent; halter capitulum dark brown ... (Madagascar) ..... **griveaudi** Stuckenberg
–. M_2 distinct apically 4

4. Apical palpomere only slightly longer than penultimate; postalar callus with 2-3 bristles. Halter capitulum pale brownish ... (Fiji) ..... **vulgaris** Thompson, **n. sp.**
–. Apical palpomere 1.5 times as long as penultimate; postalar callus with only a single bristle ... (Madagascar) ..... **sylvatica** Stuckenberg

5. Dichoptic (eyes widely separated dorsally) (Fig. 2); scutellum with 2 pairs of bristles. Halter with dark capitulum ... (Fiji) ..... **schlingeri** Thompson, **n. sp.**
–. Holoptic (eyes contiguous or at least touching dorsally) (as in Fig. 1); scutellum with only 1 pair of bristles 6

6. Costa produced beyond junction with R_{4+5}, extending about 1/2 distance to M_1; scutum dull, dark brown; 1st palpomere much larger than 2nd and 3rd; halter with dark capitulum ... (Borneo) ..... **intermedia** Edwards
–. Costa not produced, ending at junction with R_{4+5}; halter pale 7

7. Scutum dull, light ochreous, with dark brown sublateral vitta; 3rd palpomere subequal to 4th ... (Ghana)..... **medicorum** Edwards
— Scutum subshiny, darker, and unmarked; 3rd palpomere about twice as long 4th ... (Seychelles Is) ..... **scottiana** Enderlein
— Scutum yellow, with black medial and sublateral vitta; 3rd palpomere about 1/2 as long as 4th ... (Zaire) ..... **congensis** Tollet

8. Scutum unicolorous, shiny brown ... (Samoa) ..... **buxtoniana** Edwards
— Scutum bicolorous, pale with dark markings 8

9. Scutum yellow with broad sublateral black vitta ... (Fossil, Dominican amber) .... **neotropica** Grimaldi
— Scutum yellow with broad medial and lateral curved vittae ... (Java) .... **cinctipes** Meijere

Mesochria schlingeri Thompson, **new species**
(Figs 2, 3, 5)

Diagnosis. This species is readily distinguished from other extant *Mesochria* species by being dichoptic and having two pairs of scutellar bristles. The species is similar to the Dominican amber species, *neotropica*, but is easily distinguished by its leg and scutal coloration.

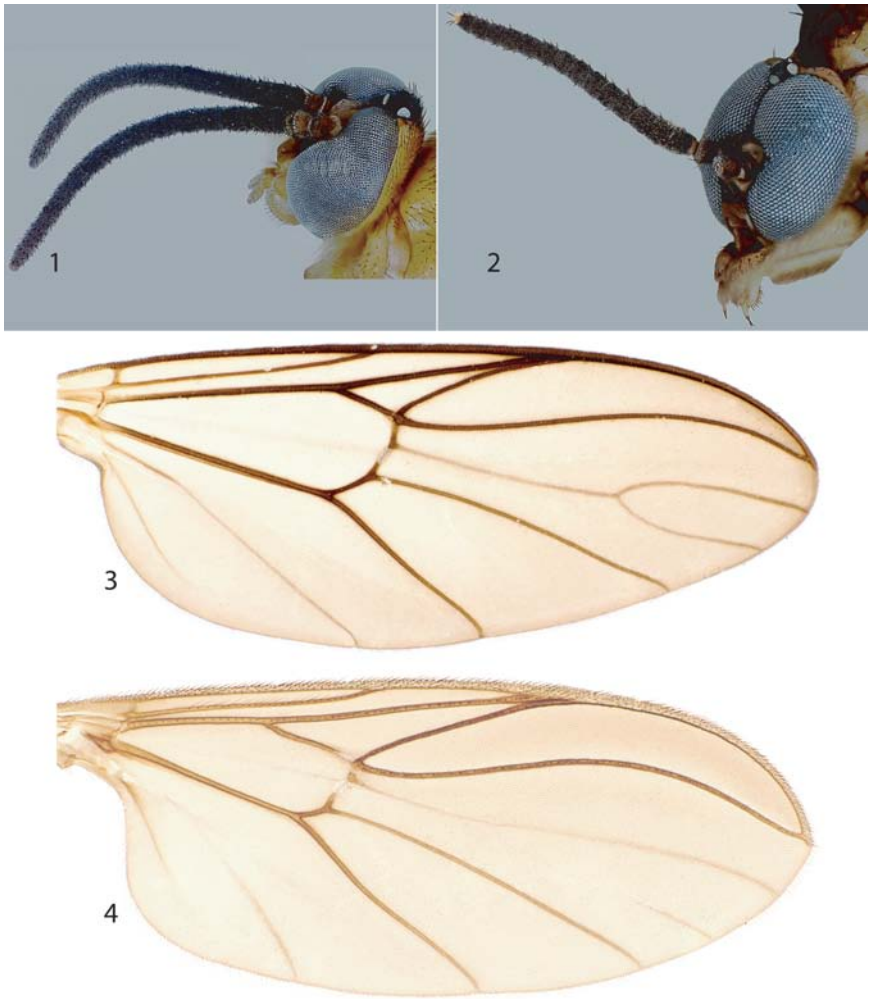
Description. Male. *Head*. Yellow except black vertex; face shiny, very short yellow pilose; frons sparsely yellow pollinose laterally; eyes (Fig. 1) broadly separated, separated by width of anterior ocellus; vertex black pilose; anterior ocellus about twice as large as lateral ocelli; occiput yellow pilose on ventral 1/2, mainly black pilose dorsally with some yellow pile intermixed anteriorly. Scape and pedicel orange, black pilose; flagellum black. Palps. 1st palpomere very short, about 1/3 as long as 2nd, equal to 3rd; 2nd palpomere long, about 3 times as long as 1st and 3rd; 3rd short, equal to 1st; 4th short, about twice as long as 1st and 3rd, about 2/3 as long as 2nd, blunt apically, without apical bristle.

Thorax. Yellow except anepisternum and postalar callus brownish orange and with broad sublateral brown vitta on scutum on medial 1/2, well separated from anterior margin and scutellum, short black pilose. Bristles weak, 2 supra-alar, 3 postalar, 2-3 dorsocentrals posteriorly, but two distinct scutellars, one basomedial and other apical. Halter white with capitulum brownish black. *Legs*. yellow, black pilose except black apical 1/5 on metatibia and black metatarsus except extreme base yellow, with pro- and mesotarsus appearing black apically due to dense black pile; tibial apical spur single on pro and metatibial, double on mesotibia, but second spur only about 1/3 as large as other. *Wing* (Fig. 3). Hyaline, microtrichose; subcostal vein bare; Rs setose; M1+2 and both M1 and M2 distinct; CuA distinctly setose, but seta only about 1/2 as long as those on radial veins; A1 distinct.

Abdomen. Yellow on basal 4 segments, except indistinct brownish medial macula on 4th segment, black on apical segments, black pilose; male genitalia (Fig. 5) brownish black, cercus orange.

Length: Body, not including antenna, 6.0 mm; antenna, 2.0; wing, 5.3 mm

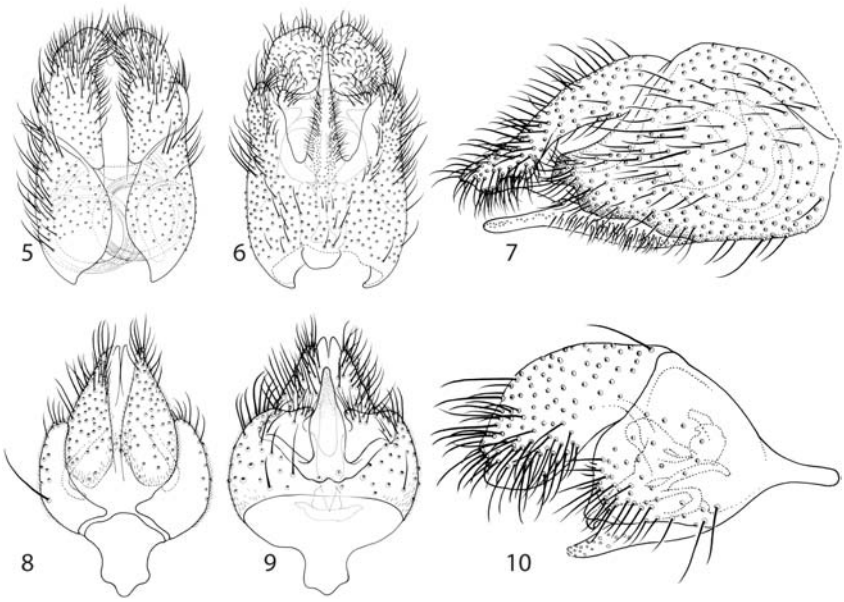
Type. Holotype ♂ (BPBM 16,560), FIJI: **Viti Levu**: Sigatoka Sand Dunes National Park, malaise trap in costal forest, 177°30'E, 18°10'S, 10 m., 22 Sep– 8 Oct 2002, M.E. Irwin, E.I. Schlinger & M. Tokota'a, (FBA 009142), to be deposited in Fiji National Insect Collection, current-



Figures 1–2. Heads of male *Mesochria*. **1**. *M. vulgaris*. **2**. *M. schlingeri*, dorsolateroblique view. **Figures 3–4**. Wings of *Mesochria*. **3**. *M. schlingeri*. **4**. *M. vulgaris*.

ly held at Bishop Museum, Honolulu. *Paratype*. FIJI: **Viti Levu:** 1♂, K oroyanitu Eco Park, Mt. Evans Range, 0.5 km N of Abaca Village, 177.55°E 17.667°S, 800 m, 26 Nov–3 Dec 2002, Malaise trap, E. I. Schlinger & M. Tokota'a (FBA 073018) (USNM).

Remarks. *Mesochria schlingeri* is a very distinctive species: Not only do the structural characters separate the species from all others, the coloration is unique and beautiful. The pale yellow abdomen with the apical segments being black, and the pale yellow scutum with dark brown sublateral vittae make an unique color pattern. So among the var-



Figures 5–10. Male genitalia of *Mesochria* species. **5, 6, 7**. *M. schlingeri*. **8, 9, 10**. *M. vulgaris*. **5, 8**. hypopygium, dorsal view; **6, 9**. hypopygium, ventral view. **7, 10**. hypopygium, lateral view;

ious original descriptions, this species clearly stands out, unlike *vulgaris* (see below).

Etymology. This species is dedicated to Evert I. Schlinger, in recognition of his effort to start the Terrestrial Arthropod Survey of Fiji.

Mesochria vulgaris Thompson, **new species**
(Figs 1, 4, 6)

Diagnosis. This species is most similar to *sylvatica*, differing from that species as outlined in the key above.

Description. *Head*. Brownish yellow except brown frons and black vertex; face shiny, very short yellow pilose; eyes (Fig. 2) broadly contiguous for about 1.5 length of vertex; vertex black pilose; ocelli about equal in size; occiput black pilose. Antenna black except white apical 1/3 of apical flagellomere, black pilose. Palps. 1st and 3rd palpomeres short, about 1/3 as long as 2nd; 2nd palpomere long, about 3 times as long as 1st and 3rd; 4th short, slightly longer than 1st and 3rd, tapered apically, with stout apical black bristle.

