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Monograph

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A revision of *Parapterogramma* Papp and *Pseudopterogramma* Papp, with a review of the *Parapterogramma* genus group of the Pacific and Indomalayan regions (Diptera, Sphaeroceridae, Limosiniinae)

Gregory K. KUWAHARA ^{1,*}, Stephen A. MARSHALL ² & Stephen P.L. LUK ³

^{1,2,3}University of Guelph Insect Collection and Insect Systematics Laboratory, School of Environmental Sciences, University of Guelph, Guelph, Ontario, N1G 2W1, Canada.

*Corresponding author: gkuwahar@gmail.com

²Email: samarsha@uoguelph.ca

³Email: stephen.pl.luk@gmail.com

¹[urn:lsid:zoobank.org:author:2E2D313F-7249-4F76-AF5D-615516840188](https://zoobank.org/urn:lsid:zoobank.org:author:2E2D313F-7249-4F76-AF5D-615516840188)

²[urn:lsid:zoobank.org:author:6C1C1C9E-365F-48BF-B8C7-31163EC5F3A7](https://zoobank.org/urn:lsid:zoobank.org:author:6C1C1C9E-365F-48BF-B8C7-31163EC5F3A7)

³[urn:lsid:zoobank.org:author:AD749672-730E-456D-8722-0AB36C96C530](https://zoobank.org/urn:lsid:zoobank.org:author:AD749672-730E-456D-8722-0AB36C96C530)

Abstract. The “*Pterogramma*-like” genera of the Pacific and Indomalayan regions (*Archipterogrammoides* Papp, 2008, *Minialula* Papp, 2008, *Parapterogramma* Papp, 2008, *Pseudopterogramma* Papp, 2008, *Pterogrammoides* Papp, 2008) are reviewed and treated as a monophyletic group of three genera, here referred to as the *Parapterogramma* genus group. The following 13 new *Parapterogramma* and three new *Pseudopterogramma* species are described: *Pa. bicolor* sp. nov. (Fiji), *Pa. dentatum* sp. nov. (Papua New Guinea), *Pa. digitisternum* sp. nov. (Australia), *Pa. gonitellum* sp. nov. (Australia), *Pa. hieroglyphicum* sp. nov. (Fiji, New Caledonia), *Pa. magnum* sp. nov. (Australia), *Pa. matau* sp. nov. (Fiji), *Pa. ofienseis* sp. nov. (Papua New Guinea), *Pa. peckorum* sp. nov. (Fiji), *Pa. pollex* sp. nov. (Fiji), *Pa. pugioformis* sp. nov. (Australia, Papua New Guinea), *Pa. simplex* sp. nov. (Fiji), *Pa. tokotaai* sp. nov. (Fiji), *Ps. fijiensis* sp. nov. (Fiji), *Ps. kasut* sp. nov. (Indonesia, Singapore), and *Ps. ketambensis* sp. nov. (Indonesia, Malaysia). *Archipterogrammoides* is treated as a new junior synonym of *Pseudopterogramma*, resulting in the following new combinations: *Pseudopterogramma aestivale* (Richards, 1973) comb. nov., *Pseudopterogramma deemingi* (Richards, 1973) comb. nov., and *Pseudopterogramma metatarsalis* (Papp, 2008) comb. nov. *Minialula* is treated as a new junior synonym of *Parapterogramma*, resulting in the following new combinations: *Parapterogramma poeciloptera* (Papp, 2008) comb. nov., *Parapterogramma continentalis* (Hayashi, 2013) comb. nov., and *Parapterogramma tropicalis* (Hayashi, 2013) comb. nov. A key to the species of the *Parapterogramma* genus group is provided.

Keywords. *Minialula*, *Pterogrammoides*, *Archipterogrammoides*, Australia, Fiji.

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Introduction

In his monograph describing 25 new genera of “Old World” Limosininae, Papp (2008) described the four similar genera *Archipterogrammoides* Papp, 2008, *Minialula* Papp, 2008, *Parapterogramma* Papp, 2008, and *Pseudopterogramma* Papp, 2008. As indicated by some of the generic names, these genera superficially resemble *Pterogramma* Spuler, 1924 because of their characteristically patterned wings with a very short R_{2+3} . *Pterogramma*, however, is a New World genus characterized by a single orbital bristle in contrast to the plesiomorphic paired orbitals found in similar Indomalayan and Pacific taxa. Furthermore, *Pterogramma* belongs in a clade of several Neotropical genera characterized by the distinctive apomorphy of an additional lobe between the right side of the epandrium and the hypandrium. The *Pterogramma*-like genera referred to here as the *Parapterogramma* genus group have two orbital bristles (though reduced in *Pterogrammoides*) and lack the additional epandrial lobe that characterizes *Pterogramma* and related Neotropical genera. We here review the taxonomic history of the *Parapterogramma* genus group, provide new generic diagnoses and revise the species of *Parapterogramma* and *Pseudopterogramma*.

The genera included in the *Parapterogramma* genus group share the following diagnostic characters: CS2 very short ($0.4\text{--}0.6 \times \text{CS3}$); R_{2+3} short; R_{4+5} usually upcurved, ending before wing tip; wings usually lightly but distinctly patterned; orbital bristles in two pairs (those of *Pterogrammoides* are strongly reduced); dorsocentral bristles in two large pairs, anterior pair $0.6\text{--}0.8 \times$ length of posterior pair and located near suture; basiphallus usually large, often as large as or larger than distiphallus; distiphallus stout, boxy, inflated without much internal structure (i.e. “empty”). With the exception of the two orbital bristles, all of these characters are arguably synapomorphic for the group. Females of all included genera except *Pseudopterogramma* have a strongly reduced epiproct and a largely membranous hypoproct.

Most collections of these genera are from rainforests, usually near water (streams, waterfalls, lakeshores, etc.). Most specimens were taken in traps baited with dung, fungus, or carrion, but some were collected via flight intercept traps, Malaise traps, or sweep-netting. The larval habits of the genera in the *Parapterogramma* genus group are unknown, though they likely occur in high-microbe environments such as dung, as is typical of most sphaerocerids (Marshall & Richards 1987).

Genera included in the *Parapterogramma* genus group

Parapterogramma

Papp (2008) described *Parapterogramma* for a single species from Thailand, *Pa. asiaticum* Papp, 2008, naming it for its similarity to *Pterogramma*. We here describe 13 new species of *Parapterogramma* and redefine the genus to include the three species formerly placed in *Minialula* (see discussion below).

Pseudopterogramma

As noted by Roháček *et al.* (2001), the Pacific and Indomalayan species catalogued by Roháček *et al.* (2001) as “*Pterogramma*” were placed in *Pterogramma* on an interim basis because “*a new genus is being described for these species (Marshall & Smith, in manuscript)*”. Smith & Marshall (2004) further characterized that group of species as the “*conicum* group” pending formal description of the genus in a later paper. Papp (2008) described part of the same group as a new genus, *Pseudopterogramma*, including a new species, *Ps. siamense* Papp, 2008 from Thailand and the Papua New Guinean/Indonesian species *Ps. insulare*, which Smith & Marshall (2004) had explicitly treated as part of the *conicum* group. Papp (2008) ignored other species in the “*conicum* group” beyond briefly stating that “*Leptocera (Poecilosomella) conica* Richards, 1946 (*Pacific Islands, New Guinea*) may belong here”. Marshall *et al.* (2011) treated *Ps. annectens* (Richards, 1964), *Ps. brevivenosum* (Tenorio, 1967), and

Ps. conicum as *Pseudopterogramma* and we here confirm the placement of *Ps. aestivale* (Richards, 1973) and *Ps. deemingi* (Richards, 1973) in the same genus. We here describe three new species of *Pseudopterogramma* and redefine the genus to include *Archipterogrammoides metatarsalis* Papp, 2008 (see discussion below).

Pterogrammoides

Papp (1972) described the new genus *Pterogrammoides* for three new species of short-winged, terricolous sphaerocerids from New Guinea; he later added two new species from India and Thailand (Papp 1989). *Pterogrammoides* differs from other genera in the *Parapterogramma* genus group by its reduced wing, apically pointed postpedicel, and mid tibial chaetotaxy consisting of a single anterodorsal proximal bristle and a single dorsal distal bristle. However, *Pterogrammoides* shares many probable synapomorphies with the other members of the *Parapterogramma* genus group, including the large anterior dorsocentral bristles, short R_{2+3} , large basiphallus, large globose distiphallus, strongly reduced female epiproct, and strongly reduced female hypoproct.

Minialula

The genus *Minialula* was originally described for a single species, *M. poeciloptera* Papp, 2008 from Taiwan. Hayashi (2011) recorded this species from Japan, and later described two new species of *Minialula* from southeast Asia (Hayashi, 2013). In his description of *Parapterogramma*, Papp (2008) noted that “*Cephalic and mesonotal patterns [of Parapterogramma] are similar to those of Minialula and some structure of their male genitalia (e.g. short postgonites) show similarities. However, I think the differences found in the male and female genitalia are enough to serve as a base for separating them as different genera.*” Indeed, *Minialula* and *Parapterogramma* share many synapomorphies, including the characteristic silver-gold microtomentum on the head, additional small dorsal bristles on the proximal half of the mid tibia, anterior dorsocentral bristles arising just behind the suture, strongly curved R_{4+5} , short first segment of R_{4+5} (shorter than or equal to distance between crossveins), strongly patterned wings including a pale spot on r-m, bilobed surstylus usually with a larger anterior lobe, short postgonites, and basiphallus with a well-developed epiphallus. The apparent differences in the male and female genitalia referred to by Papp (2008) are inadequate to exclude *Minialula* from *Parapterogramma*, given the diversity in genitalic characters of the latter genus (which now includes 17 species). Instead, we consider the synapomorphies for the three species described in *Minialula* (four dorsal bristles on the proximal half of the mid tibia, costa ending at R_{4+5} , male S6 with a setulose posteromedial knob, V-shaped surstylus with an elongate, bare, anteroventral lobe, and postgonite with a deep, rounded posteroventral lobe flanked by triangular lobes) to be synapomorphies for a group within *Parapterogramma* and we consider *Minialula* to be a synonym of *Parapterogramma*.

Archipterogrammoides

Papp (2008) described *Archipterogrammoides* for a single species, *A. metatarsalis* Papp, 2008 from Thailand, noting that “*Archipterogrammoides and Pterogrammoides may belong to a monophyletic group*”. While *A. metatarsalis* resembles most species of *Pterogrammoides* in having a rounded surstylus with a thick ventromedial seta, several synapomorphies – in fact all of the synapomorphies we now recognize for *Pseudopterogramma* (long and sinuate postgonite, large basiphallus roughly half the length of the distiphallus, distiphallus composed of many well-developed sclerites) – characterize both *A. metatarsalis* and the other species we now treat as *Pseudopterogramma*. *Archipterogrammoides metatarsalis* differs from typical *Pseudopterogramma* in having the postpedicel conical apically, the surstylus stout with a tooth-like apical seta, and the female epiproct and hypoproct strongly reduced. These features, however, are arguably autapomorphic for *A. metatarsalis* and thus do not exclude it from *Pseudopterogramma*. We therefore consider *Archipterogrammoides* to be a synonym of *Pseudopterogramma*.

Old World Pterogramma-like genera excluded from the Parapterogramma genus group

Afropterogramma

The monotypic African genus *Afropterogramma* Papp, 2008 superficially resembles some *Parapterogramma* genus group species in having patterned wings and a short R_{2+3} , but *Afropterogramma minor* Papp, 2008 lacks anterior dorsocentral bristles and does not have the posterior proximal mid tibial bristle that characterizes *Parapterogramma* genus group species. Additionally, the male fifth sternite of *Af. minor* is armed with many thickened setae (as opposed to the relatively bare S5s of *Parapterogramma* genus group species), the female sternites are narrow, and the female cerci have several long but thick setae.

Biconnecta

As noted above, *Pterogramma* and several related Neotropical genera, including *Aptilotella* Duda, 1924, *Archiceroptera* Papp, 1977, *Bitheca* Marshall, 1987, *Bromeoloecia* Spuler, 1924, and *Robustagramma* Marshall & Cui, 2005 are characterized by an epandrium with the right anteroventral corner drawn out into a finger-like process that extends to the hypandrium, giving a second connection between the right side of the epandrium and the hypandrium. One of the 25 Old World genera described by Papp (2008) was named as the new monotypic genus *Biconnecta* because it has a similar epandrial structure, which Papp considered unique although his description corresponds to the structure discussed and illustrated for Neotropical genera by Smith & Marshall (2004). Papp's description of *Biconnecta*, based on a single male specimen from India in the Hungarian Natural History Museum (not examined in person, but a photo of the holotype was sent to us by Petra Szöllösi-Tóth of HNHM), is inadequate to exclude the possibility that it is actually a species of *Pterogramma*. The single pair of dorsocentral bristles, short and rounded surstylus, and ventrally-projecting cercus exclude *Biconnecta* from the *Parapterogramma* genus group.

Material and methods

Terminology and techniques, including specimen preparation, illustration, measurements, and abbreviations are as in Kuwahara & Marshall (2022) except that wing photographs were taken using a Nikon D300S camera mounted on a Nikon Labophot-2 compound microscope. The habitus illustration in Fig. 1 was done by SPL, genitalic illustrations in other figures were done by GKK. The following alpha-3 code acronyms are used in the species key: AUS (Australia); COK (Cook Islands); FJI (Fiji); FSM (Micronesia); GUM (Guam); IDN (Indonesia); IND (India); JPN (Japan); MYS (Malaysia); NPL (Nepal); PHL (Philippines); PLW (Palau); PNG (Papua New Guinea); PYF (French Polynesia); SGP (Singapore); SLB (Solomon Islands); THA (Thailand); TON (Tonga); USA (United States of America [Hawaii]); VNM (Vietnam); WSM (Samoa).

Specimen deposition

Specimens examined or referred to are deposited in the following institutions:

- AMSA = Australian Museum, Sydney, New South Wales, Australia
- ANIC = Australian National Insect Collection, Canberra, Australian Capital Territory, Australia
- BMNH = Natural History Museum, London, England, United Kingdom
- BPBM = Bernice Pauahi Bishop Museum, Honolulu, O'ahu, Hawaii, USA
- CAS = California Academy of Sciences, San Francisco, California, USA
- CNCI = Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada
- DEBU = School of Environmental Sciences, University of Guelph, Guelph, Ontario, Canada
- HNHM = Hungarian Natural History Museum, Budapest, Hungary
- LKCNHM = Lee Kong Chian Natural History Museum, National University of Singapore, Singapore

- NIID = Reference Museum, Department of Medical Entomology, National Institute of Infectious Diseases, Tokyo, Japan
QMBA = Queensland Museum, South Brisbane, Queensland, Australia
ROME = Royal Ontario Museum, Toronto, Ontario, Canada
UPLB = University of the Philippines Los Baños, Los Baños, Laguna, Philippines
USNM = National Museum of Natural History, Washington, District of Columbia, USA



Fig. 1. *Pseudopterogramma fijiensis* sp. nov., male habitus (DEBU).

Results

Systematic part

Class Insecta Linnaeus, 1758
Order Diptera Linnaeus, 1758
Superfamily Sphaeroceroidea Macquart, 1835
Family Sphaeroceridae Macquart, 1835
Subfamily **Limosiniinae** Macquart, 1835

Key to species of the *Pterogramma*-like genera of the Pacific and Indomalayan regions

Couplets for the *Pterogrammoides* species are modified from, or quoted directly from, Papp (1989). Couplets for the *Parapterogramma* species originally described as *Minialula* are based on Hayashi (2013).

1. Mid tibia with a single dorsal bristle on distal half (as in Fig. 70A). Orbital bristles very small and fine (Fig. 70B). Wing long and narrow, crossveins in basal third of wing (Figs 70C, 72C). Abdominal sclerites strongly reduced or absent 2 (*Pterogrammoides* Papp, 2008)
 - Mid tibia with at least two dorsal bristles on distal half (as in Fig. 25A). Orbital bristles strong. Wing broad and ovoid, crossveins in middle of wing (Figs 40–41, 68). Abdominal sclerites desclerotized around edges but otherwise well-developed 6
2. Scutum with distinct pattern of yellowish spots. Lateral sclerites of female T8 very large. One pair of orbital bristles; katepisternal bristle absent. Wing infusate, darkest along veins
..... *Pt. poecilosomus* Papp, 1972 (PNG)
 - Scutum unicolourous, orange-brown to brown. Lateral sclerites of female T8 smaller. Two pairs of orbital bristles; katepisternal bristle present. Wing very lightly patterned 3
3. Male S6–8 large, as wide as or wider than T1+2 (Papp 1989: figs 10, 26). Posteromedial process of surstylus thin, blade-like (Papp 1989: figs 15, 32). Postgonite strongly bent distally, apex truncate (Papp 1989: figs 14, 30) 4
 - Male S6–8 smaller, distinctly narrower than T1+2 (Papp 1989: figs 1, 16). Posteromedial process of surstylus stout, rounded (Papp 1989: figs 3, 17). Postgonite gently curved distally, apex tapered (Papp 1989: figs 5, 19) 5
4. Length of male S6–7 1.3× epandrial width, epandrium with short setae (Papp 1989: fig. 10). “Postgonite curved in apical third” (Papp 1989: fig. 14). Surstylus with one large seta and one slightly smaller ventromedial tooth-like seta (Papp 1989: figs 13, 15)
..... *Pt. indicus* Papp, 1989 (IND)
 - Length of male S6–7 1.7× epandrial width, epandrium with longer setae (Papp 1989: fig. 26). “Postgonite curved in apical fifth” (Papp 1989: fig. 31). Surstylus with one very large ventromedial tooth-like seta and a much finer ventromedial seta (Papp 1989: figs 32–33)
..... *Pt. thaii* Papp, 1989 (THA)
5. Wing reduced, extending at most to end of T4. Postgonite “arcuately bent in its whole length, apex rounded, posterior margin serrate” (Fig. 71B). Surstylus anteroapically bare, with two stout apical setae, ventromedial tooth-like setae large and flat (Fig. 71A) *Pt. baloghi* Papp, 1972 (PNG)
 - Wing extending beyond end of abdomen. Postgonite “more strongly bent, apex narrower”, posterior margin smooth (Papp 1989: fig. 19). Surstylus anteroapically densely setulose, without stout apical setae, ventromedial tooth-like setae small, conical (Papp 1989: figs 17–18)
..... *Pt. longipennis* Papp, 1972 (PNG)

6. Head and thorax without a pattern of microtomentose areas, often bare and shiny (as in Fig. 51B). Anterior pair of dorsocentral bristles arising just before suture (as in Fig. 54A)..... 7 (*Pseudopterogramma* Papp, 2008)
- Head and thorax with silvery microtomentum forming patterns (as in Fig. 2B). Anterior pair of dorsocentral bristles arising just behind suture (as in Fig. 3A) 18 (*Parapterogramma* Papp, 2008)
7. Postpedicel conical apically. Surstylus with stout tooth-like apical setae (Papp 2008: fig. 82). Female epiproct and hypoproct strongly reduced. M_4 (= CuA of most recent authors) usually ending at dm-m (= dm-cu), sometimes extending very slightly beyond (Papp 2008: fig. 318)..... *Ps. metatarsalis* (Papp, 2008) (SGP, THA)
- Postpedicel rounded apically. Surstylus never with stout tooth-like apical setae. Female epiproct and hypoproct well-developed and distinct. M_4 usually extending beyond dm-m (Fig. 68)..... 8
8. Hind tarsomeres greatly expanded and dorsoventrally flattened, fore tarsomeres slightly flattened (Fig. 43A) *Ps. aestivale* (Richards, 1973) (AUS)
- Fore and hind tarsomeres cylindrical, sometimes swollen but not dorsoventrally flattened (as in Fig. 66A)..... 9
9. Wing largely hyaline, with a dark spot around R_1 or R_{2+3} (Fig. 58B–C, G) 10
- Wing distinctly patterned, with light and dark areas (Fig. 58A, D–F, H–J) 12
10. Interfrontal bristles in four large pairs, approximately as thick as anterior orbital bristle (Fig. 48B). Hind tibia uniformly brown (Fig. 48A). Surstylus divided into anterior and posterior lobes (Fig. 49B)..... *Ps. brevivenosum* (Tenorio, 1967) (COK, FJI, PNG, PYF, TON, USA, WSM)
- Interfrontal bristles in three small pairs, distinctly weaker than anterior orbital bristle (Figs 46B, 60B). Basal third to half of hind tibia yellow, distinctly paler than apical half (Figs 46A, 60A). Surstylus with a single lobe, either curving anteriorly (Fig. 47B) or posteriorly (Fig. 61B) 11
11. Male mid tibia with a double row of stout apicoventral setae. M_4 extending distinctly beyond dm-m (Fig. 68B). Surstylus curved anteriorly, apex pointed (Fig. 47B). Postgonite very slightly sinuate, very narrow, apex simple (Fig. 47A). Basiphallus large ($\sim 0.6 \times$ length of postgonite)..... *Ps. annectens* (Richards, 1964) (IDN, PNG, SLB)
- Male mid tibia with a small midventral bristle and a small apicoventral bristle. M_4 not developed past dm-m (Fig. 68G). Surstylus curved posteriorly, apex rounded (Fig. 61B). Postgonite curved, broader (length $\sim 5.5 \times$ medial width), apex with several spine-like inner lobes (Fig. 61A). Basiphallus small ($\sim 0.3 \times$ length of postgonite)..... *Ps. kasut* sp. nov. (IDN, SGP)
12. Hind tibia with a large dorsal preapical seta (as in Fig. 66A) 13
- Hind tibia with uniformly short dorsal setae (as in Fig. 54A) 16
13. Fore and mid tibiae brown with central third yellow, sometimes yellow area indistinct (Fig. 51A). Male S5 with a posteroventral flange on left third (Fig. 52C). Posterior lobe of surstylus elongate and sinuate, relatively parallel-sided throughout (Fig. 52B). Postgonite with three distinct, strong bends, strongly tapered after apical bend (Fig. 52A)..... *Ps. conicum* (Richards, 1946) (AUS, FSM, GUM, PLW, PNG)
- Fore and mid tibiae solid brown, without any yellow banding (as in Fig. 57A). Male S5 simple, without any additional posteroventral lobes (Fig. 58C; Papp 2008: figs 121, 130). Posterior lobe of surstylus triangular (Fig. 58B) or rectangular (Papp 2008: figs 126, 132). Postgonite gently sinuate and gradually tapered..... 14

14. Scutum yellow-orange, contrasting strongly with dark brown pleuron (Fig. 57A). Male S5 asymmetrical, strongly reduced on right side and rectangular on the left; setae limited to a transverse row of eight posteromedial setae (Fig. 58C). Posterior lobe of surstylus distinctly smaller than anterior lobe (Fig. 58B) *Ps. fijiensis* sp. nov. (FJI)
 – Scutum brown, concolourous or nearly so with pleuron (as in Fig. 66A). Male S5 almost symmetrical, both sides rectangular and well-developed; uniformly short-setose (Papp 2008: figs 121, 130). Posterior lobe of surstylus distinctly larger than anterior lobe (Papp 2008: figs 126, 132)..... 15
15. Posterior lobe of surstylus with a short (length $1.0 \times$ height) apicoventral point, anterior lobe smooth ventrally (Papp 2008: fig. 132). Postgonite slightly broadened subbasally (Papp 2008: fig. 133).....
 *Ps. insulare* (Papp, 1972) (IDN, PNG)
 – Posterior lobe of surstylus with a long (length $2.1 \times$ height) apicoventral point, anterior lobe with a triangular posteroventral lobe (Papp 2008: fig. 126). Postgonite almost parallel-sided, gradually tapered and not broadened subbasally (Papp 2008: fig. 128)
 *Ps. siamense* Papp, 2008 (IDN, IND, MYS, NPL, PHL, SGP, THA, VNM)
16. Mid tibia brown with two yellow rings. R_{4+5} almost straight (Richards 1973: fig. 63). Surstylus with very few setae, limited to ventral surface (Richards 1973: fig. 69)
 *Ps. deemingi* (Richards, 1973) (PNG)
 – Mid tibia solid yellow-brown, without distinct rings. R_{4+5} curved (Figs 68E, H). Surstylus with many setae, some on lateral surface (Figs 55B, 64B) 17
17. Fore and hind tibiae solid yellow (Fig. 54A). R_{2+3} distinctly sinuate (Fig. 68E). Male S5 uniformly short-setose (Fig. 55C). Surstylus triangular, about as tall as epandrium (Fig. 55B). Postgonite strongly bent forwards, thick and asymmetrically bifid apically (Fig. 55A)
 *Ps. fenestrata* (Richards, 1973) (AUS)
 – Fore and hind tibiae distinctly banded (Fig. 63A). R_{2+3} almost straight (Fig. 68H). Male S5 with a transverse row of very long medial setae (Fig. 64C). Surstylus bent at an obtuse angle, about a quarter the height of epandrium (Fig. 64B). Postgonite gently bisinuate and slender (Fig. 64A) *Ps. ketambensis* sp. nov. (IDN, MYS)
18. Costa ending at apex of R_{4+5} . One postpronotal bristle. Mid tibia with two posterodorsal bristles on proximal half. Male S6 with a knob-like lobe (Papp 2008: fig. 98) 19
 – Costa usually extending far beyond apex of R_{4+5} (only slightly beyond in *Pa. magnum* sp. nov.). Two postpronotal bristles. Mid tibia with one posterodorsal bristle on proximal half. Male S6 simple, without a knob-like lobe 21
19. Male mid tibia with a long, hair-like apicoventral seta (Hayashi 2011: fig. 2). Anterior lobe of surstylus bent at $\sim 90^\circ$ angle in relation to posterior lobe (Papp 2008: fig. 99)
 *Pa. poeciloptera* (Papp, 2008) (JPN, TWN)
 – Male mid tibia with stout apicoventral bristle. Anterior lobe of surstylus bent at an angle of $< 90^\circ$ in relation to posterior lobe (Hayashi 2013: figs 6, 9) 20
20. Male S5 with uniform setae and a slight posteromedial emargination (Hayashi 2013: fig. 5). Postgonite bent about 70° at midlength, apex pointed (Hayashi 2013: fig. 7)
 *Pa. continentalis* (Hayashi, 2013) (NPL, THA, VNM)
 – Male S5 bare medially with a short posteromedial lobe (Hayashi 2013: fig. 8). Postgonite bent about 30° at midlength, apex rounded (Hayashi 2013: fig. 10)..... *Pa. tropicalis* (Hayashi, 2013) (IDN)
21. Orbital plate with strong silver-gold microtomentose line connecting orbital and inner vertical bristles (as in Fig. 2B)..... 22

- Orbital plate with silver-gold microtomentum limited to bases of orbital and inner vertical bristles (as in Fig. 8B) 27
- 22. Costa extending slightly beyond ($1-2 \times$ costal width) end of R_{4+5} ; M_1 distinct beyond dm-m (Fig. 40G). Scutum with dark medial longitudinal stripe (Fig. 17B). Posterior lobe of surstylus rectangular, much larger than anterior lobe (Fig. 18B)..... *Pa. magnum* sp. nov. (AUS)
 - Costa extending well beyond ($5-6 \times$ costal width) end of R_{4+5} ; M_1 indistinct beyond dm-m (Fig. 40A–F, H). Scutum with pale medial longitudinal stripe (as in Fig. 2B). Posterior lobe of surstylus various but usually smaller than anterior lobe; if larger than or comparable to anterior lobe, posterior lobe triangular (Fig. 24B) 23
- 23. R_{2+3} straight for most of its length, usually bent towards costa apically (Figs 40A, 41A) 24
 - R_{2+3} gently to strongly curved for entire length (Figs 40E–F, 41C)..... 25
- 24. Male mid tibia with a stout apicoventral bristle and two rows of stout ventral setae. M_4 indistinct beyond dm-m (Fig. 40A). Male S5 projecting posteromedially and with setae restricted to posterolateral margins (Papp 2008: fig. 116)..... *Pa. asiaticum* Papp, 2008 (IDN, SGP, THA)
 - Male mid tibia with a small stout apicoventral bristle only. M_4 short but tubular beyond dm-m (Fig. 41A). Male S5 rectangular and desclerotized posteromedially with relatively uniformly distributed setae (Fig. 24D) *Pa. ofiensis* sp. nov. (PNG)
- 25. Head yellow, scutum yellow with distinct brown spots, lower two-thirds of anepisternum and below dark brown (Fig. 14). Male mid tibia with a long apicoventral bristle. Male S5 with thickened, tooth-like setae along posterior margin (Fig. 15D). Surstylus trilobed, with a small inner median lobe and larger triangular anterior and posterior lobes (Fig. 15B)..... *Pa. hieroglyphicum* sp. nov. (FJI)
 - Head caramel-brown, scutum brown with dark and light longitudinal stripes, sides of thorax brown (Figs 11A, 28A). Male mid tibia with a short apicoventral bristle, with or without two rows of stout ventral setae. Male S5 various, relatively bare (Fig. 12D) or densely setose laterally (Fig. 29D), but never with tooth-like posterior setae. Surstylus various but always bilobed, never with a small inner medial lobe (Figs 12B, 29B)..... 26
- 26. M_4 indistinct beyond dm-m; CuA+CuP separated from wing margin by $0.7 \times$ its length (Fig. 40F). Male S5 with relatively sparse posterolateral setae (Fig. 12D). Postgonite significantly reduced, $0.5 \times$ length of distiphallus (Fig. 12C). Spermathecal bulb spherical (Fig. 13D–E)
 - *Pa. gonitellum* sp. nov. (AUS)
 - M_4 tubular beyond dm-m, extending $0.7-0.8 \times$ length of dm-m; CuA+CuP separated from wing margin by $0.3-0.4 \times$ its length (Fig. 41C). Male S5 with densely long-setose posterolateral lobes (Fig. 29D). Postgonite not reduced, $1.3 \times$ length of distiphallus (Fig. 29C). Spermathecal bulb cylindrical with deep basal and apical invaginations (Fig. 30D–E)..... *Pa. pollex* sp. nov. (FJI)
- 27. M_4 distinct and tubular beyond dm-m, lower corner of dm usually angular 28
 - M_4 indistinct beyond dm-m, lower corner of dm usually relatively rounded..... 32
- 28. Scutum shiny yellow-orange, without any microtomentose stripes; frons yellow-orange, concolourous with scutum (Fig. 3B). Posterior lobe of surstylus with long ventral setae, almost as long as lobe itself (Fig. 4B)..... *Pa. bicolor* sp. nov. (FJI)
 - Scutum dull brown with pale brown and grey microtomentose stripes; frons reddish caramel-brown, distinctly different from scutal colour (as in Fig. 8B). Posterior lobe of surstylus with shorter ventral setae, half as long as lobe at most (Figs 9B, 26B, 35B, 38B)..... 29

29. Scutum with dark central microtomentose stripe (Fig. 8B). R_{2+3} almost straight and reaching costa at an angle of 25–30°, resulting in a very narrow r_1 ; CuA+CuP short, indistinct beyond level of M_4 (Fig. 40D). Male mid tibia with a single, long apicoventral bristle. Male S5 with an elongate posterolateral extension on left side (Fig. 9D)..... *Pa. digitisternum* sp. nov. (AUS)
- Scutum with pale central microtomentose stripe (as in Fig. 37B). R_{2+3} distinctly curved and reaching costa at an angle of 60–80°, resulting in a much broader r_1 ; CuA+CuP longer, distinct beyond level of M_4 as a coloured pseudovein (Fig. 41B, E–F). Male mid tibia with a small apicoventral bristle, with or without 1–2 rows of stout ventral setae. Male S5 roughly symmetrical, without an elongate posterolateral extension (Figs 26D, 35D, 38D)..... 30
30. Microtomentum of orbital plate silver-white, strongly reflective; scutum dark brown with conspicuous greyish microtomentum (Fig. 34B). Male S5 relatively simple with only scattered setae along posterior margin (Fig. 35D). Epandrium with uniformly sized setae; male cercus with 1–2 setae (Fig. 35B). Anterior lobe of surstylus largely bare and preapically constricted (Fig. 35B) *Pa. simplex* sp. nov. (FJI)
- Microtomentum of orbital plate silver-gold; scutum pale brown to brown (Figs 25B, 37B). Male S5 with large, densely setose posterolateral arms (Figs 26D, 38D). Epandrium with one distinctly enlarged lateral seta on either side of anal fissure; male cercus with 8–10 setae (Figs 26B, 38B). Anterior lobe of surstylus with several ventral setae and evenly tapered apically (Figs 26B, 38B) ...
..... 31
31. Male mid tibia with a weak apicoventral bristle and a row of stout ventral setae. Male S5 with a more rectangular or ovoid posteroventral emargination, lateral arms with shorter setae ($< 0.4 \times$ lateral S5 length) (Fig. 38D). Anterior lobe of surstylus rectangular, posterior lobe flattened, curved outwards, and longer than anterior lobe (Fig. 38B). Postgonite tapered apically; epiphallus absent (Fig. 38C)..... *Pa. tokotaii* sp. nov. (FJI)
- Male mid tibia with a stout apicoventral bristle only. Male S5 with a more triangular posteroventral emargination, lateral arms with longer setae ($> 0.5 \times$ lateral S5 length) (Fig. 26D). Anterior lobe of surstylus subtriangular, posterior lobe stouter and shorter than anterior lobe (Fig. 26B). Postgonite bifurcate apically; epiphallus present (Fig. 26C)..... *Pa. peckorum* sp. nov. (FJI)
32. Scutum uniformly chocolate brown, lacking microtomentose stripes (Fig. 6B). Male mid tibia with a stout apicoventral bristle only. Postgonite boot-shaped with many ventral tooth-like knobs; distiphallus with sclerotized tooth-like lateral projections (Fig. 7C) ... *Pa. dentatum* sp. nov. (PNG)
- Scutum with distinct microtomentose stripes (Figs 20B, 31B). Male mid tibia with a long apicoventral bristle, with or without a row of stout ventral setae. Postgonite various but ventral surface smooth, without tooth-like knobs; distiphallus with membranous lateral lobes only, lacking sclerotized lateral projections (Figs 21C, 32C)..... 33
33. R_{2+3} almost straight, reaching costa at an angle of 40–45°, resulting in a narrower r_1 (Fig. 41D). Acrostichal setulae in 6–8 rows between anterior dorsocentrals. Male mid tibia with a long apicoventral bristle only. Male S5 broad with sparse setae and a pair of triangular posterior projections surrounding a small posteromedial emargination (Fig. 32D). Epandrium with uniformly sized setae; anterior lobe of surstylus much larger than posterior lobe (Fig. 32B) *Pa. pugioformis* sp. nov. (AUS, PNG)
- R_{2+3} strongly curved, reaching costa at an angle of 60–70°, resulting in a broader r_1 (Fig. 40H). Acrostichal setulae in 9–10 rows between anterior dorsocentrals. Male mid tibia with a row of stout ventral setae in addition to a long apicoventral bristle. Male S5 with large, densely setose posterolateral arms surrounding a very large posteromedial emargination (Fig. 21D). Epandrium with a distinctly enlarged seta on either side of anal fissure; anterior lobe of surstylus slightly smaller than posterior lobe (Fig. 21B)..... *Pa. matau* sp. nov. (FJI)

Genus *Parapterogramma* Papp, 2008

Parapterogramma Papp, 2008: 97 (neuter). Type species: *Parapterogramma asiaticum* Papp, 2008 by original designation.

Minialula Papp, 2008: 91 (feminine). Type species: *Minialula poeciloptera* Papp, 2008 by original designation. **Syn. nov.**

Parapterogramma – Marshall *et al.* 2011: 257 (world catalog).

Minialula – Marshall *et al.* 2011: 249 (world catalog). — Hayashi 2013: 351 (redescription).

Diagnosis

In addition to the synapomorphies that define the *Parapterogramma* genus group, *Parapterogramma* is diagnosed by the following combination of characters: head and scutum with pale yellow and grey microtomentum; anterior pair of dorsocentral bristles just behind suture; mid tibia with 3–4 dorsal bristles on proximal half; R_{2+3} strongly curved towards costa to almost straight; R_{4+5} strongly curved and meeting costa well before wing tip; first section of R_{4+5} $0.5\text{--}1.0 \times$ length of M_1 between crossveins; male S6 simple; surstylus usually divided into larger anterior lobe and smaller posterior lobe; postgonite short; female S8 large, usually convex anteromedially.

Definition

Parapterogramma is defined by the following synapomorphies: silver-gold microtomentum on the orbital and interfrontal plates, anterior dorsocentral bristles just behind the suture, 3–4 dorsal bristles on the proximal half of the mid tibia (proximal 1–2 smaller), first section of R_{4+5} shorter than or equal to length of M_1 between crossveins, and R_{4+5} strongly curved forwards to end well before the wing tip.

Redescription

BODY. Colour light to dark brown. Length 1.0–1.9 mm.

HEAD. Yellow to dark brown, with silver-gold microtomentum on interfrontal plate, orbital plate, lunule, around the inner vertical bristle and/or the ocellar triangle. Frontal width $2.0\text{--}2.5 \times$ interfrontal height. Interfrontal bristles in three fine pairs, middle pair largest with tips almost touching; two moderate lateroocellate orbital bristles, anterior orbital smaller ($0.5\text{--}0.7 \times$) than posterior; ocellar bristles large and diverging; inner orbital bristle very large; postvertical bristle large; postocellar bristle small. Lunule small; face shiny and translucent. Vibrissa large, vibrissal angle with subvibrissal seta; gena with a large, upcurved, anteroventral seta and several smaller setulae. Palpus small ($\sim 0.5 \times$ median width of eye, not strongly reduced as Papp (2008) describes), clavate, narrow with two subapical setulae. Eye with a slight notch at about level of anterior edge of frons, eye height $2.0\text{--}4.0 \times$ genal height.

THORAX. Yellow to dark brown, scutum often with complex patterns of grey-brown microtomentum. Two pairs of large dorsocentral bristles, anterior pair just behind suture and large ($0.7\text{--}0.8 \times$ posterior pair), separated by 7–10 rows of fine acrostichal setulae. Two postpronotal bristles, outer bristle large and inner bristle smaller; two notopleural bristles, anterior notopleural slightly larger than posterior; two strong supra-alar bristles; postalar and intrapostalar bristles strong. Katepisternum with a strong posterior seta and usually a few smaller setae below. Scutellum subtriangular, densely microtomentose with darker anteromedial triangle and four large marginal bristles, apical pair $1.4 \times$ length of basal pair.

LEGS. Light to dark brown; tarsi pale brown. Mid tibia with three dorsal bristles (two anterodorsal and one posterodorsal) on proximal half and three dorsal bristles (two anterodorsal and one posterodorsal) on distal half. Ventral surface of mid tibia with a stout apical bristle and two rows of stout setae or with only an apical bristle in males (mid femur with two corresponding rows of strong proximoventral

setae) and with a strong apical bristle in females; never with a distinct midventral bristle. Mid basitarsus without distinctly enlarged ventral setae. Hind tibia with several longer, fine, curved dorsal setulae in both proximal and distal halves.

WING. Patterned, membrane slightly to strongly infuscate with pale spots typically forming distinct pale vertical bands, sometimes with darkened spots along anterior edge. CS2 short, $0.4\text{--}0.5 \times$ CS3. Vein R_{2+3} short, straight for most of its length and apically bent or gently curved over its entire length, reaching costa at an angle of $30\text{--}40^\circ$ but meeting costa at an angle of $60\text{--}70^\circ$; R_{4+5} strongly upcurved, meeting costa well before wing tip; costa extending far beyond apex of R_{4+5} (except in *Pa. continentalis* (Hayashi, 2013), *Pa. magnum* sp. nov., *Pa. poeciloptera* (Papp, 2008), and *Pa. tropicalis* (Hayashi, 2013) in which it extends only slightly beyond). M_1 and M_4 usually distinct beyond dm-m. CuA+CuP usually long and distinct but non-tubular. Halter pale.

MALE ABDOMEN. Preabdomen brown, shiny. T2–5 and S2–4 desclerotized along margins, uniformly long-setose on posterior half. S5 usually broad and short, often with a posteromedial desclerotized part (except in the type species) and long posterolateral setae. Synsternite 6+7 large, S6 curved or sinuate, S7 usually small; sensory setae large; S6+7 strongly fused to S8 dorsally. Epandrium short dorsally and long ventrally (thus somewhat wedge-shaped) and uniformly long-setose; cercus small, flat, and fused (at least dorsomedially) to form a subanal plate; subepandrial sclerite usually pentagonal or hexagonal and medially darkened. Hypandrium Y-shaped, posterolateral arms strongly fused to anteromedial apodeme but not to the anteroventral corners of the epandrium; arms also bifurcate posteriorly. Surstylus typically large, varying widely between species, usually divided (almost entirely) into anterior and posterior lobes. Postgonite in two forms: relatively simple, curved, and tapered or more elaborate, split into inner and outer lobes. Phallapodeme elongate and sinuate; basiphallus well-developed, usually box- or trough-like with a large, elongate epiphallus (which is sometimes larger than the basiphallus). Distiphallus usually with a sclerotized basal part and a membranous apical part.

FEMALE ABDOMEN. T2–5 and S2–5 brown, shiny and desclerotized along margins, uniformly long-setose on posterior two-thirds. T1+2 broad, T3–5 and S1–5 stouter. Abdomen slightly shorter than length of head + thorax. T6–7 and S6–7 usually rectangular and long-setose in the posterior half, S7 sometimes modified to receive anterior margin of S8. T8 often divided into two setulose, lateral sclerites. Epiproct greatly reduced, without setae. Cercus densely microtomentose, subtriangular with two large setae (one apical and one dorsal) and several smaller setae. S8 usually large, microtomentose, and with several posteromedial setae. Hypoproct usually rectangular and reduced. Internal vaginal sclerotization absent. Spermathecae (2+1) usually stout, spherical to cylindrical and lightly grooved, stem membranous.

Distribution

Parapterogramma is known from Australia, Fiji, Indonesia, Japan, Nepal, New Caledonia, Papua New Guinea, Singapore, Taiwan, Thailand, and Vietnam (Fig. 42).

Species descriptions (in alphabetical order)

Parapterogramma asiaticum Papp, 2008

Figs 2, 40A, 42

Parapterogramma asiatica Papp, 2008: 99.

Parapterogramma asiaticum – Marshall *et al.* 2011: 257.

Type material

Holotype

THAILAND – **Trang Province** • ♂; Khao Chong Botanic Garden; 18 Nov. 2004; L. Papp and M. Földvári leg.; rainforest; HNHM.

Paratypes

THAILAND – **Trang Province** • 1 ♂; same collection data as for holotype; 22 Nov. 2004; HNHM • 1 ♂; Palian District, Nam Tok Nam Pan Forest Park; 17 Nov. 2004; L. Papp and M. Földvári leg.; over streams and vegetation around waterfalls; HNHM • 1 ♀; Thung Khai Botanic Garden; 12 Nov. 2004; L. Papp and M. Földvári leg.; primary lowland rainforest; HNHM.

Material examined

Holotype photo provided by Petra Szöllösi-Tóth, HNHM.

INDONESIA – **Aceh** • 1 ♂, 1 ♀; Gunung Leuser National Park, Ketambe Research Station; 3°41' N, 97°39' E; 350 m a.s.l.; 2–6 Sep. 1989; W.K. Gall leg.; primary rainforest, UV/MV light; ROME • 1 ♀; Mount Leuser National Park, Ketambe Research Station; 350 m a.s.l.; 3–10 Sep. 1989; B. Hubley & D.C. Darling leg.; young forest, closed canopy, Malaise head; DEBU.

SINGAPORE • 1 ♂; National University of Singapore campus; 29 Apr. 2015; NUS Insect Survey Project leg.; LKCNHM • 1 ♂; Sungei Buloh Wetland Reserve; 2 May 2012; Singapore Mangrove Insect Project leg.; LKCNHM.

Redescription

BODY (Fig. 2). Length 1.0–1.2 mm. Head dark brown except for reddish lower portion of frons, with silvery-yellow microtomentum on lunule, interfrontal plates, ocellar triangle, orbital plates, and occiput; gena brownish-yellow; antenna brown. Frontal width $2.3\text{--}2.4 \times$ interfrontal height. Eye height $3.0\text{--}3.2 \times$ genal height. Palpus reduced. Thorax brown, anepimeron with a pale ventral spot. Scutum with pale grey and brown microtomentum forming three grey longitudinal stripes, lateral margins broadly dark

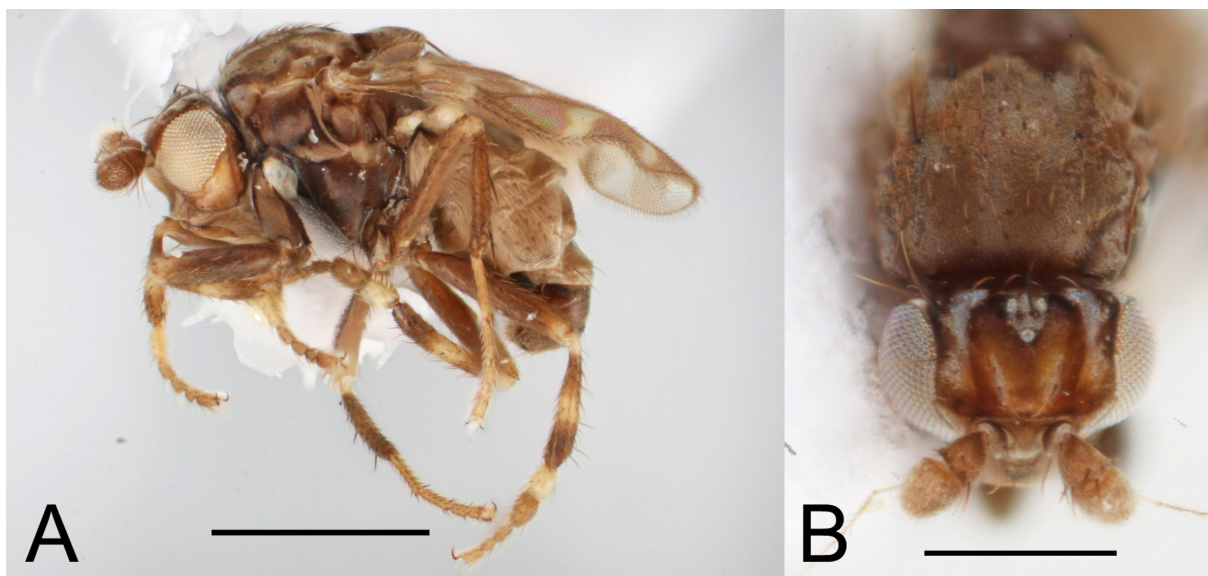


Fig. 2. *Parapterogramma asiaticum* Papp, 2008 (ZRC_BDP 0105476, LKCNHM). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

brown microtomentose, and pale M-shaped microtomentose mark enclosing posterior dorsocentral bristles; scutellum dark brown with median, grey-brown microtomentose triangle. Anterior dorsocentral bristles separated by 6 rows of acrostichal setulae. Legs dark brown with yellow basal and medial rings; fore and hind basitarsi light yellow. Male mid tibia with a stout apicoventral bristle and two rows of stout ventral setae. Wing (Fig. 40A) pattern strong. CS2 $0.5 \times$ CS3. R_{2+3} broadly curved in apical half, angled at $\sim 60^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5\text{--}6 \times$ costal width). M_1 and M_4 both indistinct beyond dm-m; CuA+CuP long. Halter pale brown.

MALE ABDOMEN. S5 broad, long-setose along posterior margin with a large, rounded, posteromedial lobe and a separate, posteriorly-setulose dorsal sclerite. S6 extending to the right side and sinuate. Cercus flat, subquadrate, with two setae; subepandrial sclerite hexagonal with a dark X-shaped pattern. Surstylus long but low, bilobed: anterior lobe smaller, triangular, laterally setose with a stout apical tooth-like seta, posterior lobe subtriangular, slightly curved, and setose laterally and ventrally. Postgonite small, bent about midlength and broadened, apex emarginate, medially with a setulose, anterior process terminating in a downcurved, tooth-like projection. Phallapodeme elongate, slightly curved; basiphallus elongate, extended into a tapered epiphallus distally. Distiphallus stout, largely membranous with several upper-lateral and lower supporting sclerites, lower sclerite with a knob-like ventral lobe.

FEMALE ABDOMEN. T7 divided into two lateral sclerites; T8 very small, triangular, divided into two parts. S6 rectangular and setose along posterior margin; S7 small and rectangular. Spermathecae stout, subcylindrical, stem very short and membranous. No other details of the female terminalia are given in Papp (2008).

Distribution

Indomalayan: Indonesia (**new record**), Singapore (**new record**), Thailand (Papp 2008).

Remarks

The slightly reduced palpus of *Pa. asiaticum* is an autapomorphy of the species, rather than a generic synapomorphy as suggested by Papp's generic description; other species of *Parapterogramma* have relatively well-developed palpi. Illustrations of the male genitalia are not provided here as Papp's (2008) illustrations are detailed and adequate.

Parapterogramma bicolor sp. nov.

[urn:lsid:zoobank.org:act:703C22ED-5B41-41A8-9E49-9F1A31E6AD83](https://zoobank.org/act:703C22ED-5B41-41A8-9E49-9F1A31E6AD83)

Figs 3–5, 40B, 42

Etymology

This species name (from the Latin '*bicolor*', 'of two colours') refers to the bicoloured thorax: yellow dorsally and dark brown laterally and ventrally.

Material examined

Holotype

FIJI – **Taveuni** • ♂; Cakaudrove, 5.5 km SE of Tavuki Village; $16^\circ 50' 35''$ S, $179^\circ 57' 58''$ W; 1188 m a.s.l.; 30 Jun.–14 Aug. 2004; Schlinger and Tokota'a leg.; rainforest; Malaise; BPBM.

Paratypes

FIJI – **Taveuni** • 1 ♂; Cakaudrove, Tavuki Village, Mount Devo; $16^\circ 50' 13''$ S, $179^\circ 58' 23''$ W; 892 m a.s.l.; 14–31 Jul. 2004; Schlinger and Tokoka'a leg.; Malaise; BPBM • 1 ♀; same collection data as for preceding; $16^\circ 49' 52''$ S, $179^\circ 58' 48''$ W; 734 m a.s.l.; 30 Jun.–14 Aug. 2004; BPBM • 2 ♂♂, 1 ♀;

Cakaudrove, 5.3 km SE of Tavuki Village, Mount Devo; 16°50'28" S, 179°58'05" W; 1064 m a.s.l.; 20–27 Dec. 2002; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; same collection data as for preceding; 31 Jul.–14 Aug. 2004; BPBM • 1 ♂; same collection data as for preceding; 16°50'27" S, 179°58'04" W; 31 Oct.–14 Nov. 2002; DEBU • 4 ♂♂, 3 ♀♀; Cakaudrove, 5.6 km SE of Tavuki Village; 3–10 Jan. 2003; Schlinger and Tokota'a leg.; rainforest, Malaise; DEBU • 1 ♀; same collection data as for preceding; 7–23 Oct. 2004; P. Vodo leg.; BPBM • 2 ♂♂, 1 ♀; Cakaudrove, Devo Forest Reserve; 800 m a.s.l.; 16°50' S, 179°59' E; 3–10 Jan. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 2 ♂♂, 4 ♀♀; Cakaudrove, Devo Peak; 10–15 Jan. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂; Cakaudrove, Devo Peak Radio Tower; 16°51' S, 179°58' E; 1200 m a.s.l.; 31 Oct.–21 Nov. 2002; Irwin, Schlinger and Tokota'a leg.; rainforest Malaise; DEBU. – **Vanua Levu** • 2 ♀♀; Bua, 6 km NW of Kilaka Village, Batiqere Range; 16°48'40" S, 178°59'17" E; 61 m a.s.l.; 3–10 Apr. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; same collection data as for preceding; 16°48'55" S, 178°59'11" E; 146 m a.s.l.; 15–28 Apr. 2004; DEBU • 1 ♂; same collection data as for preceding; 16°43'54" S, 178°59'59" E; 113 m a.s.l.; 3–15 Jun. 2004; BPBM • 1 ♂; Bua, Kilaka Village; 16°41'02" S, 178°59'02" E; 28 Jun.–2 Jul. 2004; 154 m a.s.l.; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU.

Description

BODY (Fig. 3). Length 1.0–1.3 mm. Head yellow with a brown crescent around each ocellus and silvery-yellow microtomentum on interfrontal plates, ocellar triangle, orbital plates, and occiput; gena yellow; antennal pedicel yellow, scape and flagellum brown, flagellum pale-haired on distal half. Frontal width $2.5 \times$ interfrontal height. Eye height $2.1 \times$ genal height. Thorax bicoloured: lower third of anepisternum and below dark brown, upper two-thirds yellow with medial brown spot; scutum moderately shiny, yellow with dark brown microtomentum restricted to two spots on posterior margin; scutellum yellow, somewhat brownish along margins. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Legs yellowish brown, mid and hind tibiae and tarsi darker. Male mid tibia with long apicoventral bristle only. Wing (Fig. 40B) pattern strong. CS2 $0.5 \times$ CS3. R_{2+3} broadly curved in apical half, angled at $\sim 80^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5\text{--}6 \times$ costal width). M_1 indistinct beyond dm-m; M_4 extending beyond dm-m; CuA+CuP long. Halter pale brown.

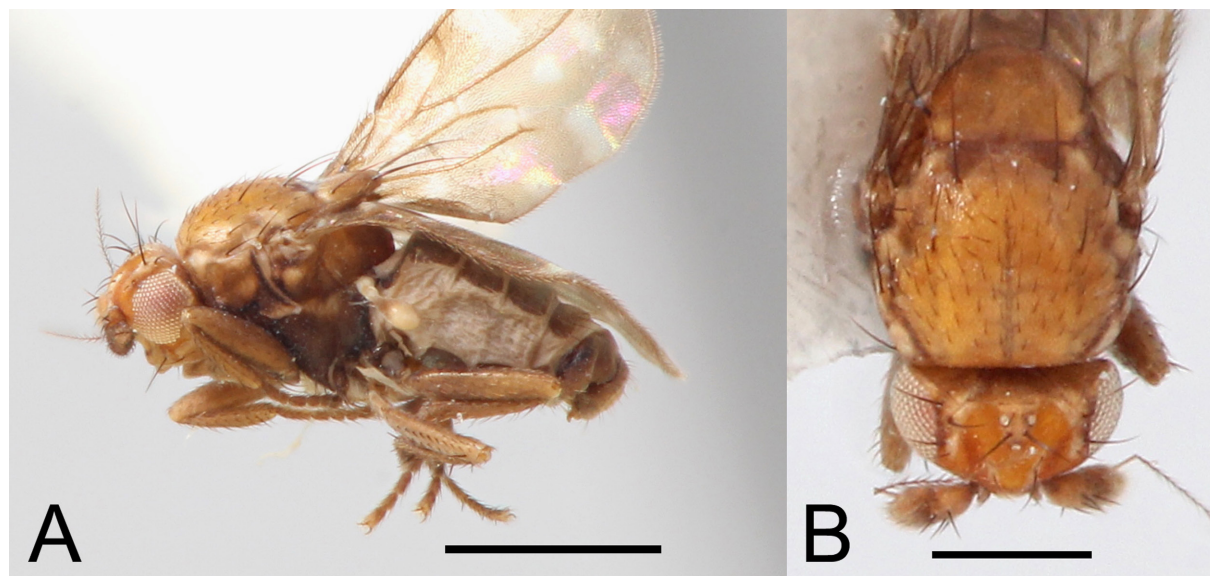


Fig. 3. *Parapterogramma bicolor* sp. nov., holotype (debu00070134, BPBM). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

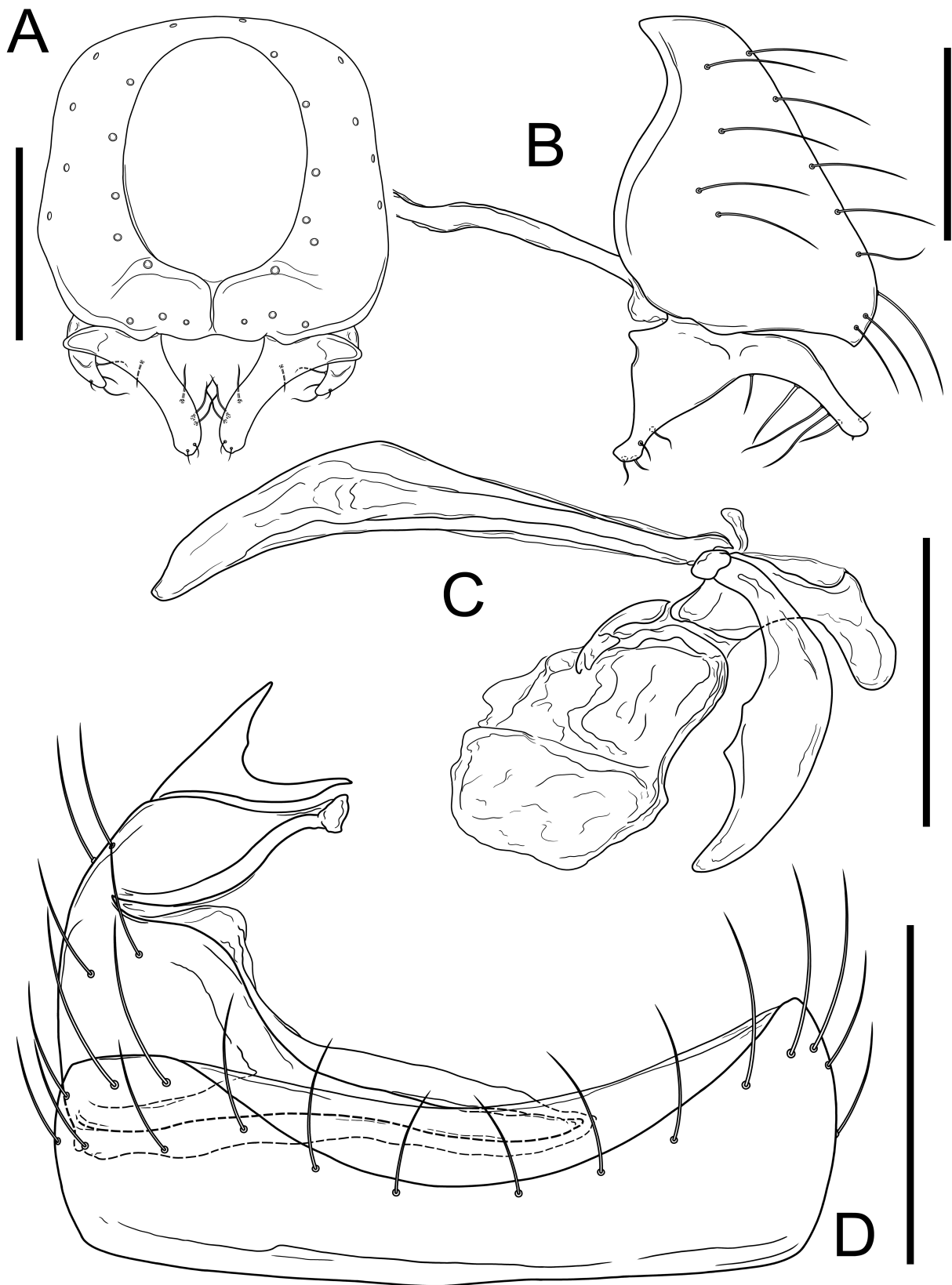


Fig. 4. *Parapterogramma bicolor* sp. nov., paratype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

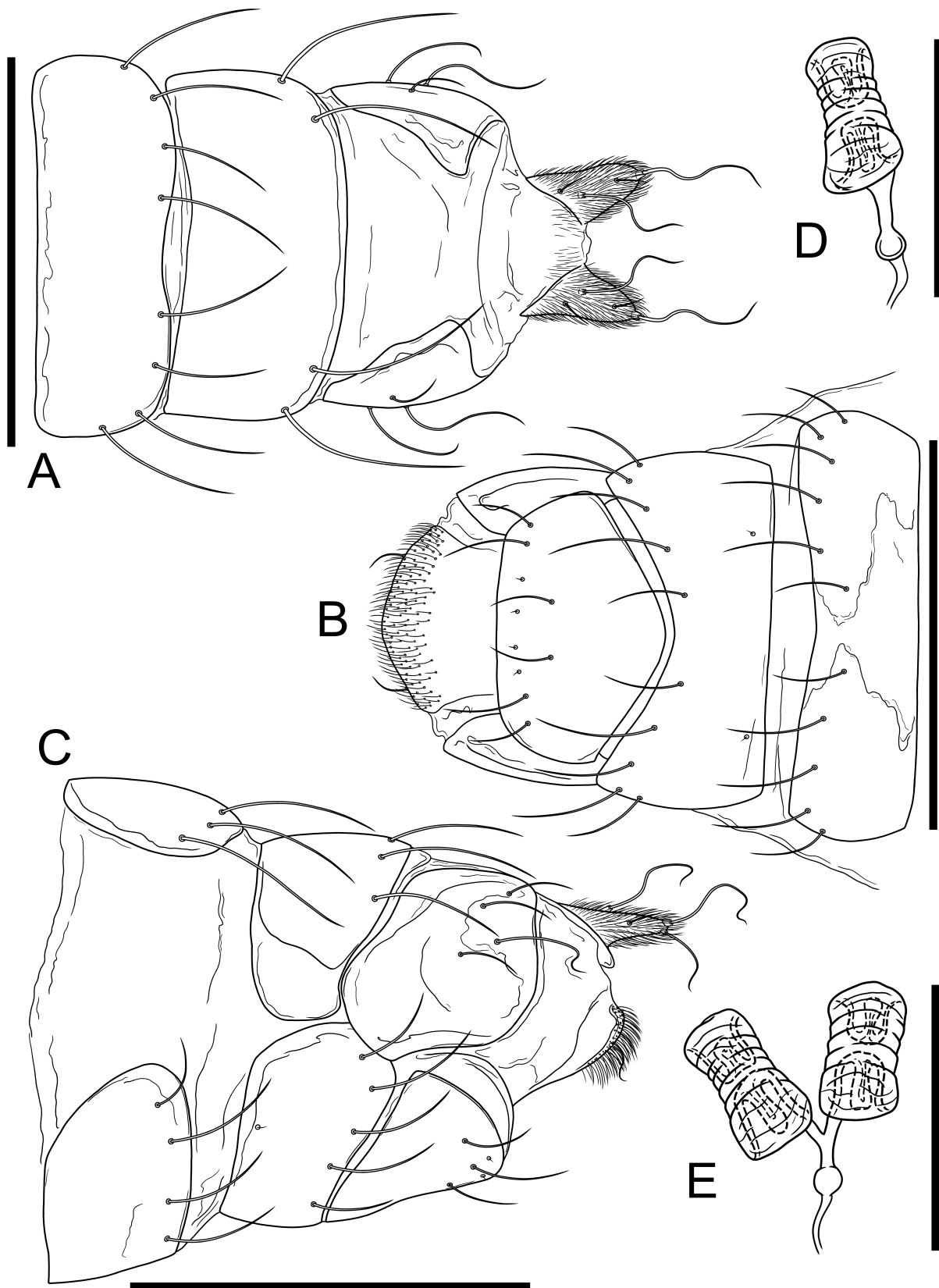


Fig. 5. *Parapterogramma bicolor* sp. nov., paratype (BPBM). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

MALE ABDOMEN (Fig. 4). S5 broad, deeply posteromedially desclerotized and sparsely long-setose. S6 sinuate. Cercus flat, subquadrate with three setae; subepandrial sclerite indistinct but dorsomedially darkened. Surstylus long but low, bilobed: anterior lobe larger, triangular, largely bare with slightly flared anteroventral apex, posterior lobe rectangular (apically truncate), curved, with 4–5 long ventral setae. Postgonite short but broad, curved, evenly tapered, anterior half pale. Phallapodeme elongate, gently curved with tooth-like anteromedial lobe and pointed apex; basiphallus large, ring-shaped with an elongate, flattened, apically rounded, spoon-shaped epiphallus. Distiphallus stout, largely membranous, basal half with a broad, W-shaped sclerite and a pair of smaller lateral sclerites, apex supported by weakly sclerotized upper and lower sclerites.

FEMALE ABDOMEN (Fig. 5). T6 and T7 well-developed, rectangular and long-setose along posterior margin; T8 split into two large, sparsely setose, subquadrate, lateral plates. Epiproct membranous and posteriorly microtomentose. S6 rectangular and long-setose along posterior margin; S7 rectangular and posteriorly long-setose with broad posterior emargination; S8 pentagonal, fitting into emargination of S7, with a row of six posteromedial setae. Hypoproct rectangular, largely membranous except for a sclerotized, setulose posterior part. Spermathecae elongate, cylindrical, and deeply grooved with large basal and apical invaginations, each invagination with a finger-like central projection, stem short and membranous.

Remarks

While *Pa. bicolor* sp. nov. is externally very different from *Pa. simplex* sp. nov., which has distinct scutal stripes and microtomentum, the male genitalia of these two species are remarkably similar. The shape of the surstylus, postgonites, and basiphallus are almost identical, with some slight differences between them (in *Pa. bicolor*, the posterior lobe of the surstylus is thinner and apically truncate with longer ventral setae, and the postgonite has a tooth-like anterior lobe at about midlength). Externally, *Pa. bicolor* resembles species of *Pseudopterogramma* in having a shiny head and scutum with very limited microtomentum, but it is diagnosed as a species of *Parapterogramma* by the small microtomentose patches on the head and costa extending well beyond R_{4+5} .

Parapterogramma continentalis (Hayashi, 2013) comb. nov.

Minialula continentalis Hayashi, 2013: 351, figs 1, 3–7.

Type material

Holotype

THAILAND • ♂; Chiang Mai, Doi Inthanon; 1900 m a.s.l.; 21 Oct. 2001; T. Hayashi leg.; NIID.

Paratypes

NEPAL – **Bagmati** • 1 ♂, 1 ♀; Gokarna, Kathmandu; 9 Oct. 1992; T. Hayashi leg.; NIID.

THAILAND – **Chiang Mai** • 12 ♂♂, 4 ♀♀; same collection data as for holotype; 1700–1900 m a.s.l.; 21–23 Oct 2001; NIID.

VIETNAM – **Vinh Phu** • 5 ♂♂, 10 ♀♀; Tam Dao; 930–1230 m a.s.l.; 21–27 Sep. 1995; H. Kurahashi leg.; NIID • 7 ♂♂, 2 ♀♀; same collection data as for preceding; 8–10 Oct. 1998; T. Hayashi leg.; NIID.

Material examined

No specimens of *M. continentalis* were examined.

Redescription

BODY. Length 1.1–1.5 mm. Head dark brown with lower portion of frons lighter and silvery microtomentum on interfrontal plates, ocellar triangle, orbital plates, and occiput; gena brown; antenna dark brown. Thorax dark brown, sides with three indistinct horizontal stripes. Scutum with pale grey and brown microtomentum forming four pale longitudinal stripes. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Legs dark brown, femora proximally paler, fore and hind basitarsomeres whitish. Mid tibia with two anterodorsal and two posterodorsal bristles on proximal half; male mid tibia with long apicoventral bristle only. Wing pattern strong. CS2 $0.5 \times$ CS3. R_{2+3} distinctly sinuate, angled at $\sim 60^\circ$ to costa; costa extending just beyond apex of R_{4+5} ($\sim 1 \times$ costal width). M_1 extending beyond dm-m as a dark pseudovein, M_4 indistinct beyond dm-m; CuA+CuP long and tubular. Halter pale brown with dark stem.

MALE ABDOMEN. S5 broad, uniformly long-setose, slightly projecting posteromedially with a small medial emargination. S6 with a posteriorly-projecting setulose lobe located behind posteromedial emargination of S5. Surstylus long but low, bilobed: anterior lobe elongate, bare, and curved posteroventrally into a V-shape, posterior lobe rounded and setose. Postgonite short but broad, bent at about midlength, apical half with an anterodorsal triangular lobe and two posteroventral triangular lobes flanking a rounded ventral emargination (exaggerating depth of emargination), apex pointed. Phallapodeme elongate, apex truncate; basiphallus large, triangular in lateral view and V-shaped in dorsal view, with an elongate, apically rounded and downturned epiphallus. Distiphallus stout, largely membranous, supported by curled, weakly sclerotized lateral sclerites.

FEMALE ABDOMEN. Presumably as described for *Pa. poeciloptera* below (abdominal characters other than spermatheca not described in Hayashi 2013). Spermathecae stout, subspherical, and smooth with a large, broad but not deep, apical invagination, stem short and membranous.

Distribution

Indomalayan: Nepal (Hayashi 2013), Thailand (Hayashi 2013), Vietnam (Hayashi 2013).

Remarks

The above redescription of *Pa. continentalis* (Hayashi, 2013) is based on Hayashi's (2013) description of the species.

This species, along with *Pa. poeciloptera* and *Pa. tropicalis* (Hayashi, 2013), forms a distinct clade of very similar species formerly treated as *Minialula* (see above). *Parapterogramma continentalis* is externally almost identical to *Pa. tropicalis*, from which it differs by the posteromedially emarginate male S5 and the pointed apex of the postgonite. Both of these species can be separated from *Pa. poeciloptera* by the stout (rather than hair-like) apicoventral bristle on the male mid tibia.

Parapterogramma dentatum sp. nov.

[urn:lsid:zoobank.org:act:3E00C8FC-70B6-4E82-B28B-0A898BF08860](https://zoobank.org/act:3E00C8FC-70B6-4E82-B28B-0A898BF08860)

Figs 6–7, 40C, 42

Etymology

This species name (from the Latin '*dentatus*', 'toothed') refers to the tooth-like lateral projections on the distiphallus and the tooth-like ventral knobs of the postgonite.

Material examined

Holotype

PAPUA NEW GUINEA • ♂; Kokoda Trail, Iora Creek, 17 km S of Kokoda; 1400 m a.s.l.; 3–6 Aug. 1976; O. Kukal leg.; dung; DEBU.

Description

BODY (Fig. 6). Length 1.3 mm. Head dark brown with lower portion of frons lighter and silvery microtomentum limited to bases of interfrontal and orbital bristles, ocellar triangle, lunule, and around inner vertical bristle; gena brownish-yellow; antenna brown. Frontal width $2.5 \times$ interfrontal height. Eye height $4.0 \times$ genal height. Thorax brown with indistinct paler central stripe; scutellum brown with dark brown anteromedial spot. Microtomentum limited to postpronotal lobes and posterolateral corners of scutum. Anterior dorsocentral bristles separated by 5–6 rows of acrostichal setulae. Legs brown, mid femur slightly yellowish, tarsi paler. Male mid tibia with stout apicoventral bristle only. Wing (Fig. 40C) pattern weak. $CS2$ $0.4 \times CS3$. R_{2+3} broadly curved in apical half, angled at $\sim 70^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5 \times$ costal width). M_1 and M_4 both indistinct beyond dm-m; CuA+CuP long. Halter whitish.

MALE ABDOMEN (Fig. 7). S5 broad, rectangular, posteromedially desclerotized with a long posterolateral seta and dense microtomentum on the membrane posterior to desclerotized part. S6 short and slightly curved. Cercus flat, subquadrate with two setae; subepandrial sclerite indistinct but medially darkened. Surstylus long but low, bilobed: anterior lobe triangular, bulging outwards slightly with sparse long setae, posterior lobe rounded triangular, ventrally curved posteriorly with stout apical seta, main part densely setose/setulose, middle part connecting lobes with ventral row of long setae. Postgonite elongate, slightly curved, apex broadly expanded anteriorly in a foot-like shape, ventral surface with many rounded, tooth-like projections, just basal to foot-like part with a bulging, rounded lateral lobe. Phallapodeme elongate, apex triangular and flared; basiphallus large, greatly enlarged posteriorly, laterally flattened, and densely setulose. Distiphallus stout, largely membranous, and complex: centrally supported by a sinuate upper sclerite and scoop-like lower sclerite, laterally supported on each side by a long, Y-shaped, curved sclerite; lateral membranous flaps with row of four large (progressively smaller from anterior to posterior), tooth-like lateral projections.

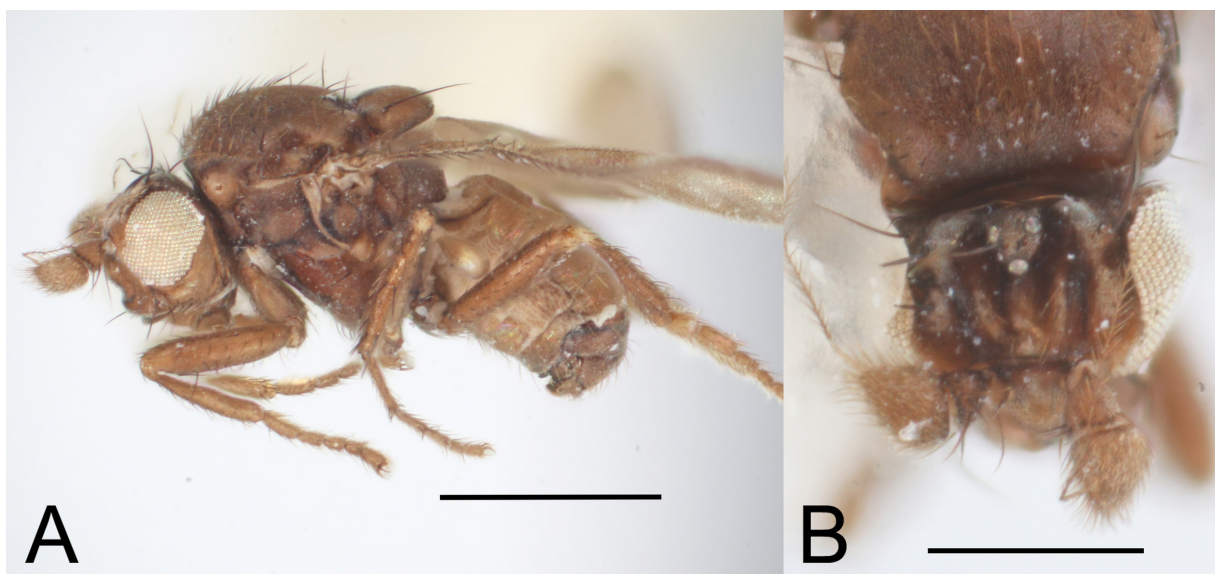


Fig. 6. *Parapterogramma dentatum* sp. nov., holotype (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

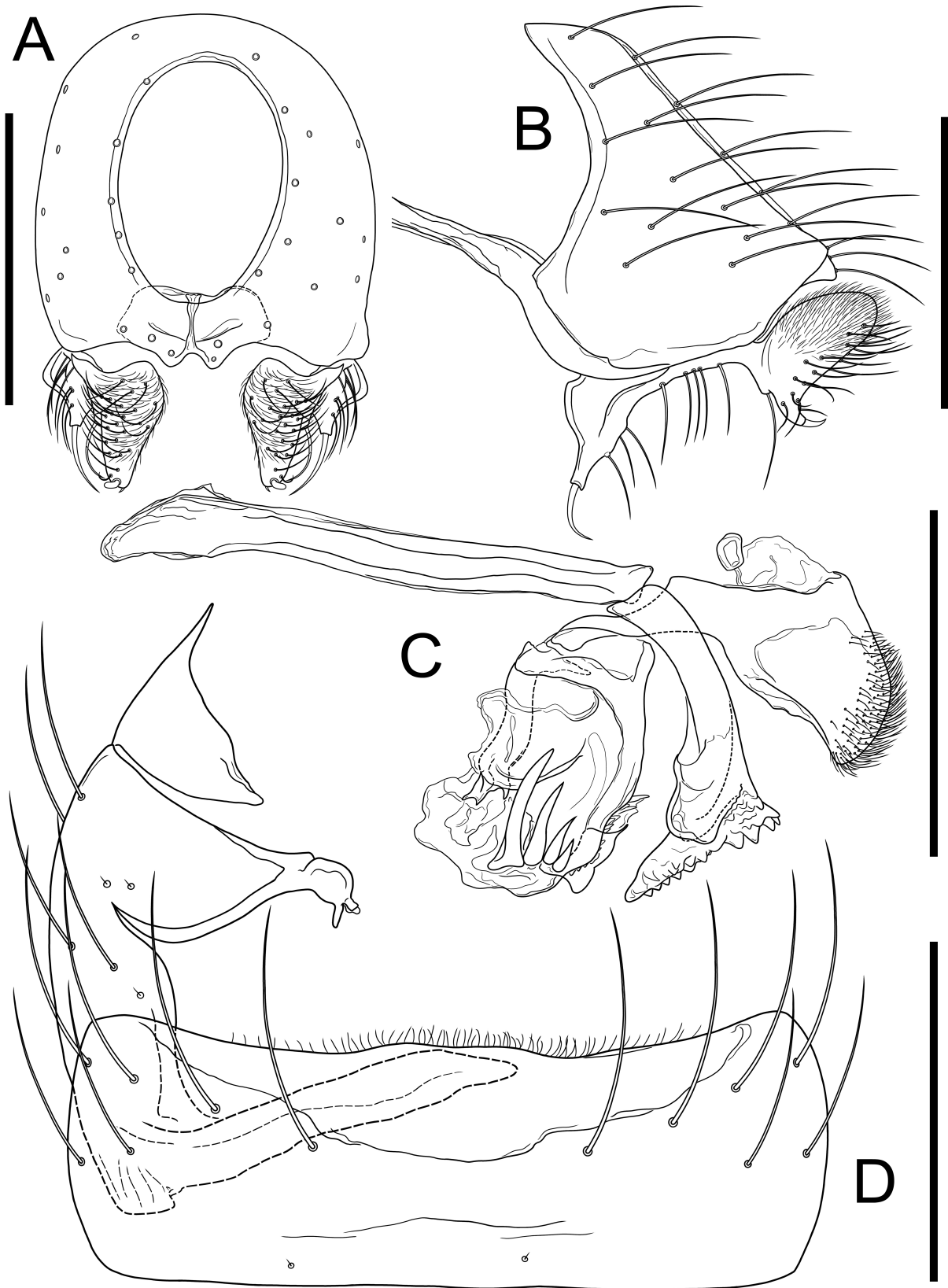


Fig. 7. *Parapterogramma dentatum* sp. nov., holotype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

FEMALE ABDOMEN. Female unknown.