Thorax. Brownish except yellow propleuron and more yellowish laterally on scutum, short black pilose. Bristles distinct, 2–3 supra-alar, 3 postalar, 6–8 dorsocentrals, 1 apical scutellar. Halter white with capitulum pale brownish. *Legs*. Brownish yellow, black pilose except black apical 1/5 on metatibia and black metatarsus except extreme base yellow, with pro- and mesotarsus appearing black apically due to dense black pile; tibial apical spur single on protibia, double on meso- and metatibia, but second spur only about 1/3 as large as other. *Wing* (Fig. 4). Hyaline, microtrichose;

subcostal vein setose on apical 4/5 ventrally; Rs bare; M_{1+2} absent, M_2 only distinct on apical 1/3 at wing margin; CuA bare; A_1 only distinctly apically, basal portion absent.

Abdomen: terga brownish yellow in males, brown in female, black pilose; sterna yellow, black pilose; male genitalia brownish (Fig. 6).

Length (5). Body, not including antenna, 3.9–5.6 (4.4) mm; antenna, 1.2–1.6 (1.4) mm; wing 4.0-5.7 (4.6) mm.

Variation. Femora darker in some, metatibia may also be darker basally; abdomen may be pale medially on terga in females.

Types. Holotype male (BPBM 16,651), FIJI: **Taveuni**: Devo Peak Radio Tower, 16°51'S, 179°58'E, 1200 m, 10–17 Oct 2002, Malaise trap in rain forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA 009143), to be deposited in FNIC, currently held at BPBM. *Paratypes*: FIJI. **Taveuni:** Devo Peak, 3–16 Jan 2003, Malaise trap, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA 038572, 1 broken spm); ..., Devo Reserve, 16°50'S 179°58'W, 800 m, 3–10 Jan 2003, Malaise trap in montane wet forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA041869, 1♀); ..., Devo Peak Radio Tower, 16°51'S, 179°58'E, 1200 m, 31 Oct–21 Nov 2002, Malaise trap in rain forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA009144, 1♀); ..., (FBA019743, 1♂ [in USNM], 019745–019746, 2♀); Mt Devo, Tavuki village, 16.831°S, 179.98°E, 734 m, 30 Jun–14 Aug 2004, E.I. Schlinger & M. Tokota'a, Malaise trap, (FBA071288, 1 broken spm); ... Devo Peak, 5.6 km SE of Tavuki Village, 16°50'35.7"S, 179°57'56.7"E, 1187 m, Malaise trap in cloud forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA056709-056713, 2♂, 3♀); ... (FBA058130–058132, 3 broken spms); ..., 5.3 km SE of Tavuki Village, 16°50'27.4"S 179°58'4.1"W, 1064 m, Malaise trap in montane wet forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA053432–053436, 3♂, 1♀, 1 broken spm); ..., Koronibuabua, 16°51'28.3"S, 179°53'37.0"W, 212 m, 4-19 Nov 2003, Malaise trap in lowland rainforest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA046305, 1♀); ..., Mt Koronibuabua, 3.2 km NW Lavena Village, 16.855°S, 179.892°E, 236 m, 4–19 Sep 2003, E.I. Schlinger & M. Tokota'a, Malaise trap, (FBA074337, 1♀). **Kadavu:** Solodamu, 19°04'S 178°07'E, 128 m, 11 Jun–6 Jul 2003, Malaise trap in costal limestone forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA045708, 1♀). **Viti Levu:** Nakobolevu, logging road behind Suva, 18°03'S, 178°25'E, 340 m, 22 Sep–9 Oct 2002, Malaise trap in rain forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA009145–0091457, 3♀); ..., Nakobolevu, 18°03'S, 178°25'E, 340 m, 24–29 Oct 2003, Malaise trap in rain forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA026027–026028, 2♀); ..., Nakobolevu, 4 km WSW Colo-i-Suva Village, 18.055°S, 178.424°E, 372 m, Malaise Trap, E.I. Schlinger & M. Tokota'a (FBA065233, 1♀); ..., Nakobolevu Peak, Radio Towers behind Suva, 18°03'S, 178°25'E, 460 m, 22 Sep–9 Oct 2002, Malaise trap in rain forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA009148, 1♀); ..., Navai, 17°37'S, 177°59'E, 700 m, 15 May–2 Jun 2003, Malaise trap in gymnosperm dominated rainforest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA041574, 1♀); ..., 24 Oct–8 Nov 2003, ... (FBA031660, 1♂); ..., 6 Jun–15 Jul 2003, ... (FBA029510–029511, 2♀); ..., 13–18 Feb 2003 (FBA039756–039757 2♀); ..., PABITRA wabu baseline survey, Delena Veikori, 17°35'S, 178°05'E, 1034 m, Malaise trap (FBA053145, 1 broken spm). **Vanua Levu:** Kilaka, 16°48'29.7"S, 178°59''11.0"E, 146 m, 3–10 Jun 2004, Malaise trap in lowland wet forest, M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA040284–040286, 1♂, 2♀); ..., 24 Jun–21 Jul 2004,... (FBA028298–028299, 2♀); ..., 16°48'41.2 "S, 178°59'01.7"E, 154 m, 28 Jun–2 Jul 2004 ... (FBA048289–048295, 2♂, 5♀); ..., 16°48'41.2"S 178°59'29.0"E, 98 m; ..., 3–10 Jul 2004, ... (FBA034818–034822, 2♂, 3♀); ..., Batigere Range, 6 km NW Kilaka, 16.7317°S, 178.9997°E, 113 m, 3–15 Jun 2004, Malaise trap, E.I. Schlinger & M. Tokota'a (FBA069147–069151, 5♀); ... 16.8057°S, 178.9914°E, 98 m, 15–24 Jun 2004, E.I. Schlinger & M. Tokota'a (FBA074678–074677, 074580–074581, 3♀, 1♂); ..., 16.1653°S, 178.9564°E, 140 m, 15–28 Jun 2004, E. I. Schlinger & M. Tokota'a (FBA072410–072411, 1♀, 1♂); ..., 16°31'89.1"S, 179°01'14.7"E, 105 m, Malaise trap in transition seasonal forest , M.E. Irwin, E.I. Schlinger & M. Tokota'a (FBA046796, 1♀); ..., 0.4 km S Rokosalase, 16.532°S, 179.019°E, 118 m, 23 Apr–8 May 2004, Malaise trap, E.I. Schlinger & M. Tokota'a (FBA066616, 1♀). Paratypes will be distributed to BMNH, BPBM, DBUSP, FNIC, and USNM.

Remarks. This is the most common *Mesochria*. Previously the most specimens collected of any *Mesochria* species was two. The species is very similar to *scottiana* and

medicorum and given that *medicorum* was bred from rotten banana fibre, these names all may apply to one common widespread variable species associated with banana.

Mesochria vulgaris with *scottiana*, *medicorum*, and *sylvatica*, forms a species group, as all are more or less uniformly brownish to yellowish, with unicolorous legs, and identical wing venation. *Mesochria sylvatica* and *vulgaris* differs from the other two by having the apical flagellomere white. Enderlein clearly described the antenna of *scottiana*, specifically mentioning the apical flagellomere, so one must assume it was dark as described. Edwards in his brief diagnosis of *medicorum* did not mention the antenna, but as he wrote "otherwise as in *scottiana*" and had access to a syntype of *scottiana*, again one must assume the antennae are entirely black. Stuckenberg does not describe the structure of the palps, merely the relative length of the last and penultimate palpomeres. Some species of *Mesochria* have the last segment tapering apically and with an apical bristle (Fig. 4). From Enderlein's description, this is the condition in *scottiana*, and, hence, one assumes also *medicorum*. The question is the condition in *sylvatica*. In summary, as one reads the original descriptions while examining specimens of *vulgaris*, one realizes all these species are very similar and what differences that can be found between the various description may be due to error or variation. So, the association with an agricultural plant, banana, which has been widely disseminated throughout the tropical areas where these species occur does suggest alternative hypothesis, one species, not a group of them.

Etymology. The epithet, *vulgaris*, an adjective, is used for this species due to its abundance.

CHECKLIST OF THE SPECIES OF *MESOCHRIA* ENDERLEIN

1. *Mesochria buxtoniana* Edwards, 1928a: 40. **Type-locality**: Samoa, Upolu, Malololelei. Holotype ♀ in BMNH, London.

Distribution: Samoa.

2. *Mesochria cinctipes* de Meijere, 1913: 322. **Type-locality**: Indonesia, Java, Djakarta. Holotype ♂ in ZMAN, Amsterdam.

Distribution: Java.

3. *Mesochria congoensis* Tollet, 1956: 29, fig. 11 (male genitalia, ventral view). **Type-locality**: Zaire, Kishangane [as "Stanleyville"]. Holotype ♂ MRAC, Tervueren.

Distribution: Zaire.

4. *Mesochria griveaudi* Stuckenberg, 1961: 128. **Type-locality**: Madagascar, Pèrinet (east-central montane forest zone). Holotype ♂ IRSM, Tananarive.

Distribution: Madagascar.

5. *Mesochria intermedia* Edwards, 1931: 491. **Type-locality**: Indonesia, Sabah [as "North Borneo"], Bettotan. Holotype♀ BMNH, London.

Distribution: Borneo.

6. *Mesochria medicorum* Edwards, 1928b: 26, fig. 6 (habitus). **Type-locality**: Ghana [as "Gold Coast"], Aburi. Holotype ♀ BMNH, London.

Distribution: Ghana.

7. *Mesochria neotropica* Grimaldi, 1991: 21, fig. 47 (habitus). **Type-locality**: Dominican Republic [amber, Oligocene / Miocene]. Holotype♀ AMNH, New York.

Distribution: Oligocene / Miocene. Dominican Republic [amber]

8. *Mesochria scottiana* Enderlein, 1910: 65, fig. 4 (wing). **Type-locality**: Seychelles Is.,

Mahé, Cascade Estate, 800–1500 ft. Syntypes 2♀ BMNH, London & PAN, Warsaw.

Distribution: Seychelles Is.

9. *Mesochria schlingeri* Thompson, n. sp. **Type-locality**: Fiji, Viti Levu, Sigatoka Prov., Sigatoka Sand Dunes National Park. Holotype ♂ FNIC, Suva.

Distribution: Fiji.

10. *Mesochria sylvatica* Stuckenberg, 1991: 126. **Type-locality**: Madagascar, Ambatolampy District, Ankaratra Massif, Vieille Forest, Manjakatompo Forest Station. Holotype ♀ IRSM, Tananarive.

Distribution: Madagascar.

11. *Mesochria vulgaris* Thompson, n. sp. **Type-locality**: Fiji, Taveuni, Devo Peak Radio Tower. Holotype ♂ FNIC, Suva.

Distribution: Fiji.

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New *Chrysopilus* Macquart (Diptera: Rhagionidae) from Fiji, with notes on described species

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Abstract. Two new species of *Chrysopilus* Macquart, *C. fijiensis,* **n**. **sp**., and *C. schlingeri,* **n**. **sp**. (Diptera: Rhagionidae) are described from Fiji with illustrations of the male and female heads, the wings, and male genitalia. Keys are provided to identify the species from Fiji.

INTRODUCTION

Specimens of the genus *Chrysopilus* Macquart (Diptera: Rhagionidae) have been studied as part of the NSF-funded Fiji Arthropod Survey. This material represents two species of *Chrysopilus* new to science. Historically, only one species of *Chrysopilus* has been described from Fiji, *Chrysopilus coeruleothorax* Lindner, based on a single female.