Remarks

Parapterogramma dentatum sp. nov. and *Pa. bicolor* sp. nov. differ from congeners in having a uniformly coloured scutum, with microtomentum not forming distinct vittae.

Parapterogramma digitisternum sp. nov.

[urn:lsid:zoobank.org:act:221C7BB8-0FF6-4993-A123-B3D753951B1C](https://zoobank.org/act:221C7BB8-0FF6-4993-A123-B3D753951B1C)

Figs 8–10, 40D, 42

Etymology

The species name (from the Latin ‘*digitus*’, ‘finger’) refers to the long, finger-like extension of the male S5.

Material examined

Holotype

AUSTRALIA – Queensland • ♂; Wonga Beach, 10 km S of Daintree; 15–16 Apr. 1999; S.A. Marshall leg.; low forest, dung; QMBA debu00164317.

Paratypes

AUSTRALIA – Queensland • 1 ♂, 12 ♀♀; same collection data as for holotype; DEBU • 2 ♂♂, 12 ♀♀; same collection data as for holotype; QMBA • 8 ♂♂; Fitzroy Island, site 2; 16°56′ S, 145°59′ E; 40 m a.s.l.; 19–21 Apr. 1999; G.B. Monteith leg.; transition to rainforest, dung trap; DEBU • 8 ♂♂; same collection data as for preceding; QMBA • 5 ♂♂; Fitzroy Island, site 4; 16°56′ S, 145°59′ E; 15 m a.s.l.; 19–21 Apr. 1999; G.B. Monteith leg.; transition to rainforest, dung trap; DEBU • 6 ♂♂, 2 ♀♀; same collection data as for preceding; QMBA.

Other material examined

AUSTRALIA – Queensland • 4 ♀♀; 4 km S of Hartley’s Creek; 16°41′ S, 145°35′ E; 5 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; littoral rainforest, fish pitfall; QMBA • 7 ♂♂, 2 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 3 ♀♀; Atherton Tablelands, Lake Eacham, Chambers Lodge; 6–8 Apr. 1999; S.A. Marshall leg.; dung; DEBU • 6 ♂♂, 5 ♀♀; Buchan Point; 16°44′ S, 145°39′ E; 5 m a.s.l.; 11–13 Feb. 1999; G.B. Monteith leg.; rainforest, dung pitfall; QMBA • 1 ♀; Cape Tribulation; 10 m a.s.l.; 15 Jul. 1982; S. Peck leg.; rainforest litter, carrion; DEBU • 1 ♂, 1 ♀; Cape Tribulation, 40 km N of Daintree; 10 m a.s.l.; 12–15 Jul. 1982; S. Peck leg.; dung trap; DEBU • 6 ♀♀; same collection data as for preceding; 12–17 Jul. 1982; rainforest, carrion trap; DEBU • 2 ♀♀; Cardwell Gap, 15 km N of Ingham; 80 m a.s.l.; 9 Aug. 1982; S. and J. Peck leg.; rainforest, carrion; DEBU • 1 ♀; Cooktown, Keatings Gap; 100 m a.s.l.; 28–31 Jun. 1982; S. and J. Peck leg.; rainforest, carrion; DEBU • 1 ♂, 10 ♀♀; same collection data as for preceding; dung trap; DEBU • 4 ♂♂; 1 km SW of Kauri Creek; 17°09′ S, 145°35′ E; 700 m a.s.l.; 10–11 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♂; 2 km E of Kauri Creek; 17°08′ S, 145°37′ E; 680 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; QMBA • 1 ♀; same collection data as for preceding; fungus pitfall; QMBA • 1 ♂, 5 ♀♀; Kuranda, Kuranda State Forest; 360 m a.s.l.; 27–31 Jul. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 1 ♂; Lake Euramoo; 17°10′ S, 145°38′ E; 700 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; QMBA • 3 ♂♂; same collection data as for preceding; fungus pitfall; QMBA • 7 ♀♀; Mossman Gorge National Park, 6 km SW of Mossman; 50 m a.s.l.; 11–18 Jul. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 1 ♀; Mount Finnigan Slopes, 30 km S of Cooktown; 400 m a.s.l.; 2–5 Jul. 1982; S. and J. Peck leg.; broken termite nest; DEBU • 9 ♀♀; same collection data as for preceding; rainforest, carrion trap; DEBU • 4 ♀♀; same collection data as for preceding; dung

trap; DEBU • 1 ♀; same collection data as for preceding; 1 Jul. 1982; litter and fungi; DEBU • 3 ♀♀; Noah Creek, 20 km N of Daintree; 4 m a.s.l.; 12–18 Aug. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 4 ♂♂, 2 ♀♀; Oak Beach; 16°36' S, 145°31' E; 5 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; rainforest, fish pitfall; QMBA • 3 ♂♂, 2 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 1 ♀; Palmerston National Park, near Innisfail; 360 m a.s.l.; 2–5 Aug. 1982; S. and J. Peck leg.; carrion trap; DEBU • 1 ♂, 1 ♀; Rex Range; 16°31' S, 145°23' E; 90 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; open forest, fish and fungus pitfall; QMBA • 1 ♀; Rex Range, 12 km S of Mossman; 400 m a.s.l.; 10–18 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 7 ♀♀; Thorton Range, near Daintree; 200 m a.s.l.; 12–18 Jul. 1982; S. and J. Peck leg.; carrion trap; DEBU.

Description

BODY (Fig. 8). Length 1.1–1.3 mm. Head caramel-brown, darkened around frontal vitta and ocellar triangle; interfrontal plates pale yellow, with silver-gold microtomentum limited to bases of interfrontal and orbital bristles, ocellar triangle, and around inner vertical bristle; gena golden; antenna brown. Frontal width $2.0 \times$ interfrontal height. Eye height $2.5 \times$ genal height. Thorax brown, anepimeron with a pale posterior spot. Scutum with pale grey and brown microtomentum forming two grey longitudinal stripes, lateral margins broadly yellow and dark brown microtomentose, pale M-shaped microtomentose mark enclosing posterior dorsocentral bristles; scutellum dark brown with median, grey-brown microtomentose triangle. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Legs brown, tibiae proximally paler, tarsi paler. Male mid tibia with long apicoventral bristle only. Wing (Fig. 40D) pattern weak. CS2 $0.4 \times$ CS3. R_{2+3} gently sinuate, angled at $\sim 25^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5\text{--}6 \times$ costal width). M_1 indistinct beyond dm-m; M_4 slightly extended beyond dm-m; CuA+CuP short and non-tubular. Halter pale brown.

MALE ABDOMEN (Fig. 9). S5 very narrow and strongly asymmetrical, posteromedially desclerotized with long posterolateral setae in normal corners, but left side extremely elongate and well-sclerotized and right side with a disconnected sclerite running along posterior edge of S5. S6+7 shifted posteriorly, about halfway down the left-side extension of S5. Cercus flat, rectangular with many long setae, medial edges touching each other; subepandrial sclerite ovoid, medially darkened. Surstylus large, bilobed: anterior lobe triangular with a basal constriction and dense setation along posterior edge, posterior lobe

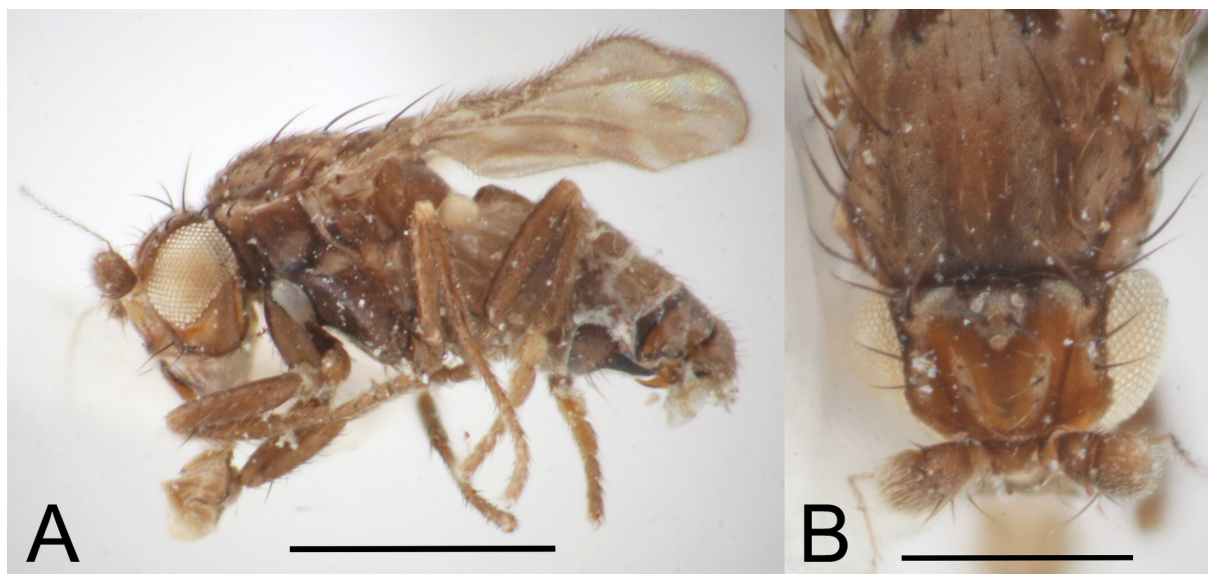


Fig. 8. *Parapterogramma digitisternum* sp. nov., paratype (debu00157176, DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

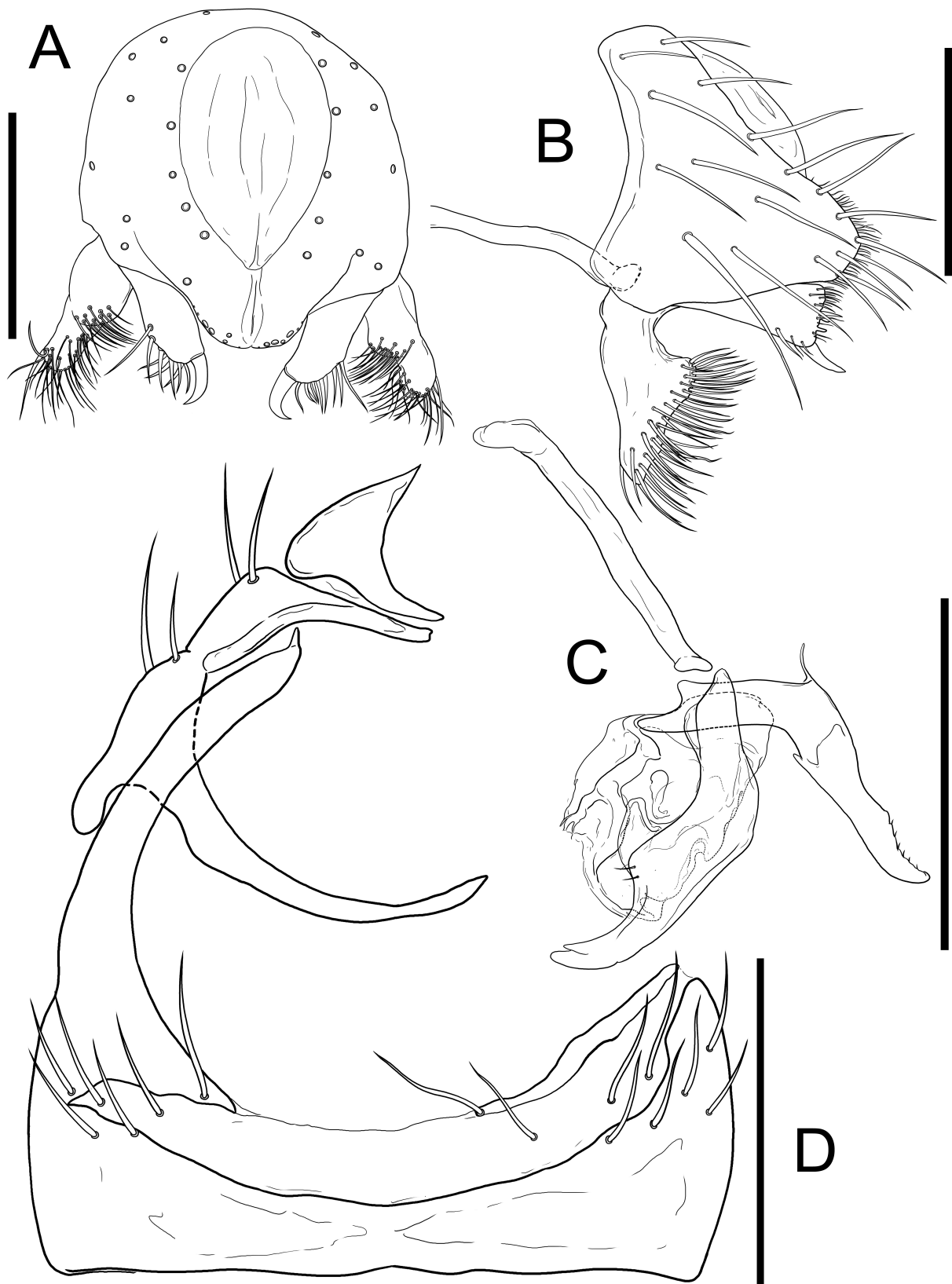


Fig. 9. *Parapterogramma digitisternum* sp. nov., paratype (debu00157172, QMBA). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

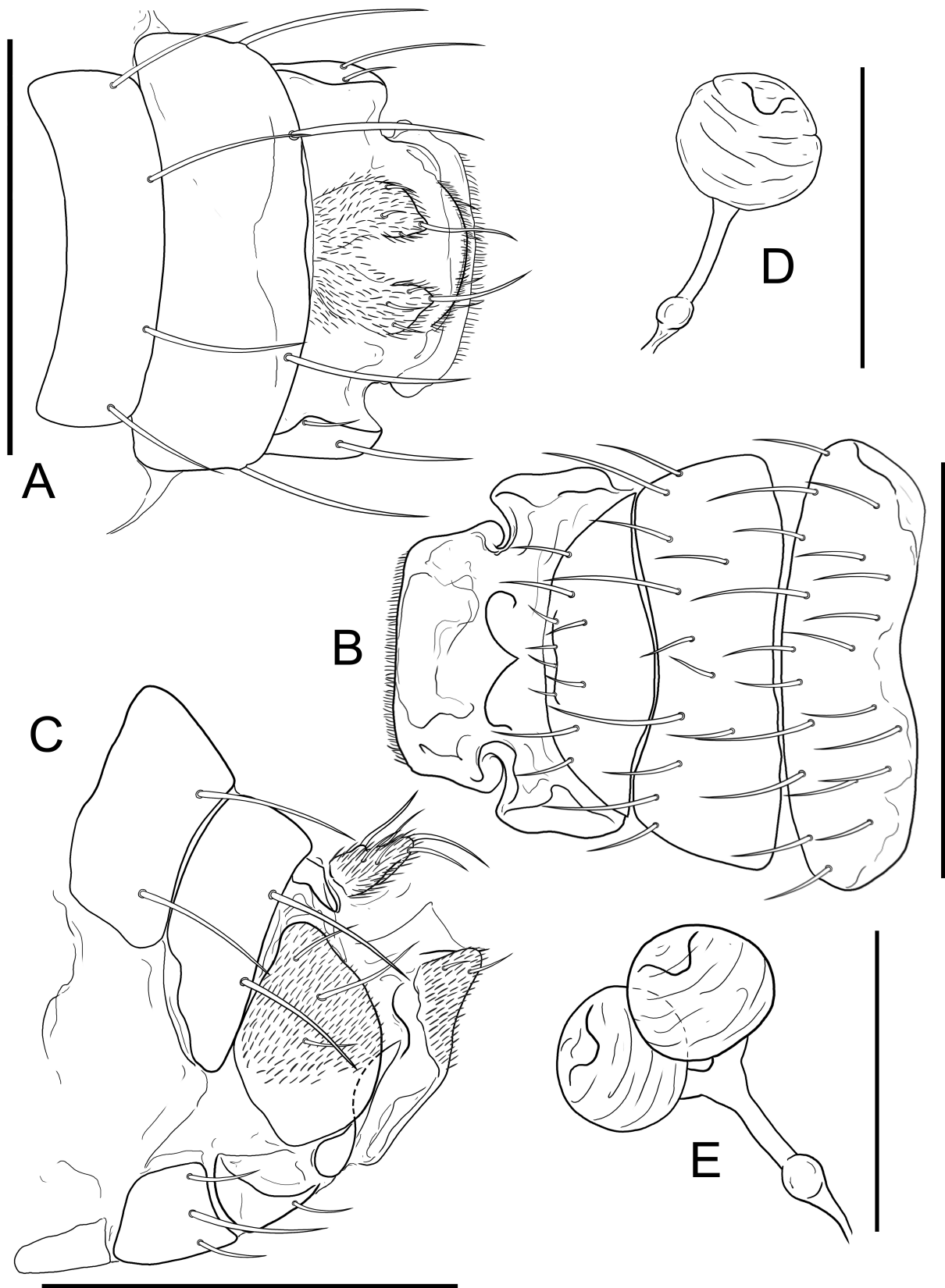


Fig. 10. *Parapterogramma digitisternum* sp. nov., paratype (debu00164307, DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

stout, triangular (tapered anteriorly, posterior edge truncate) with several apical setulae and a very large claw-like apicoventral seta. Postgonite elongate, curved forwards with a triangular medial extension along anterior edge and a bifurcate apex. Phallapodeme elongate, narrow with a slightly enlarged apex; basiphallus very large, box-like with anteriorly emarginate lateral arms and a triangular, dorsally sinuate epiphallus with a set of 6–7 minute dorsal setulae. Distiphallus stout, largely membranous, made mostly of two rounded flaps and supported by a chair-shaped, sclerotized, dorsomedial frame (anterior part apically bifurcate with a deeply bifurcate posteromedial arm).

FEMALE ABDOMEN (Fig. 10). T6 and T7 well-developed, rectangular and long-setose along posterior margin; T8 split into two large, sparsely setose, lateral plates. Epiproct membranous and microtomentose. S6 and S7 rectangular and long-setose along posterior margin; S8 semicircular, long-setose along posterior margin and with a row of four smaller posteromedial setae. Hypoproct rectangular, largely membranous except for a sclerotized, setulose medial part. Spermathecae stout, spherical, and lightly grooved, stem long and membranous.

Remarks

Parapterogramma digitisternum sp. nov. resembles *Pa. pugioformis* sp. nov. in having the microtomentum on the orbital plates limited to the bases of the orbital and inner vertical bristles. *Parapterogramma digitisternum* differs from *Pa. pugioformis* by its taller frons (width $2.0 \times$ height), more sinuate R_{2+3} , CuA+CuP well separated from the wing margin, posteromedially simple male S5, blade-like epiphallus, and a more triangular surstylus with a basal constriction.

Parapterogramma gonitellum sp. nov.

[urn:lsid:zoobank.org:act:774B9202-A4C3-4816-BD47-3266E6C0F427](https://zoobank.org/act:774B9202-A4C3-4816-BD47-3266E6C0F427)

Figs 11–13, 40E, 42

Etymology

This name refers to the highly reduced male postgonites.

Material examined

Holotype

AUSTRALIA – Queensland • ♂; Atherton Tablelands, Lake Eacham, Chambers Lodge; 6–8 Apr. 1999; S.A. Marshall leg.; dung; QMBA debu00163357.

Paratypes

AUSTRALIA – Queensland • 3 ♂♂, 10 ♀♀; same collection data as for holotype; DEBU • 2 ♂♂, 13 ♀♀; same collection data as for holotype; QMBA • 10 ♂♂, 8 ♀♀; Fitzroy Island, site 2; 16°56' S, 145°59' E; 40 m a.s.l.; 19–21 Apr. 1999; G.B. Monteith leg.; transition to rainforest, dung trap; DEBU • 12 ♂♂, 10 ♀♀; same collection data as for preceding; QMBA • 4 ♂♂, 15 ♀♀; same collection data as for preceding; site 4; 15 m a.s.l.; QMBA • 3 ♂♂, 4 ♀♀; Lake Euramoo; 17°10' S, 145°36' E; 700 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; DEBU • 4 ♂♂, 4 ♀♀; same collection data as for preceding; QMBA • 7 ♂♂, 3 ♀♀; 3.5 km SE of Malanda; 17°23' S, 145°36' E; 760 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, dung pitfall; DEBU • 8 ♂♂, 4 ♀♀; same collection data as for preceding; QMBA.

Other material examined

AUSTRALIA – Queensland: • 1 ♂, 1 ♀; Above Mill Creek; 17°30' S, 145°27' E; 1030 m a.s.l.; 5–9 Feb. 1999; Monteith and Cook leg.; open forest, fungus pitfall; QMBA • 3 ♂♂, 3 ♀♀; Atherton Tablelands, Lake Eacham; 5–8 Apr. 1999; S.A. Marshall leg.; sweep; DEBU • 1 ♀; Baldy Mountain Road, start; 17°21' S, 145°25' E; 860 m a.s.l.; 3–6 Feb. 1999; Monteith and Cook leg.; open forest,

fish pitfall; QMBA • 1 ♀; same collection data as for preceding; fungus pitfall; QMBA • 1 ♀; 1 km NW of Buchan Point; 16°44' S, 145°39' E; 10 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; open forest, dung pitfall; QMBA • 2 ♂♂; same collection data as for preceding; fish pitfall; QMBA • 4 ♂♂, 2 ♀♀; Buchan Point; 16°44' S, 145°39' E; 5 m a.s.l.; 11–13 Feb. 1999; G.B. Monteith leg.; rainforest, dung pitfall; QMBA • 3 ♀♀; Cape Tribulation; 10 m a.s.l.; 15 Jul. 1982; S. Peck leg.; rainforest litter, carrion trap; DEBU • 2 ♀♀; Cape Tribulation, 40 km N of Daintree; 10 m a.s.l.; 12–17 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 3 ♀♀; Cheelonga Creek, Evelyn; 17°31' S, 145°32' E; 1080 m a.s.l.; 15–17 Apr. 1999; G.B. and S.R. Monteith leg.; rainforest, dung trap; QMBA • 4 ♀♀; Cooktown, Keatings Gap; 100 m a.s.l.; 28–31 Jun. 1982; S. and J. Peck leg.; rainforest, dung trap; DEBU • 2 ♂♂; 4 km S of Hartley's Creek 16°41' S, 145°35' E; 5 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; littoral rainforest, dung pitfall; QMBA • 2 ♂♂, 1 ♀; same collection data as for preceding; fish pitfall; QMBA • 8 ♂♂, 6 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 2 ♂♂; 1 km SW of Kauri Creek; 17°09' S, 145°35' E; 700 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; QMBA • 8 ♂♂, 5 ♀♀; 2 km E of Kauri Creek; 17°08' S, 145°37' E; 680 m a.s.l.; 10–11 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 2 ♀♀; Kjellberg Road, State Forest boundary; 17°32' S, 145°35' E; 920 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, dung pitfall; QMBA • 6 ♂♂, 5 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 7 ♂♂; Kjellberg Road turnoff; 17°32' S, 145°36' E; 740 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 4 ♂♂, 13 ♀♀; Lacey's Creek, 10 km SE of El Arish, near Mission Beach; 40 m a.s.l.; 23 Jun.–5 Aug. 1982; S. and J. Peck leg.; rainforest, flight intercept trap; DEBU • 5 ♂♂; Maalan State Forest, Ravenshoe Road; 17°35' S, 145°36' E; 840 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♂; Mill Creek; 17°30' S, 145°27' E; 940 m a.s.l.; 5–9 Feb. 1999; Monteith and Cook leg.; open forest, fungus pitfall; QMBA • 1 ♀; Mill Creek, above; 17°30' S, 145°27' E; 1000 m a.s.l.; 5–9 Feb. 1999; Monteith and Cook leg.; open forest, rotten bait; QMBA • 1 ♂, 1 ♀; Millaa-Millaa Falls; 17°30' S, 145°37' E; 800 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 4 ♂♂, 7 ♀♀; Millstream Conservation Park; 17°32' S, 145°29' E; 1040 m a.s.l.; 3–5 Feb. 1999; Monteith and Cook leg.; wet sclerophyll, dung trap; QMBA • 3 ♂♂, 7 ♀♀; same collection data as for preceding; fish pitfall; QMBA • 19 ♂♂, 10 ♀♀; same collection data as for preceding; fungus trap; QMBA • 1 ♀; Millstream Conservation Park, adjacent; 17°32' S, 145°29' E; 1040 m a.s.l.; 4–5 Feb. 1999; G.B. Monteith leg.; open forest, automatic dung trap (day); QMBA • 1 ♂; Millstream Retreat; 17°32' S, 145°31' E; 1020 m a.s.l.; 14–17 Apr. 1999; G.B. and S.R. Monteith leg.; wet sclerophyll, fungus trap; QMBA • 3 ♂♂, 3 ♀♀; The Millstream, 10 km NNE of Ravenshoe; 17°32' S, 145°31' E; 1040 m a.s.l.; 3–5 Feb. 1999; Monteith and Cook leg.; rainforest, fish pitfall; QMBA • 1 ♂, 1 ♀; same collection data as for preceding; dung trap; QMBA • 2 ♂♂; The Millstream, 10 km NNE of Ravenshoe; 17°32' S, 145°31' E; 1040 m a.s.l.; 6 Dec. 1998–5 Feb. 1999; Cook and Monteith leg.; rainforest, pitfall trap; QMBA • 2 ♂♂, 5 ♀♀; The Millstream, 10 km NNE of Ravenshoe; 17°32' S, 145°31' E; 1050 m a.s.l.; 14–17 Apr. 1999; G.B. and S.R. Monteith leg.; wet sclerophyll, dung trap; QMBA • 6 ♂♂, 5 ♀♀; same collection data as for preceding; fungus trap; QMBA • 1 ♂, 1 ♀; Mount Finnigan Slopes, 30 km S of Cooktown; 400 m a.s.l.; 2–5 Jul. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 1 ♀; same collection data as for preceding; litter and fungi; 1 Jul. 1982; DEBU • 1 ♂; Mount Hugh Nelson, south base; 17°31' S, 145°33' E; 1080 m a.s.l.; 7–9 Feb. 1999; G.B. Monteith leg.; rainforest, dung pitfall; QMBA • 4 ♂♂, 1 ♀; same collection data as for preceding; fungus pitfall; QMBA • 1 ♂, 1 ♀; same collection data as for preceding; rotten bait; QMBA • 22 ♂♂, 10 ♀♀; Mount Hypipamee National Park; 11–17 Apr. 1999; S.A. Marshall leg.; dung; DEBU • 3 ♂♂, 2 ♀♀; Oak Beach; 16°36' S, 145°31' E; 5 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; rainforest, fish pitfall; QMBA • 7 ♂♂, 3 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 1 ♂, 2 ♀♀; Palmerston National Park, near Innisfail; 360 m a.s.l.; 2–5 Aug. 1982; S. and J. Peck leg.; carrion trap; DEBU • 1 ♀; 3 km SW of Ravenshoe; 17°38' S, 145°28' E; 860 m a.s.l.; 3–5 Feb. 1999; Monteith and Cook leg.; open forest, fungus pitfall; QMBA • 2 ♂♂, 1 ♀; Ravenshoe, 4 km SSE; 17°39' S, 145°30' E; 930 m a.s.l.; 4–6 Feb. 1999; Monteith and leg.; open forest, fungus pitfall; QMBA •

1 ♀; 7 km NE of Ravenshoe; 17°34' S, 145°31' E; 1080 m a.s.l.; 6 Dec. 1998–5 Feb. 1999; Monteith and Cook leg.; wet sclerophyll, pitfall; QMBA • 1 ♀; 9 km N of Ravenshoe; 17°32' S, 145°29' E; 1060 m a.s.l.; 3–5 Feb. 1999; Monteith and Cook leg.; wet sclerophyll, dung pitfall; QMBA • 1 ♀; same collection data as for preceding; fish pitfall; QMBA • 1 ♂, 1 ♀; same collection data as for preceding; fungus pitfall; QMBA • 1 ♂; 9.5 km N of Ravenshoe; 17°32' S, 145°29' E; 1060 m a.s.l.; 14–17 Apr. 1999; G.B. and S.R. Monteith leg.; wet sclerophyll, dung trap; QMBA • 1 ♀; Rosina Creek, 14 km SE of Millaa Millaa, Palmerston Highway; 720 m a.s.l.; 24 Jun.–2 Aug. 1982; S. Peck leg.; rainforest, flight intercept trap; DEBU • 1 ♂, 1 ♀; Shipton's Flat; 15°48' S, 145°14' E; 220 m a.s.l.; 19–22 Nov. 1998; G.B. Monteith leg.; rainforest, automatic dung trap (day); QMBA • 1 ♂, 4 ♀♀; Sluice Creek; 17°32' S, 145°32' E; 1100 m a.s.l.; 14–17 Apr. 1999; G.B. and S.R. Monteith leg.; rainforest, fungus trap; QMBA • 3 ♀♀; Thorton Range, near Daintree; 200 m a.s.l.; 12–18 Jul. 1982; S. and J. Peck leg.; carrion trap; DEBU • 9 ♂♂, 1 ♀; Tolga Scrub; 17°15' S, 145°29' E; 760 m a.s.l.; 3–6 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♂; Vine Creek, Majors Mountain; 17°41' S, 145°32' E; 1060 m a.s.l.; 4–6 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♂; 2 km SSE of Wondecla; 17°26' S, 145°24' E; 910 m a.s.l.; 3–6 Feb. 1999; Monteith and Cook leg.; open forest, dung pitfall; QMBA • 8 ♂♂, 13 ♀♀; Wonga Beach, 10 km S of Daintree; 15–16 Apr. 1999; S.A. Marshall leg.; low forest, dung; DEBU.

Description

BODY (Fig. 11). Length 1.2–1.5 mm. Head caramel-brown, darkened around lateral and posterior margins, with pale yellow frontal vitta and interfrontal plates, and silvery-gold microtomentum on ocellar triangle, orbital plates and occiput; gena yellow; antenna brown. Frontal width $2.0 \times$ interfrontal height. Eye height $2.5 \times$ genal height. Thorax brown, anepimeron with a pale ventral spot. Scutum with pale grey and brown microtomentum forming two dark longitudinal stripes, lateral margins broadly yellow microtomentose, pale M-shaped microtomentose mark at level of posterior dorsocentral bristles; scutellum dark brown with median, grey-brown microtomentose triangle. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Legs brown, tibiae proximally paler, tarsi paler. Male mid tibia with a stout apicoventral bristle and two rows of stout ventral setae. Wing (Fig. 40E) pattern strong, anterior edge with a single darker spot below R_1 . CS_2 $0.4 \times CS_3$. R_{2+3} gently sinuate, distal curve much

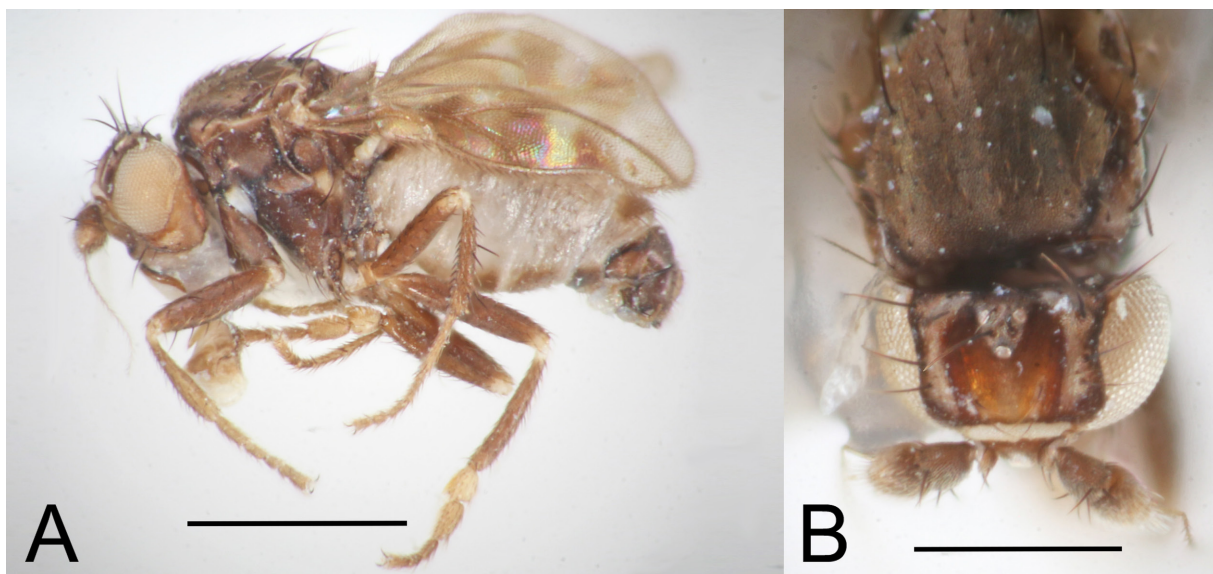


Fig. 11. *Parapterogramma gonitellum* sp. nov., paratype (debu00162066, DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

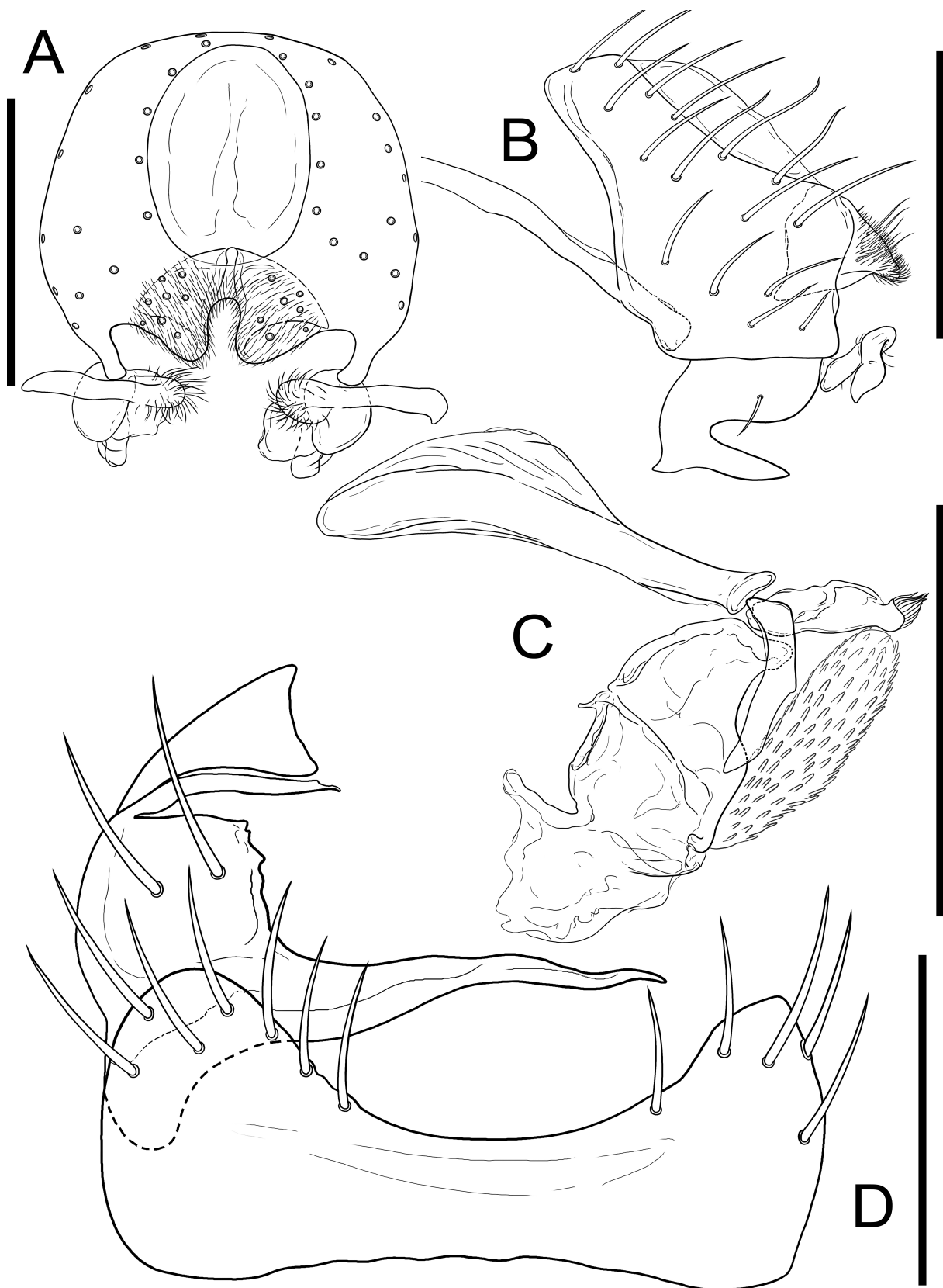


Fig. 12. *Parapterogramma gonitellum* sp. nov., paratype (debu00162082, QMBA). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

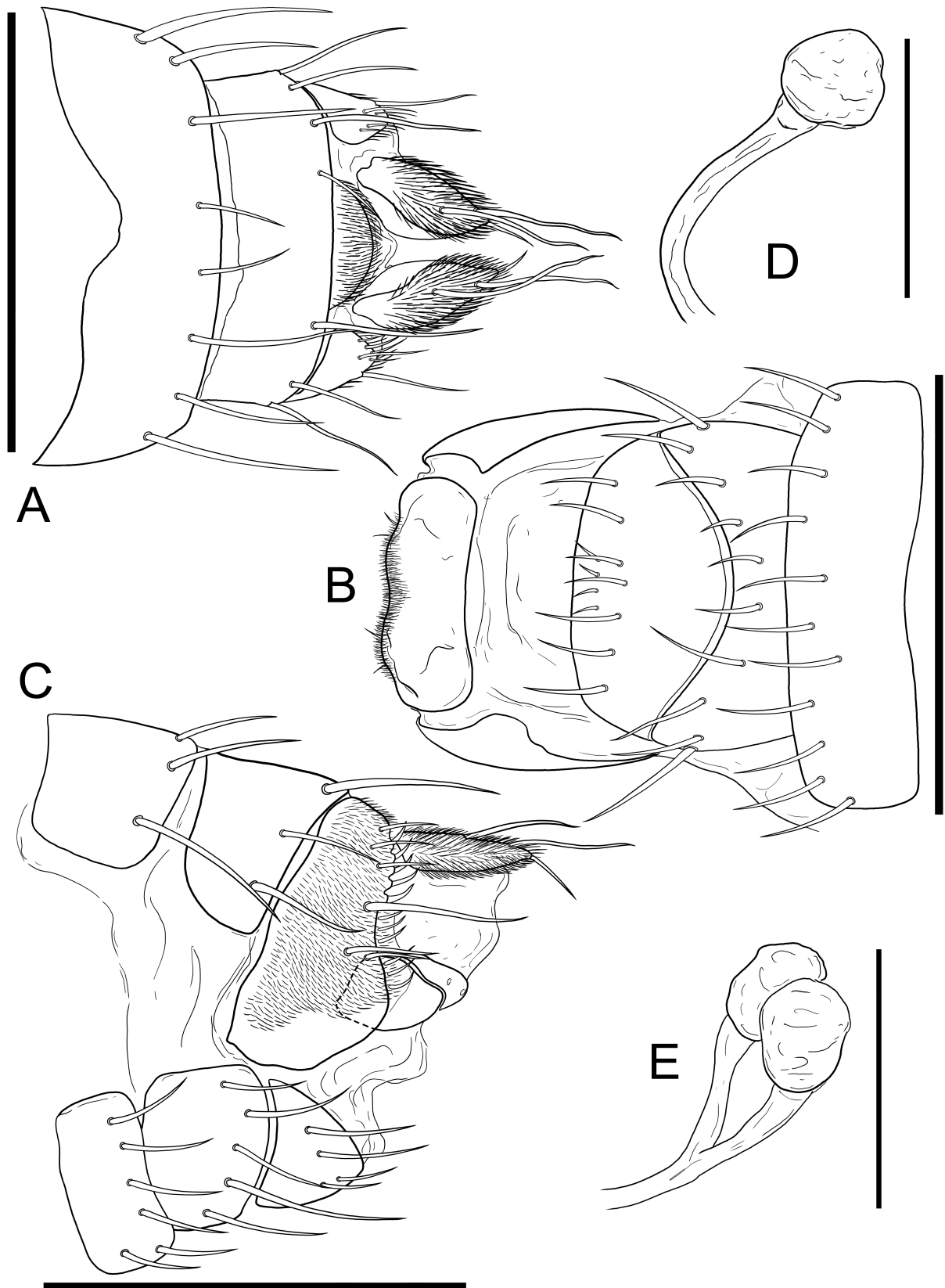


Fig. 13. *Parapterogramma gonitellum* sp. nov., paratype (debu00159701, QMBA). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

stronger than basal curve, angled at $\sim 60^\circ$ to costa and broadly separated from costa for most of its length; costa extending well beyond apex of R_{4+5} ($4\text{--}5 \times$ costal width). M_1 sometimes extending slightly beyond dm-m; M_4 indistinct beyond dm-m; CuA+CuP short and non-tubular. Halter off-white.