Thirty-two species of *Chrysopilus* have been described from the Australasian/ Oceanian Regions (Nagatomi & Evenhuis 1989). From the original descriptions of these species, none displayed a close similarity to the two new species from Fiji. Twenty-one species occur in Australia (Paramanov 1962) with only *Chrysopilus howei* Paramonov having a yellow body and patterned wings. *Chrysopilus howei* differs from the two new species from Fiji in being large (11 mm), the male eyes holoptic, and the wings with a brown spot at the bifurcation of R_{4+5} and the apex of the discal cell. Two species of *Chrysopilus* have been reported from New Caledonia (Nagatomi & Evenhuis 1989). Only *Chrysopilus androgynus* Paramonov has the male eyes dichoptic and is the same size as the new species from Fiji, but the wings are hyaline and without markings, the femora brown, and the abdomen lacks dark brown markings. No species of *Chrysopilus* have been described from Vanuatu, Tonga, the Samoan islands, or the Solomon Islands. Nine species of *Chrysopilus* have been described from Irian Jaya, Maluku, and Papua New Guinea. Most of these species are known only from only single locations and only *Chrysopilus ferruginous* (Wiedemann) is widely distributed in the Oriental and Australasian Regions. This is a large (9–11 mm), reddish yellow species, with clear wings and a dark brown pterostigma.

MATERIALS AND METHODS

Material was borrowed from the Bishop Museum, Honolulu (BPBM). Holotypes of new species will be deposited in the Fiji National Insect Collection, Suva (FNIC); paratypes will be vouchered in the FNIC, BPBM, and the Illinois Natural History Survey, Champaign , Illinois, USA.

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1. Contribution No. 2006-008 to the NSF-Fiji Arthropod Survey.

Morphological terminology follows McAlpine (1981). When more than one specimen was examined, lengths are given in parentheses as a range, followed by the mean. Ratios of the female frons are as follows: head/frons width, obtained by dividing the greatest width of the head by the narrowest width of the frons; width/length, obtained by dividing the narrowest width of the frons by the distance from the median ocellus to the dorsal edge of the antennal sockets. Setae described as elongate have a length equal to or greater than the width of the scape; those described as short have a length less than the width of the scape. All material examined is listed after the description and the depository collection is given within parentheses. Georeferences are cited as [latitudes/longitudes].

SYSTEMATICS

KEY TO SPECIES OF *CHRYSOPILUS* OF FIJI

1. Mesonotum with turquoise hue. Wing membrane hyaline. Halter brown .... **coeruleothorax** Lindner
–. Mesonotum dark yellow, glossy. Wing membrane pale brown with brown markings. Halter yellow 2

2. Wing (Fig. 3) with diffuse brown band from pterostigma to basal angle of R_4 and along apical margin of *dc*; pterostigma dark brown, diffuse, not extending to costa. Male abdomen dark yellow, glossy and tergites 2–7 dark reddish brown anterolaterally. The male eyes separated by distance greater than width of ocellar tubercle (Fig. 1). The gonostyle (Fig. 4) broad apically. Female abdomen dark yellow, glossy with anterior half of tergites 1–3 dark reddish brown, remaining tergites and terminalia entirely brown ..... **fijiensis** Webb, **n**. **sp**.
–. Wing (Fig. 8) with dark brown band from pterostigma to basal angle of R_4, along apical margin of *dc*, and along CuA_1; pterostigma dark brown, extending to costa. Male abdomen dark yellow, glossy and tergites 5–8 dark brown. The male eyes separated by distance less than width of ocellar tubercle (Fig. 6). The gonostyle (Fig. 9) pointed apically. Female abdomen dark yellow, glossy with tergites 4–9 and terminalia dark brown ..... **schlingeri** Webb, **n**. **sp**.

Chrysopilus coeruleothorax Lindner

Lindner (1925: 21) described *Chrysopilus coeruleothorax* based on a single female deposited in the Universität von Hamburg, Zoologisches Institut und Museum, Hamburg, Germany. The holotype female was destroyed by fire in 1943 (Dr. H. Struempel, pers. comm.). Translation of original description:

> This species stands out because of its wing venation with the conspicuously large R_3, because of the clearly setose arista and in the female the turquoise-blue mesonotum.
>
> Female: Occiput gray, frons and face brown-yellow, antenna yellow, small, with long setose arista. Palpus slightly up-curved, yellow. Proboscis brownish. Thorax brownish, mesonotum turquoise-blue. Like the scutellum with only a few dark, longer setae in between. Tarsi brownish, midtarsi with two apical spurs, hindtarsi with one apical spur and covered the whole length with small black setulae. Abdomen dirty brown, with broad,

dark-brown, front margins of the tergites; wing venation brown, wing transparent, iridescent, with dark-brown stigma in and around cavity of R_{2+3}. R_3 conspicuously big and broad. Inside beneath the stigma is a light, brownish shadow. Cu closed at the margin. Halter brown, with light stalk. 4.5 mm.

One female in Museum in Hamburg. Viti Levu.

Diagnosis. *Chrysopilus coeruleothorax* differs from *C. fijiensis* and *C. schlingeri* in having the mesonotum with a turquoise hue, the wing membrane hyaline, and the halter brown.

Chrysopilus fijiensis Webb, **new species**
(Figs. 1–5)

Etymology. *-ensis* (Latin) = a suffix denoting place, locality or country. This species is named after the country of Fiji from where all of the specimens have been collected. This name is treated as a noun in apposition.

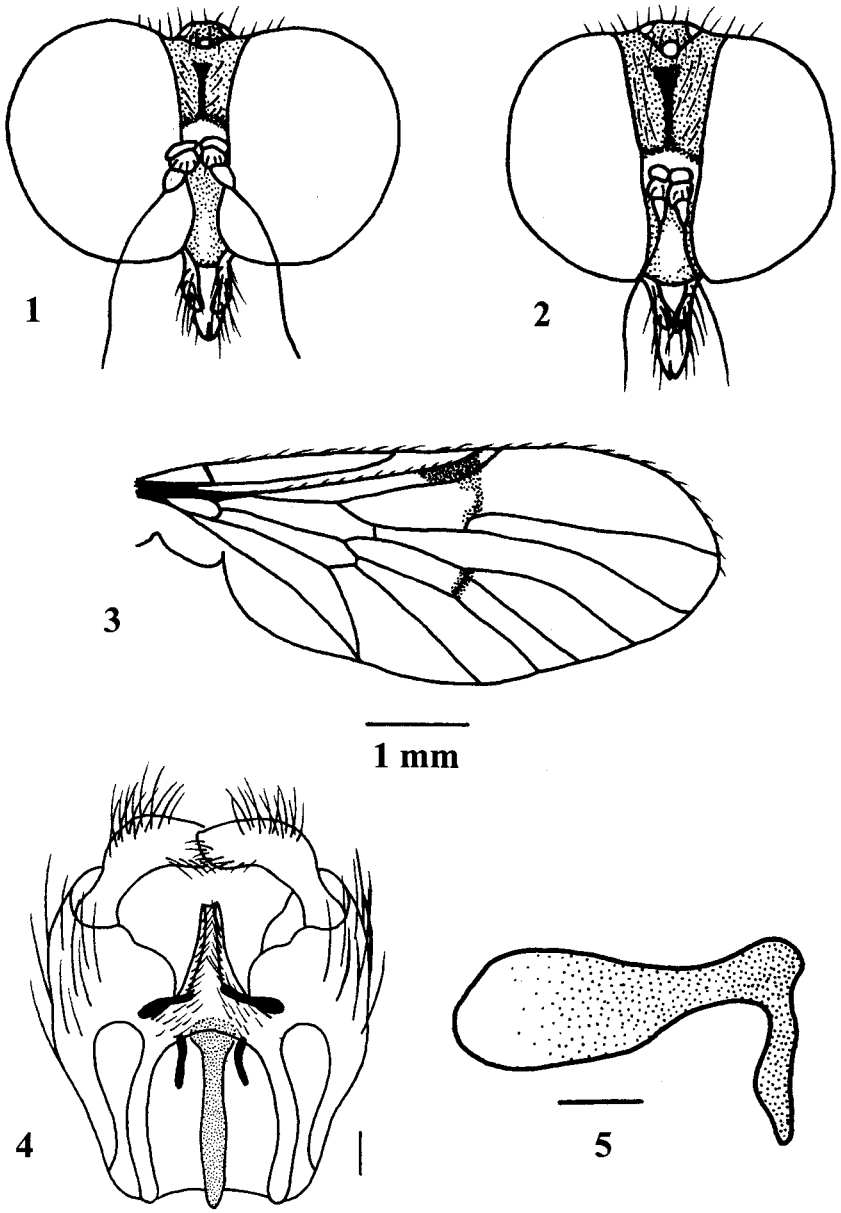
Diagnosis. *Chrysopilus fijiensis* is similar to *C. schlingeri* in having the thorax dark yellow and glossy. It differs from *C. schlingeri* in having the male eyes separated by a distance greater than the width of the ocellar tubercle; the wing (Fig. 3) pale brown, darker brown in narrow, diffuse band from pterostigma to basal angle of R_4 and along apical margin of *dc*, pterostigma dark brown, diffuse, not extending to costa; the male abdomen dark yellow, glossy and tergites 2–7 dark reddish brown anterolaterally; the gonostyle (Fig. 4) broad, rounded apically; the ejaculatory apodeme (Fig. 4) expanded posteriorly and in lateral view (Fig. 5) bent ventrally at 90° angle; and the female abdomen is dark yellow, glossy with the anterior margin of tergite 1 dark reddish brown, the anterior half of tergites 2–3 dark reddish brown and the remaining tergites and terminalia brown.

Male. Body length 3.3–4.5, 3.6 mm (n = 5).

Head. Ocellar tubercle dark brown, pruinescence yellowish brown, dense; setae black, short. Eyes dark brown; ommatidia of equal size; dichoptic (Fig. 1), separated by distance 0.9–1.6, 1.2 times width of ocellar tubercle. Frons pubescence brownish gray, dense, dark yellow dorsal of antennal base; median dorsoventral groove deep, dark brown; setae black. Antenna dark yellow, arista dark brown; scape shorter than pedicel and flagellum, wider than flagellum, setae absent; pedicel slightly wider than long, setae black, short; flagellum cone-shaped, tapered posteriorly to an elongate arista. Parafacial not visible. Clypeus dark yellow; setae absent. Maxillary palpus yellow, slightly clavate apically, about 4.0 times longer than wide; setae yellow with scattered apical dark brown setae. Genal setae yellowish brown, elongate. Occipital setae yellowish brown becoming sparse dorsally.

Thorax. Mesonotum dark yellow, glossy; vittae indistinct; setae dark brown, short with thicker dark brown, elongate setae on notopleuron, supraalar area, and postalar callus. Postpronotal lobe concolorous with mesonotum. Pleuron dark yellow, glossy; setae dark brown across dorsal margin of anepisternum, dark yellow across ventral margin of katepisternum and on anterior, middle and posterior tufts of laterotergite. Scutellum yellow; setae dark brown, short, erect with thicker dark brown setae across posterior margin. *Wing*. Length 4.2–4.7, 4.4 mm (n = 5). Membrane (Fig. 3) pale brown with diffuse brown band from pterostigma to basal angle of R_4 and along apical margin of *dc*; pterostigma dark brown, diffuse, not extending to costa. Cell r_4 with basal half narrow, dorsal half expanded, enclosing apex of wing; basal angle of R_4 right-angled; R_4 ends slightly anterior to apex of wing; *cup* closed. Halter dark yellow to yellowish brown. *Legs.* Dark yellow.