MALE ABDOMEN (Fig. 12). S5 narrow, posteromedially desclerotized with long posterolateral setae. S6 sinuate. Cercus flat, triangular with several enlarged setulae, and widely separated between the pair; subepandrial sclerite semicircular, anteromedially darkened and posteromedially emarginate. Surstylus bilobed, the lobes almost entirely separated: anterior lobe somewhat C-shaped, with a broad basal half and a pointed apical half that curves underneath the basal half and has a small anteroventral tooth, posterior lobe J-shaped, basal part densely setulose, apical part tapered and curled outwards. Postgonite reduced, about half the length of the distiphallus, tapered, slightly sinuate, and usually angled almost perpendicular to distiphallus. Phallapodeme short, stout, sinuate with a large dorsal ‘fin’; basiphallus short and ring-shaped, with a small bulb-like epiphallus bearing a patch of minute setulae. Distiphallus stout: basal part well-sclerotized but frame-like, with a blade-like sclerite along anterior face connected to the broad lateral sclerites by a pair of narrow medial sclerites; apical part with a large membranous scoop-like flap and supported posteroventrally by a large, papillate, membranous extension of the basal part (separate from, but reaching, epiphallus).

FEMALE ABDOMEN (Fig. 13). T6 and T7 well-developed, rectangular and long-setose along posterior margin; T8 split into two large lateral plates, with dense setation along posterior margin. Epiproct membranous, rounded posteriorly and setulose. S6 rectangular; S7 deeply emarginate and long-setose along posterior margin; S8 broadened anteriorly to fit into emargination in S7, long-setose along posterior margin and with a row of four smaller posteromedial setae. Hypoproct rectangular, with developed lateral plates and a membranous, setulose medial part. Spermathecae stout, spherical, and smooth, stem very long and membranous.

Remarks

This is the most frequently collected species of *Parapterogramma* in Australia and the only species of *Parapterogramma* with a reduced postgonite and a twisted posterior surstylar lobe. *Parapterogramma gonitellum* is externally most similar to *Pa. magnum* sp. nov., from which it differs in having a taller frons (width $2.0 \times$ height), concave R_{2+3} , short and largely non-tubular CuA+CuP, and the costa extending ~ 4 costal widths beyond R_{4+5} .

Parapterogramma hieroglyphicum sp. nov.

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Figs 14–16, 40F, 42

Etymology

This species name (from the Latin ‘*hieroglyphicus*’, ‘hieroglyphic’) refers to the distinct patterning on the scutum, reminiscent of hieroglyphics.

Material examined

Holotype

FIJI – **Viti Levu** • ♂; Nandarivitu, Y00 Microwave Station; 3350 m a.s.l.; 16–23 Aug. 1978; S. and J. Peck leg.; forest dung; DEBU.

Paratypes

FIJI – **Taveuni** • 3 ♂♂; Cakaudrove, 5.3 km SE of Tavuki Village, Mount Devo; $16^\circ 50' 28''$ S, $179^\circ 58' 05''$ W; 1064 m a.s.l.; 17–24 Oct. 2002; Schlinger and Tokota’a leg.; Malaise; BPBM • 1 ♀; same collection data as for preceding; 24–31 Oct. 2002; BPBM • 1 ♂; Cakaudrove, Devo Forest

Reserve; 16°50' S, 179°59' E; 800 m a.s.l.; 3–10 Jan. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU • 1 ♀; Cakaudrove, Devo Peak Radio Tower; 16°51' S, 179°58' E; 1200 m a.s.l.; 31 Oct.–21 Nov. 2002; Irwin, Schlinger, and Tokota'a leg.; Malaise in rainforest; DEBU • 1 ♂; Cakaudrove, Taveuni Estate; 16°50' S, 179°59' E; 140 m a.s.l.; 10–17 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; Malaise in garden; BPBM. – **Vanua Levu** • 1 ♂; Bua, 6 km NW of Kilaka, Batiqere Range; 16°48'24" S, 178°59'29" E; 98 m a.s.l.; 15–24 Jun. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; Bua, Kilaka; 16°48'41" S, 178°59'29" E; 98 m a.s.l.; 28 Jun.–21 Jul. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU • 1 ♂; Bua, Kilaka; 16°48'41" S, 178°59'02" E; 154 m a.s.l.; 28 Jun.–2 Jul. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂; Macuata, Dogotuki, 2.5 km E of Nasavu River; 16°15'07" S, 179°47'00" E; 226 m a.s.l.; 7 Jul. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM. – **Viti Levu** • 25 ♂♂, 26 ♀♀; same collection data as for holotype; CNCI • 24 ♂♂, 25 ♀♀; same collection data as for holotype; DEBU • 2 ♂♂; Naitasiri, Navai Village, Eteni; 17°37' S, 177°59' E; 700 m a.s.l.; 15 May–2 Jun. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU • 4 ♂♂, 4 ♀♀; same collection data as for preceding; 6 Jun.–15 Jul. 2003; BPBM • 1 ♀; 1.8 km E of Navai Village, old trail to Mount Tomaniivi; 17°37'16" S, 177°59'53" E; 700 m a.s.l.; 9–30 Aug. 2004; E. Namatalau leg.; Malaise; DEBU • 1 ♂; 10 km N of Galoa; 300 m a.s.l.; 29 Aug.–1 Sep. 1978; S. and J. Peck leg.; second forest; DEBU.

NEW CALEDONIA • 1 ♀; Col des Roussettes, near Bourail; 500–600 m a.s.l.; 31 Jul.–7 Aug. 1978; S. Peck leg.; rainforest, dung trap; DEBU • 1 ♂; Mount Koghi, Auberger, near Nouméa; 500 m a.s.l.; 26 Jul.–13 Aug. 1978; S. and J. Peck leg.; rainforest; DEBU.

Description

BODY (Fig. 14). Length 1.0–1.2 mm. Head yellow, with a brown crescent around each ocellus, and silvery-yellow microtomentum on interfrontal plates, ocellar triangle, orbital plates, and occiput; gena brownish; antenna yellow. Frontal width $2.5 \times$ interfrontal height. Eye height $2.1 \times$ genal height. Thorax bicoloured (Fig. 14C–D): lower two-thirds of anepisternum and below dark brown, upper third yellow, scutum yellow with 8–10 dark brown, irregular oval to triangular spots; scutellum yellow with brown spots anterolaterally, anteromedially, and posteromedially. Scutum uniformly microtomentose except on spots. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Legs brown, fore tibia yellow, mid and hind femora apically and tibiae proximally paler, tarsi paler. Male mid tibia with long apicoventral bristle only. Wing (Fig. 40F) pattern strong, anterior margin with bold dark spots. CS2 $0.5 \times$ CS3. R_{2+3} broadly curved in apical half, angled at $\sim 60^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5\text{--}6 \times$ costal width). M_1 and M_4 both indistinct beyond dm-m; CuA+CuP long. Halter whitish.

MALE ABDOMEN (Fig. 15). S5 broad, rectangular, with a posteromedial row of 7–8 thickened setae and longer posterolateral setae. S6 short and slightly curved. Cercus flat, subquadrate with two setae; subepandrial sclerite indistinct but medially darkened. Surstylus long but low, bilobed: anterior lobe larger, triangular, largely bare, with flared anteroventral apex, posterior lobe triangular, slightly curved, and setulose in the apical half and anteroventrally. Postgonite small, short but broad, curved, evenly tapered, anterior half pale. Phallapodeme elongate, apex strongly curved; basiphallus small, ring-shaped with a well-developed, flattened, triangular epiphallus. Distiphallus stout: basal part well-sclerotized but frame-like, with a blade-like sclerite along anterior face connected to the broad lateral sclerites by a pair of narrow medial sclerites; apical part with a large membranous scoop-like flap and supported posteroventrally by a large, papillate, membranous extension of the basal part extending to (but separate from) epiphallus.

FEMALE ABDOMEN (Fig. 16). T6 and T7 well-developed, rectangular and long-setose along posterior margin; T8 broad, wrapping around laterally, rectangular and sclerotized dorsally, with three lateral setae. Epiproct entirely membranous. S6 rectangular and setose along posterior margin; S7 subrectangular

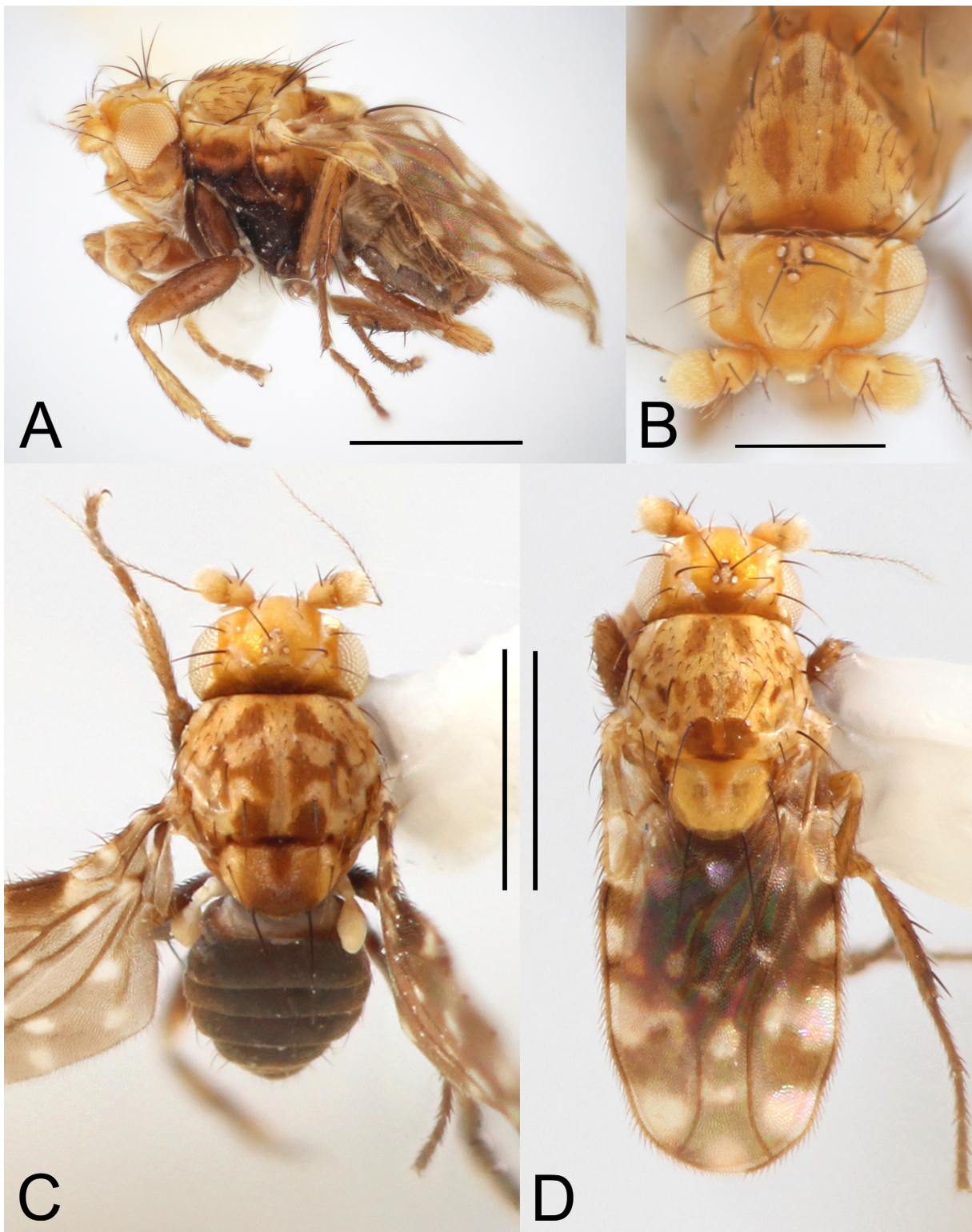


Fig. 14. *Parapterogramma hieroglyphicum* sp. nov., paratypes (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. **C.** Male habitus with connected scutal pattern, dorsal view (debu00074730). **D.** Male habitus with isolated scutal pattern, dorsal view (debu00029571). Scale bars: A, C–D = 0.50 mm; B = 0.25 mm.

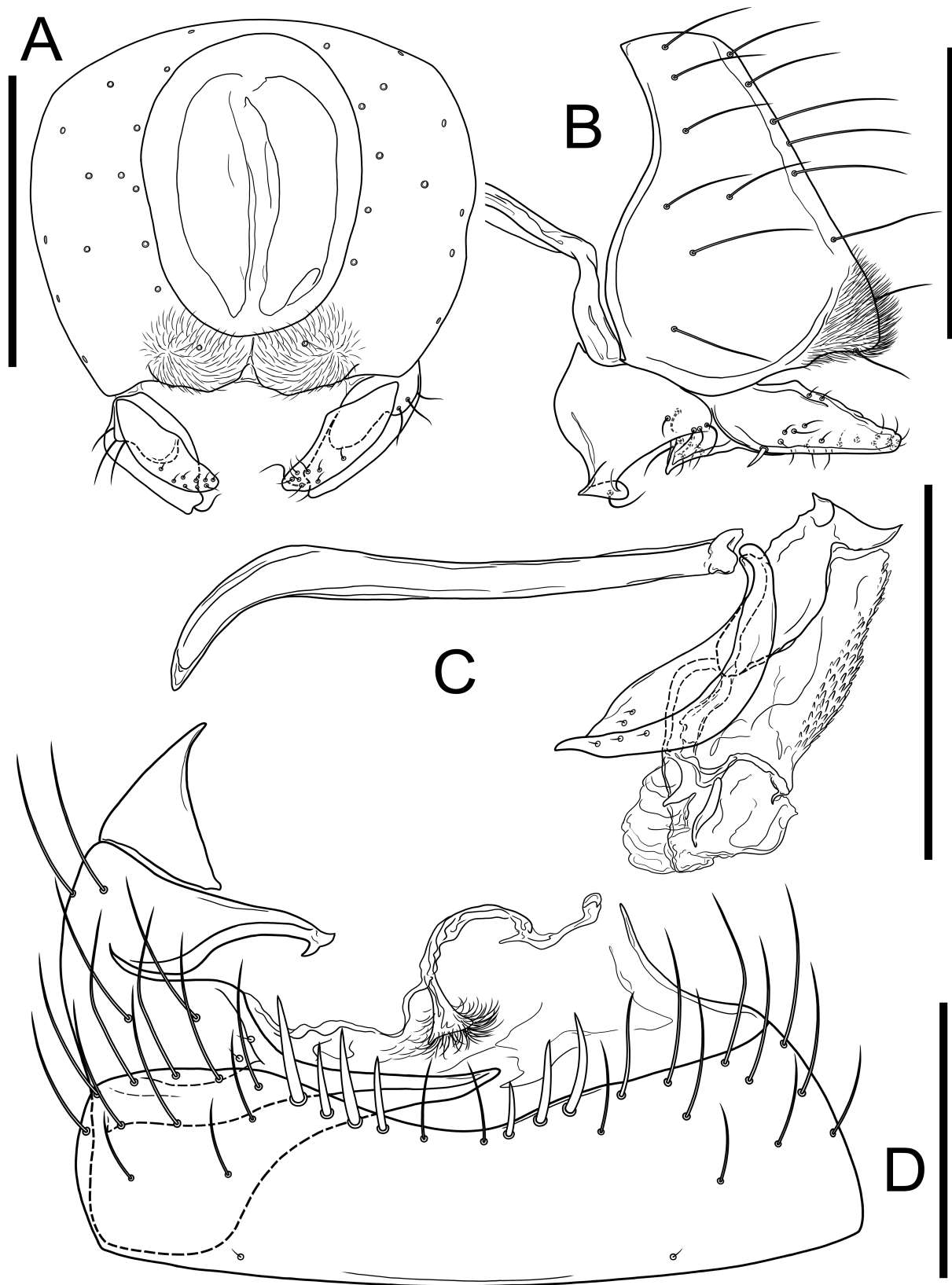


Fig. 15. *Parapterogramma hieroglyphicum* sp. nov., paratype (BPBM). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

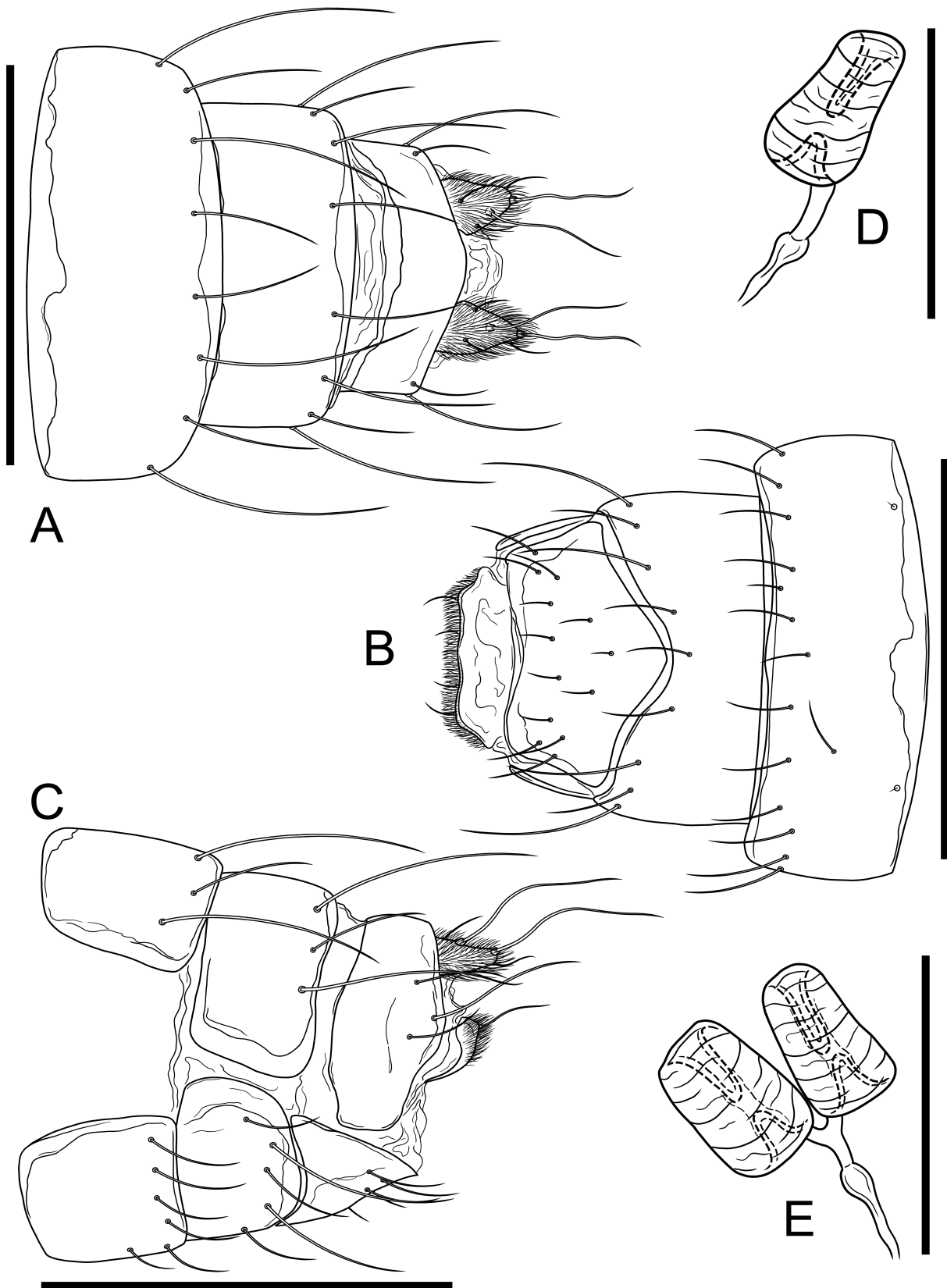


Fig. 16. *Parapterogramma hieroglyphicum* sp. nov., paratype (BPBM). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

with deep posteromedial emargination and posterior row of setae; S8 pentagonal, anteriorly projecting into emargination of S7, with scattered setae. Hypoproct reduced, rectangular, largely membranous except for a sclerotized, setulose medial part. Spermathecae stout, subcylindrical, wider at base, lightly grooved with deep invaginations on both ends, stem very short and membranous.

Remarks

Parapterogramma hieroglyphicum sp. nov. is easily recognized by the distinctly bicoloured thorax and spotted scutum. This species is primarily known from Fiji, although two specimens were collected in New Caledonia.

Parapterogramma magnum sp. nov.

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Figs 17–19, 40G, 42

Etymology

The species name (from the Latin ‘*magnus*’, ‘large, great, big’) is in reference to the large body size compared to the other species of *Parapterogramma*.

Material examined

Holotype

AUSTRALIA – **Queensland** • ♂; Rosina Creek, 14 km SE of Millaa Millaa, Palmer Highway; 720 m a.s.l.; 24 Jun.–2 Aug. 1982; S. Peck leg.; rainforest, flight intercept trap; QMBA.

Paratypes

AUSTRALIA – **New South Wales** • 6 ♂♂, 4 ♀♀; Bruxner Park, 8 km N of Coffs Harbour; 140 m a.s.l.; 12 Jun.–26 Aug. 1982; S. Peck leg.; rainforest, flight intercept trap; AMSA • 5 ♂♂, 4 ♀♀; same collection data as for preceding; DEBU • 5 ♂♂, 3 ♀♀; Ingalla State Forest, 30 km S of Macksville; 40 m a.s.l.; 12 Jun.–26 Aug. 1982; S. Peck leg.; wet sclerophyll, flight intercept trap; AMSA • 5 ♂♂; same collection data as for preceding; DEBU. – **Queensland** • 2 ♂♂, 1 ♀; same collection data as for holotype; QMBA • 1 ♂, 3 ♀♀; Brisbane Forest Park, Scrub Creek Road; 27°25′41″ S, 152°50′15″ E; 29 Sep.–3 Oct. 2002; C.R. Nelson leg.; Malaise trap; QMBA • 2 ♂♂; Brisbane Forest Park, Scrub Creek Road; 27°25′41″ S, 152°50′15″ E; 29 Sep. 2002; C.R. Nelson leg.; yellow pans; QMBA • 1 ♂, 3 ♀♀; Hugh Nelson Range, 19 km NW of Millaa Millaa, near the Crater; 1080 m a.s.l.; 24 Jun.–2 Aug. 1982; S. and J. Peck leg.; flight intercept trap; DEBU • 1 ♂, 2 ♀♀; Kirra State Forest, 32 km NW of Cardwell; 800 m a.s.l.; 23 Jun.–8 Aug. 1982; S. and J. Peck leg.; rainforest, flight intercept trap; QMBA • 1 ♂, 1 ♀; Kuranda State Forest, 3 km N of Kuranda; 360 m a.s.l.; 25 Jun.–3 Aug. 1982; S. Peck leg.; rainforest, flight intercept trap; DEBU • 1 ♂; Lamington National Park, Binna Burra; 900 m a.s.l.; 23 Jun.–7 Aug. 1978; S. and J. Peck leg.; *Nothofagus* grove, carrion; DEBU • 2 ♀♀; Mary Cairncross Park, 7 km SE of Maleny; 900 m a.s.l.; 18 Jun.–15 Aug. 1982; S. and J. Peck leg.; rainforest, flight intercept trap; QMBA • 1 ♀; Mount Finnigan Slopes, 30 km S of Cooktown; 400 m a.s.l.; 2–5 Jun. 1982; S. and J. Peck leg.; rainforest, dung trap; DEBU • 4 ♂♂, 2 ♀♀; Mount Lewis, 20 km SW of Mossman; 900 m a.s.l.; 26 Jun.–1 Aug. 1982; S. and J. Peck leg.; rainforest, flight intercept trap; DEBU • 4 ♂♂, 3 ♀♀; same collection data as for preceding; QMBA • 7 ♂♂, 10 ♀♀; Paluma, Paluma Dam Road; 850 m a.s.l.; 22 Jun.–6 Aug. 1982; S. Peck leg.; rainforest, flight intercept trap; DEBU • 7 ♂♂, 10 ♀♀; same collection data as for preceding; QMBA • 1 ♀; Sluice Creek; 17°32′ S, 145°32′ E; 1100 m a.s.l.; 14–17 Apr. 1999; G.B. and S.R. Monteith leg.; rainforest, fungus trap; QMBA • 2 ♂♂; Yabba Creek, 7 km SW of Kenilworth; 150 m a.s.l.; 18 Jun.–15 Aug. 1982; S. and J. Peck leg.; wet sclerophyll, flight intercept trap; DEBU • 1 ♂, 1 ♀; Yabba Creek, 7 km SW of Kenilworth; 15 Aug. 1982; S. and J. Peck leg.; rainforest litter; QMBA.

Description

BODY (Fig. 17). Length 1.4–1.9 mm. Head dark brown with silver-gold microtomentum on lunule, interfrontal plates, ocellar triangle, orbital plates, and occiput; gena caramel-brown; antenna brown. Frontal width $2.5 \times$ interfrontal height. Eye height $2.5 \times$ genal height. Thorax dark brown, anepimeron with a pale ventral spot. Scutum with pale grey and brown microtomentum forming indistinct dark longitudinal stripes, lateral margins broadly pale yellow microtomentose, pale M-shaped microtomentose mark at level of posterior dorsocentral bristles; scutellum dark brown with median, grey-brown microtomentose triangle. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Legs dark brown, femora apically and tibiae proximally paler, tarsi pale brown. Male mid tibia with a stout apicoventral bristle and two rows of stout ventral setae. Wing (Fig. 40G) pattern strong. CS2 $0.5 \times$ CS3. R_{2+3} almost straight for most of its length, distal quarter abruptly bent towards costa, causing R_{2+3} to reach costa at a $\sim 60^\circ$ angle and moderately separated from costa for most of its length; costa extending very slightly beyond apex of R_{4+5} ($1-2 \times$ costal width). M_1 and M_4 both extended slightly beyond dm-m; CuA+CuP long and tubular. Halter white.

MALE ABDOMEN (Fig. 18). S5 narrow, posteromedially desclerotized with long posterolateral setae. S6 short and broadened. Cercus small, flat with a very large seta and two smaller setae, mesial edges touching each other; subepandrial sclerite broadly pentagonal and medially darkened. Surstylus large, bilobed: anterior lobe low, triangular with several ventral setae, posterior lobe large, rectangular, apically setulose. Postgonite elongate with a long, triangular lateral fin and a strong, triangular posterior extension. Phallapodeme relatively short, stout with a broad, arrow-like apical part; basiphallus narrow but long and box-like with an elongate, flattened and apically setulose epiphallus. Distiphallus stout: basal part well sclerotized and tubular, with a well-developed dorsal sclerite and separate, apically bifurcate lateral sclerites; apical part with large membranous flaps and supported by basal part.

FEMALE ABDOMEN (Fig. 19). T6 semicircular, well-developed, and long-setose along posterior margin; T7 well-developed, rectangular and long-setose along posterior margin; T8 large, slightly emarginate posteromedially with long setae in posterolateral margins. Epiproct largely reduced. S6 and S7 well-developed and rectangular; S8 large, semicircular, and uniformly long-setose, posterior edge with a broad

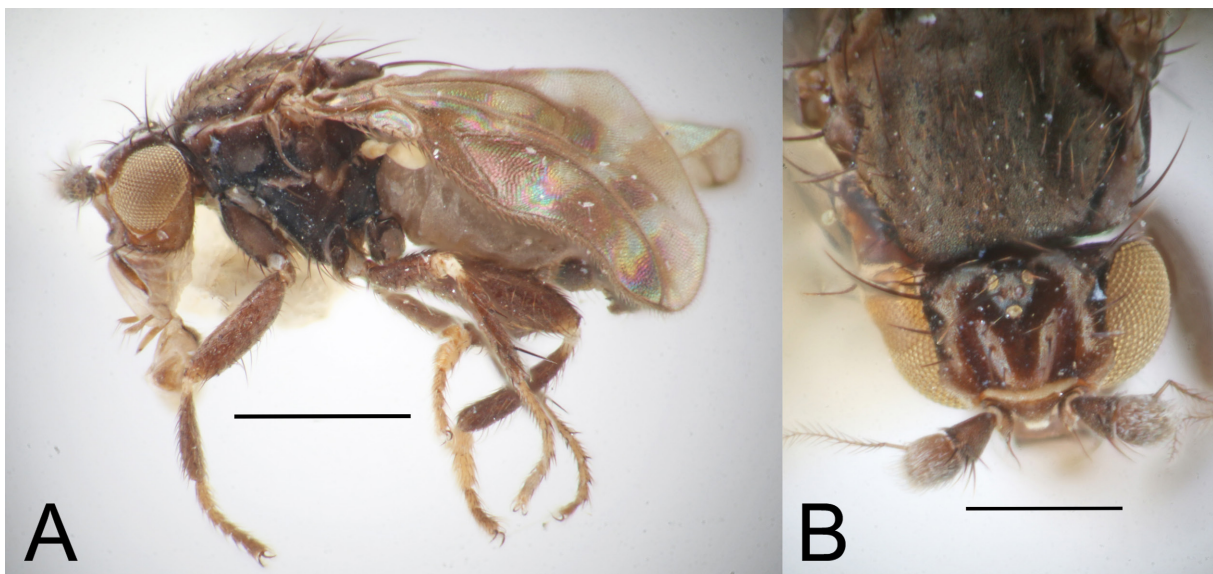


Fig. 17. *Parapterogramma magnum* sp. nov., holotype (QMBA). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

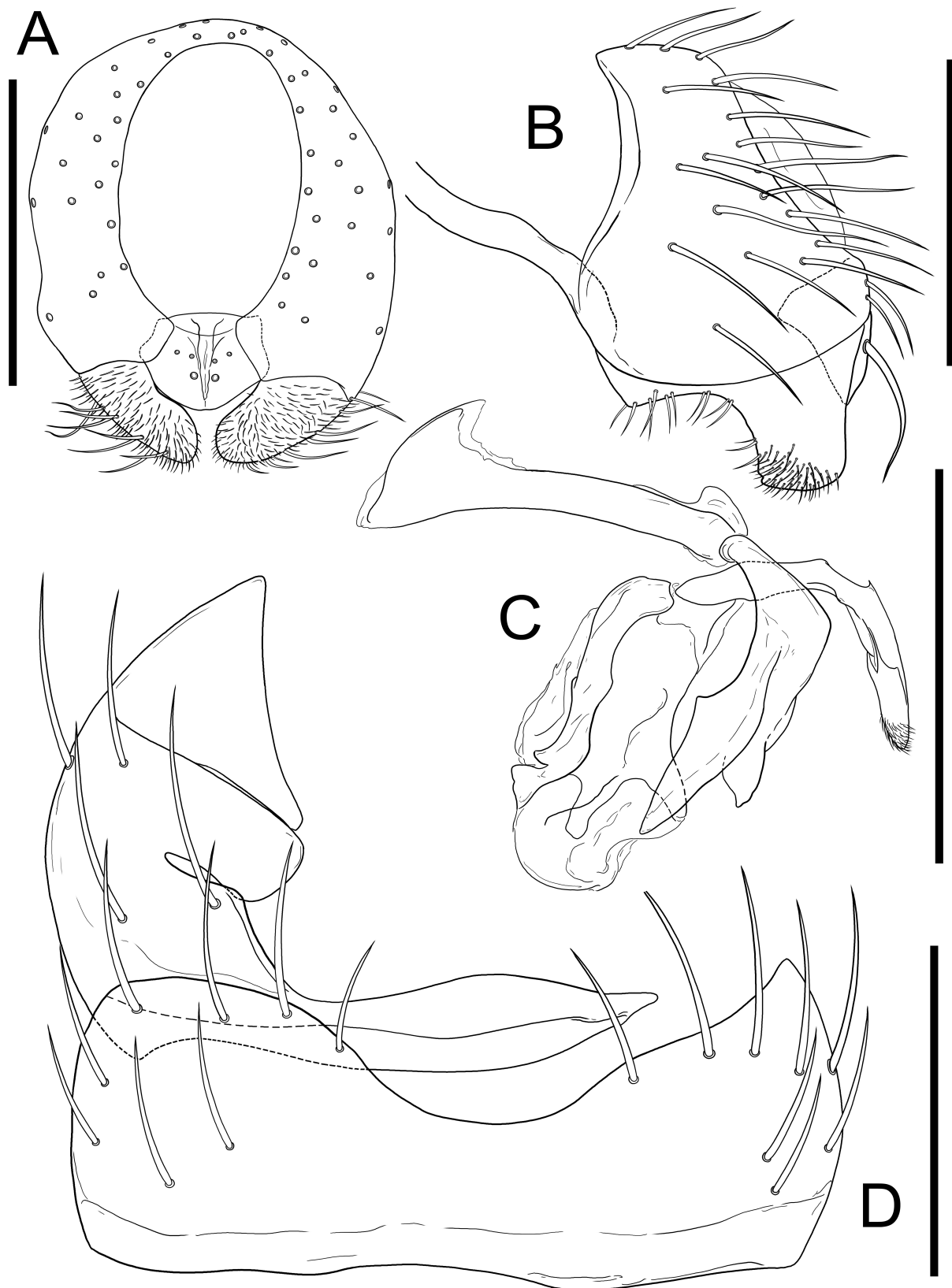


Fig. 18. *Parapterogramma magnum* sp. nov., paratype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

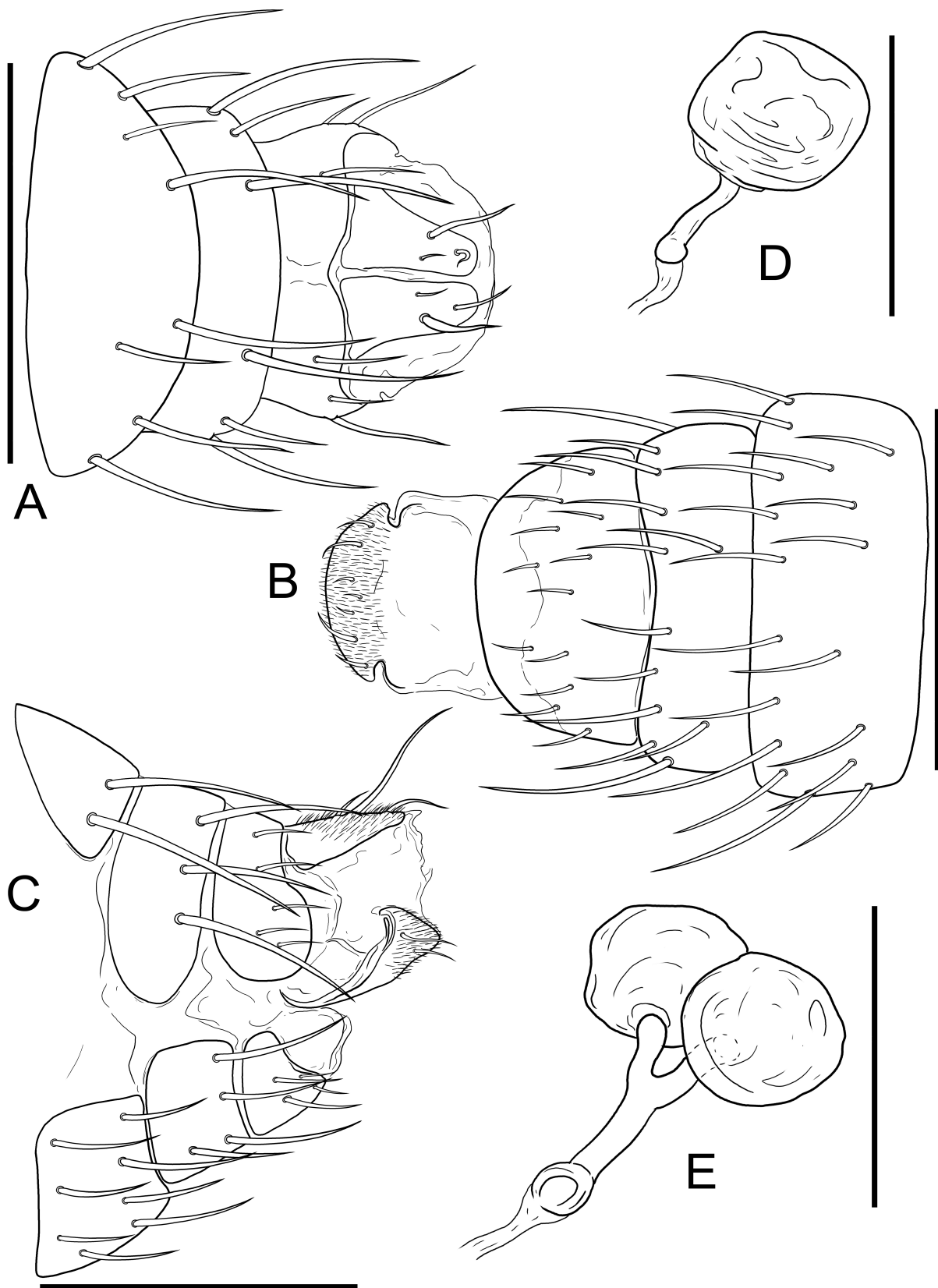


Fig. 19. *Parapterogramma magnum* sp. nov., paratype (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

desclerotized margin. Hypoproct semicircular, with sclerotized anterolateral edges and a membranous, setulose medial part. Spermathecae stout, spherical, and smooth, stem short and sclerotized.

Remarks

Parapterogramma magnum is externally most similar to *Pa. gonitellum* sp. nov., from which it differs in having a broader frons (width $2.5 \times$ height), straighter R_{2+3} , long and tubular $CuA+CuP$, and the costa only extending 1–2 costal widths beyond R_{4+5} .

Parapterogramma matau sp. nov.

[urn:lsid:zoobank.org:act:16D0A4FA-BD8D-4B35-8A43-E967248275D5](https://zoobank.org/act:16D0A4FA-BD8D-4B35-8A43-E967248275D5)

Figs 20–22, 40H, 42

Etymology

This species name (from the Fijian ‘*matau*’, ‘axe’) refers to the axe-shaped posterior lobe of the male surstylus.

Material examined

Holotype

FIJI – **Taveuni** • ♂; Cakaudrove, Mount Devo, 5.3 km SE of Tavuki Village; 16°50'28" S, 179°58'05" W; 1064 m a.s.l.; 31 Jul.–14 Aug. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM.

Paratypes

FIJI – **Taveuni** • 1 ♀; Cakaudrove, Devo Forest Reserve; 16°50' S, 179°59' E; 800 m a.s.l.; 10–16 Jan. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂, 1 ♀; same collection data as for preceding; Devo Peak; BPBM • 1 ♀; Cakaudrove, Devo Peak Radio Tower; 16°51' S, 179°58' E; 1200 m a.s.l.; 10–17 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; rainforest Malaise; BPBM • 3 ♂♂, 2 ♀♀; same collection data as for preceding; 31 Oct.–21 Nov. 2002; BPBM • 1 ♀; Cakaudrove, Tavuki Village, Mount Devo; 16°49'52" S, 179°58'48" W; 734 m a.s.l.; 30 Jun.–14 Aug. 2004; Schlinger and Tokota'a leg.; Malaise; DEBU • 1 ♀; Cakaudrove, Mount Devo, Tavuki Village; 16°50'13" S, 179°58'23" W; 892 m a.s.l.; 14–31 Jul. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; Cakaudrove, Mount Devo, 5.3 km SE of Tavuki Village; 16°50'28" S, 179°58'05" W; 1064 m a.s.l.; 10–17 Oct. 2002; Schlinger and Tokota'a leg.; Malaise; DEBU • 2 ♂♂; same collection data as for preceding; 17–24 Oct. 2002; DEBU • 1 ♂, 2 ♀♀; same collection data as for preceding; 31 Jul.–14 Aug. 2004; DEBU • 1 ♂, 1 ♀; same collection data as for preceding; 23 Oct.–15 Nov. 2004; P. Vodo leg.; BPBM • 1 ♂; Cakaudrove, 5.5 km SE of Tavuki Village; 16°50'35" S, 179°57'58" W; 1188 m a.s.l.; 30 Jun.–14 Aug. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂, 2 ♀♀; Cakaudrove, 5.6 km SE of Tavuki Village, Mount Devo; 16°50'35" S, 179°57'36" W; 1187 m a.s.l.; 31 Oct.–14 Nov. 2002; Schlinger and Tokota'a leg.; rainforest Malaise; BPBM • 1 ♂; same collection data as for preceding; 14–21 Nov. 2002; BPBM • 2 ♂♂, 2 ♀♀; same collection data as for preceding; 3–10 Jan. 2003; BPBM. – **Vanua Levu** • 1 ♂; Bua, Kilaka Village; 16°48'03" S, 178°59'11" E; 3–10 Jun. 2004; 146 m a.s.l.; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU • 3 ♂♂; Bua, Kilaka Village; 16°48'41" S, 178°59'29" E; 98 m a.s.l.; 3–10 Jun. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂; same collection data as for preceding; 28 Jun.–21 Jul. 2004; BPBM • 3 ♂♂; same collection data as for preceding; 16°48'41" S, 178°59'02" E; 154 m a.s.l.; 28 Jun.–2 Jul. 2004; BPBM • 1 ♂, 1 ♀; Bua, 6 km NW of Kilaka, Batiqere Range; 16°48'24" S, 178°59'29" E; 98 m a.s.l.; 15–28 Jun. 2004; Schlinger and Tokota'a leg.; Malaise; DEBU • 5 ♂♂; same collection data as for preceding; 15–24 Jun. 2004; DEBU • 1 ♂, 1 ♀; same collection data as for preceding; 16°48'55" S, 178°59'11" E; 146 m a.s.l.; 13–26 Apr. 2004; BPBM • 4 ♂♂, 1 ♀; same collection data as for preceding; 15–28 Jun. 2004; BPBM • 2 ♂♂; same collection data as for preceding; 28 Jun.–21 Jul. 2004; BPBM • 5 ♂♂, 1 ♀; same collection data

as for preceding; 16°48'40" S, 178°59'17" E; 61 m a.s.l.; 3–10 Jun. 2004; BPBM • 1 ♂, 2 ♀♀; same collection data as for preceding; 16°43'54" S, 178°59'59" E; 113 m a.s.l.; 3–15 Jun. 2004; DEBU • 1 ♂; Macuata, 0.4 km S of Rokosalase Village; 16°31'55" S, 179°01'08" E; 118 m a.s.l.; 23 Apr.–8 May 2004; Schlinger and Tokota'a leg.; Malaise; DEBU • 1 ♂; Macuata, 0.6 km S of Rokosalase Village; 16°32'00" S, 179°01'05" E; 180 m a.s.l.; 22 May–8 Jun. 2004; Schlinger and Tokota'a leg.; Malaise in forest; BPBM. – **Viti Levu** • 1 ♀; Naitasiri, 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'18" S, 178°25'26" E; 372 m a.s.l.; 25 Feb.–17 Mar. 2003; Schlinger and Tokota'a leg.; Malaise; DEBU • 1 ♀; Naitasiri, 3.8 km N of Veisari Settlement, logging road to Waivudawa; 18°04'44" S, 178°21'47" E; 300 m a.s.l.; 25 Apr.–25 May 2003; 300 m a.s.l.; Schlinger and Tokota'a leg.; Malaise; BPBM.

Description

BODY (Fig. 20). Length 1.2–1.5 mm. Head dark brown with silvery microtomentum limited to bases of interfrontal and orbital bristles, ocellar triangle, lunule, and around inner vertical bristle; gena yellow; antenna yellow-brown. Frontal width 1.5 × interfrontal height. Eye height 2.5 × genal height. Thorax brown. Scutum with grey and brown microtomentum in presutural half forming two dark longitudinal stripes, lateral margins broadly dark brown, posterior margin with a pair of dark brown microtomentose marks; scutellum brown with median, dark brown microtomentose triangle. Anterior dorsocentral bristles separated by 9–10 rows of acrostichal setulae. Legs brown, mid and hind femora apically pale, tarsi and fore tibia paler. Male mid tibia with long apicoventral bristle and a row of ventral setae along apical two-thirds. Wing (Fig. 40H) pattern weak. CS2 0.5 × CS3. R_{2+3} broadly curved in apical half, angled at ~60° to costa; costa extending well beyond apex of R_{4+5} (6–7 × costal width). M_1 and M_4 both lacking (thus cell dm with rounded corners); CuA+CuP long. Halter whitish.

MALE ABDOMEN (Fig. 21). S5 broad with a very large, posteromedial emargination, and long, dense posterolateral setae. S6 with an elongate, strongly sinuate ventrolateral apodeme extending underneath the medial part of S5, apex with a dark dorsal knob; S7 broad. Epandrium small, wedge-shaped and sparsely long-setose laterally; cercus flat, rectangular, ventrally projecting as a small triangular lobe, with a medial patch of setulae surrounding a very large seta; subepandrial sclerite rectangular, indistinct

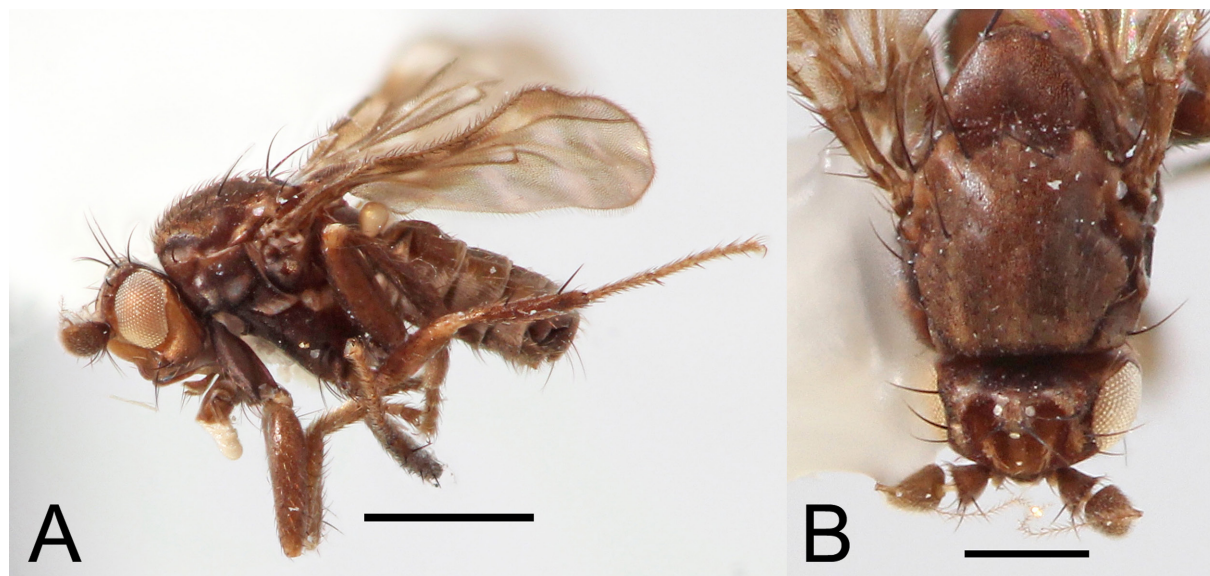


Fig. 20. *Parapterogramma matau* sp. nov., holotype (debu00107949, BPBM). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

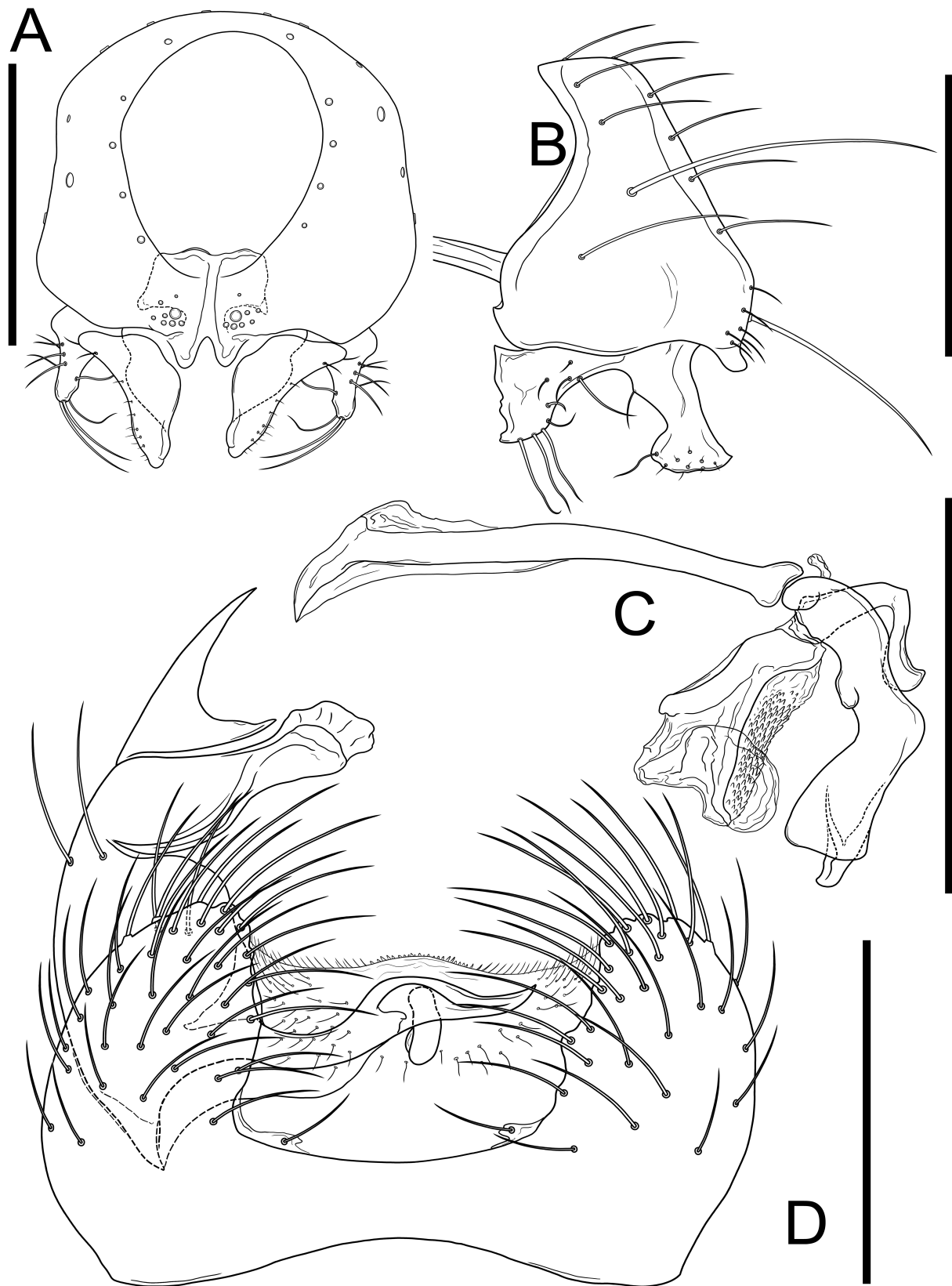


Fig. 21. *Parapterogramma matau* sp. nov., paratype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

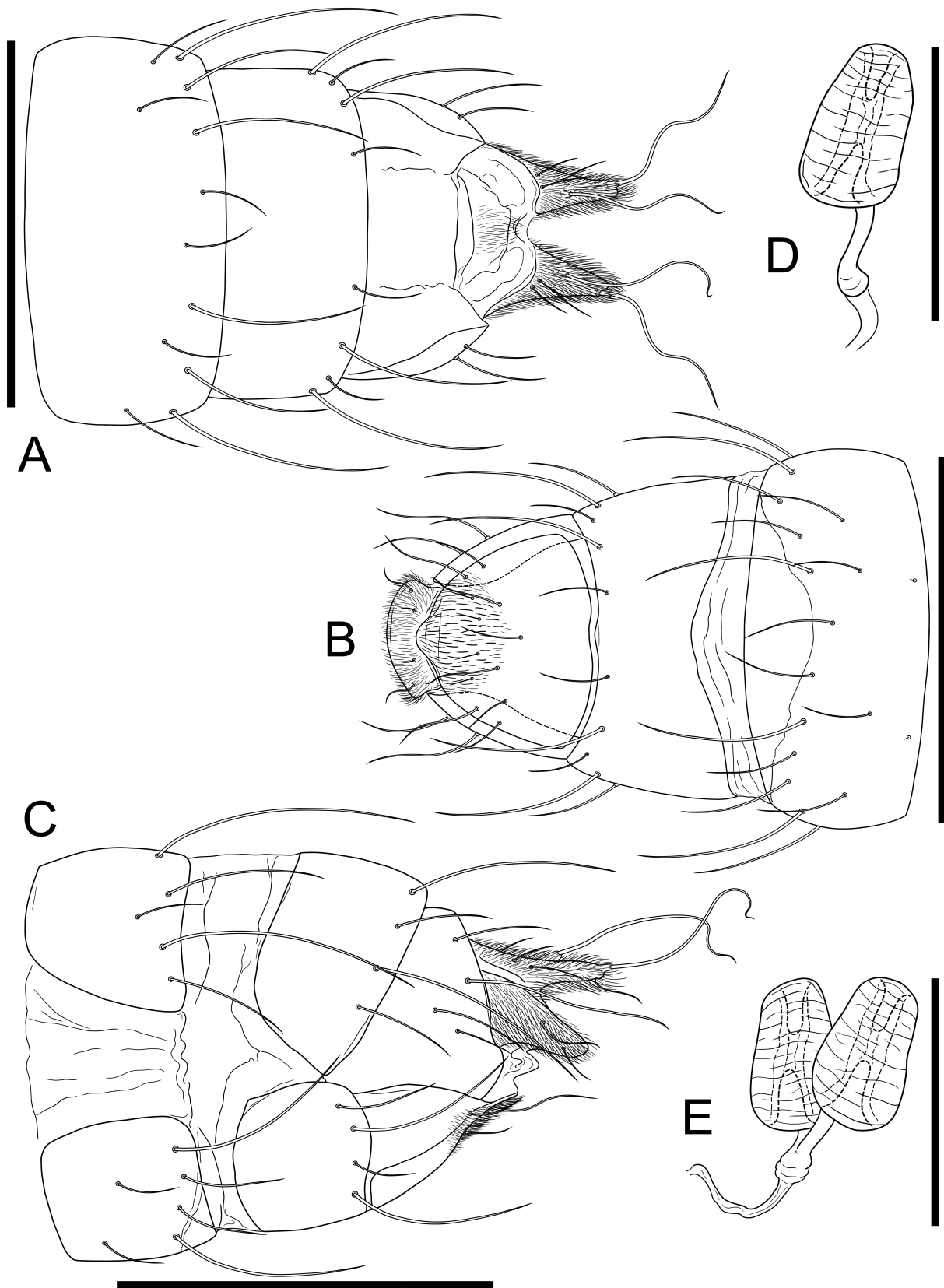


Fig. 22. *Parapterogramma matau* sp. nov., paratype (BPBM). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

but medially darkened. Surstylus long but low, bilobed: anterior lobe larger, subrectangular, with three long ventral setae and several setulae along posteroventral margin, posterior lobe subrectangular with preapical constriction, resembling an axe head, apex with an anterior seta and several setulae. Postgonite elongate, sinuate and strongly bent about midlength, apex bifurcate with a flattened, truncate outer lobe and a tapered inner lobe. Phallapodeme elongate, slightly sinuate with distinctly bent apex; basiphallus wedge-shaped with a slender, sinuate, tapered epiphallus. Distiphallus stout, largely membranous, basal half with a broad, Y-shaped upper sclerite, apex with large lateral flaps supported by lateral extensions of the basal sclerite, lower surface almost entirely papillate.

FEMALE ABDOMEN (Fig. 22). T6 and T7 rectangular, slightly desclerotized anteromedially and long-setose along posterior margin; T8 desclerotized medially and split into two large lateral plates with long lateral setae. Epiproct membranous, indistinct. S6 rectangular, desclerotized posteromedially; S7 broadly emarginate anteriorly and posteriorly and long-setose along posterior margin; S8 subtriangular, anteriorly projecting slightly into emargination of S7, with a V-shaped row of longer setae and a transverse row of small setae. Hypoproct reduced, rectangular, largely membranous with four small setae. Spermathecae stout, subcylindrical, slightly wider at base, lightly grooved with deep invaginations on both ends, stem very short and membranous.

Remarks

Parapterogramma matau sp. nov. differs from the externally similar *Pa. peckorum* sp. nov. and *Pa. tokotaai* sp. nov. in lacking a distinct M_4 beyond dm-m. It is generally larger and darker than the latter species and further differs by genitalic characters including the axe-shaped posterior surstyler lobe and truncate postgonite.

Parapterogramma ofiensis sp. nov.

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Figs 23–24, 41A, 42

Etymology

This species name refers to the type locality of the species, Ofi Creek in Papua New Guinea.



Fig. 23. *Parapterogramma ofiensis* sp. nov., holotype (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

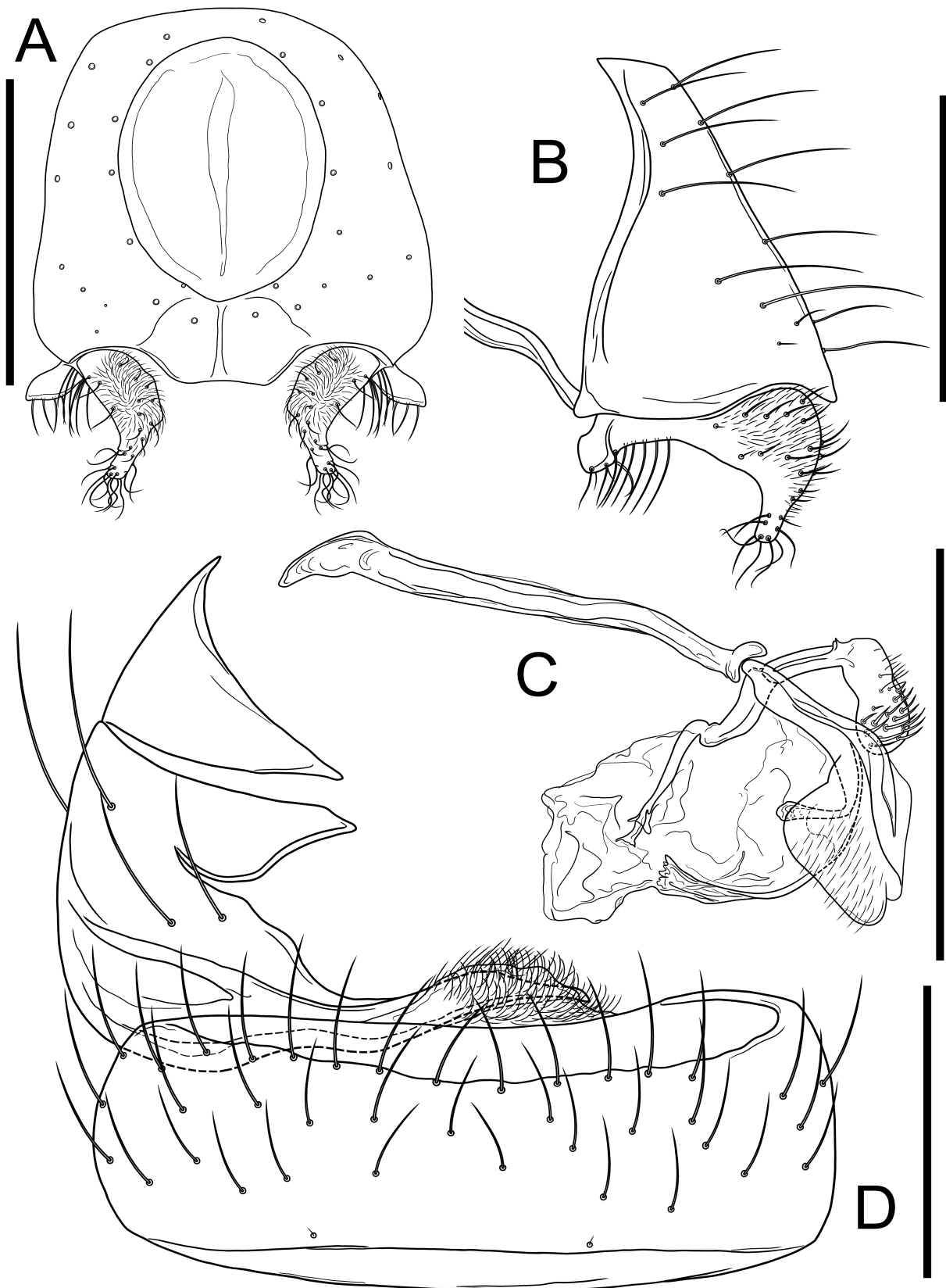


Fig. 24. *Parapterogramma ofiensis* sp. nov., holotype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

Material examined

Holotype

PAPUA NEW GUINEA • ♂; Kokoda Trail, Ofi Creek, 8 km SW of Naoro; 650 m a.s.l.; 15–18 Aug. 1976; O. Kukal leg.; lowland forest, dung; CNCI.

Description

BODY (Fig. 23). Length 1.2 mm. Head dark brown with lower portion of frons lighter, and silvery-yellow microtomentum on interfrontal plates, ocellar triangle, orbital plates, and occiput; gena brownish-yellow with a small ovoid patch of pale microtomentum; antenna brown. Frontal width $2.0 \times$ interfrontal height. Eye height $3.5 \times$ genal height. Thorax brown with indistinct paler central stripe; scutellum brown with dark brown anteromedial spot. Scutum with pale grey and brown microtomentum forming a pair of Y- or V-shaped dark longitudinal marks, lateral margins broadly yellow microtomentose, pale M-shaped microtomentose mark at level of posterior dorsocentral bristles, below this dark brown; scutellum brown with median, dark brown microtomentose triangle. Anterior dorsocentral bristles separated by 5–6 rows of acrostichal setulae. Legs light brown, mid tibia slightly paler apically, tarsi pale. Male mid tibia with small, stout apicoventral bristle only. Wing (Fig. 41A) pattern weak. CS2 $0.4 \times$ CS3. R_{2+3} broadly curved in apical half, angled at $\sim 70^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5 \times$ costal width). M_1 indistinct beyond dm-m; M_4 extending beyond dm-m; CuA+CuP long but non-tubular. Halter whitish.

MALE ABDOMEN (Fig. 24). S5 broad, rectangular, uniformly setose, posteromedially desclerotized with a setulose membrane between S5 and S6. S6 short and slightly sinuate. Cercus flat, subquadrate, with one seta; subepandrial sclerite indistinct but medially darkened. Surstylus long but low, bilobed: anterior lobe bulging outwards anteriorly with several long ventral setae, posterior lobe rounded triangular, bulbous dorsally with dense setae and setulae and projecting ventrally with several long, sinuate setae. Postgonite slightly bent, constricted in the basal half, greatly expanded anterolaterally in the apical half and setulose laterally. Phallapodeme elongate, apex triangular and flared; basiphallus large, stalked, peanut-shaped with stout posterior setae. Distiphallus stout, largely membranous, and complex: centrally supported by an elongate, sinuate upper sclerite and a short, scoop-like lower sclerite, laterally supported on each side by a long, curved, apically flared sclerite.

FEMALE ABDOMEN. Female unknown.

Remarks

Parapterogramma ofiensis sp. nov. is externally most similar to *Pa. asiaticum*, but differs in having M_4 tubular beyond dm-m and the male mid tibia with only a single stout apicoventral bristle.

Parapterogramma peckorum sp. nov.

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Figs 25–27, 41B, 42

Etymology

This species name is in honour of Dr Stewart B. Peck and Dr Jarmilla Kukalová-Peck whose collecting efforts yielded many of the *Parapterogramma* specimens examined in this project, including several specimens of this species.

Material examined

Holotype

Fiji – **Viti Levu** • ♂; Nandarivitu, Y00 Microwave Station; 3350 m a.s.l.; 16–23 Aug. 1978; S. and J. Peck leg.; BPBM.

Paratypes

FIJI – **Kadavu** • 1 ♀; 0.25 km SW of Solodamu Village, Moanakaka Bird Sanctuary; 19°04'41" S, 178°07'16" E; 50 m a.s.l.; 23 Oct.–6 Nov. 2004; S. Lau leg.; Malaise; DEBU. – **Taveuni** • 2 ♀♀; Cakaudrove, Devo Peak; 10–16 Jan. 2003; Irwin, Schlinger, and Tokota'a leg.; BPBM • 3 ♂♂; Cakaudrove, Mount Devo, 5.3 km SE of Tavuki Village; 16°50'28" S, 179°58'05" W; 1064 m a.s.l.; 17–24 Oct. 2002; Schlinger and Tokota'a leg.; Malaise; DEBU • 1 ♂; same collection data as for preceding; 24–31 Oct. 2002; BPBM • 3 ♀♀; same collection data as for preceding; 7–23 Oct. 2004; P. Vodo leg.; Malaise; BPBM; • 1 ♂; Cakaudrove, 5.6 km SE of Tavuki Village, Mount Devo; 16°50'35" S, 179°57'54" W; 1187 m a.s.l.; 3–10 Jan. 2003; Schlinger and Tokota'a leg.; rainforest Malaise; BPBM • 1 ♀; Cakaudrove, Lavena; 16°51'32" S, 179°53'34" W; 213 m a.s.l.; 4–19 Nov. 2003; Irwin, Schlinger, and Tokota'a leg.; rainforest Malaise; BPBM • 1 ♂; Cakaudrove, Devo Peak Radio Tower; 16°51' S, 179°58' E; 1200 m a.s.l.; 31 Oct.–21 Nov. 2002; Irwin, Schlinger, and Tokota'a leg.; rainforest Malaise; DEBU. – **Vanua Levu** • 2 ♂♂; 4 km NW of Kilaka Village, Wainibeqa; 16°48'29" S, 178°59'13" E; 87 m a.s.l.; 9–20 Dec. 2004; P. Manuelli leg.; Malaise; DEBU; • 1 ♂, 2 ♀♀; Bua, 6 km NW of Kilaka, Batiqere Range; 16°48'24" S, 178°59'29" E; 98 m a.s.l.; 15–24 Jun. 2004; Schlinger and Tokota'a leg.; Malaise; DEBU • 1 ♀; Bua, 6 km NW of Kilaka Village, Batiqere Range; 16°48'55" S, 178°59'11" E; 146 m a.s.l.; 15–26 Apr. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♀; same collection data as for preceding; 15–28 Jun. 2004; BPBM; • 1 ♀; Bua, Kilaka Village; 16°48'41" S, 178°59'29" E; 98 m a.s.l.; 28 Jun.–21 Jul. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM. – **Viti Levu** • 8 ♂♂, 10 ♀♀; same collection data as for holotype; DEBU • 7 ♂♂, 10 ♀♀; same collection data as for holotype; CNCI • 11 ♂♂, 4 ♀♀; same collection data as for holotype; forest dung; DEBU • 12 ♂♂, 5 ♀♀; same collection data as for holotype; forest dung; CNCI • 1 ♀; 4 km NW of Lami Town, Mount Korobaba; 18°06'14" S, 178°22'52" E; 250 m a.s.l.; 1–13 Dec. 2004; K. Koto leg.; Malaise; BPBM • 3 ♂♂; 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'18" S, 178°25'26" E; 372 m a.s.l.; 12–24 Oct. 2002; Timoci leg.; Malaise; BPBM • 1 ♀; 10 km N of Galoa; 300 m a.s.l.; 1 Sep. 1978; S. and J. Peck leg.; DEBU • 8 ♂♂, 11 ♀♀; 15 km N of Suva, Tholoisuva Watershed; 200 m a.s.l.; 25–31 Aug. 1978; S. and J. Peck leg.; rainforest; DEBU • 2 ♀♀; Vuda, Koroyanitu EcoPark, 1 km E of Abaca Village; 17°40'01.2" S, 177°33'00.0" E; 800 m a.s.l.; 2–16 Nov. 2004; L. Tuimereke leg.; Malaise; BPBM • 1 ♂, 1 ♀; Suva, Tholoisuva Watershed; 25–31 Aug. 1978; S. and J. Peck leg.; carrion trap; DEBU.

Other material examined

FIJI – **Viti Levu** • 1 ♂, 1 ♀; Naitasiri, 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'21" S, 178°25'19" E; 325 m a.s.l.; 17 Mar.–9 Apr. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♀; same collection data as for preceding; 4–14 Nov. 2003; BPBM • 1 ♂, 1 ♀; Naitasiri, 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'18" S, 178°25'26" E; 372 m a.s.l.; 17 Mar.–9 Apr. 2003; Schlinger and Tokota'a leg.; Malaise; DEBU • 2 ♀♀; same collection data as for preceding; 14–28 Jul. 2003; DEBU • 1 ♀; Naitasiri, Mount Nakobalevu, below tower near Scaevola in bloom; 18°03' S, 178°25' E; 461 m a.s.l.; 22 Sep.–8 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; BPBM • 1 ♂, 1 ♀; Naitasiri, Mount Nakobalevu; 18°03' S, 178°25' E; 340 m a.s.l.; 24–29 Oct. 2003; Irwin, Schlinger, and Tokota'a leg.; rainforest Malaise; DEBU • 1 ♀; Naitasiri, Navai Village, Eteni; 17°37' S, 177°59' E; 700 m a.s.l.; 24 Oct.–8 Nov. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU • 2 ♂♂, 1 ♀; same collection data as for preceding; 6 Jun.–15 Jul. 2003; BPBM • 1 ♀; Namosi, 2 km SE of Nabukavesi Village, Ocean Pacific Resort; 18°10'15" S, 178°15'29" E; 40 m a.s.l.; 22–7 Jul. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; Namosi, Wainadoi, Pacific Ocean; 18°10' S, 178°15' E; 40 m a.s.l.; 5–24 Nov. 2003; Irwin, Schlinger, and Tokota'a leg.; coastal Malaise; DEBU • 1 ♀; Vuda, 0.5 km N of Abaca Village, Koroyanitu EcoPark, Mount Evan's Range; 17°40'01" S, 177°33'00" E; 800 m a.s.l.; 26 Oct.–6 Nov. 2002; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♀; same collection data as for preceding; 16–20 Nov. 2004; L. Tuimereke leg.; BPBM • 2 ♂♂; same collection data as for preceding;

13–27 Dec. 2004; DEBU • 1 ♂; same collection data as for preceding; Mount Evan's Range; 26 Nov.–3 Dec. 2002; BPBM • 1 ♂; same collection data as for preceding; Kokabula Trail; BPBM.

Description

BODY (Fig. 25). Length 1.2–1.5 mm. Head caramel-brown, paler under microtomentum, with silvery microtomentum limited to bases of interfrontal and orbital bristles, ocellar triangle, lunule, and around inner vertical bristle; gena yellow; antenna yellow-brown. Frontal width $2.5 \times$ interfrontal height. Eye height $2.5 \times$ genal height. Thorax brown. Scutum with pale grey and brown microtomentum forming two dark longitudinal stripes, lateral margins broadly yellow microtomentose, pale M-shaped microtomentose mark at level of posterior dorsocentral bristles; scutellum brown with median, dark brown microtomentose triangle. Anterior dorsocentral bristles separated by 9–10 rows of acrostichal setulae. Legs brown, mid femur apically paler, tarsi slightly paler. Male mid tibia with stout apicoventral bristle only. Wing (Fig. 41B) pattern weak. CS2 $0.5 \times$ CS3. R_{2+3} broadly curved in apical half, angled at $\sim 60^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5\text{--}6 \times$ costal width). M_1 indistinct beyond dm-m; M_4 extended beyond dm-m; CuA+CuP long. Halter brown.

MALE ABDOMEN (Fig. 26). S5 broad, deeply posteromedially desclerotized and densely long-setose posterolaterally. S6 curved with a tab-like, densely setulose, posteromedial lobe. Cercus flat, subtriangular and indistinct from epandrium, with several small setae; subepandrial sclerite indistinct but medially darkened. Anteromedial apodeme of hypandrium elongate and sinuate. Surstylus long but low, bilobed: anterior lobe larger, subrectangular, setulose on the inner ventral surface with pointed anteroventral apex, posterior lobe triangular, curved downwards and twisted inwards, with setulae along anterior margin. Postgonite short but broad, curved, evenly tapered with apex bifurcate, posterior half pale. Phallapodeme elongate, gently curved with slightly hooked apex; basiphallus flattened laterally and elongate with a slender, slightly sinuate, tapered epiphallus. Distiphallus stout, complex but largely membranous, basal half with a pair of ovoid upper sclerites, apex supported by pair of curved dorsolateral sclerites, lower surface almost entirely papillate.