Abdomen. Dark yellow, glossy, tergite 1 with anterior margin brown, tergites 2–7 with broad



Figures 1–5. *Chrysopilus fijiensis.* **1.** Male head. **2.** Female head. **3.** Wing. **4.** Male gonocoxite. **5.** Male ejaculatory apodeme, lateral view. Scale 0.1 mm unless otherwise indicated.

anterolateral area dark reddish brown; dorsal setae dark reddish brown, short, appressed. *Terminalia*. Dark yellow. Gonostyle (Fig. 4) with apical margin broad, rounded. Ejaculatory apodeme (Fig. 4) expanded posteriorly, tapered to point anteriorly; lateral view (Fig. 5), anterior half expanded dorsoventrally, apical half narrow, bent ventrally at 90° angle.

Female. Similar to male except as follows.

Body length 3.2–4.8, 4.0 mm (n = 10).

Head. Vertex (Fig. 2) not emarginate lateral to ocellar tubercle. Head/frons width 4.3–5.6, 5.0 (n = 10); frons width/length 0.48–0.65, 0.56 (n = 10).

Thorax. *Wing*. Length 4.5–5.3, 4.8 mm (n = 10).

Abdomen. Tergite 1 dark yellow, glossy with anterior margin dark reddish brown; tergites 2–3 dark yellow with anterior half dark reddish brown; tergite 4 dark reddish brown; tergites 5–9 and terminalia pale brown.

Immature stages. Unknown.

Distribution. *Chrysopilus fijiensis* is recorded from the Fiji islands of Taveuni and Viti Levu.

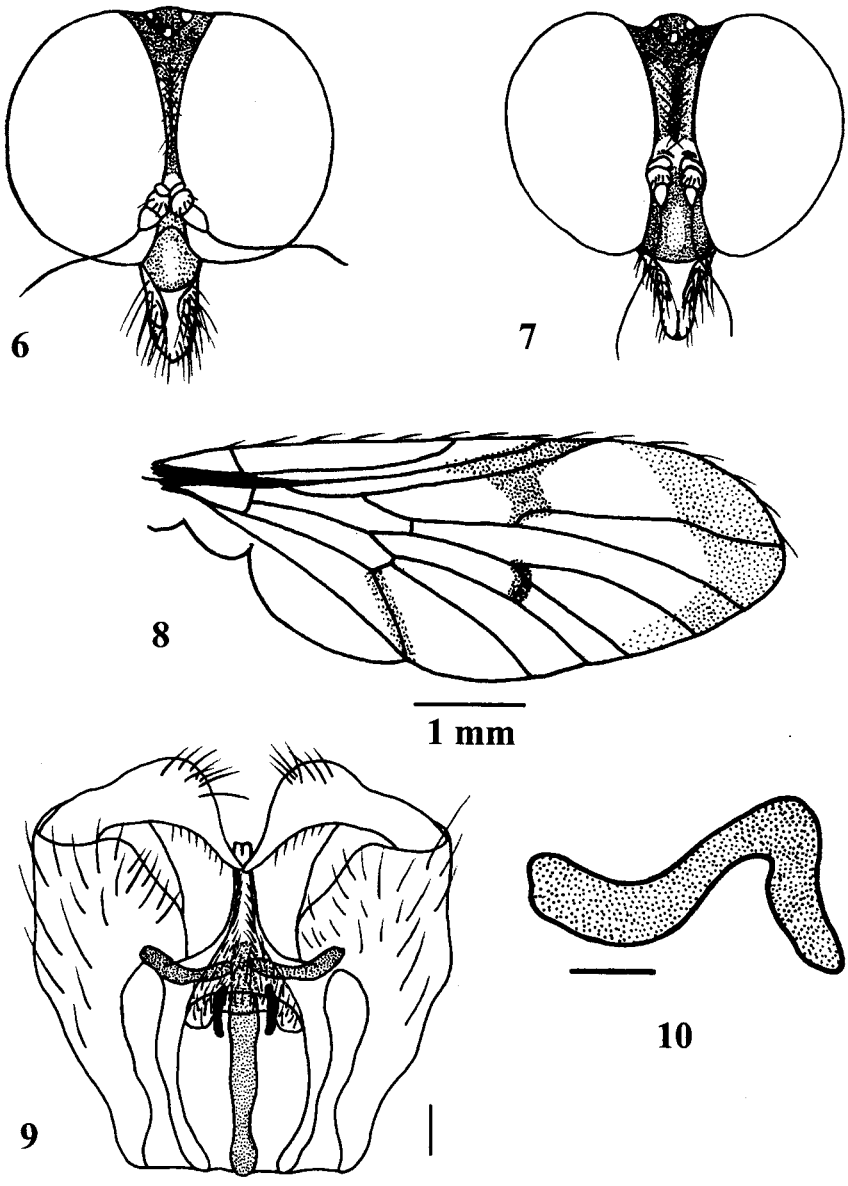
Temporal Phenology. *Chrysopilus fijiensis* has been collected in Malaise traps in November, December, and January.

Type specimens. The holotype ♂ of *Chrysopilus fijiensis* is labeled "FIJI, Taveuni Isl., Cakaudrove Prov., Devo Forest Reserve, 3.I–10.I.2003, FJ-9 malaise, M. Irwin, E. Schlinger, M. Tokota'a, 179°59'E, 16°50'S, 800 m, FBA042905" and will be deposited in FNIC. *Paratypes*: FIJI. **Taveuni:** 1♂,1♀, Devo Forest Reserve, -16.85, 179.9667, 800 m, 14–21 Nov 2002, Irwin, M.E., Schlinger E.I., Tokota'a M., Malaise (FBA005828–005829); 1♀, same data except: 10–16 Jan 2003, Irwin, M.E., Schlinger E.I., Tokota'a M., Malaise (FBA041333); 1♂,1♀, Devo Peak Radio Tower, -16.85, 179.9667, 1200 m, 21 Nov–13 Dec 2002, Irwin, M.E., Schlinger, E.I., Tokota'a, M., Malaise (FBA005825–005826); 1♀, same data except: 13–20 Dec 2002, Irwin, M.E., Schlinger, E.I., Tokota'a, M, Malaise (FBA019793); 2♀, same data except: 20–27 Dec 2002, Irwin, M.E., Schlinger E.I., Tokota'a M., Malaise (FBA005830–005831). **Viti Levu:** 1♂,8♀, Koroyanitu National Heritage Park, Savuione Trail, -17.667, 177.55, 800 m, 12–19 Dec 2002, Schlinger, E.I., Tokota'a, M., Malaise (FBA090001–090005, 090007–090010); 7♀, Koroyanitu National Heritage Park, Savuione Trail, -17.667, 177.55, 450 m, 12–19 Nov 2002 Irwin, M.E., Schlinger, E.I., Tokota'a, M., Malaise in montane forest (FBA005818–005824); 2♀, Koroyanitu National Heritage Park, 1 km E Abaca Village, Savuione Trail, -17.667, 177.55, 800 m, 7–12 Oct 2002, Schlinger, E.I., Tokota'a, M., Malaise (FBA081711–081712); 1♀, same data except: 12–19 Oct 2002, Schlinger, E.I., Tokota'a, M., Malaise (FBA083761); 1♂,1♀, same data except: 19–26 Oct 2002, Schlinger, E.I., Tokota'a, M., Malaise (FBA088613); 1♂,1♀, 26 Oct–5 Nov 2002, Schlinger, E.I., Tokota'a, M., Malaise (FBA083154).

Chrysopilus schlingeri Webb, **new species**
(Figs. 6–10)

Etymology. This species is named in honor of Evert I. Schlinger for his support and development of the Fiji Terrestrial Arthropod Survey.

Diagnosis. *Chrysopilus schlingeri* is similar to *C. fijiensis* in having the thorax dark yellow and glossy. It differs from *C. fijiensis* in having the male eyes separated by a distance less than the width of the ocellar tubercle, wing (Fig. 8) pale brown, darker brown apically and in band from pterostigma to basal angle of R_4, along apical margin of *dc*, and along CuA_1; pterostigma dark brown, extending to costa; male abdomen dark yellow,



Figures 6–10. *Chrysopilus schlingeri.* **6.** Male head. **7.** Female head. **8.** Wing. **9.** Male gonocoxite. **10.** Male ejaculatory apodeme, lateral view. Scale 0.1 mm unless otherwise indicated.

glossy and tergites 5–8 dark brown; the gonostyle (Fig. 9) pointed apically; the ejaculatory apodeme (Fig. 9) not expanded posteriorly and in lateral view (Fig. 10) cylindrical, sinuate; and in the female the abdomen is dark yellow, glossy with tergites 4–9 and terminalia dark brown.

Male. Body length 4.2–6.2, 5.0 mm (n = 7).

Head (Fig. 6). Ocellar tubercle dark brown, pruinescence yellowish brown; not raised above level of vertex; setae black, moderately long. Eyes dark brown; glabrous; ommatidia of equal size; dichoptic, separated by distance 0.5–0.9, 0.7 (n = 7) times width of ocellar tubercle. Frons dark brown, pubescence pale brown, dark yellow ventrally; diverging dorsally; setae black, elongate. Antenna dark yellowish brown to pale brown; scape quadrate, shorter than pedicel and flagellum, narrower than width of flagellum, setae absent; pedicel quadrate, length subequal to width, setae black, short; flagellum cone-shaped, tapered posteriorly with elongate arista, length subequal to width, longer than scape, subequal in length to pedicel. Parafacial not visible. Clypeus dark reddish brown, glossy; setae absent. Maxillary palpus brown, cylindrical, slightly clavate apically; about 3.0 times longer than wide; setae dark brown, elongate. Genal setae white, elongate. Occipital setae white, becoming sparse dorsally.

Thorax. Mesonotum dark yellow, glossy; vittae indistinct; setae dark brown, short with thicker, dark brown setae on notopleuron, supraalar area, postalar callus, and scattered anteriorly on mesonotum. Postpronotal lobe concolorous with mesonotum, setae dark brown, short. Pleuron dark yellow, glossy; setae dark brown across dorsal margin of anepisternum, yellow across ventral margin of katepisternum, and varying from dark yellow to brown on anterior, middle and posterior tufts on laterotergite. Scutellum pale brown, posterior margin yellow; setae dark brown, short, erect with numerous thicker dark brown setae across posterior margin. *Wing.* Length 4.6–6.2, 5.3 mm (n = 6) mm. Membrane (Fig. 8) pale brown, slightly darker apically, brown band from pterostigma to basal angle of R_4, along apical margin of *dc*, and along CuA_1; pterostigma dark brown, extending to costa. Cell r_4 narrow, elongate, expanded posteriorly, enclosing apex of wing; basal angle of R_4 right-angled; R_4 ends slightly anterior to apex of wing. Cell *cup* closed. Halter pale yellowish brown. *Legs.* Dark yellow, glossy; coxal setae yellow intermixed with dark brown setae.

Abdomen. Dark yellow, glossy, tergites 5–8 dark brown (occasionally some dark brown markings on tergite 4); dorsal setae dark brown, short, appressed. *Terminalia.* Dark brown. Gonostyle (Fig. 9) tapered apically to point. Ejaculatory apodeme (Fig. 9) narrow, cylindrical, not expanded posteriorly; lateral view (Fig. 10) cylindrical, sinuate.

Female. Similar to male except as follows.

Body length 4.0–5.7, 4.9 mm (n = 10).

Head (Fig. 7). Vertex (Fig.) slightly emarginate lateral to ocellar tubercle. Head/frons width 5.2–12.2, 8.4 (n = 10); frons width/length 0.20–0.52, 0.32 (n = 10).

Thorax. *Wing.* Length 5.0–6.7 mm, 5.9 mm (n = 10).

Abdomen. Dark yellow, glossy, tergites 4–9 and terminalia dark brown.

Immature stages. Unknown.

Distribution. *Chrysopilus schlingeri* is recorded from the Fiji islands of Taveuni and Vanua Levu.

Temporal Phenology. *Chrysopilus schlingeri* has been collected in Malaise traps from June–August and October–December.

Type specimens. The holotype ♂ of *Chrysopilus schlingeri* is labeled "FIJI, Vanua Levu Island, Bua Prov., 6 km NW Kilaka, 3.VI–15.VI.[20]04, Batiqere Range, Malaise, 113m, Schlinger, Tokota'a, -16.7317, 178.9997, FJVN58c_M02_06, FBA069281" and will be deposited in FNIC. *Paratypes*: Same data as holotype, 2♂, 1♀ (FBA069278–069280). FIJI: **Vanua Levu:** Kilaka, -16.80, 178.9833, 146 m, 3–10 June 2004, Irwin, M.E., Schlinger, E.I., Tokota'a, M., 1♂ (FBA040923), Malaise; 1♀, same data

except: 28 June–2 July 2004, Irwin, M.E., Schlinger, E.I., Tokota'a, M. (FBA041333), Malaise. **Taveuni:** Devo Forest Reserve, -16.85, 179.9667, 800m, 3–10 Jan 2003, Irwin, M.E., Schlinger, E.I., Tokota'a, M., 2♂,1♀ (FBA042903–042904, 042906), Malaise; 5♀, same data except: 10–16 Jan 2003, Irwin, M.E., Schlinger, E.I., Tokota'a, M. (FBA041331–041332, 041334–041336); Devo Peak Radio Tower, -16.85, 179.9667, 1200m, 2–10 Oct 2002, Irwin, M.E., Schlinger E.I., Tokota'a, M., 1♂ (FBA021453), Malaise; 1♀, same data except:21 Nov–13 Dec 2002, Irwin, M.E., Schlinger, E.I., Tokota'a, M. (FBA005827); 3♀, same data except:13–20 Dec 2002, Irwin, M.E., Schlinger, E.I., Tokota'a, M. (FBA019791–019792, 019794); Tavuki Village, Mt Devo, -16.831 -179.88, 30 June–14 Aug 2004, Schlinger, E.I., Tokota'a, M., 1♂ (FBA071223), Malaise; 5.3 km SE Tavuki Village, Mt Devo, -16.841 -179.9678, 31 Oct–14 Nov 2002, Schlinger, E.I., Tokota'a, M., 1♀ (FBA089391), Malaise.

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The Genus *Mesoleptogaster* Frey in Fiji (Diptera: Asilidae: Leptogastrinae)[1,2]

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Abstract. Four new species of the leptogastrine asilid genus *Mesoleptogaster: M. levusara,* **n. sp**., *M. loaloa,* **n. sp.,** *M. meriel,* **n. sp. ,** and *M. vitiensis*, **n. sp.** are described and illustrated. The previously only known Fijian leptogastrine, *Leptogaster pacifica* Bezzi, is transferred to *Mesoleptogaster* (as *Mesoleptogaster pacifica*, **n. comb**.) and the male terminalia described for the first time. With the addition of these four new species there are currently five leptogastrines known from the Fiji Islands.

INTRODUCTION

Leptogastrines, or grass flies, are nearly cosmopolitan with an abundance of species from tropical regions including oceanic islands. Adults inhabit grasslands, hence their common name, as well as the undergrowths of forests where they prey on mostly small soft-bodied invertebrates. The leptogastrines are easily distinguished from other Fijian asilids by the absence of pulvilli and an alula and by the long thin abdomen and legs, the hind femora of which are commonly swollen apically. In this respect, they are very wasp-like in appearance, yet no known cases of mimicry with an identified model have been recorded from Fiji.

Only one species of Leptogastrinae had been previously described from Fiji: *Leptogaster pacifica* Bezzi (1928) from Ovalau and Viti Levu. Examination of that species as well as a number of others from the Melanesian region by Torsten Dikow (as part of his worldwide study of Leptogastrinae) and by myself during this study, shows that the leptogastrine species from Fiji all belong to the genus *Mesoleptogaster* Frey.

This study, based primarily on the extensive Malaise trap collections of the Schlinger Fiji Bioinventory of Arthropods (FBA) and the NSF-Fiji Terrestrial Arthropod project (NSF) and supplemented by hand collections by others, records four new species of the genus *Mesoleptogaster* Frey and transfers *L. pacifica* to *Mesoleptogaster*, bringing the total number of species of the genus in Fiji to five.

MATERIALS AND METHODS

Specimens in this study derive primarily from collecting and trapping conducted by the FBA and NSF projects, types and voucher specimens of which will be deposited in the Fiji National Insect Collection, Suva (FNIC). Where series numbers permit, paratypes and duplicates are deposited in the Bishop Museum, Honolulu (BPBM) and the Natural History Museum, London (BMNH). Descriptive terminology follows that of McAlpine

1. Contribution No. 2006-009 to the NSF-Fiji Arthropod Survey.
2. Contribution No. 2006-006 to the Pacific Biological Survey.

(1981) and Dikow (2003).

SYSTEMATICS

Mesoleptogaster Frey

Leptogaster (*Mesoleptogaster*) Frey, 1937: 39. Type species: *Leptogaster fuscatipennis* Frey, 1937, by original designation.
Mesoleptogaster Frey. Hsia, 1949: 45. Hull, 1962: 302. Oldroyd, 1975: 104. Lehr, 1988: 270.

Mesoleptogaster was originally described as a subgenus of *Leptogaster* by Frey (1937) but further study by Hsia (1949) prompted his raising it to generic status. This was followed by Hull (1962), Oldroyd (1975), and Lehr (1988). Dikow (in prep.) has corroborated its treatment as a full genus, which is followed here.

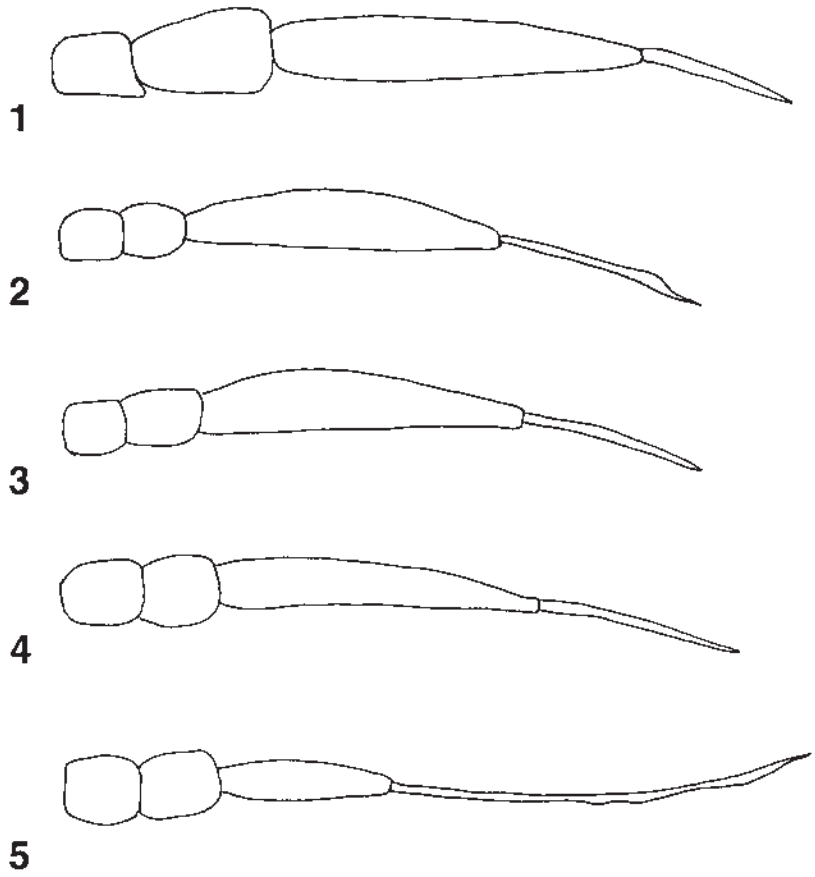
Frey (1937) separated *Mesoleptogaster* from *Leptogaster s. str*. by the following characters: hind tibia with row of more or less strong setae on its outer (lateral) surface and the first flagellomere four times longer than wide. Hsia (1949) further distinguished *Mesoleptogaster* from *Leptogaster s. str*. by the following characters: first antennal flagellomere spindle shaped, almost tapering to a point, longer than scape and pedicel combined; style shorter than first flagellomere; wing narrow, cubital branches short, convergent, or parallel, cells narrowly open at wing margin; legs slender, hind tibia with row of more or less strong bristles on external (posterolateral) surface. Hull (1962) added that species had a polished mesonotum. Except for style length (some in Fiji are longer than the first flagellomere), Hsia's characters seem to hold up fairly well in separating species of *Mesoleptogaster* and related genera, such as *Lobus* Martin, found in the Melanesian region. Hull's addition of the polished mesonotum holds for most species, but one new species described here has a distinctly matte mesonotum, not polished; otherwise it has all the salient characters of the genus.

All *Mesoleptogaster* from Fiji thus far known are endemic, although one species (*M. meriel*, sp. nov.) fits with a complex of species in the Papuan/Malesian region with similar wing venation and microtrichial wing pattern typified by *Leptogaster trifasciata* (de Meijere) from Java, New Guinea, and the Philippines. Further study including comparisons of male genitalia (outside the scope of this Fiji study) may show that *trifasciata* and related species still placed in *Leptogaster s. lat.* need to be transferred to *Mesoleptogaster*.