Fig. 25. *Parapterogramma peckorum* sp. nov., paratype (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

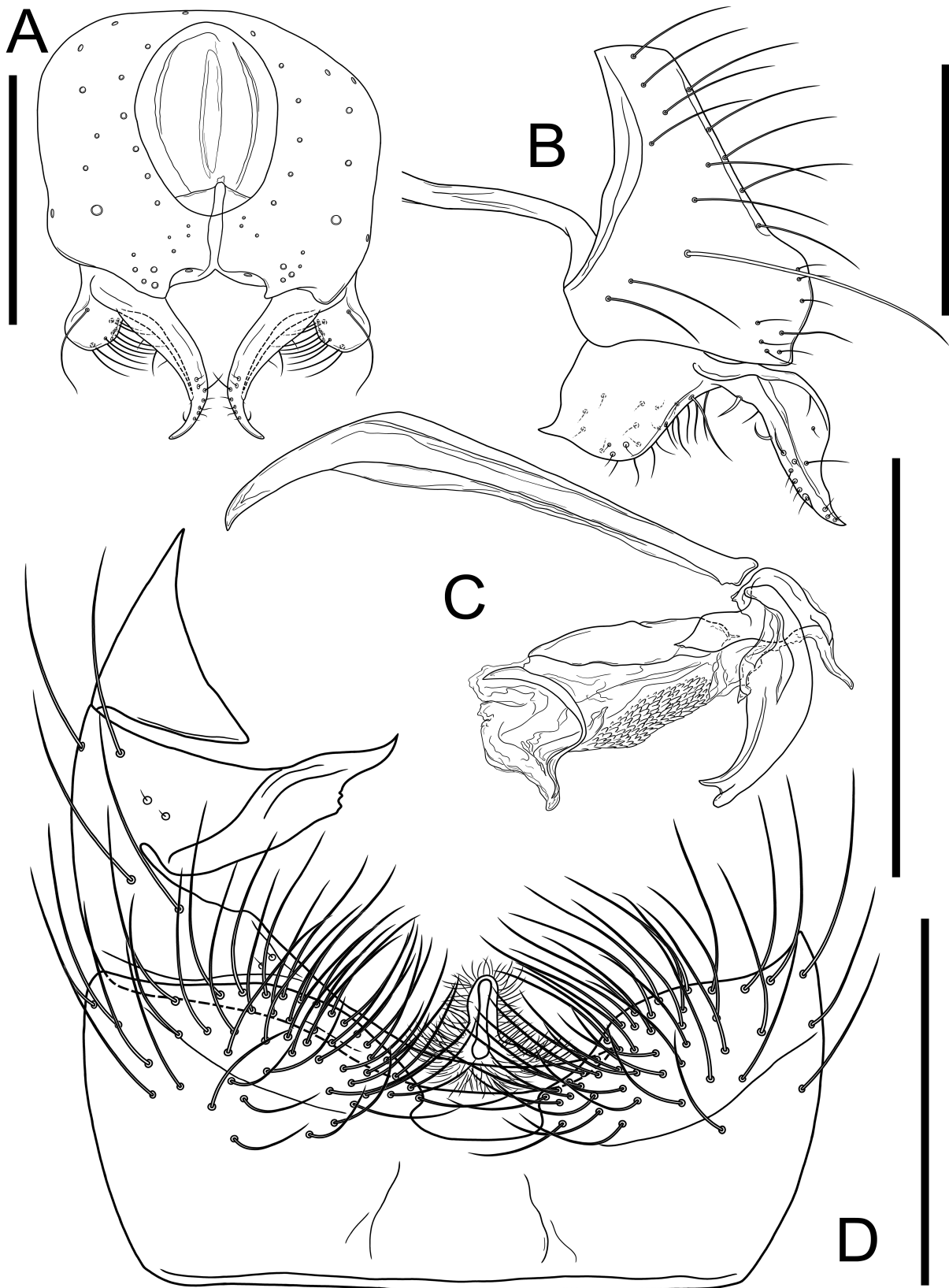


Fig. 26. *Parapterogramma peckorum* sp. nov., paratype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

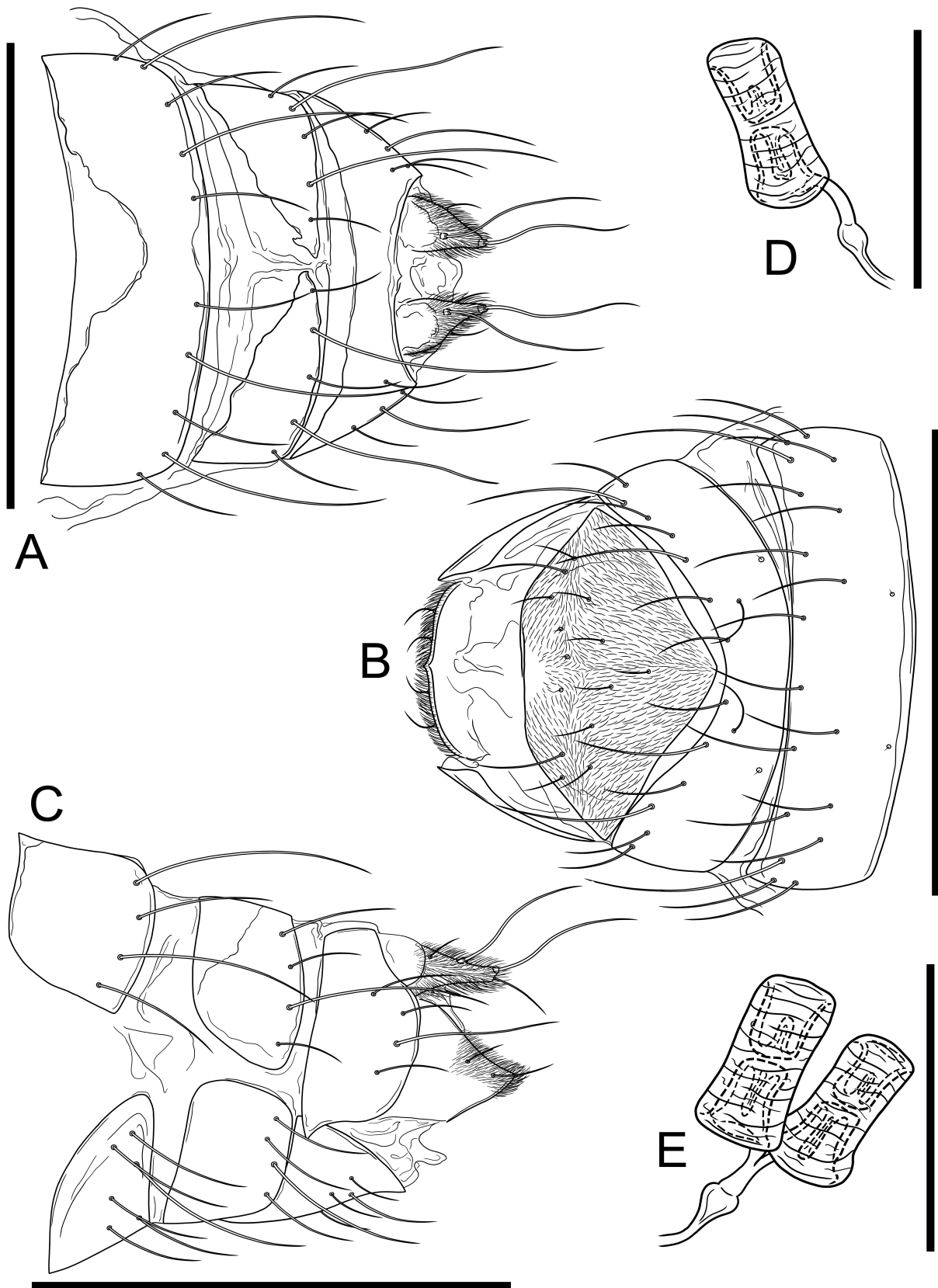


Fig. 27. *Parapterogramma peckorum* sp. nov., paratype (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

FEMALE ABDOMEN (Fig. 27). T6 and T7 rectangular, desclerotized anteromedially (T7 divided completely) and long-setose along posterior margin; T8 broad and entire, laterally expanded posteriorly with long lateral setae. Epiproct membranous, indistinct. S6 rectangular; S7 broadly emarginate and long-setose along posterior margin; S8 subtriangular, anteriorly projecting into emargination of S7, with V-shaped row of setae. Hypoproct reduced, rectangular, largely membranous except for a sclerotized, setulose medial part. Spermathecae stout, subcylindrical, slightly wider at base, lightly grooved with deep invaginations at both ends, each invagination with a small central projection, stem very short and membranous.

Remarks

Parapterogramma peckorum sp. nov. is externally similar to *Pa. matau* sp. nov. and *Pa. tokotaai* sp. nov. Males of *Pa. peckorum* differ from those of *Pa. tokotaai* by their mid tibial chaetotaxy, including a weak apicoventral bristle and a conspicuous row of stout anteroventral seta; both sexes differ from *Pa. matau* in having a distinct extension of M_4 beyond dm-m.

Parapterogramma pollex sp. nov.

[urn:lsid:zoobank.org:act:79D2EBE3-3ABB-4A36-A309-D94AF585ED08](https://zoobank.org/act:79D2EBE3-3ABB-4A36-A309-D94AF585ED08)

Figs 28–30, 41C, 42

Etymology

This species name (from the Latin ‘*pollex*’, ‘thumb’) refers to the distinctive knob-like posterior lobe of the surstylus.

Material examined

Holotype

FIJI – **Viti Levu** • ♂; 15 km N of Suva, Tholoisuva Watershed; 200 m a.s.l.; 25–31 Aug. 1978; S. and J. Peck leg.; rainforest; DEBU.

Paratypes

FIJI – **Kadavu** • 1 ♂; 0.25 km SW of Solodamu Village, Moanakaka Bird Sanctuary; 19°04'41" S, 178°07'16" E; 60 m a.s.l.; 28 May–11 Jun. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM. – **Vanua Levu** • 1 ♂; Bua, 6 km NW of Kilaka Village, Batiqere Range; 16°48'55" S, 178°59'11" E; 146 m a.s.l.; 15–26 Apr. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM. – **Viti Levu** • 20 ♂♂; same collection data as for holotype; CNCI • 20 ♂♂; same collection data as for holotype; DEBU • 1 ♂, 1 ♀; Naitasiri, Navai Village, Eteni; 17°37' S, 177°59' E; 700 m a.s.l.; 6 Jun.–15 Jul. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂; 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'18" S, 178°25'26" E; 372 m a.s.l.; 12–24 Oct. 2002; Timoci leg.; Malaise; BPBM • 1 ♂, 1 ♀; same collection data as for preceding; 12–25 Feb. 2003; BPBM • 2 ♂♂, 1 ♀; same collection data as for preceding; 25 Feb.–17 Mar. 2003; BPBM • 4 ♂♂, 1 ♀; same collection data as for preceding; 14–28 Jul. 2003; DEBU • 1 ♂, 5 ♀♀; same collection data as for preceding; 4–14 Nov. 2003; DEBU • 1 ♂, 2 ♀♀; same collection data as for preceding; 18°03'22" S, 178°25'19" E; 325 m a.s.l.; 17 Mar.–9 Apr. 2003; BPBM • 6 ♂♂, 3 ♀♀; same collection data as for preceding; 14–28 Jul. 2003; BPBM • 1 ♂; same collection data as for preceding; 4–14 Nov. 2003; DEBU • 1 ♀; Naitasiri, Mount Nakobalevu, below tower near *Scaevola* in bloom; 18°03' S, 178°25' E; 461 m a.s.l.; 22 Sep.–8 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂; Naitasiri, 3.5 km N of Veisari Settlement, logging road to Waivudawa; 18°04'05" S, 178°22'01" E; 14 Feb.–8 Mar. 2003; 300 m a.s.l.; Schlinger and Tokota'a leg.; Malaise; BPBM • 4 ♂♂, 1 ♀; Namosi, 2 km SE of Nabukavesi Village, Ocean Pacific Resort; 18°10'16" S, 178°15'29" E; 40 m a.s.l.; 5–22 Jun. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; same collection data as for preceding; 22 Jun.–7 Jul. 2003; DEBU • 1 ♂; 10 km N of

Galoa; 300 m a.s.l.; 19 Aug.–1 Sep. 1978; S. and J. Peck leg.; second forest; DEBU • 2 ♂♂; 10 km N of Ngoloa; 300 m a.s.l.; 29 Aug.–1 Sep. 1978; S. and J. Peck leg.; second forest; DEBU • 9 ♂♂; Nandarivitu, Y00 Microwave Station; 1100 m a.s.l.; 16–23 Aug. 1978; S. and J. Peck leg.; CNCI • 8 ♂♂; Suva, Tholoisuva Watershed; 25–31 Aug. 1978; S. and J. Peck leg.; carrion trap; DEBU • 1 ♂; Vuda, 0.5 km N of Abaca Village, Koroyanitu EcoPark, Mount Evan's Range; 17°40'01" S, 177°33'00" E; 800 m a.s.l.; 26 Nov.–3 Dec. 2002; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; Vuda, 1 km E of Abaca Village, Koroyanitu National Park, Kokabula Trail; 17°40' S, 177°33' E; 800 m a.s.l.; 12–19 Nov. 2002; Schlinger and Tokota'a leg.; Malaise; DEBU • 2 ♂♂; same collection data as for preceding; Savuione Trail; DEBU.

Description

BODY (Fig. 28). Length 1.1–1.5 mm. Head caramel-brown, darkened around lateral and posterior margins, with silver-gold microtomentum on interfrontal plates, ocellar triangle, orbital plates, and occiput; gena yellow; antenna caramel-brown. Frontal width $2.0 \times$ interfrontal height. Eye height $2.5 \times$ genal height. Thorax caramel-brown to dark brown, anepimeron with a pale posterior spot. Scutum with grey brown microtomentum forming indistinct grey longitudinal stripes, lateral margins broadly yellow microtomentose, with pale M-shaped microtomentose mark at level of posterior dorsocentral bristles; scutellum caramel-brown to dark brown with median, grey-brown microtomentose triangle. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Legs brown, tibiae proximally paler, tarsi paler. Male mid tibia with a stout apicoventral bristle and two rows of stout ventral setae. Wing (Fig. 41C) pattern weak. CS2 $0.5 \times$ CS3. R_{2+3} gently sinuate, distal curve much stronger than basal curve and spanning most of vein length, reaching costa at almost a right angle and broadly separating it from costa for most of its length; costa extending well beyond apex of R_{4+5} ($5\text{--}6 \times$ costal width). M_1 indistinct beyond dm-m; M_4 extending beyond dm-m; CuA+CuP long but non-tubular. Halter pale brown.

MALE ABDOMEN (Fig. 29). S5 broad with a large, posteromedial emargination, a small triangular posteromedial lobe, and long posterolateral setae. S6 with an elongate, sinuate ventrolateral apodeme extending underneath the medial part of S5; S7 broad. Epandrium small, wedge-shaped and uniformly long-setose; cercus flat, rectangular with several enlarged setulae, ventrally emarginate, mesial edges fused; subepandrial sclerite triangular and ventrally rounded. Surstylus large, bilobed: anterior lobe

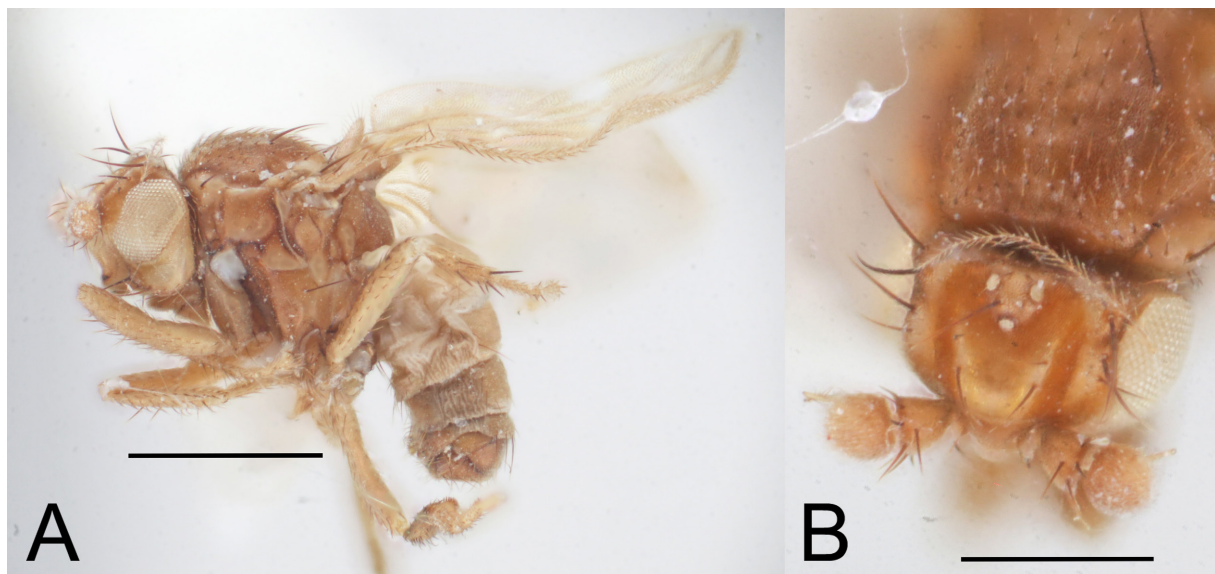


Fig. 28. *Parapterogramma pollex* sp. nov., paratype (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

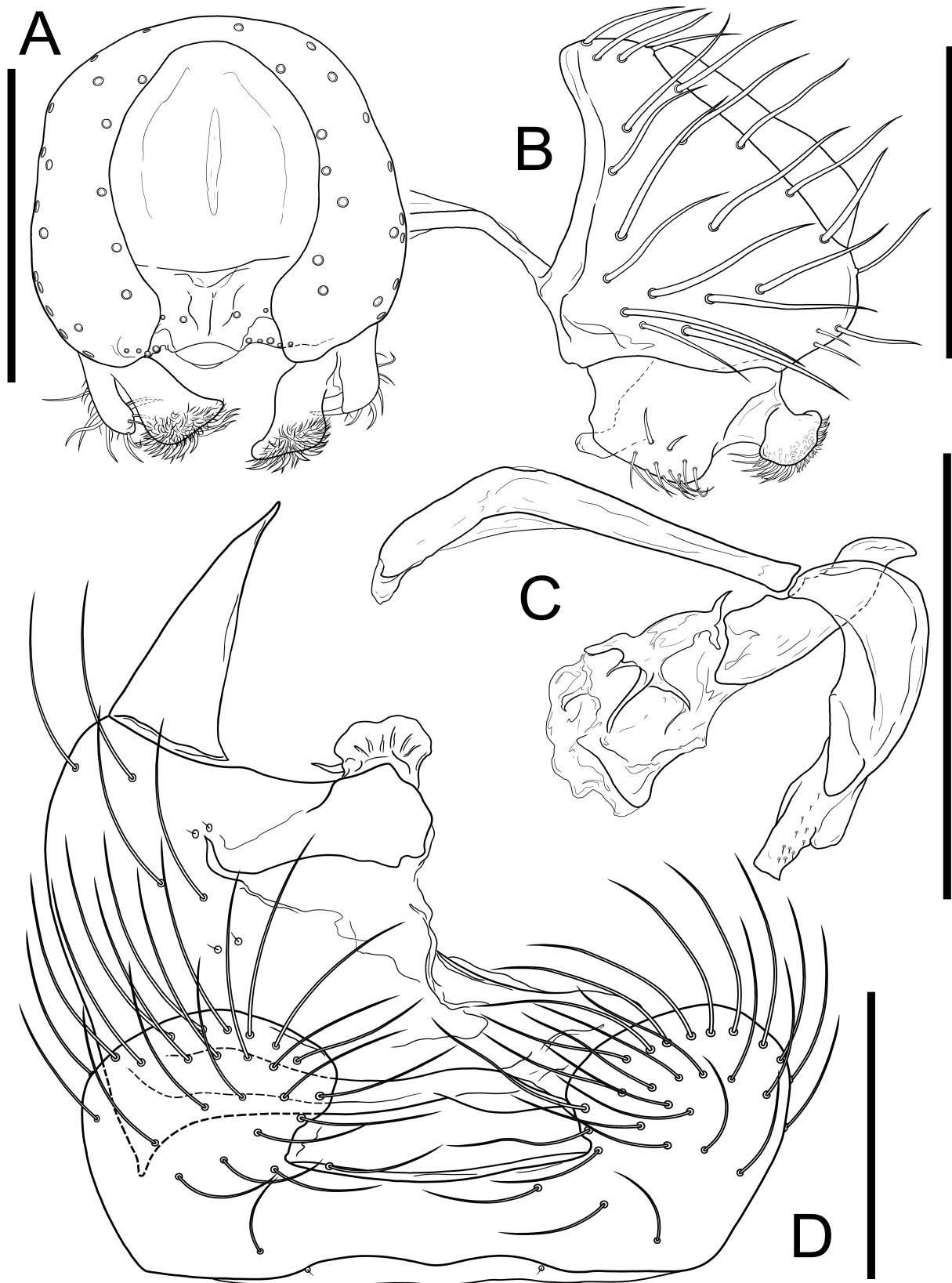


Fig. 29. *Parapterogramma pollex* sp. nov., paratype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

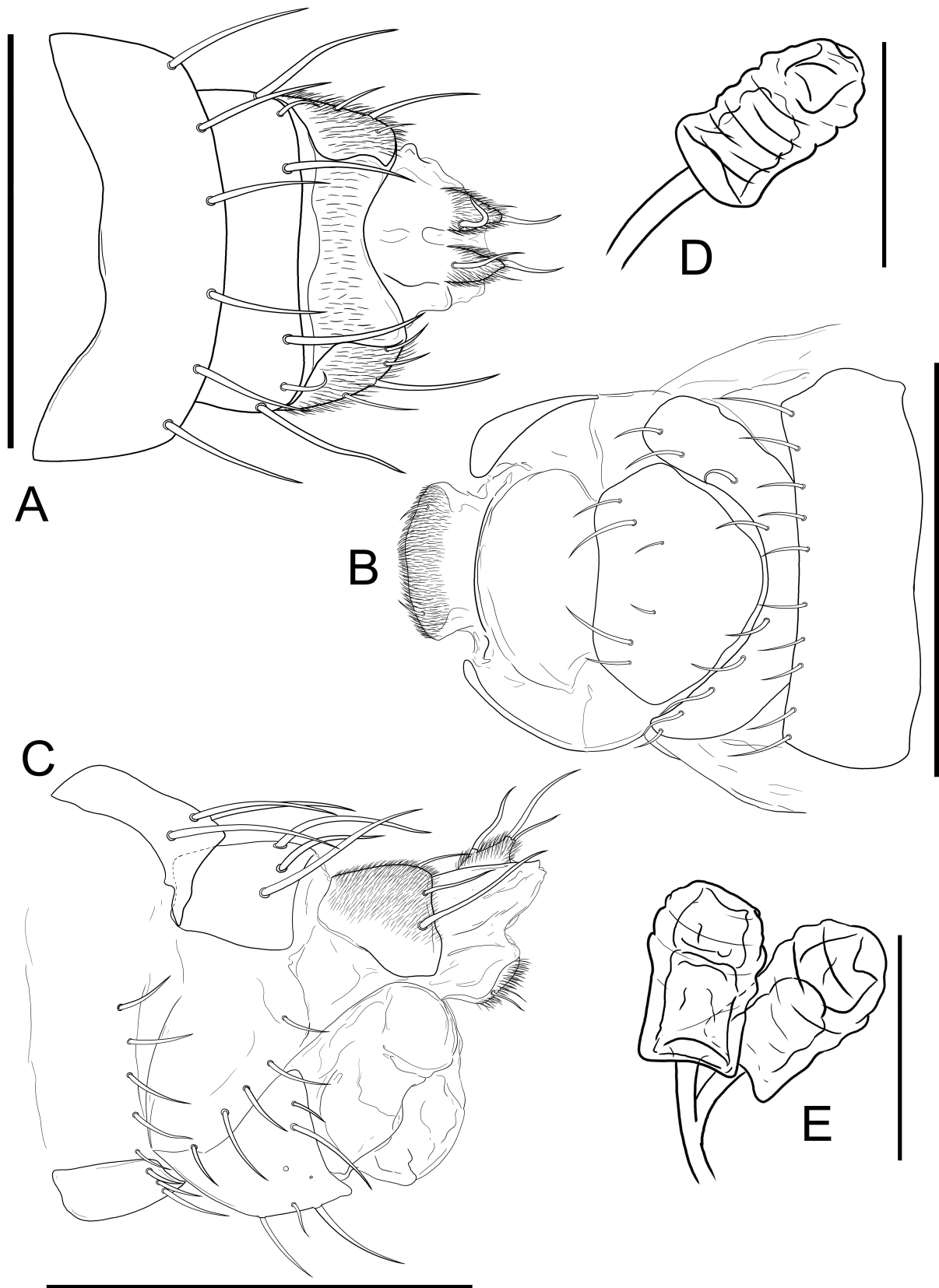


Fig. 30. *Parapterogramma pollex* sp. nov., paratype (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

boxy and ventrally setulose with a short anteroventral protuberance, posterior lobe smaller with dense setulae on the inner surface. Postgonite large, strongly curved, apically bifurcate with a triangular lateral lobe originating at about midlength. Phallapodeme long, tapered, and angled downwards apically; basiphallus long and wedge-shaped with a short, triangular epiphallus. Distiphallus stout, complex and made of several narrow T-shaped dorsolateral and ventral sclerites supporting the membranous apex.

FEMALE ABDOMEN (Fig. 30). T6 and T7 well-developed, rectangular and long-setose along posterior margin; T8 split into two large lateral plates, with sparse setation along posterior margin. Epiproct entirely membranous and C-shaped. S6 rectangular; S7 deeply emarginate and long-setose along posterior margin; S8 pentagonal, broadened anteriorly to fit into emargination in S7, and with 6 posteromedial setae. Hypoproct rectangular, largely membranous, and setulose with a pair of posterolateral setae. Spermathecae elongated, ovoid, grooved with an apical invagination, stem long and membranous.

Remarks

Parapterogramma pollex sp. nov. seems to be most closely related to *Pa. matau* sp. nov., males of which also have large, long-setose posterolateral lobes on S5 and large lateral lobes on the postgonite. It differs from *Pa. matau* in having a distinct extension of M_4 beyond dm-m, (usually) smaller size, and lighter colour. *Parapterogramma pollex* females are more like females of *Pa. peckorum* sp. nov., which also have a deeply posteromedially concave S7, anteromedially bulging S8, and spermathecae with large, wide invaginations (as opposed to the narrower invaginations in *Pa. matau*).

Parapterogramma poeciloptera (Papp, 2008) comb. nov.

Minialula poeciloptera Papp, 2008: 92, figs 93–102, 320.

Minialula poeciloptera – Marshall *et al.* 2011: 249. — Hayashi 2011: 69.

Type material

Holotype

TAIWAN – Taipei • ♂; Fu-Shan Long Term Ecological Research Site; 27 Mar. 2003; L. Papp leg.; along/over a small river; HNHM.

Paratypes

TAIWAN – Taipei • 2 ♂♂, 1 ♀; Han-Lo-Dé; 450 m a.s.l.; 29–30 Mar, 2003; L. Papp leg.; forest undergrowth; HNHM • 2 ♂♂; Pinling; 319 m a.s.l.; 17 Apr. 2003; L. Papp leg.; over/along Jinggualiao River; HNHM.

Material examined

Holotype photo provided by Petra Szöllösi-Tóth, HNHM.

Redescription

BODY. Length 1.4–1.8 mm. Head dark brown, lower portion of frons reddish with silvery microtomentum on interfrontal plates, orbital plates, and occiput. Antenna with a rounded dorsal conus. Thorax dark brown. Scutum with pale grey and brown microtomentum forming five pale longitudinal stripes. Anterior dorsocentral bristles separated by 8–10 rows of acrostichal setulae. Legs dark brown, femora apically and tibiae proximally yellow, fore and hind basitarsomeres whitish. Mid tibia with two anterodorsal and two posterodorsal bristles on proximal half; male mid tibia with long hair-like apicoventral seta only. Wing pattern strong. CS2 0.6 × CS3. R_{2+3} distinctly sinuate, angled at ~40° to costa; costa extending just

beyond apex of R_{4+5} ($\sim 1 \times$ costal width). M_1 extending beyond dm-m as a very faint crease; M_4 indistinct beyond dm-m; CuA+CuP long and tubular. Halter pale brown with dark stem.

MALE ABDOMEN. S5 broad, uniformly long-setose, slightly desclerotized and setulose posteromedially. S6 with a posteriorly-projecting setulose lobe located behind posteromedial emargination of S5. Surstylus long but low, bilobed: anterior lobe elongate, bare, and sharply bent posteroventrally into a V-shape, posterior lobe rounded and setose. Postgonite short but broad, bent at about midlength, apical half with two rounded, posteroventral triangular lobes flanking a rounded ventral emargination (exaggerating depth of emargination), apex broadly rounded. Phallapodeme elongate, apex curving downwards and pointed; basiphallus large, subtriangular in lateral view and V-shaped in dorsal view, with an elongate, apically rounded and downturned epiphallus. Distiphallus stout, largely membranous, supported by curled, weakly sclerotized lateral sclerites.

FEMALE ABDOMEN. T3–5 and S2–5 shortened but broad. T6 and T7 well-developed, rectangular; T8 split into two lateral plates. Epiproct largely reduced. S6 and S7 well-developed, rectangular; S8 trapezoidal. Hypoproct largely reduced. Spermathecae stout, subcylindrical, and smooth with a large, broad but not deep, apical invagination, stem short and membranous.

Distribution

Indomalayan: Japan (Hayashi 2011), Taiwan (Papp 2008).

Remarks

The above redescription of *Pa. poeciloptera* is based on Papp's (2008) description, Hayashi's (2011) redescription, and a photo of the holotype.

This species, along with *Pa. continentalis* and *Pa. tropicalis*, form a distinct clade of similar species formerly treated as *Minialula* (see above). *Parapterogramma poeciloptera* has a long, hair-like apicoventral seta on the male mid tibia, unlike the stout apicoventral mid tibial bristle of *Pa. continentalis* and *Pa. tropicalis*.

Parapterogramma pugioformis sp. nov.

[urn:lsid:zoobank.org:act:11B040B0-DEAE-4211-A49F-37CA54337CAB](https://zoobank.org/act:11B040B0-DEAE-4211-A49F-37CA54337CAB)

Figs 31–33, 41D, 42

Etymology

The species name (from the Latin '*pugio*', 'dagger' and suffix '*-formis*', 'having the form of') refers to the dagger-shaped male postgonite.

Material examined

Holotype

AUSTRALIA – Queensland • ♂; Atherton Tablelands, Lake Eacham, Chambers Lodge; 6–8 Apr. 1999; S.A. Marshall leg.; dung; QMBA debu00163634.

Paratypes

AUSTRALIA – Queensland • 1 ♂, 2 ♀♀; same collection data as for holotype; QMBA • 5 ♂♂; Cape Tribulation, 40 km N of Daintree; 10 m a.s.l.; 12–17 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 5 ♂♂, 2 ♀♀; same collection data as for preceding; QMBA • 2 ♂♂, 1 ♀; 1 km SW of Kauri Creek; 17°09' S, 145°35' E; 700 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; DEBU • 1 ♂, 4 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 12 ♂♂, 3 ♀♀;

Wonga Beach, 10 km S of Daintree; 15–16 Apr. 1999; S.A. Marshall leg.; low forest, dung; DEBU • 14 ♂♂; same collection data as for preceding; QMBA.

PAPUA NEW GUINEA • 20 ♂♂, 16 ♀♀; 29 km N of Port Moresby, Brown River; 3 m a.s.l.; 14–15 Jul. 1974; S. Peck leg.; forest dung; CNCI • 4 ♂♂, 5 ♀♀; 30.5 km N of Port Moresby, Brown River; 3 m a.s.l.; 14–15 Jul. 1974; S. and J. Peck leg.; forest dung; CNCI • 7 ♂♂, 9 ♀♀; Kokoda Trail, Iora Creek, 17 km S of Kokoda; 1400 m a.s.l.; 3–6 Aug. 1976; O. Kukal leg.; dung; CNCI • 3 ♂♂, 1 ♀; Kokoda Trail, Iora Creek, 23 km S of Kokoda, Templeton's Crossing; 1900 m a.s.l.; 6–8 Aug. 1976; O. Kukal leg.; dung; CNCI • 7 ♂♂, 3 ♀♀; Kokoda Trail, Karai River, Manari; 700 m a.s.l.; 12–14 Jul. 1976; O. Kukal leg.; dung; CNCI • 4 ♂♂, 4 ♀♀; Kokoda Trail, Ofi Creek, 8 km SW of Naoro; 650 m a.s.l.; 15–18 Aug. 1976; O. Kukal leg.; lowland forest, dung; CNCI.

Other material examined

AUSTRALIA – **Queensland** • 2 ♂♂; 1 km NW of Buchan Point; 16°44' S, 145°39' E; 10 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; open forest, fish pitfall; QMBA • 3 ♂♂, 5 ♀♀; Buchan Point; 16°44' S, 145°39' E; 5 m a.s.l.; 11–13 Feb. 1999; G.B. Monteith leg.; rainforest, dung pitfall; QMBA • 1 ♂; Cape Tribulation, 40 km N of Daintree; 10 m a.s.l.; 12–15 Jul. 1982; S. Peck leg.; dung trap; DEBU • 3 ♂♂; Cooktown, Keating's Gap; 100 m a.s.l.; 28–31 Jun. 1982; S. and J. Peck leg.; rainforest, carrion; DEBU • 10 ♂♂, 2 ♀♀; same collection data as for preceding; dung trap; DEBU • 7 ♀♀; Fitzroy Island, site 2; 16°56' S, 145°59' E; 40 m a.s.l.; 19–21 Apr. 1999; G.B. Monteith leg.; transition to rainforest, dung trap; QMBA • 6 ♀♀; same collection data as for preceding; site 4; 15 m a.s.l.; QMBA • 1 ♀; 2.5 km S of Hartley's Cree; 16°40' S, 145°34' E; 10 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; open forest, fish pitfall; QMBA • 2 ♂♂, 4 ♀♀; 4 km S of Hartley's Cree; 16°41' S, 145°35' E; 5 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; littoral rainforest, fish pitfall; QMBA • 2 ♀♀; same collection as for preceding; dung pitfall; QMBA • 2 ♂♂, 7 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 3 ♂♂; 2 km E of Kauri Creek; 17°08' S, 145°37' E; 680 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; QMBA • 3 ♂♂, 1 ♀; same collection data as for preceding; fungus pitfall; QMBA • 5 ♂♂, 1 ♀; Kuranda State Forest, 3 km N of Kuranda; 360 m a.s.l.; 25 Jun.–3 Aug. 1982; S. Peck leg.; rainforest, flight intercept trap; DEBU • 3 ♀♀; Lacey's Creek, 10 km SE of El Arish, near Mission Beach; 40 m a.s.l.; 23 Jun.–5 Aug. 1982; S. and J. Peck leg.; rainforest, flight intercept trap; DEBU • 1 ♂, 2 ♀♀; Lake Euramoo; 17°10' S, 145°36' E; 700 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; QMBA • 3 ♂♂, 2 ♀♀; same collection data as for preceding; fungus pitfall; Monteith and Cook leg.; QMBA • 14 ♂♂; Mossman Gorge National Park, 6 km SW of Mossman; 50 m a.s.l.; 11–18 Jul. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 9 ♂♂; Mount Finnigan Slopes, 30 km S of Cooktown; 400 m a.s.l.; 2–5 Jul. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 2 ♂♂; same collection data as for preceding; dung trap; DEBU • 5 ♂♂, 1 ♀; same collection data as for preceding; litter and fungi; DEBU • 1 ♂; Mount Hypipamee National Park; 11–17 Apr. 1999; S.A. Marshall leg.; dung; DEBU • 5 ♂♂, 1 ♀; Noah Creek, 20 km N of Daintree; 4 m a.s.l.; 12–18 Aug. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 2 ♂♂, 7 ♀♀; Oak Beach; 16°36' S, 145°31' E; 5 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; rainforest, fish pitfall; QMBA • 1 ♂, 3 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 1 ♂, 2 ♀♀; Palmerston National Park, near Innisfail; 360 m a.s.l.; 2–5 Aug. 1982; S. and J. Peck leg.; carrion trap; DEBU • 2 ♂♂; Rex Range; 16°31' S, 145°23' E; 90 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; open forest, fish and fungus pitfall; QMBA • 6 ♂♂, 1 ♀; Rex Range, 12 km S of Mossman; 400 m a.s.l.; 10–18 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 12 ♂♂, 6 ♀♀; Thorton Range, near Daintree; 200 m a.s.l.; 12–18 Jul. 1982; S. and J. Peck leg.; carrion trap; DEBU • 1 ♂; Tolga Scrub; 17°15' S, 145°29' E; 760 m a.s.l.; 3–6 Feb. 1999; Monteith and Cook leg.; rainforest, fish pitfall; QMBA • 1 ♂; same collection data as for preceding; fungus pitfall; QMBA.

PAPUA NEW GUINEA • 19 ♂♂, 13 ♀♀; Mount Hagen; 1829 m a.s.l.; 5–8 Jul. 1974; S. Peck leg.; oak forest, dung trap; DEBU.

Description

BODY (Fig. 31). Length 1.3–1.8 mm. Head dark brown; interfrontal plates pale yellow with silver-gold microtomentum limited to bases of interfrontal, orbital, and ocellar bristles, lunule, and around inner vertical bristle; gena brown; antenna brown. Frontal width $2.5 \times$ interfrontal height. Eye height $2.5 \times$ genal height. Thorax brown, anepimeron with a pale posterior spot. Scutum with pale grey and brown microtomentum forming two grey longitudinal stripes, lateral margins broadly yellow microtomentose with pale M-shaped microtomentose mark wrapping around posterior dorsocentral bristles; scutellum dark brown with median, grey-brown microtomentose triangle. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Legs brown, tibiae proximally paler, tarsi paler. Male mid tibia with long apicoventral bristle only. Wing (Fig. 41D) pattern weak. CS2 $0.5 \times$ CS3. R_{2+3} almost straight for most of its length, distal fifth abruptly bent towards costa, angled at $\sim 45^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($4\text{--}5 \times$ costal width). M_1 and M_4 both indistinct beyond dm-m; CuA+CuP long and weakly tubular. Halter pale brown.

MALE ABDOMEN (Fig. 32). S5 narrow, posteromedially desclerotized between two narrow posterior arms and uniformly long-setose. S6 with sinuate lateral apodeme. Cercus flat, triangular with a few setae and many fine apical setulae, large gap between the pair; subepandrial sclerite indistinct but medially darkened. Surstylus large, bilobed, the lobes almost entirely separated: anterior lobe triangular, curved inwards, and densely long-setose along the posterior edge, posterior lobe subtriangular, posteriorly setulose, with a shorter outer projection and a larger inner projection, each with a stout apical seta. Postgonite elongate, broadly triangular with two spine-like, posterior extensions on the basal half and a curved, blade-like apical half with a small anterior hook. Phallapodeme elongate, slightly sinuate with a broad apex; basiphallus large, ring-shaped with an elongate, flattened, and apically rounded epiphallus. Distiphallus stout, complex and made of two parts: basal half with an elongate, apically bifurcate dorsomedial sclerite and a large, cylindrical ventral sclerite; apically with large membranous flaps and supported by a small dorsal and a larger ventral sclerite.