Key to Species of *Mesoleptogaster* Frey of Fiji

1. Mesonotum matte, not polished, with admedian vittae ...(Viti Levu) .... **levusara** Evenhuis, **n. sp**.
–. Mesonotum polished yellowish brown, brown, or black, without vittae 2
•
2. Wing completely smoky yellowish brown to brown (Fig. 7) ... (Viti Levu) .... **loaloa** Evenhuis, **n.sp**.
–. Wing predominantly hyaline, infuscation restricted to tip of wing 3

3. Antennal scape and pedicel black; cell cup open narrowly at wing margin, much narrower in width than cell r4 at wing margin (Fig. 9); wing tip patch of microtrichia narrow at tip or imperceptible; hind femora black ... (Ovalau, Viti Levu) ..... **pacifica** Bezzi
–. Antennal scape and pedicel yellow to orange, not black; cell cup subequal in width at wing margin to cell r4 (cf. Fig. 8); wing tip patch of microtrichia as a narrow strip or triangles, distinctly more extensive than above; hind femora tan to

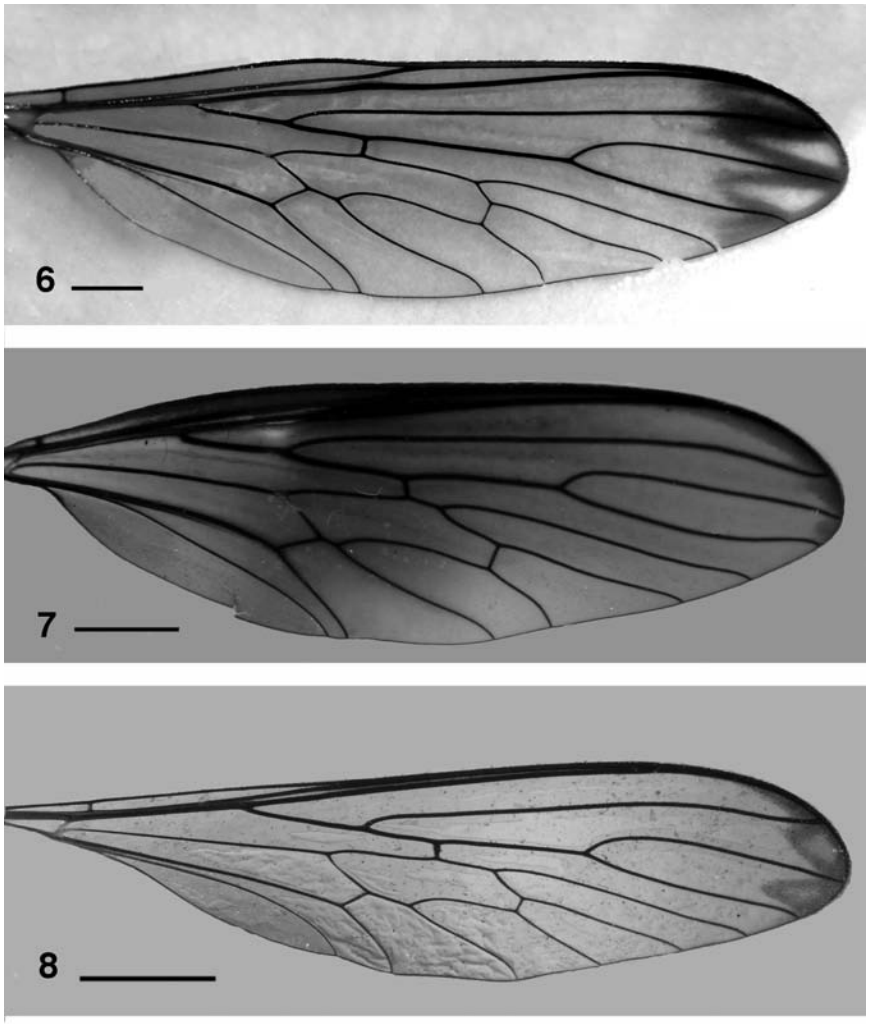


Figures 1–5. *Mesoleptogaster* antennae, diagrammatic, not to scale, to show comparative shapes. **1**. *M. levusara*. **2**. *M. loaloa*. **3**. *M. meriel*. **4**. *M. pacifica*. **5**. *M. vitiensis*.

brown, with or without subapical band 4

4. Wing tip infuscated, forming triangles of infuscation (Fig. 8); hind femora with subapical brown band; antennal style shorter than flagellomere; male second sternite without minute sclerite in fenestra (Fig. 11) ... (Viti Levu, Gau, Taveuni, Vanua Levu) ..... **meriel** Evenhuis, **n. sp**.

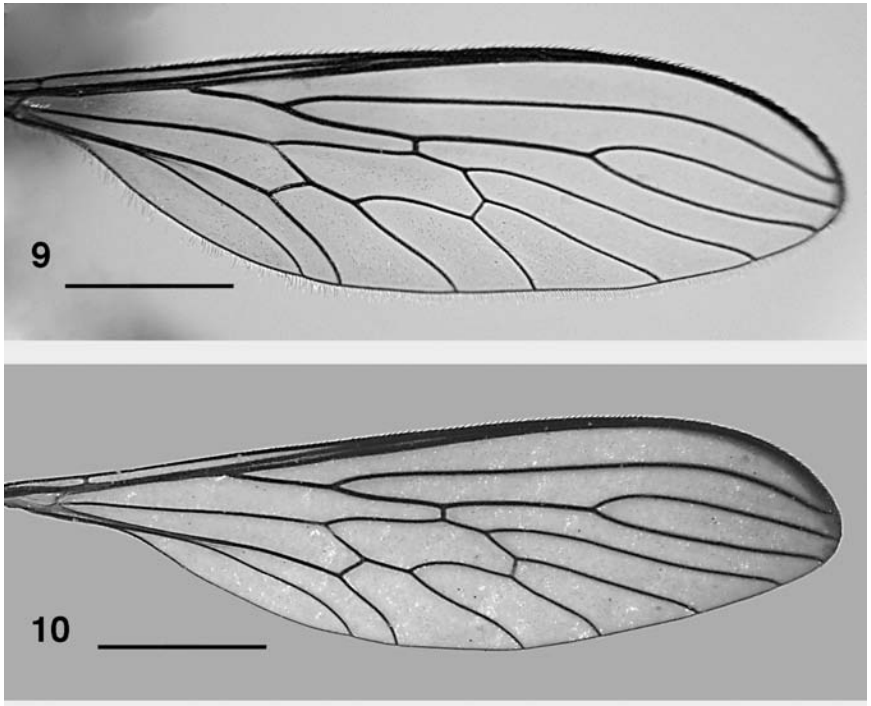
–. Wing tip narrowly infuscated, not forming triangles (Fig. 10); hind femora without subapical brown band; antennal style much longer than flagellomere; male second sternite often with minute heart-shaped sclerite in fenestra (Fig. 12) ... (Viti Levu [including Macuta I], Vanua Levu, Taveuni, Yasawa, Kadavu, Lakeba) ..... **vitiensis** Evenhuis, **n. sp**.



Figures 6–8. *Mesoleptogaster* wings. **6**. *M. levusara*. **7**. *M. loaloa*. **8**. *M. meriel*. Scale = 1.0 mm.

Mesoleptogaster levusara Evenhuis, **new species**
(Figs. 1, 6)

Diagnosis: *Mesoleptogaster levusara* is easily distinguished from the congeners in Fiji by its generally large size (greater than 15 mm), thick abdomen (girth much thinner in the other Fijian species) and its matte mesonotum dorsally (mesonotum polished in other Fijian species). The swollen costal cell (Fig. 6) is similar to that found in *loaloa*, n.sp., but



Figures 9–10. *Mesoleptogaster* wings. **9**. *M. pacifica* Bezzi. **10**. *M. vitiensis*. Scale = 1.0 mm.

it is separated from it by the more clear wing (the wing smoky black in *loaloa*), and the matte brownish body coloration (black in *loaloa*).

Description: Lengths: body: 17.2 mm; wing 12.0 mm. *Head*: Black; face golden brown pruinose; proboscis dark brown with short white hairs apically; palpus dark brown, setae white basally dark brown apically; ocellar tubercle black, scattered brown pruinose; occiput gray pruinose below, golden brown pruinose above, post ocular setae yellowish brown above, white hairs laterally. Antenna (Fig. 1) with scape and pedicel yellowish with brown setae, pedicel ca. 2 times length of pedicel; first flagellomere yellowish brown on basal 1/3, remainder brown; style 1/3 length of flagellomere, brown.

Thorax: Matte brown, gray pruinose, mesoscutum with pair of admedian tan vittae converging in prescutellar area; notopleural margin and pleura gray to silver pruinose; dorsocentral setae minute, restricted to anterodorsal and prescutellar areas; 1 notopleural seta, 1 supraalar seta; scutellum tan pruinose, scutellar setae black. Halter stem yellowish white to white, knob grayish brown.

Legs: Coxae concolorous with pleura, gray pruinose; femora generally orange-colored, polished; hind femur swollen apically, with row of dense minute pale hairs ventrally, with brown streak laterally interrupted subapically by orange band; fore and mid tibia orange, pale yellow stripe anteriorly; hind tibia orange to black, with rows of 10 small spines along entire posterior surface, dense yellow hairs ventroapically; tarsi orange to brown, setae black; empodium distinct, 5/8 length of claws.

Wing (Fig. 6): Yellowish brown colored with microtrichae apically forming triangles of infuscation in cells r1, r2+3, r4, and r5, triangles in upper 3 cells with whitish color medially; r-m crossvein at basal one-third of cell d; M_3 beyond crossvein m-m much shorter than M_3 before crossvein; R_{2+3} almost straight to wing margin, only slightly bent at apex; cell cup narrowly open in wing margin, width less than opening of cell r4 at wing margin; anal lobe relatively broad basally, not reduced (cf. Figs. 6, 8).

Abdomen: Brown; tergites predominantly brown, anterior and posterolateral margins yellowish, brown pruinose, tergites II–VII with yellow transverse subapical and apical gray-brown transverse band; tergite I with yellow hairs along posterior margin; tergite II without setae; tergites III–IV with scattered minute black hairs; tergites V–VIII with admixture of yellow and black hairs dorsally and laterally; sternites grayish yellow pruinose, setae yellow.

Genitalia: Not dissected.

Types: Holotype ♀ from FIJI: **Viti Levu**: Koroyanitu National Heritage Park, Savuione Trail, 1 km E. Abaca Village, 800 m, 21 Oct–18 Nov 2003, 17°40'S 177°33'E, Malaise, L. Tuimereke (FBA505001). Holotype to be deposited in FNIC. Known only from the holotype female.

Etymology: The specific epithet derives from the Fijian *levu sara* = "very large, huge", referring to the large size (17 mm). It is one of the largest species in the genus.

Mesoleptogaster loaloa Evenhuis, **new species**
(Figs. 2, 7)

Diagnosis: *Mesoleptogaster loaloa* is easily distinguished from the congeners in Fiji by the all smoky brown wing (wing predominantly hyaline in all other species). Additionally, like *levusara*, n. sp., cell cup is narrowly open in the wing margin, less than the width of cell r4 at the wing margin (cell cup is more widely open in other Fijian species of the genus). It is separated from *levusara* by the smoky brown wing.

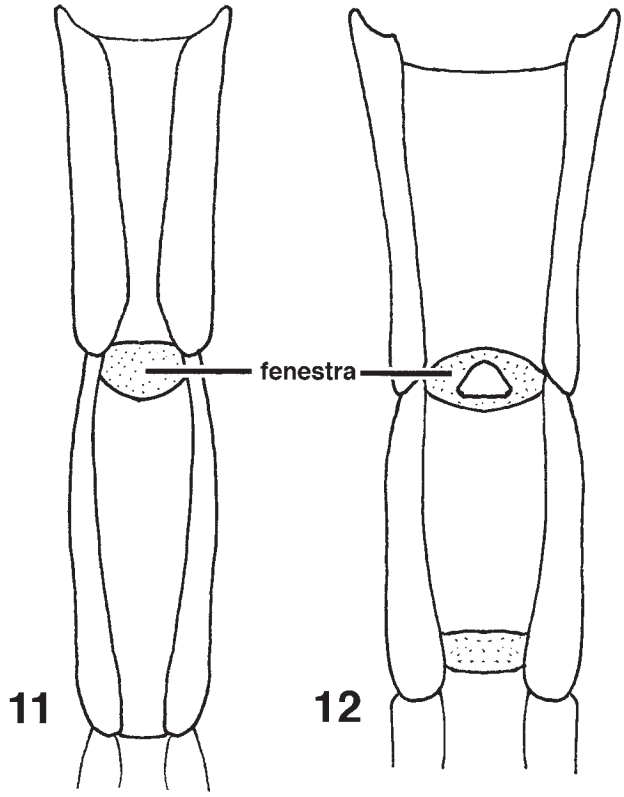
Description: Lengths: body: 8.5 mm; wing 8.0 mm. *Head*: Black; face gray pruinose; proboscis black with short white hairs apically; palpus black with white hairs; ocellar tubercle black, golden brown pruinose; occiput dense gray tomentose and pruinose, post ocular setae and hairs white. Antenna (Fig. 2) black, scape and pedicel with black setae; style 1/2 length of flagellomere.

Thorax: Mesoscutum polished black, gray pruinose laterally, brown pruinose in prescutellar area; notopleural margin gray pruinose; pleura brown, gray pruinose on upper half, brown pruinose on lower half; dorsocentral setae minute, brown, restricted to anterodorsal and prescutellar areas; 1 notopleural seta, 1 supraalar seta; scutellum densely gray pruinose, scutellar setae long, black. Halter dark brown.

Legs: Fore coxa tan, mid coxa brown, hind coxa black, all polished with sparse white to yellow pruinosity; hind femur slightly swollen apically, with row of short pale hairs ventrally on basal 2/3; fore and mid tibia brown, tan stripe anteriorly; hind tibia brown, black apically, with rows of 12 short black spines along entire posterior surface, dense orange-yellow hairs ventroapically; basitarsi orange basally, black apically; remainder of tarsi black, setae black; empodium distinct, 1/2 length of claws.

Wing (Fig. 7): Brown colored with microtrichae restricted to extreme apex of cells r1, r2+3, and r4; r-m crossvein beyond middle of cell d; R_{2+3} almost straight to wing margin, only slightly bent at apex; cell cup narrowly open in wing margin, width less than opening of cell r4 at wing margin; anal lobe relatively broad basally, not reduced (cf. Figs. 6, 10).

Abdomen: Black; posterior margin of tergites II–IV gray; tergite I with long, black hairs along posterolateral margin; tergites II–VII with patch of white hairs posterolaterally; tergites VIII with black hairs; sternite I polished black, bare; sternites II–VII dark brown, grayish pruinose with scattered white hairs.



Figures 11–12. *Mesoleptogaster* male abdominal sternites I–II, diagrammatic, not to scale, showing fenestra of sternite II. **11**. *M. meriel*, n. sp. **12**. *M. vitiensis*, n. sp.

Genitalia: Not dissected.

Types: Holotype ♀ from FIJI: **Viti Levu**: Koroyanitu National Heritage Park, Savuione Trail, 1 km E. Abaca Village, 800 m, 21 Oct–18 Nov 2003, 17°40'S 177°33'E, Malaise, L. Tuimereke (FBA049321). Holotype to be deposited in FNIC. Known only from the holotype female.

Etymology: The specific epithet derives from the Fijian *loaloa* = "black", referring to the overall black color of the species and dark smoky wing.

Mesoleptogaster meriel Evenhuis, **new species**
(Figs. 3, 8, 11, 13, 16)

Diagnosis: *Mesoleptogaster meriel* is easily distinguished from the congeners in Fiji by the presence of dark dense microtrichia forming infuscated triangles at the tip of the wing (Fig. 2) [the wing is virtually hyaline in *M. pacifica* (Fig. 3)] and the brown subapical band on the swollen portion of the hind femora. The species is similar to the Javanese and

Philippine species, *Mesoleptogaster trimaculata* (de Meijere) and can be separated from it and most other species from the Melanesian islands by the lack of a triangular pattern of microtrichia in cell r5 (this patterned area is present in these other species).

Description: Lengths: body: 9.5–13.5 mm; wing 6.5–8.0 mm. *Head*: Black; face sparse brown pruinose; proboscis dark brown with short white hairs apically; palpus pale brown with white hairs; ocellar tubercle black, scattered brown pruinose posteriorly; occiput densely grayish white pruinose, post ocular setae yellowish above, white hairs laterally. Antenna (Fig. 3) with scape and pedicel yellowish, latter with brown setae, flagellomere short, black, slightly longer than length of scape and pedicel together; style long, thin, black, 2.5 times length of flagellomere.

Thorax: Polished brown, gray pruinose in prescutellar area; notopleural margin yellowish pruinose; pleura light brown with golden pruinosity; dorsocentral setae minute, yellowish; 1 notopleural seta, 1 supraalar seta; scutellum small (overlapped by prescutellar area), brown, brown pruinose, scutellar setae minute, black. Halter yellowish.

Legs: Coxae pale yellow, mid coxa with brown basally, all yellowish pruinose; fore and mid femora brown, polished, yellow apically, with whitish yellow stripe anteriorly; hind femur swollen apically, with row of small pale hairs ventrally, orange to yellow with subapical brown band; fore and mid tibia pale yellowish brown with whitish stripe anteriorly; hind tibia brown with rows of 7–10 small spines along entire posterior surface, row of yellow hairs ventrally, densest ventroapically; fore and mid tarsi yellowish, setae brown, hind basitarsi yellow basally, dark brown apically, remainder of hind tarsi brownish yellow, setae black; claws black; empodium distinct, 5/8 length of claws.

Wing (Fig. 8): Subhyaline with microtrichae apically forming triangles of infuscation in cells r1, r2+3, and r4, triangles in r2+3 and r4 with grayish to whitish color medially; r-m crossvein beyond middle of cell d; M_3 beyond crossvein m-m subequal in length to M_3 before crossvein m-m; R_{2+3} almost straight to wing margin, only slightly bent at apex; cell cup broadly open in wing margin, width subequal to opening of cell r4 at wing margin; anal lobe reduced basally.

Abdomen: Brown, subshining except basal half of tergite II and all of tergites III–IV polished, dorsum generally bare except scattered minute black hairs, golden yellow hairs laterally and lateroventrally; tergite I yellow basally, black apically; tergite II black basally, brown apically; tergites II–IV brown; tergites V–VIII dark brown to black, blackest on VII–VIII; sternites brown, yellow apically, setae golden yellow; fenestra of sternite II (Fig. 11) without minute sclerite.

Male genitalia (Figs. 13, 16): Surstylus with dorsal lobe long, thin, tapering to acute apex, darkly sclerotized on apical 2/3; ventral lobe long, thin, spatulate, yellowish with brown medially. Proctiger hemispherical, dark brown. Hypandrium relatively large, subrectangular, yellowish with medial brown spot, caudal margin with darkly sclerotized pointed projection at posterolateral corner.

Types: Holotype ♂ from FIJI: **Taveuni**: road to Devo Peak, ca. 680 m, 24 Jan 2006, 16°49'38.8"S, 179°58'57.3"W, swept from grass, S. Gaimari, N. Evenhuis, J. Skevington, M. Tokota'a. *Paratypes*: FIJI: **Gau**: 4♂, 4♀, 4.0 km SE Navukailagi Village, Mt. Delaco, 496 m, 17.98°S, 177.275°E, 29 Jan–7 Mar 2005, 19 Apr–2 May 2005, 2 –14 May 2005, 3–19 Aug 2005, 19–31 Aug 2005, 13–26 Sep 2005, Malaise, U. Racule (FBA505919, 504923–504925, 504945, 504949, 504952); **Taveuni**: 1♀, Tavuki village, Mt. Devo 892 m, 16.837°S, 179.973°W, 29 Nov 2004–14 Jan 2005, Malaise, P. Vodo (FBA504928); 1♂, 5.5 km SE Tavuki village, Devo Peak, 1188 m, 16.843°S, 179.956°W, 14–28 Jan 2005, Malaise, P. Vodo (FBA504922). **Vanua Levu**: 4♂, 2♀, 0.4 km S Rokosalase Village, 118 m, 16.532°S, 179.019°E, 31 Aug–14 Sep 2004, 5–29 Jan 2005, Malaise, I. Sakealevu (FBA504927, 504940–504944); 1♀, 1? [tip of abdomen broken off], same data except: 0.3 km S, 94 m, 29 Jan–7 Mar 2005, 14–31 Aug 2005 (FBA504929, 504934); 1♂, 2♀, same data except: 0.5 km S, 97 m, 27 Dec 2004–5 Jan 2005, 5–29 Jan 2005, 29 Jan–7 Mar 2005 (FBA504926, 504946, 504948); 4♂, 7♀, same data except: 0.6 km S, 150 m, 14–31 Aug 2004, 14–28 Sep 2004, 28 Sep–15 Nov 2004, 15 Nov–9 Dec 2004, 29 Jan–7 Mar 2005

(FBA504915–504916, 504921, 504931, 504935–504939, 504950–504951). **Viti Levu**: 1♂, 4 km WNW Colo-i-Suva village, Mt. Nakobolevu, 325 m, 18.056°S, 178.422°E, 4 Sep 12 Oct 2004, Malaise, Timoci leg. (FBA504917); 3♂, 13♀, Navai, 700 m, 17°37'S 177°39'E, 6 Jun–15 Jul 2003, 24 Oct–8 Nov 2003, 9–20 Dec 2003, 3 Feb–16 Mar 2005, Malaise, E. Namatalau (FBA002944, 029211, 032263–032267, 036407, 031537, 037175–037179, 504932–504933); 1♀, 1.8 km E Navai village, old trail, Mt. Tomaniivi, 700 m, 17.521°S 177.998°E, 23 Sep–18 Oct 2004, Malaise, E. Namalatau (FBA504953); 5♀, Koroyanitu National Heritage Park, Savuione Trail, 1 km E. Abaca Village, 800 m, 12–19 Oct 2002, 21 Oct–18 Nov 2003, 8 Oct–2 Nov 2004, 17°40'S 177°33'E, Malaise, L. Tuimereke (FBA006900, 049324–049325, 049327, 504918); 1♂, 4 km NW Lami Town, Mt. Korobaba, 260 m, 18.104°S, 178.381°E, 1–13 Dec 2004, K. Koto (FBA504930). Holotype to be deposited in FNIC. Paratypes in BPBM, FNIC, and BMNH.

Observations. After being captured and placed alive in a vial for observation, the holotype exhibited a curious habit of a posture much like a "hand-stand" with its head directed downward and its abdomen directed straight upward as it cleaned the abdomen with its hind legs. It initiated this behavior frequently whenever it was disturbed.

Etymology: This species is named for Meriel Grace Genevieve Olson. She has been a diplomat for the project, building trust and support within communities to facilitate the survey. The name is treated as a noun in apposition.

Mesoleptogaster pacifica Bezzi, 1928, **new combination**
(Figs. 4, 9, 14, 17)

Leptogaster pacifica Bezzi, 1928: 41. Daniels, 1989: 349.

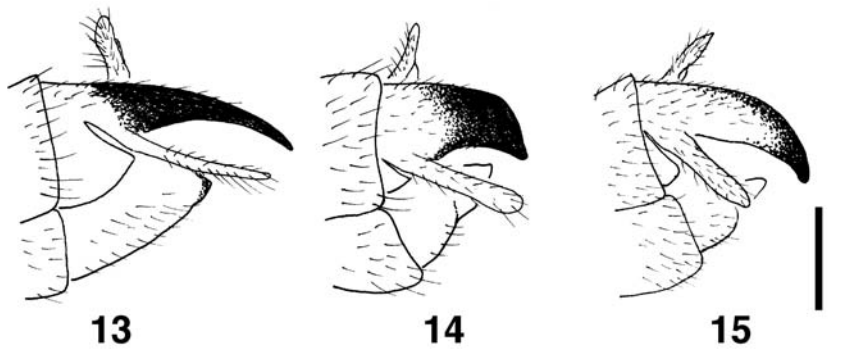
Mesoleptogaster pacifica was originally described by Bezzi (1928) based on two females: one from Ovalau and one from Viti Levu. The species is easily separated from the other species of the genus in Fiji by the all black antennae, predominantly black body color, and extremely reduced areas of microtrichia apically (or absent altogether) in the wing. Bezzi's (1928) description is detailed and accurate and serves to easily characterize the species. The antennae (Fig. 4) and wing (Fig. 9) are illustrated here for comparison with the other Fijian species and to further aid in identification. The salient characters of the male genitalia are here described and illustrated for the first time.