FEMALE ABDOMEN (Fig. 33). T6 well-developed, rectangular, and long-setose along posterior margin; T7 very large, slightly posteromedially emarginate, and long-setose in posterolateral corners; T8 large,

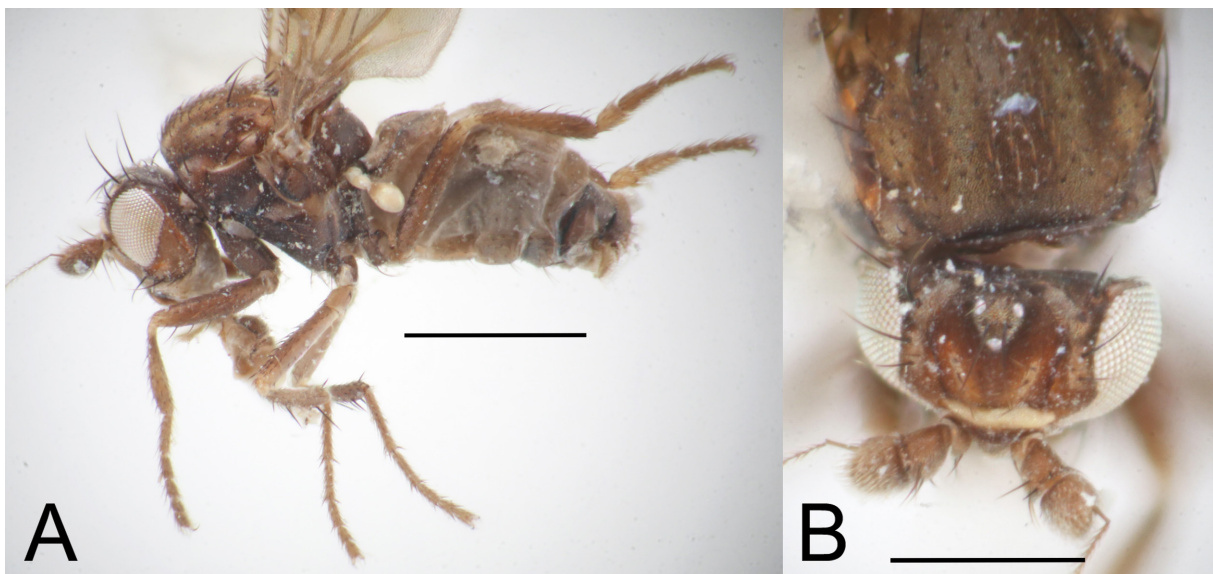


Fig. 31. *Parapterogramma pugioformis* sp. nov., holotype (debu00163634, QMBA). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

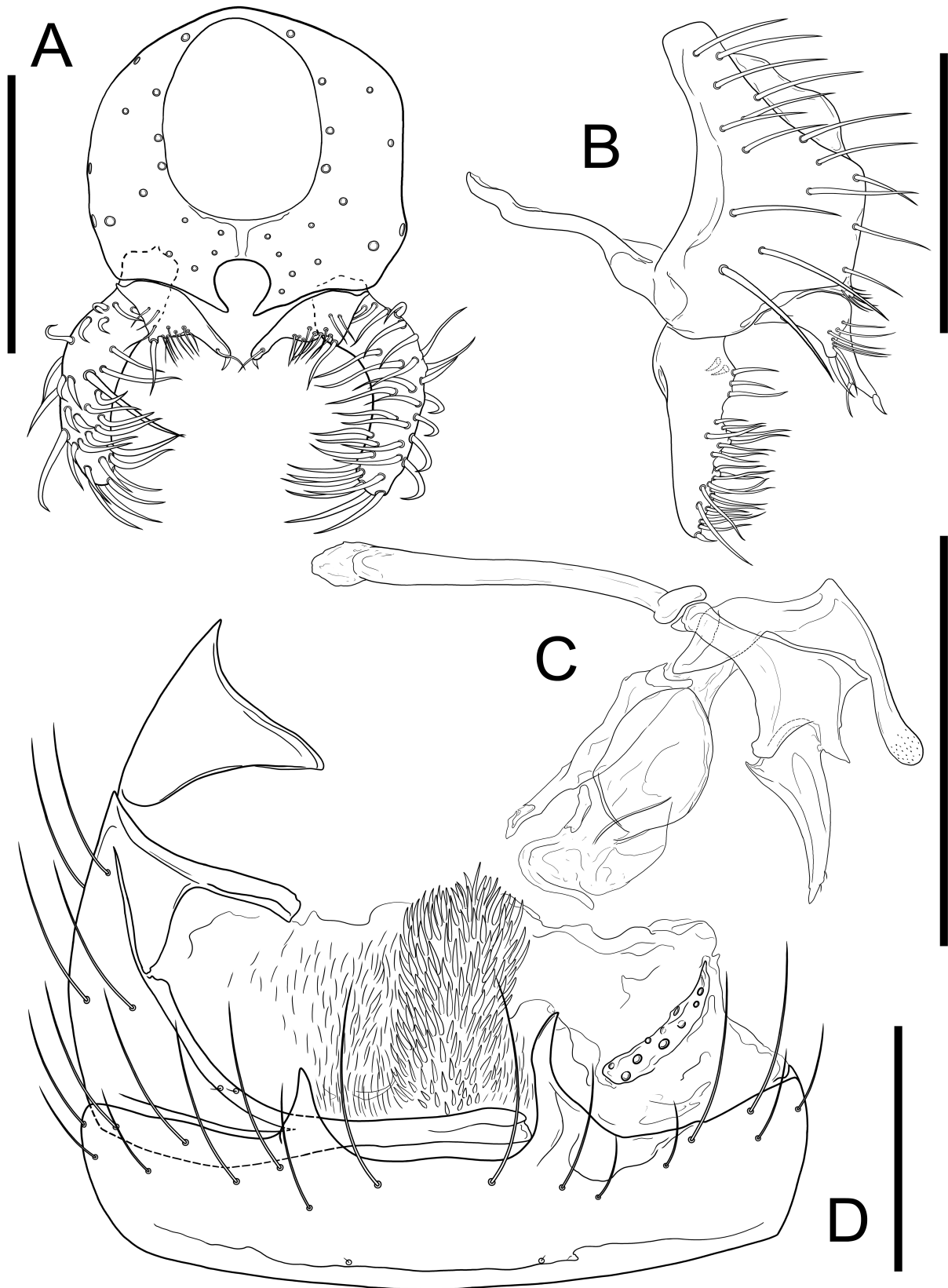


Fig. 32. *Parapterogramma pugioformis* sp. nov., paratype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

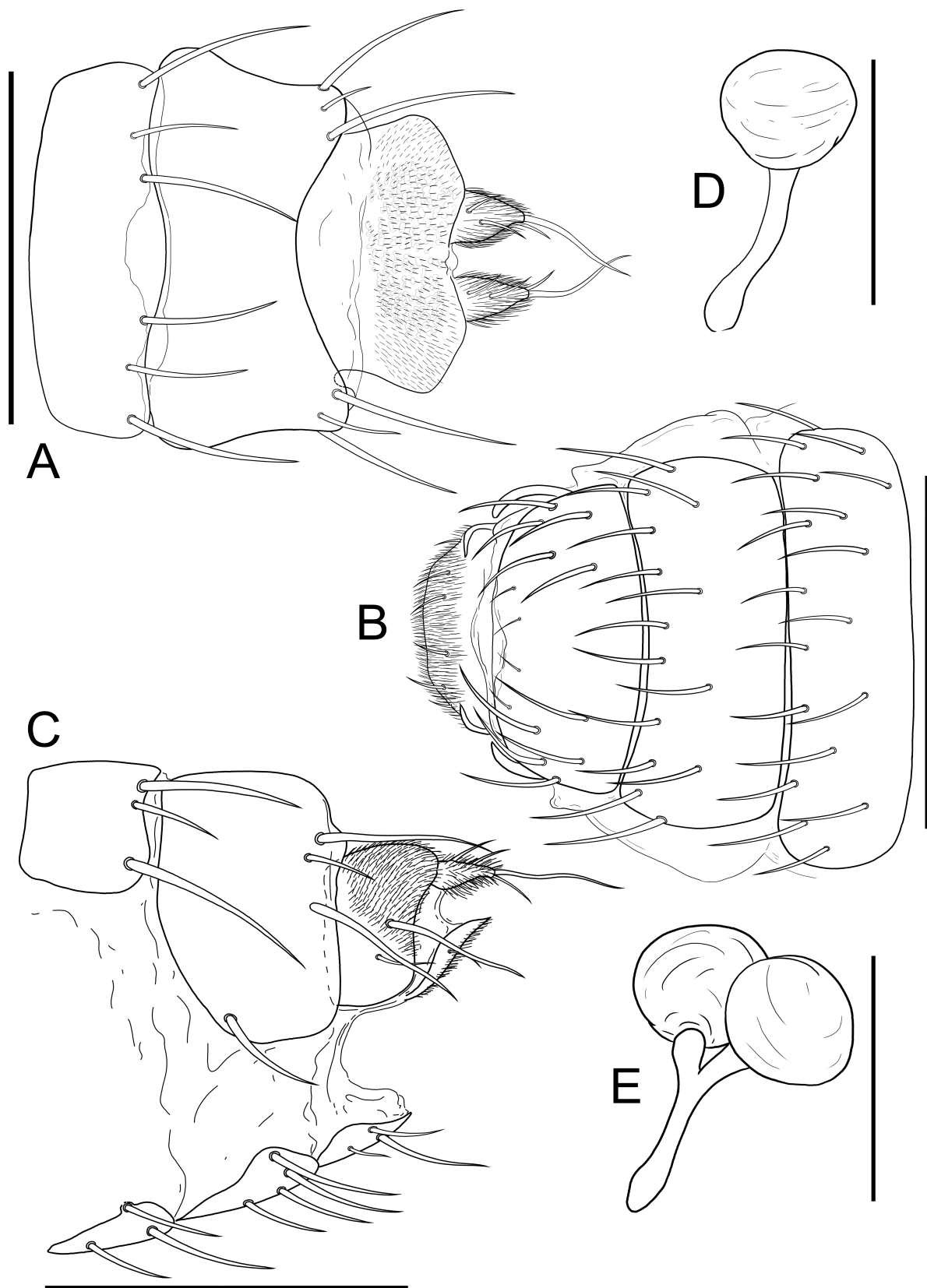


Fig. 33. *Parapterogramma pugioformis* sp. nov., paratype (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

membranous with dense dorsal setation, the setae clumped on small sclerotized patches. Epiproct largely reduced. S6 and S7 well-developed, rectangular, and long-setose along posterior margin; S8 broad with a slight posteromedial sclerotization, uniformly long-setose but with a row of four smaller posteromedial setae. Hypoproct trapezoidal with a row of 6 preapical posterior setae. Spermathecae stout, spherical, and smooth, stem short and sclerotized.

Remarks

Parapterogramma pugioformis sp. nov. and the similar *Pa. digitisternum* sp. nov. both have the microtomentum on the orbital plates limited to the bases of the orbital and inner vertical bristles. *Parapterogramma pugioformis* differs from *Pa. digitisternum* by its broader frons (width $2.5 \times$ height), straighter R_{2+3} , CuA+CuP almost reaching the wing margin, male S5 with a pair of posteromedial lobes, a rounded epiphallus, and a more linear surstylus.

Parapterogramma simplex sp. nov.

[urn:lsid:zoobank.org:act:8693005A-ED19-410D-BB82-B92A1D3F5E03](https://doi.org/10.3896/BI.2020.8693005A-ED19-410D-BB82-B92A1D3F5E03)

Figs 34–36, 41E, 42

Etymology

This species name refers to the relatively simple male genitalia, without the additional lobes or modified setae found in most other species of *Parapterogramma*.

Material examined

Holotype

FIJI – **Viti Levu** • ♂; Nandarivitu, Y00 Microwave Station; 3350 m a.s.l.; 16–23 Aug. 1978; S. and J. Peck leg.; CNCI.

Paratypes

FIJI – **Kadavu** • 1 ♂; 0.25 km SW of Solodamu Village, Moanakaka Bird Sanctuary; 19°04'41" S, 178°07'16" E; 50 m a.s.l.; 23 Oct.–6 Nov. 2004; S. Lau leg.; Malaise; BPBM. – **Viti Levu** • 28 ♂♂, 26 ♀♀;



Fig. 34. *Parapterogramma simplex* sp. nov., holotype (CNCI). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

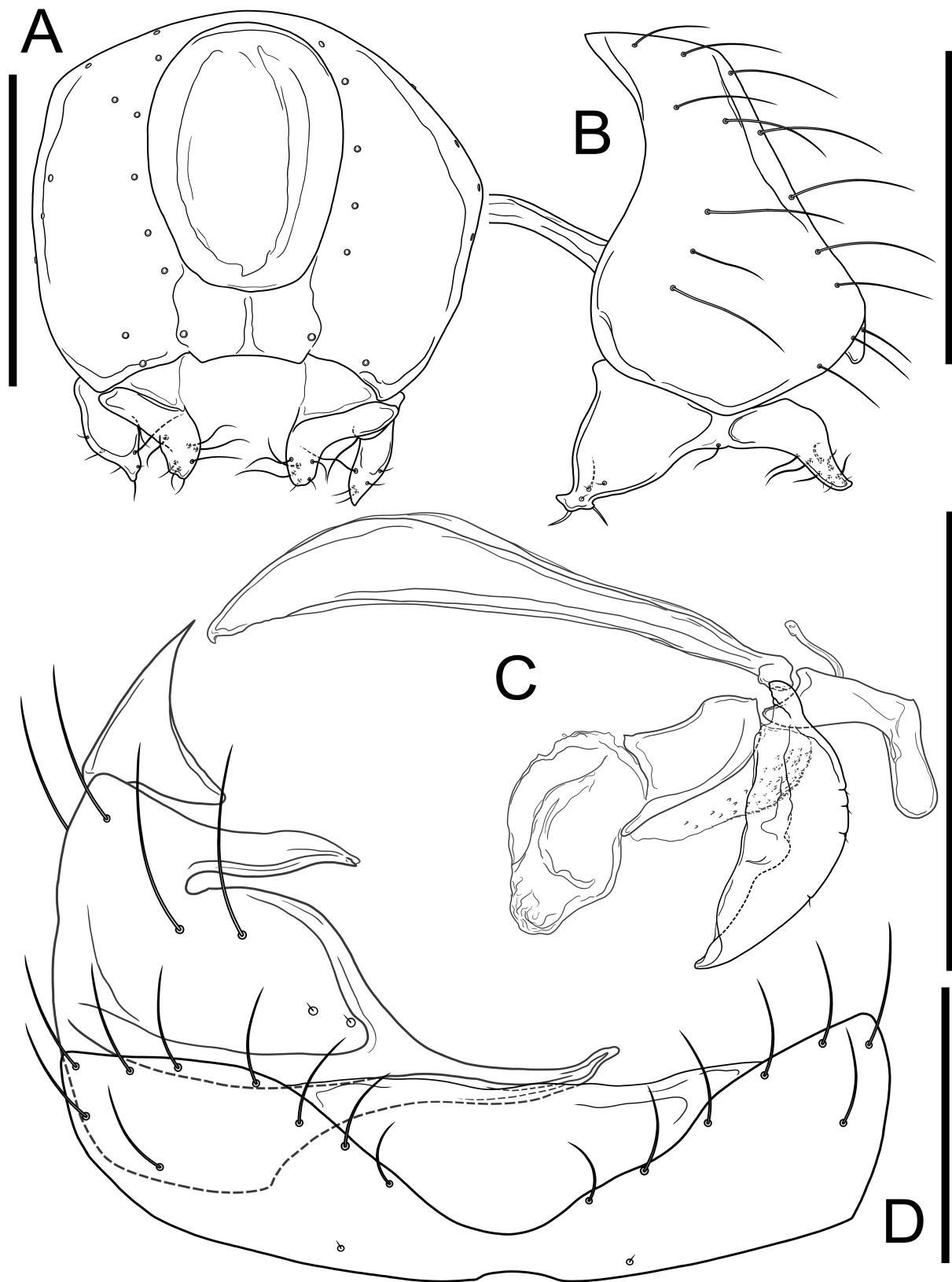


Fig. 35. *Parapterogramma simplex* sp. nov., paratype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

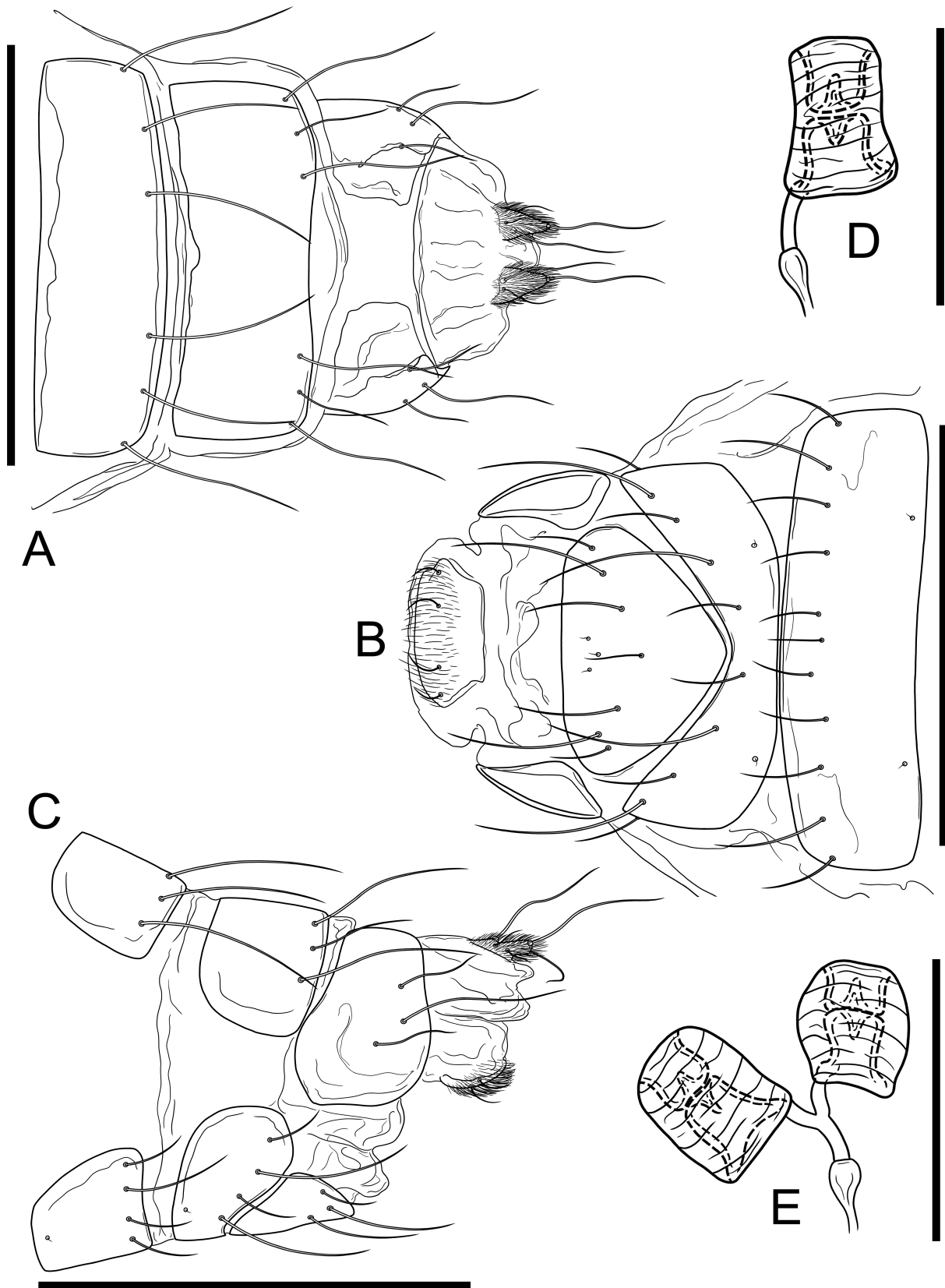


Fig. 36. *Parapterogramma simplex* sp. nov., paratype (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

same collection data as for holotype; CNCI • 26 ♂♂, 16 ♀♀; same collection data as for holotype; forest dung; DEBU • 1 ♂; 1.8 km E of Navai Village, old trail to Mount Tomaniivi; 17°37'16" S, 177°59'53" E; 700 m a.s.l.; 9–30 Aug. 2004; E. Namatalau leg.; Malaise; DEBU • 1 ♂; 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'18" S, 178°25'26" E; 372 m a.s.l.; 12–24 Oct. 2002; Timoci leg.; Malaise; BPBM • 2 ♂♂, 7 ♀♀; 10 km N of Galoa; 300 m a.s.l.; 29 Aug.–1 Sep. 1978; S. and J. Peck leg.; second forest; DEBU • 1 ♂, 5 ♀♀; 10 km N of Ngoloa; 300 m a.s.l.; 29 Aug.–1 Sep. 1978; S. and J. Peck leg.; second forest; CNCI • 7 ♂♂, 22 ♀♀; 15 km N of Suva, Tholoisuva Watershed; 200 m a.s.l.; 25–31 Aug. 1978; S. and J. Peck leg.; rainforest; CNCI • 1 ♀; Suva, Tholoisuva Watershed; 25–31 Aug. 1978; S. and J. Peck leg.; carrion trap; CNCI.

Description

BODY (Fig. 34). Length 1.1–1.3 mm. Head orange-brown, darkened posteriorly with silvery-gold microtomentum limited to bases of interfrontal and orbital bristles, ocellar triangle, tip of lunule, and around inner vertical bristle; gena yellow; antenna brown. Frontal width $2.3 \times$ interfrontal height. Eye height $3.0 \times$ genal height. Thorax brown. Scutum with pale grey and brown microtomentum forming two dark longitudinal stripes, lateral margins broadly yellow microtomentose with pale M-shaped microtomentose mark at level of posterior dorsocentral bristles; scutellum brown with median, dark brown microtomentose triangle. Anterior dorsocentral bristles separated by 9–10 rows of acrostichal setulae. Legs brown, fore tibia yellowish, tarsi slightly paler. Male mid tibia with a stout apicoventral bristle and two rows of stout ventral setae. Wing (Fig. 41E) pattern strong. CS2 $0.5 \times$ CS3. R_{2+3} broadly curved in apical half, angled at $\sim 80^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5\text{--}6 \times$ costal width). M_1 indistinct beyond dm-m; M_4 extending beyond dm-m; CuA+CuP long. Halter brown.

MALE ABDOMEN (Fig. 35). S5 broad, deeply posteromedially desclerotized and sparsely long-setose. S6 sinuate. Cercus flat, subquadrate with one seta; subepandrial sclerite indistinct but medially darkened. Surstylus long but low, bilobed: anterior lobe larger, triangular, largely bare with flared anteroventral apex, posterior lobe triangular, sinuate, and setulose on the inner surface of the apical half. Postgonite short but broad, curved, evenly tapered, anterior half pale. Phallapodeme elongate, gently curved with pointed apex; basiphallus large, ring-shaped with an elongate, flattened, apically rounded, spoon-shaped epiphallus. Distiphallus stout, complex but largely membranous, basal half with a broad, U-shaped upper sclerite and papillate lower membrane, apex supported by a small upper and a larger lower sclerite.

FEMALE ABDOMEN (Fig. 36). T6 and T7 well-developed, rectangular and long-setose along posterior margin; T8 split into two large, lateral sclerites, each with three lateral setae. Epiproct entirely membranous. S6 rectangular and setose along posterior margin; S7 subrectangular with a very deep posteromedial emargination and posterior row of setae; S8 subtriangular, anteriorly projecting into emargination of S7, with V-shaped row of setae. Hypoproct reduced, rectangular, largely membranous except for a sclerotized, setulose medial part. Spermathecae stout, subcylindrical, slightly wider at base, lightly grooved with deep invaginations at both ends, each invagination with a small central projection, stem very short and membranous.

Remarks

Parapterogramma simplex sp. nov. is the smallest species of Fijian *Parapterogramma*. It is distinguished from all congeners by its frons with silver-gold microtomentum that contrasts with the dark brown body and wing markings.

Parapterogramma tokotaai sp. nov.

[urn:lsid:zoobank.org:act:70C32D87-2212-4616-9E2B-CC337795F5A4](https://zoobank.org/urn:lsid:zoobank.org:act:70C32D87-2212-4616-9E2B-CC337795F5A4)

Figs 37–39, 41F, 42

Etymology

This species name recognizes Moala Tokota'a, a local guide who contributed to the Malaise trap sampling for the Fiji Arthropod Survey (see Evenhuis & Bickel 2005).

Material examined

Holotype

FIJI – Viti Levu • ♂; Vuda, 1 km E of Abaca Village, Koroyanitu National Park, Savuione Trail; 17°40' S, 177°33' E; 800 m a.s.l.; 7–12 Oct. 2002; Schlinger and Tokota'a leg.; Malaise; BPBM.

Paratypes

FIJI – Viti Levu • 1 ♀; Vuda, Abaca Village, Koroyanitu National Park; 17°40' S, 177°33' E; 400 m a.s.l.; 21 Sep.–7 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂, 2 ♀♀; same collection data as for preceding; 7–12 Oct. 2002; BPBM • 1 ♂, 6 ♀♀; same collection data as for preceding; 6–26 May 2003; BPBM • 1 ♀; same collection data as for preceding; Savuione Trail; 12–19 Nov. 2002; BPBM • 3 ♀♀; Vuda, 0.5 km N of Abaca Village, Koroyanitu EcoPark; 17°40'01" S, 177°33'00" E; 800 m a.s.l.; 12–19 Nov. 2002; Schlinger and Tokota'a leg.; Malaise; BPBM • 2 ♂♂, 1 ♀; same collection data as for preceding; Mount Evan's Range; 26 Nov.–3 Dec. 2002; BPBM • 2 ♂♂; same collection data as for preceding; Kokabula Trail; DEBU • 1 ♂, 2 ♀♀; Vuda, 1 km E of Abaca Village, Koroyanitu EcoPark; 17°40'01" S, 177°33'00" E; 800 m a.s.l.; 22 Apr.–6 May 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 2 ♂♂, 2 ♀♀; Vuda, 1 km E of Abaca Village, Koroyanitu National Park, Kokabula Trail; 17°40' S, 177°33' E; 800 m a.s.l.; 19–26 Oct. 2002; Schlinger and Tokota'a leg.; Malaise; DEBU • 4 ♂♂, 3 ♀♀; same collection data as for preceding; 12–19 Nov. 2002; DEBU • 1 ♂, 8 ♀♀; same collection data as for holotype; BPBM • 1 ♂, 3 ♀♀; same collection data as for holotype; 26 Oct.–5 Nov. 2002; DEBU • 3 ♂♂, 4 ♀♀; same collection data as for holotype; 12–19 Nov. 2002; BPBM • 1 ♀; same collection data as for holotype; 450 m a.s.l.; 12–19 Oct. 2002; BPBM • 1 ♀; same collection data as for holotype; 21 Oct.–18 Nov. 2003; BPBM.

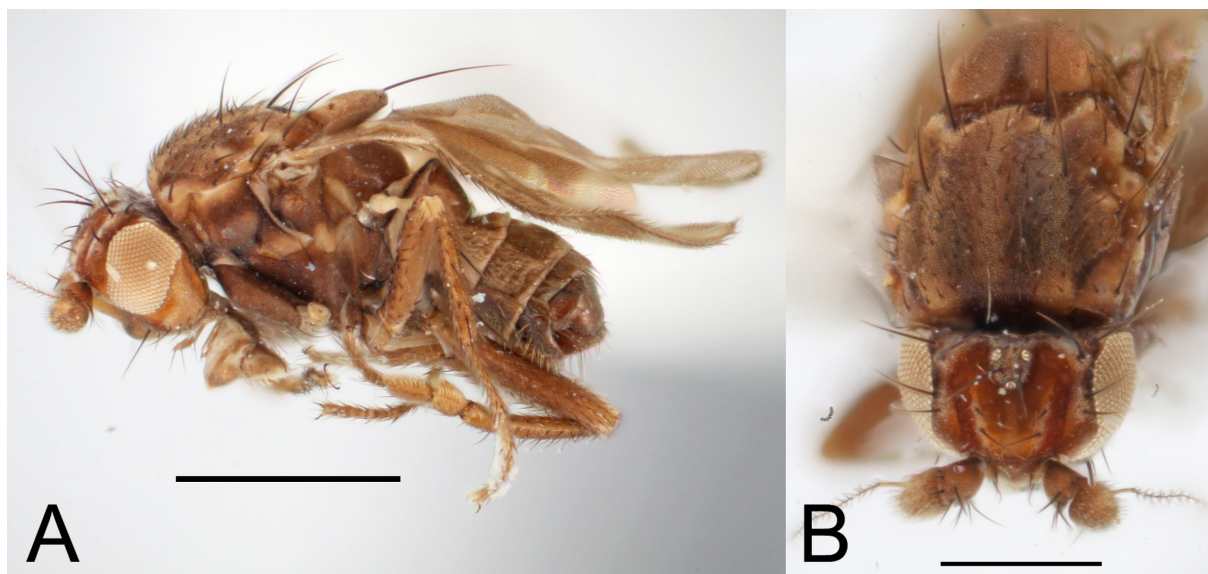


Fig. 37. *Parapterogramma tokotaai* sp. nov., paratype (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

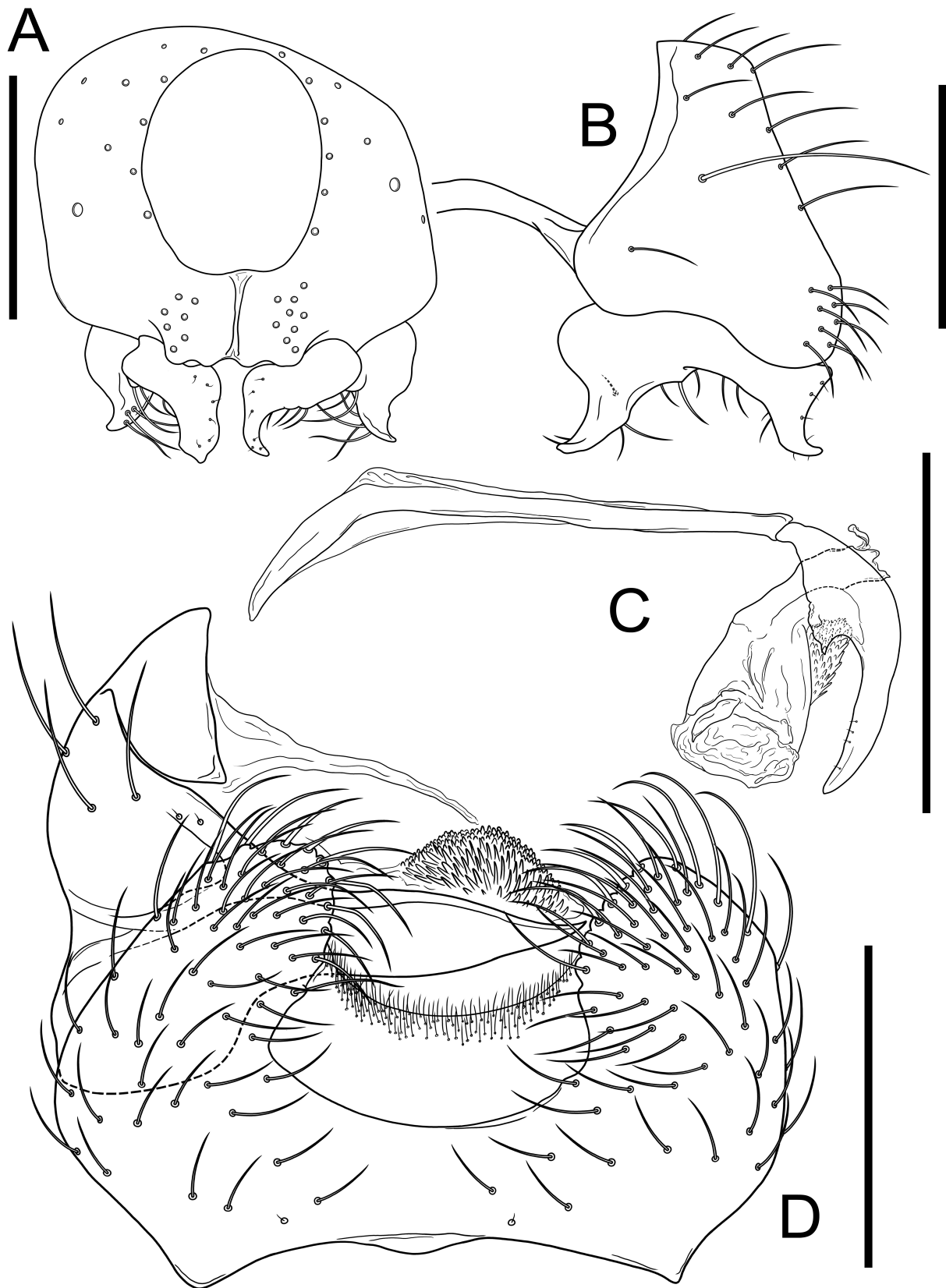


Fig. 38. *Parapterogramma tokotaai* sp. nov., paratype (DEBU). **A.** Male terminalia, posterior view. **B.** Male terminalia, lateral view. **C.** Aedeagus and associated structures, lateral view. **D.** Male S5–8, ventral view. Scale bars: A–D = 0.10 mm.

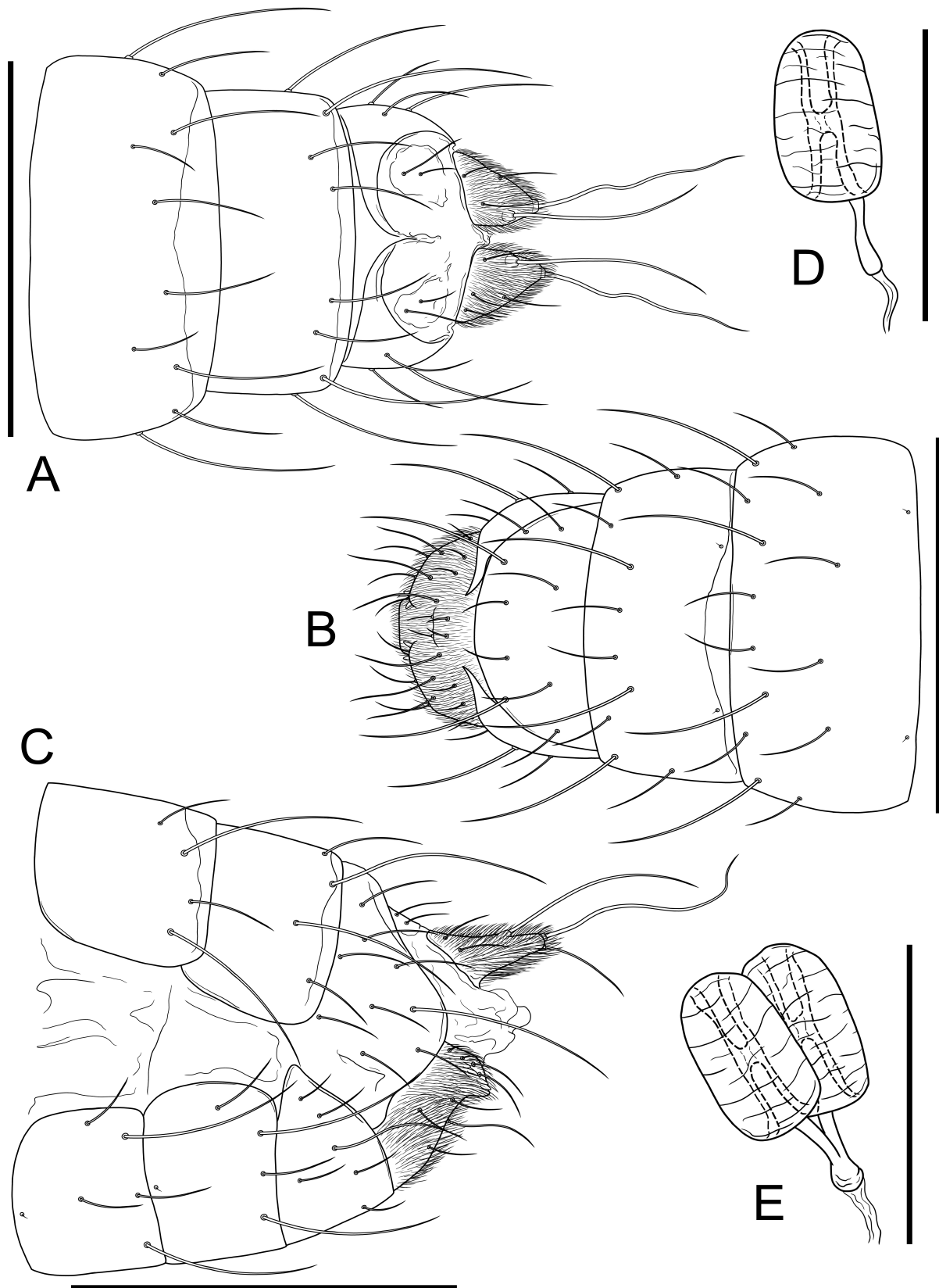


Fig. 39. *Parapterogramma tokotaai* sp. nov., paratype (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

Description

BODY (Fig. 37). Length 1.0–1.2 mm. Head caramel-brown, paler under silvery microtomentose areas that are limited to bases of interfrontal and orbital bristles, ocellar triangle, lunule, and around inner vertical bristle; gena yellow; antenna yellow-brown. Frontal width $1.3\times$ interfrontal height. Eye

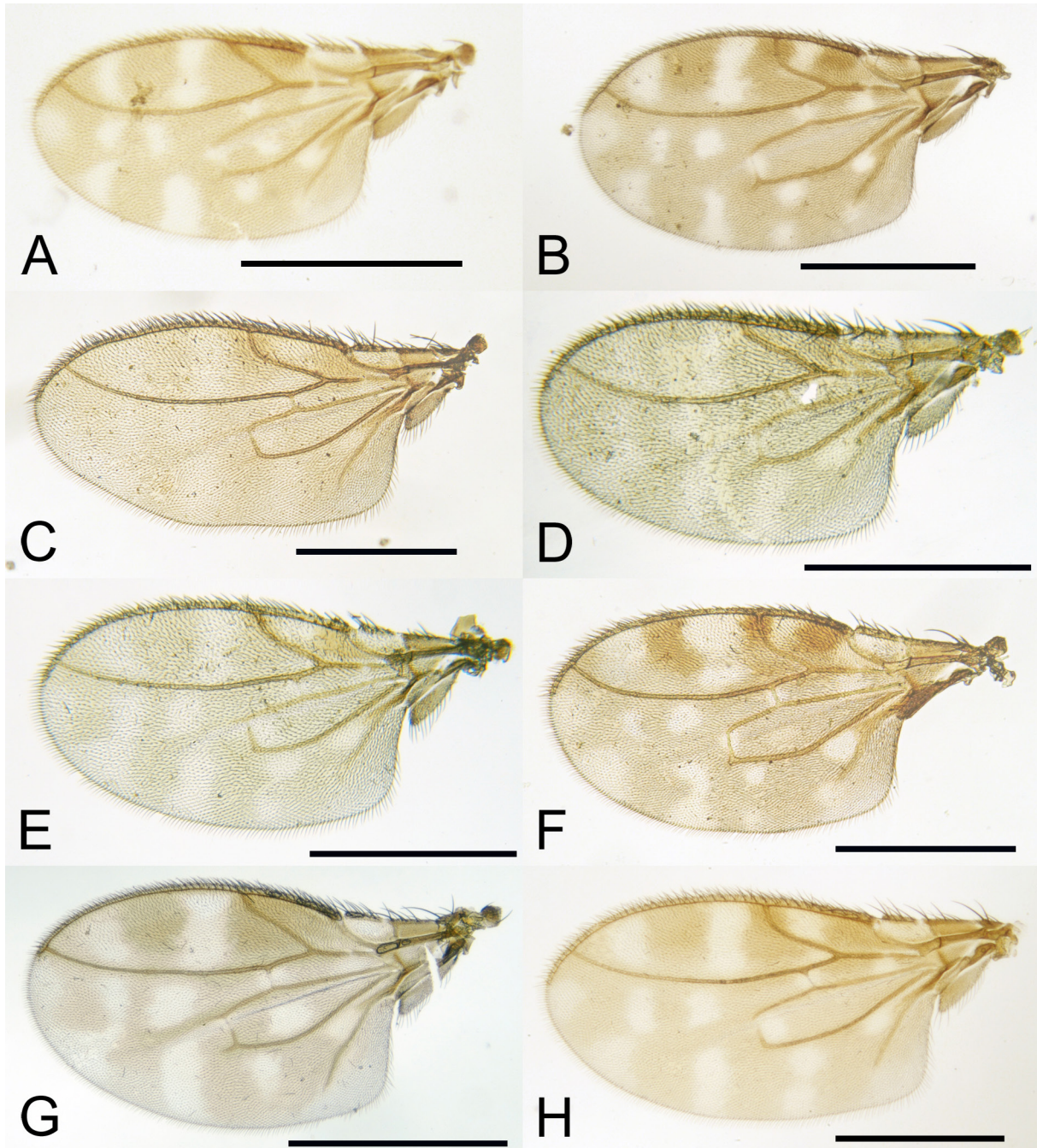


Fig. 40. *Parapterogramma* Papp, 2008, left wings, ventral views. **A.** *Parapterogramma asiaticum* Papp, 2008 (LKCNHM). **B.** *Parapterogramma bicolor* sp. nov., paratype (BPBM). **C.** *Parapterogramma dentatum* sp. nov., holotype (DEBU). **D.** *Parapterogramma digitisternum* sp. nov., paratype (DEBU). **E.** *Parapterogramma gonitellum* sp. nov., paratype (DEBU). **F.** *Parapterogramma hieroglyphicum* sp. nov., paratype (BPBM). **G.** *Parapterogramma magnum* sp. nov., paratype (QMBA). **H.** *Parapterogramma matau* sp. nov., paratype (DEBU). Scale bars: A–H = 0.50 mm.

height $2.5 \times$ genal height. Thorax brown. Scutum with pale grey and brown microtomentum forming two dark longitudinal stripes, lateral margins broadly yellow microtomentose; scutellum brown with median, dark brown microtomentose triangle. Anterior dorsocentral bristles separated by 8–9 rows of acrostichal setulae. Legs caramel-brown, femora apically paler, tarsi slightly paler. Male mid tibia with weak apicoventral bristle and one row of stout anteroventral setae; ventral face in apical third slightly concave. Male mid femur with sparse long ventral setae on apical half. Wing (Fig. 41F) pattern weak. $CS2\ 0.5 \times CS3$. R_{2+3} broadly curved in apical half, angled at $\sim 60^\circ$ to costa; costa extending well beyond apex of R_{4+5} ($5\text{--}6 \times$ costal width). M_1 indistinct beyond dm-m; M_4 extended beyond dm-m; $CuA+CuP$ long. Halter whitish.