Male genitalia (Figs. 14, 17): Surstylus with dorsal lobe broadly lanceolate, black, bent inwards distally; ventral lobe long, thin, yellow, rounded apically. Proctiger bifid, dark brown with whitish apices. Hypandrium small, subhemispherical, brown, black apically, polished.

Material Examined: FIJI: **Viti Levu**: 1♀, Koroyanitu National Heritage Park, Savuione Trail, 1 km E. Abaca Village, 800 m, 21 Oct–18 Nov 2003, 17°40'S 177°33'E, Malaise, L. Tuimereke (FBA049322); 1♀, same data except: 21 Oct–7 Nov 2002 (FBA 006950); 1♀, 4 km NW Lami Town, Mt. Korobaba, 400 m, 1–13 Dec 2004, Malaise, K. Koto (FBA504955); 1? [tip of abdomen broken off], 1.1 km SSW Volivoli Village, Sigatoka Sand Dunes, 55 m, 18.159°S 177.485°E, 29 Apr–27 Aug 2004, Malaise, S. Niusoria (FBA504954); 1♀, 4 km WNW Colo-i-Suva Village, Mt. Nakobolevu, 18.057°S, 177.42°E, 24 Sep–12 Oct 2004, Malaise, Timoci (FBA504956).

Discussion: I here transfer *Leptogaster pacifica* to the genus *Mesoleptogaster* based on its possessing short hairs on the hind femur and having male genitalia that are characteristic of species in the genus. It is a bit ironic that the only species of the genus described by Bezzi (1928) is one of the rarest found in this study of hundreds of specimens from many of the islands.

Distribution: Restricted to Viti Levu and Ovalau.



Figures 13–15. *Mesoleptogaster* male terminalia, lateral view. **13**. *M. meriel*. **14**. *M. pacifica*. **15**. *M. vitiensis*. Scale = 0.5 mm.

Mesoleptogaster vitiensis Evenhuis, **sp. nov**.
(Figs. 5, 10, 12, 15, 18)

Diagnosis: *Mesoleptogaster vitiensis* is closest to *M. meriel*, but is easily distinguished from it by the microtrichia forming a narrow infuscation at the tip (this infuscation forming triangles in *meriel*), the lack of a subapical brown band on the hind femora (present in *meriel*) and the presence of a minute sclerite in the membranous area of the anterior portion of sternite II (this minute sclerite absent in *meriel*) (cf. Figs. 11–12). It is also generally one of the smallest species in Fiji (ca. 4–9 mm in length).

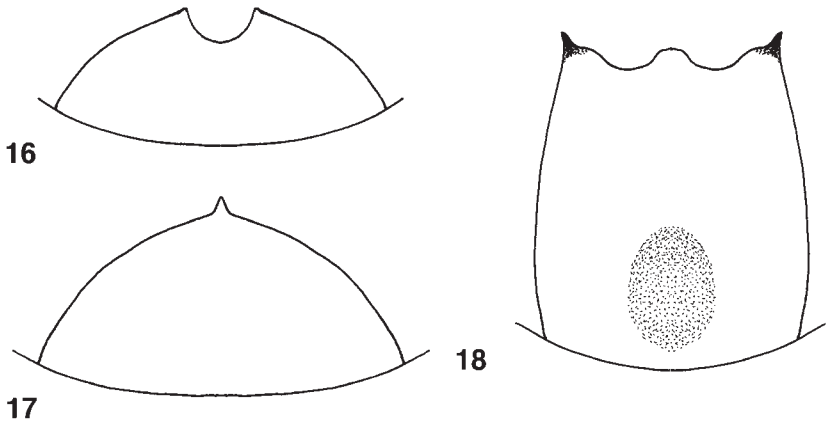
Description: Lengths: body: 4.1–9.3 mm; wing 3.0–6.2 mm. *Head*: Black; face golden brown pruinose; proboscis yellowish brown with short white hairs apically; palpus yellowish brown, setae white; ocellar tubercle black, sparse brown pruinose posteriorly; occiput gray pruinose, post ocular setae yellowish white, hairlike. Antenna (Fig. 5) with scape and pedicel yellowish with yellowish white setae, flagellomere brown; style subequal in length to flagellomere.

Thorax: Polished brown, gray pruinose in prescutellar area; notopleural margin yellowish pruinose; pleura brown, scattered white pruinose above; dorsocentral setae minute, yellowish; 1 notopleural seta, 1 supraalar seta; scutellum reddish brown, scutellar setae small, brown. Halter yellowish white.

Legs: Coxae yellowish, yellowish pruinose; remainder of legs yellowish orange, polished; hind femur swollen apically, with row of dense minute pale hairs ventrally; hind tibia with rows of 6–8 small spines along entire posterior surface, dense yellow hairs ventroapically; empodium distinct, 5/8 length of claws.

Wing (Fig. 10): Subhyaline with microtrichae restricted to extreme apex of cells r1, r2+3, and r4; r-m crossvein beyond middle of cell d; M_3 beyond crossvein m-m subequal in length to M_3 before crossvein m-m; R_{2+3} downcurved on distal one-third; width of cell cup opening in wing margin subequal in width to that of cell r4 at wing margin; anal lobe reduced basally.

Abdomen: Brown; tergites predominantly brown, anterior and posterolateral margins yellowish, brownish pruinose, golden yellow hairs laterally and ventrolaterally; tergites III–VII with whitish transverse apical band; tergite I with yellow hairs along posterior margin; tergite II without setae; ter-



Figures 16–18. *Mesoleptogaster* male hypandria, diagrammatic, not to scale, ventral view. **16**. *M. meriel*, n. sp. **17**. *M. pacifica* Bezzi. **18**. *M. vitiensis*, n. sp.

gites II–VIII with scattered minute black hairs; sternites brown, grayish yellow pruinose, with yellow hairs; fenestra of sternite II (Fig. 12) with small rounded or heart-shaped sclerite .

Male genitalia (Figs. 14, 18): Surstylus with dorsal lobe broadly lanceolate, bent inwards distally, darkly sclerotized apically. Proctiger subrectangular, flared apically with whitish apices. Hypandrium subshining, yellow, small, subhemispherical with roundish concavity posteromedially.

Types: Holotype ♂ from FIJI: **Vanua Levu**: [S of Rokosalase Village, ca. 90 m], 14–28 Sep 2004, Malaise, I. Sakealevu (FBA 504908). *Paratypes*: FIJI: **Kadavu**: 2♀, 1.3 km E Kadavu Air Strip nr. Namalata Village, 120 m, 19.05°S, 179.159°E, 5 Sep–18 Sep 2004, 18 Sep 2004–11 Jan 2005, Malaise, M. Reece (FBA504899, 504910); 1♀, same data except: 130 m, 19.05°S 179.157°E, 8 Jul–10 Aug 2004 (FBA504901); 1? [tip of abdomen broken off], same data except: 100 m, 19.058°S 179.159°E, 5–18 Sep 2004 (FBA504900); 10♂♀, Solodamu, 128 m, 19°04'S 178°07'E, 25.viii–23.x.2003, Malaise in coastal limestone forest (FBA014613–014619, 010803, 016844–016845); 1♀, 1? [tip of abdomen broken off] Namalata, 100 m, 19°02'54.1"S 178°11'05.8"E, 15–28 Jul 2004, (FBA031743–031744); 1♂, 2♀, same data except: 150 m, 19°02'55.8"S 178°11'02.1"E, 15–28 Jul 2004 (FBA 031948–031950). **Lakeba**: 1♂, Lakeba, 3.2 km NE Tubou Village, 100 m, 18.229°S 178.867°E, 8–20 Aug 2005, Malaise, D. Gaubaleinayau (FBA504957). **Taveuni**: 1? [tip of abdomen broken off], 3.2 km NW Lavena Village, Mt. Koronibuabua, 220 m, 16.856°S 179.880°W, 31 Jul–13 Aug 2004, Malaise, E. Soroalau (FBA504912); 1♀, Koronibuabua, 233 m, 16°51'28.3"S 179°53'43.6"W, 24 Sep–19 Nov 2003, Malaise in rainforest, E. Soroalau (FBA 022573); 3♂, 4♀, Taveuni Estate, 140 m, 16°50'S 179°59'E, 10–17 Oct 2002, Malaise in garden, E. Ratu (FBA051674–051677, 051680–051682). **Vanua Levu**: 3♀, 0.3 km S Rokosalase Village, 94 m, 16.531°S 179.019°E, 28 Sep–15 Nov 2004, 20 Jan–7 Mar 2005, Malaise, I. Sakealevu (FBA504903–504904, 504911); 2♀, same data except: 0.6 km S, 180 m, 16.333°S 179.018°E, 15 Nov–9 Dec 2004, 5–20 Jan 2005 (FBA504907, FBA504909); 2♂, same data except: 0.4 km S, 118m, 16.532°S 179.019°E, 5–29 Jan 2005 (FBA504913–504914). **Viti Levu**: 1♂, 2♀, Navai Village, 700 m, 15 Jun–2 Jul 2003, 13–18 Feb 2004, E. Namatalau (FBA039538, 041748–041749); 3♂, Koroyanitu Eco Park, 1 km E Abaca Village, 800 m, 17.557°S 177.55°E, 5 Jul–9 Aug 2004, 9–23 Aug 2004, Malaise, L. Tuimereke (FBA504902, 504904–504905); 1♀, same data except, 450 m, 28

Sep–18 Oct 2003, (FBA049327); 1♀, 8 mi. up Sigatoka Valley, 6 Aug 1972, D.E. Hardy (BPBM). Macuata I (offshore island on northwest coast): 2♀, 4 m, 17.353°S 178.033°E, 26 Jun–8 Jul 2005, Malaise in dryland forest, V. Tavualevu (FBA504997–504998); 1♀, same data except 8–20 Jul 2005 (FBA504999); 1♀, same data except: 10 m, 17.354°S 178.033°E, 26 Jun–8 Jul 2005 (FBA505000). **Yasawa Group** (Yasawa I): 2♂, 1♀, 2 km SE Nabukeru Village, Yawasa-i-Lau Cave, 16°50'13.4"S 177°26'42"E, 10–24 Aug 2005, 7–21 Sep 2005, 21 Sep–3 Oct 2005, Malaise in dry forest, J. Veibete (FBA505808–505810). Holotype to be deposited in FNIC. Paratypes in BPBM, BMNH, and FNIC.

Discussion: The mesonotum can vary in coloration from translucent pale tan (muscle bundles can be seen through the cuticle) to brown with a dark brown pattern medially. Abdominal coloration varies from pale brown to dark brown, but the banding pattern is consistent among specimens examined.

Etymology: The species epithet derives from the Fijian "*viti*" = Fiji; referring to the type locality of Fiji.

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