MALE ABDOMEN (Fig. 38). S5 broad with a very large, posteromedial emargination, and dense but not very long posterolateral setae. S6 with an elongate, sinuate ventrolateral apodeme extending underneath the medial part of S5; S7 broad. Epandrium small, wedge-shaped and sparsely long-setose laterally; cercus flat, rectangular, ventrally emarginate, with a medial patch of setulae; subepandrial sclerite rectangular,

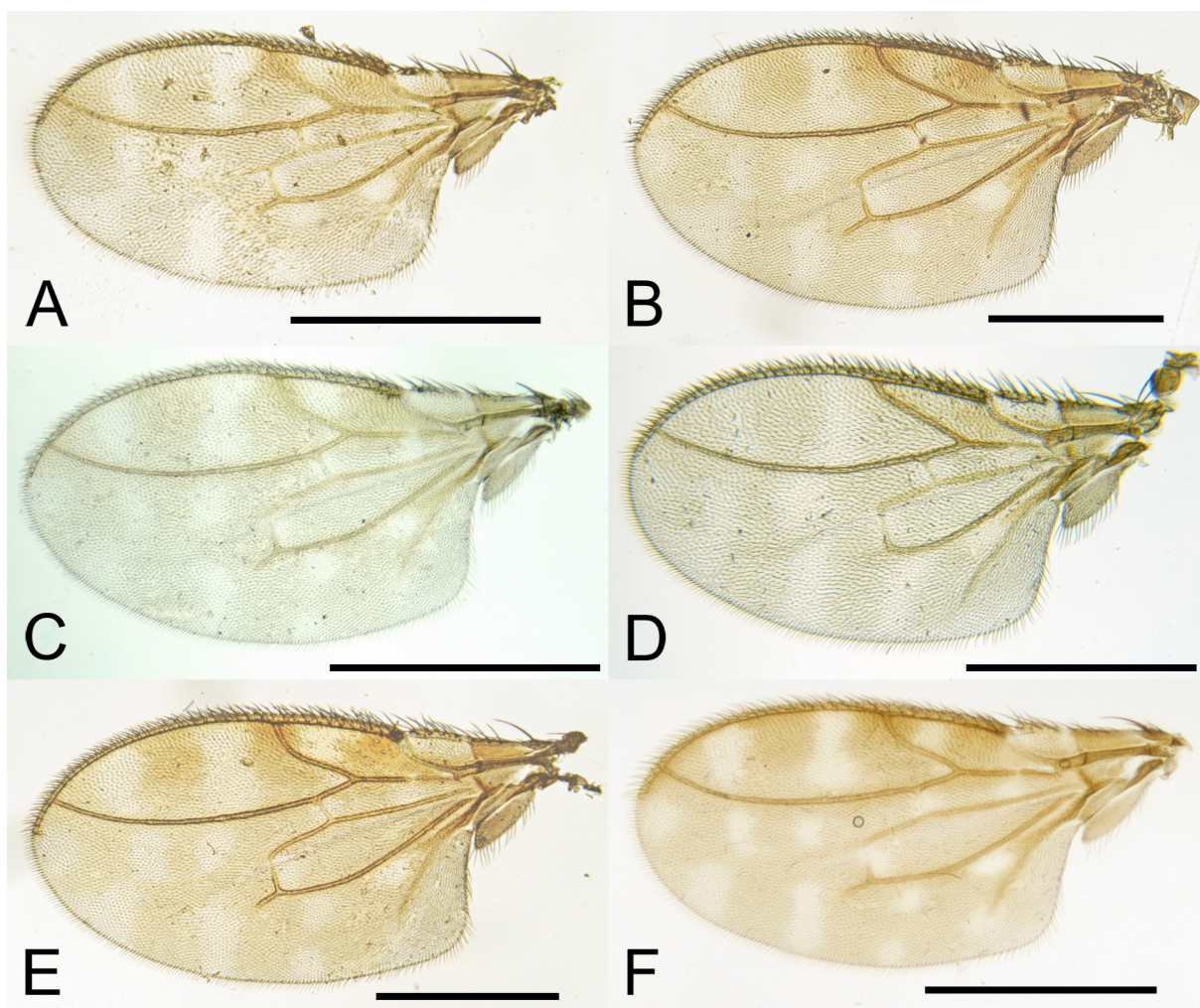


Fig. 41. *Parapterogramma* Papp, 2008, left wings, ventral views. **A.** *Parapterogramma ofiensis* sp. nov., holotype (DEBU). **B.** *Parapterogramma peckorum* sp. nov., paratype (DEBU). **C.** *Parapterogramma pollex* sp. nov., paratype (DEBU). **D.** *Parapterogramma pugioformis* sp. nov., paratype (DEBU). **E.** *Parapterogramma simplex* sp. nov., paratype (CNCI). **F.** *Parapterogramma tokotaii* sp. nov., paratype (BPBM). Scale bars: A–F = 0.50 mm.

indistinct but medially darkened. Surstylus long but low, bilobed: anterior lobe larger, subtriangular but bulging anteriorly, setulose on the inner ventral surface with pointed anteroventral apex, posterior lobe triangular, apex curved posteroventrally, with setulae along anterior margin. Postgonite elongate, curved, evenly tapered with apex blunt, basal half with a stout, tooth-like anterior lobe. Phallapodeme elongate, gently curved with distinctly bent apex; basiphallus flattened laterally, fused to base of distiphallus. Distiphallus stout, largely membranous, basal half with a broad, diamond-shaped upper sclerite, apex supported by pair of curved dorsolateral sclerites, lower surface with short patch of dense papillae.

FEMALE ABDOMEN (Fig. 39). T6 and T7 rectangular, slightly desclerotized posteromedially and long-setose along posterior margin; T8 desclerotized medially and split into two large lateral plates with long lateral setae. Epiproct membranous, indistinct but with two small, lateral setae. S6 rectangular, desclerotized posteromedially; S7 broadly emarginate anteriorly and long-setose along posterior margin; S8 semicircular and long setose posteriorly. Hypoproct reduced, subrectangular, relatively densely setose with a posteromedial row of small, stout, tooth-like setae. Spermathecae stout, subcylindrical, slightly wider at base, lightly grooved with deep invaginations at both ends, stem very short and membranous.

Remarks

Parapterogramma tokotaii sp. nov. is externally similar to *Pa. peckorum* sp. nov. and *Pa. matau* sp. nov. Males of *Pa. tokotaii* differ from those of *Pa. peckorum* in mid tibial chaetotaxy, including a weak apicoventral bristle and a conspicuous row of stout anteroventral setae; both sexes can be distinguished from *Pa. matau* by the M_4 that extends distinctly beyond dm-m.

Parapterogramma tokotaii sp. nov. is known only from Vuda Province of Viti Levu, where it occurs with the relatively infrequently collected *Pa. peckorum* sp. nov.

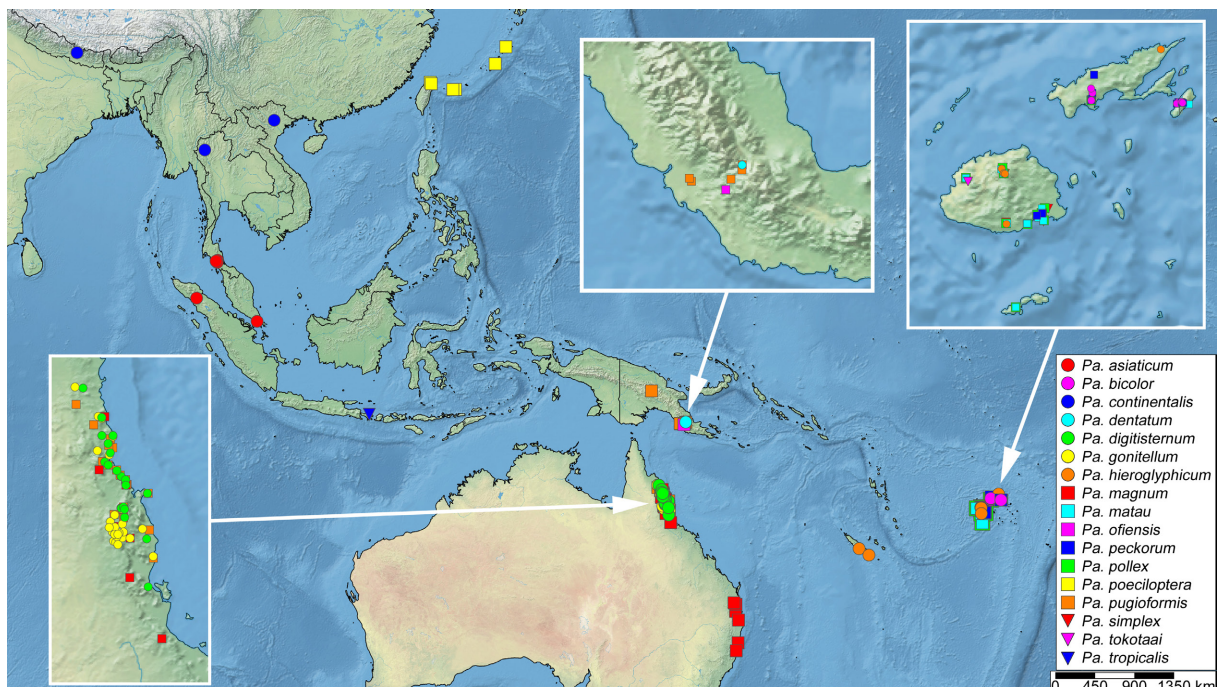


Fig. 42. Distribution map of *Parapterogramma* Papp, 2008.

Parapterogramma tropicalis (Hayashi, 2013) comb. nov.

Minialula tropicalis Hayashi, 2013: 353, figs 2, 8–10.

Type material

Holotype

INDONESIA – Bali • ♂; Kintamani; 18 Mar. 1993; T. Hayashi leg.; NIID.

Material examined

No specimens of *M. tropicalis* were examined.

Redescription

BODY. As described for *Pa. continentalis*, except as follows: length 1.6 mm.

MALE ABDOMEN. S5 broad, uniformly long-setose with a distinct, rectangular, posteromedial lobe with dense posterior setulae. S6 with an elongate, posteriorly-projecting setulose lobe located behind posteromedial lobe of S5. Surstylus long but low, bilobed: anterior lobe elongate, bare, and almost folded posteroventrally so it runs parallel with ventral surface of epandrium, posterior lobe rounded and setose. Postgonite short but broad, slightly bent at about midlength, apical half with an anterodorsal triangular lobe and two posteroventral triangular lobes flanking a rounded ventral emargination (exaggerating depth of emargination), apex rounded. Phallapodeme elongate, apex broadened and tapered; basiphallus large, triangular in lateral view and V-shaped in dorsal view, with an elongate, apically rounded and downturned epiphallus. Distiphallus stout, largely membranous, supported by curled, weakly sclerotized lateral sclerites.

FEMALE ABDOMEN. Female unknown.

Distribution

Indomalayan: Indonesia (Bali) (Hayashi 2013).

Remarks

The above redescription of *Pa. tropicalis* is based on Hayashi's (2013) description of the species.

Parapterogramma tropicalis, *Pa. continentalis*, and *Pa. poeciloptera* form a distinct clade within *Parapterogramma* (see discussion of *Minialula* in Introduction). *Parapterogramma tropicalis* is externally almost identical to *M. continentalis*, from which it can be distinguished by its posteromedially protruding male S5 and rounded postgonite apex; it can be distinguished from *Pa. poeciloptera* by the stout, apicoventral bristle on the male mid tibia.

Genus *Pseudopterogramma* Papp, 2008

Pseudopterogramma Papp, 2008: 99 (neuter). Type species: *Pseudopterogramma siamense* Papp, 2008, by original designation.

Archipterogrammoides Papp, 2008: 84. Type species *Archipterogrammoides metatarsalis* Papp, 2008: 87. **Syn. nov.**

Undescribed genus for “Pacific *Pterogramma*” corresponding to the *conicum* group of Smith and Marshall – Roháček *et al.* 2001: 212 (world catalog). — Smith & Marshall 2004: 57 (notes).

Pseudopterogramma – Papp 2008: 99 (description, key). — Marshall *et al.* 2011: 264 (world catalog).

Archipterogrammoides – Marshall *et al.* 2011: 234 (world catalog).

Diagnosis

In addition to the synapomorphies that define the *Parapterogramma* genus group, *Pseudopterogramma* is diagnosed by the following combination of characters: head and thorax lacking microtomentose patterns; anterior pair of dorsocentral bristles just before suture; mid tibia with two dorsal bristles on the proximal half; R_{2+3} straight to distinctly sinuate; R_{4+5} relatively straight and meeting costa near wing tip; costa ending at apex of R_{4+5} ; first section of R_{4+5} usually longer than distance between crossveins; male S6 simple; surstylus divided into (usually) smaller anterior lobe and larger posterior lobe (sometimes roughly subequal); postgonite elongate and usually thin; and female S8 usually subtriangular, sometimes separated into a trapezoidal anterior half and a triangular posterior half.

Definition

Pseudopterogramma is defined by the following synapomorphies: anterior dorsocentral bristles that arise just before the suture, two dorsal bristles on the proximal half of the mid tibia, R_{4+5} relatively straight and meeting the costa near the wing tip, and elongate postgonites.

Redescription

BODY. Colour brown. Length 1.0–1.9 mm.

HEAD. Brown, lower portion of frons yellow to orange-brown. Frontal width $2.1\text{--}2.2 \times$ frontal height. Interfrontal bristles in 3–4 fine pairs, middle pair(s) with tips almost touching; two strong laterocline orbital bristles, anterior orbital smaller ($0.6\text{--}0.7 \times$) than posterior; ocellar bristles large and diverging; inner and outer vertical bristles large; postvertical bristle large; postocellar bristles small. Vibrissa large, vibrissal angle usually with one subvibrissal seta; gena with a large, upcurved anteroventral seta and several smaller setae. Palpus moderate, clavate, with two subapical ventral setulae. Lunule prominent but not enlarged. Antennae divergent; scape with an enlarged anterior seta; pedicel with 6–8 apical setae and a preapical dorsal seta; postpedicel small ($1.1\text{--}1.3 \times$ pedicel), slightly pointed, gumdrop-shaped; arista long pubescent. Eye with slight notch at about level of anterior edge of frons, eye height $2.7\text{--}3.0 \times$ genal height, posteroventral corner concave from broadened gena.

THORAX. Brown with grey-brown microtomentum. Two pairs of large dorsocentral bristles, anterior pair just anterior to suture and large ($0.7\text{--}0.8 \times$ posterior pair), separated by 7–10 rows of acrostichal setulae. Two postpronotal bristles, outer bristle large and inner bristle smaller, often minute; two notopleural bristles, anterior notopleural slightly larger than posterior; two strong supra-alar bristles; postalar and intrapostalar bristles strong. Katepisternum with a very small anterior seta and a large posterior seta. Scutellum subtriangular microtomentose, $0.5\text{--}0.6 \times$ as long as broad with four large marginal bristles in the usual positions.

LEGS. Pale brown, femora darker, tarsomeres lighter. Fore femora with 4–5 large ventral setae, fore tibia without any enlarged setae. Dorsal surface of mid tibia with two (one anterodorsal, one posterodorsal) bristles in the proximal half and three (two anterodorsal, one posterodorsal) bristles in the distal half. Mid basitarsus with a slightly enlarged ventral setula.

WINGS. Lightly patterned. CS2 $0.4\text{--}0.5 \times$ CS3. R_{2+3} short, mostly straight with a slight sinuate bend at midlength; R_{4+5} upcurved, ending well before wing tip; costa terminating at the end of R_{4+5} . M_1 extending to wing edge as a faint crease; M_4 extending slightly beyond dm-m. CuA+CuP almost reaching edge. Halter pale brown with white apex.

MALE ABDOMEN. Preabdomen brown, shiny. T2–5 and S2–4 slightly desclerotized around edges, posterolateral corners of T4–5 with enlarged setae. S5 broad, rectangular, simple, usually with short, sparse setae, often emarginate or desclerotized posteromedially. Synsternite 6+7 well-developed, S6

usually narrow and curved. Epandrium wedge-shaped (longer ventrally than dorsally), left side often more developed than right, uniformly long-setose; cercus well-developed, usually large and undifferentiated from epandrium; subepandrial sclerite broad but weakly-developed, usually only distinct medially as a dark vertical bar. Hypandrium well-developed and T-shaped, anteromedial apodeme curved or sinuate and strongly fused to lateral arms, lateral arms not fused to anteroventral corners of epandrium. Surstylus of various forms, usually bilobed and inverted-V-shaped, ventral margin usually with long setae. Postgonite of various forms, usually elongate and narrow, almost straight to strongly sinuate. Phallapodeme usually elongate and curved; basiphallus usually very tall (3–4 × as tall as long). Distiphallus large with elongate dorsal and ventral sclerites surrounding a large, “empty” center; membrane often with patches of papillae or microtomentum.

FEMALE ABDOMEN. Preabdomen brown, shiny. T2–5 and S2–5 slightly desclerotized around edges, posterolateral corners of T4–6 with enlarged setae. Abdomen slightly shorter than length of head + thorax. T6 rectangular with posterior row of setae; T7 rectangular, setae restricted to posterolateral corners; T8 split into two large, subtriangular lateral sclerites with a vertical medial desclerotized strip, posterodorsal margin with long setae, posteroventral margin with small setulae, ventrally with a thickened edge which is bent inwards to touch dorsolateral surface of S8. Epiproct various, always with dorsal pair of setae. Cercus stout, often with a slightly thickened apical seta and 2–3 long preapical setae. S6 rectangular, usually uniformly setose; S7 broad, rectangular with posterior row of setae; S8 usually subtriangular with large, sinuate anterolateral setae and posteromedial patch of four very fine setae, sometimes divided into anterior and posterior parts by a transverse desclerotized strip. Hypoproct usually broad, trough-shaped with pair of long setae and several small setae. Spermathecae (2+1) stout, spherical to cylindrical, sometimes with apical invagination; stem weakly sclerotized, stem connecting paired spermathecae very short.

Distribution

Pseudopterogramma is widespread in southeast Asia and Oceania, and is here recorded from several Pacific islands (Fig. 69). Some species are known from a single country (often Australia or Papua New Guinea), while others are known from multiple islands separated by thousands of kilometers of ocean (for example, Hawaii to Samoa).

Species descriptions (in alphabetical order)

Pseudopterogramma aestivale (Richards, 1973) comb. nov.

Figs 43–45, 68A, 69

Leptocera (*Pterogramma*) *aestivalis* Richards, 1973: 368.

Pterogramma aestivale – Marshall 1989: 606. — Roháček *et al.* 2001: 212.

Type material

Holotype

AUSTRALIA – New South Wales • ♂; Otford; 31 Dec. 1962; D.H. Colless leg.; swept close to surface of rocks and water; ANIC.

Paratypes

AUSTRALIA – New South Wales • 3 ♂♂; near Mullumbimby, Huonbrook; 4 Dec. 1961; McAlpine and Lossin leg.; AMSA • 1 ♂; Blue Mountains, Springwood; 10 Jan. 1956; D.K. McAlpine leg.; AMSA • 1 ♂; Otford; 4 Apr. 1958; D.K. McAlpine leg.; AMSA. All in AMSA except one now in BMNH

Material examined

AUSTRALIA – **New South Wales** • 1 ♂; Bruxner Park, 8 km N of Coffs Harbour; 140 m a.s.l.; 12 Jun.–25 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♂, 7 ♀♀; Limpinwood Gardens; 28°18'23" S, 153°12'22" E; 1 Apr. 2019; S.A. Marshall leg.; DEBU • 1 ♀; Minnamurra Falls; 29 Jan. 1968; Z. Liepa leg.; ANIC • 1 ♂; Royal National Park, Scientist' Cabin Trail; 25 Dec. 2003; S.A. Marshall leg.; creek bed, sweep; DEBU • 1 ♂, 1 ♀; Springbrook, Dragonfly Cottage; 28°11'22" S, 153°16'04" E; 28 Feb. 2019; S.A. Marshall leg.; DEBU • 7 ♂♂, 14 ♀♀; Ulong, Ashton's Eco Retreat; 30°13'47" S, 152°55'12" E; 22 Mar. 2019; S.A. Marshall leg.; dung; DEBU. – **Queensland** • 1 ♂, 1 ♀; 5–8 mi. Mount Lewis Road off Mossman–Mount Mulloy Road; 22 Apr. 1967; D.H. Colless leg.; ANIC • 3 ♂♂, 2 ♀♀; Arthur Baillie Road; 17°41' S, 145°31' E; 1000 m a.s.l.; 6–8 Feb. 1999; D.J. Cook leg.; rainforest, automatic dung trap (day); QMBA • 1 ♂; Atherton Tablelands, Lake Eacham; 5–8 Apr. 1999; S.A. Marshall leg.; sweep; DEBU • 2 ♂♂, 2 ♀♀; Atherton, Lake Eacham National Park, Wrights Creek; 26–30 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 1 ♀; Brandy Creek, 18 km E of Proserpine; 100 m a.s.l.; 21 Jun.–10 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♀; Brisbane Forest Park, Enoggera Creek at Scrub Road; 27°25'42" S, 152°50'33" E; 200 m a.s.l.; 3 Oct.–2 Nov. 1995; Gaimari and Irwin leg.; Malaise; DEBU • 1 ♂, 2 ♀♀; Cape Tribulation, 40 km N of Daintree; 10 m a.s.l.; 12–17 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 1 ♀; Cardwell Gap, 15 km N of Ingham; 80 m a.s.l.; 9 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♂, 4 ♀♀; Gillies Road, northeast Atherton, 16 km NE of Yungaburra; 800 m a.s.l.; 24 Jun.–3 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♀; Josephine Falls; 2 Jul. 1979; P.A. Parsons leg.; fruit bait; ANIC • 2 ♂♂; Kirrama State Forest, 32 km NW of Cardwell; 800 m a.s.l.; 23 Jun.–8 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 2 ♂♂, 5 ♀♀; Kuranda State Forest, 3 km N of Kuranda; 360 m a.s.l.; 25 Jun.–3 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♂, 2 ♀♀; same collection data as for preceding; 27–31 Jul. 1982; carrion trap; DEBU • 3 ♀♀; Lacey's Creek, 10 km SE of El Arish, near Mission Beach; 40 m a.s.l.; 23 Jun.–5 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 7 ♂♂, 7 ♀♀; Lake Eacham National Park; Dec. 1974; I.R. Bock leg.; ANIC • 2 ♂♂, 1 ♀; Lake Euramoo; 17°10' S, 145°38' E; 700 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; QMBA • 1 ♀; Longlands Gap, three-ways road junction; 17°28' S, 145°29' E; 1060 m a.s.l.; 3–6 Feb. 1999; Monteith and Cook leg.; wet sclerophyll, rotten bait; QMBA • 6 ♂♂, 4 ♀♀; Malanda, Malanda Falls Conservation Park; 730 m a.s.l.; 26–29 Jul. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♂, 1 ♀; Maple Creek, W of Innisfail; 17°41' S, 145°42' E; 23 Apr. 1980; S.F. McEvey leg.; rainforest, swept; ANIC • 1 ♂; Millaa-Millaa Falls; 17°30' S, 145°37' E; 800 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♀; Mill Creek; 17°30' S, 145°27' E; 1000 m a.s.l.; 5–9 Feb. 1999; Monteith and Cook leg.; open forest, fungus pitfall; QMBA • 1 ♂; same collection data as for preceding; 940 m a.s.l.; rotten bait; QMBA • 1 ♀; Millstream Conservation Park; 17°32' S, 145°29' E; 1040 m a.s.l.; 6 Dec. 1998–4 Feb. 1999; Monteith and Cook leg.; open forest, flight-intercept trap; QMBA • 2 ♂♂; same collection data as for preceding; 3–5 Feb. 1999; wet sclerophyll, fungus trap; QMBA • 1 ♂; Millstream Retreat; 17°32' S, 145°31' E; 1020 m a.s.l.; 14–17 Apr. 1999; G.B. and S.R. Monteith leg.; wet sclerophyll, fungus trap; QMBA • 5 ♂♂, 2 ♀♀; Mossman Gorge National Park, 6 km SW of Mossman; 50 m a.s.l.; 11–18 Jul. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 1 ♀; Mount Edith Forest Road, 1.6 km off Danbulla Road; 6 May 1967; D.H. Colless leg.; ANIC • 2 ♀♀; Mount Glorious; 27°19'54" S, 152°45'29" E; 24–30 Dec. 1997; T. Hiller leg.; Malaise; DEBU • 5 ♂♂, 2 ♀♀; Mount Hypipamee National Park, 14 km SW of Malanda; 960 m a.s.l.; 24 Jul.–2 Aug. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 13 ♂♂, 7 ♀♀; Mount Lewis, 20 km SW of Mossman; 1000 m a.s.l.; 10 Jul.–1 Aug. 1982; S. and J. Peck leg.; carrion trap; DEBU • 11 ♂♂, 5 ♀♀; same collection data as for preceding; rainforest, dung trap; DEBU • 4 ♂♂, 8 ♀♀; same collection data as for preceding; flight-intercept trap; DEBU • 1 ♀; Mount Lewis, 20 km SW of Mossman; 900 m a.s.l.; 26 Jun.–1 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♂; near Daintree, Thorton Range; 200 m a.s.l.; 12–18 Jul. 1982; S. and J. Peck leg.; carrion

trap; DEBU • 4 ♂♂, 6 ♀♀; near Innisfail, Palmerston National Park; 360 m a.s.l.; 2–5 Aug. 1982; S. and J. Peck leg.; carrion trap; DEBU • 16 ♂♂, 22 ♀♀; near Wallaman Falls, 40 km W of Ingham; 600 m a.s.l.; 22 Jun.–7 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♀; Paluma; 12 Nov. 1975; P.A. Parsons leg.; rainforest, mushroom bait; ANIC • 4 ♀♀; Paluma, Paluma Dam Road; 850 m a.s.l.; 22 Jun.–6 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♀; 3 km SE of Ravenshoe; 17°38' S, 145°30' E; 960 m a.s.l.; 4–6 Feb. 1999; G.B. Monteith leg.; dung pitfall; QMBA • 1 ♂; Ravenshoe, 3 km SE; 17°38' S, 145°30' E; 960 m a.s.l.; 15–18 Apr. 1999; G.B. and S.R. Monteith leg.; open forest, fungus trap; QMBA • 1 ♀; 4 km SSE of Ravenshoe; 17°39' S, 145°30' E; 4–6 Feb. 1999; Monteith and Cook leg.; open forest, dung trap; QMBA • 1 ♀; 9 km N of Ravenshoe; 17°32' S, 145°29' E; 1060 m a.s.l.; 3–5 Feb. 1999; Monteith and Cook leg.; wet sclerophyll, dung pitfall; QMBA • 1 ♂; same collection data as for preceding; fish pitfall; QMBA • 2 ♀♀; 9.5 km N of Ravenshoe; 17°32' S, 145°29' E; 1060 m a.s.l.; 14–17 Apr. 1999; G.B. and S.R. Monteith leg.; wet sclerophyll, dung trap; QMBA • 3 ♂♂, 1 ♀; Rex Range, 12 km S of Mossman; 400 m a.s.l.; 10–18 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 4 ♂♂, 10 ♀♀; Rosina Creek, 14 km SE of Millaa Millaa, Palmerston Highway; 720 m a.s.l.; 24 Jun.–2 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♂, 2 ♀♀; Sluice Creek; 17°32' S, 145°32' E; 4–5 Feb. 1999; D.J. Cook leg.; rainforest, automatic dung trap (day); QMBA • 1 ♀; Vine Creek, Majors Mountain; 17°41' S, 145°32' E; 1060 m a.s.l.; 4–6 Feb. 1999; Monteith and Cook leg.; rainforest, dung pitfall QMBA • 3 ♀♀; same collection data as for preceding; fungus pitfall; QMBA • 1 ♂; same collection data as for preceding; fish pitfall; QMBA • 7 ♂♂, 11 ♀♀; West side of Mount Bartle Frere; 30 Jul.–4 Aug. 1982; S. and J. Peck leg.; carrion trap; DEBU • 1 ♀; Wongabel State Forest; 5 May 1967; D.H. Colless leg.; ANIC • 1 ♂; Yungaburra (State Forest 452); 29 Apr. 1967; D.H. Colless leg.; ANIC.

Redescription

BODY (Fig. 43). Length 1.2–1.9 mm. Head brown, lower portion of frons and upwards between interfrontal and orbital plates orange. Interfrontal bristles in four pairs. Thorax brown, dull microtomentose. Anterior dorsocentral bristles separated by 9–10 rows of acrostichal setulae. Fore and hind tarsi greatly enlarged, flattened dorsoventrally. Ventral surface of mid tibia with only a large apicoventral bristle in both sexes. Hind tibia with several slightly thickened dorsal preapical setae. Wing (Fig. 68A) pale with two indistinct

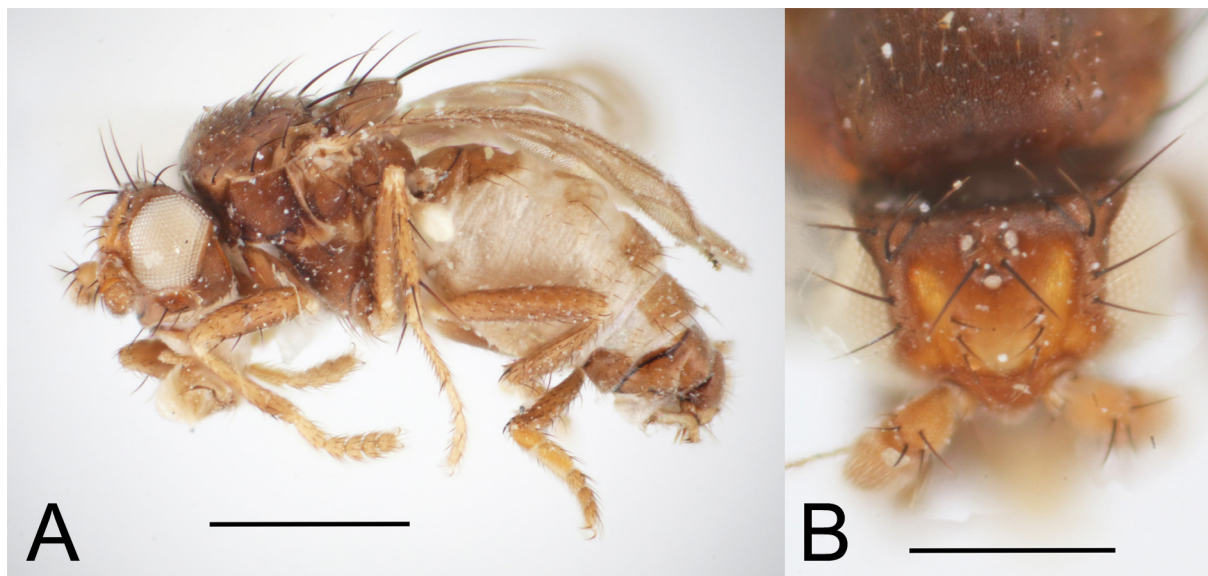


Fig. 43. *Pseudopterogramma aestivale* (Richards, 1973) (debu00163000, QMBA). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

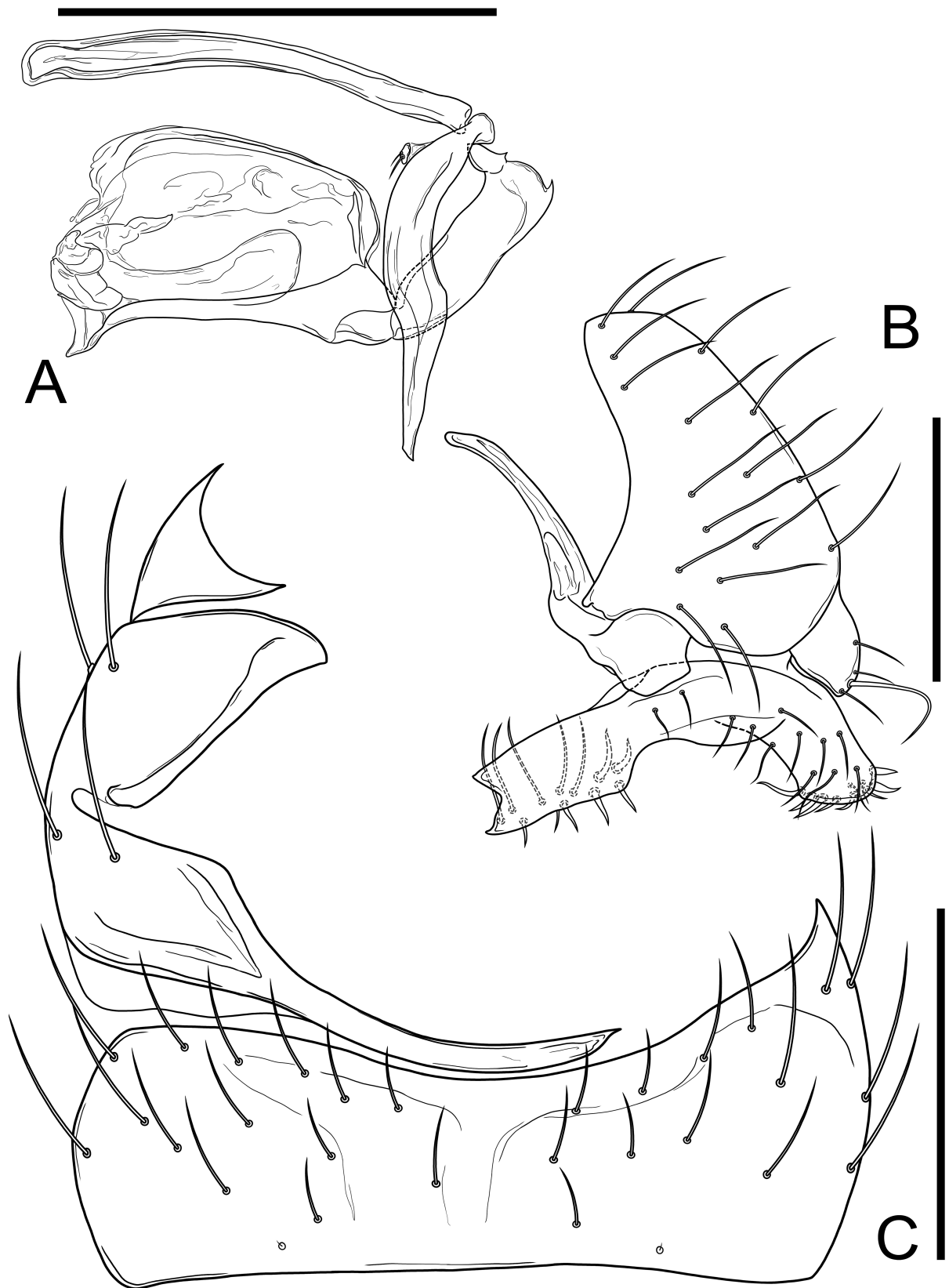


Fig. 44. *Pseudopterogramma aestivale* (Richards, 1973) (DEBU). **A.** Aedeagus and associated structures, lateral view. **B.** Male terminalia, lateral view. **C.** Male S5-8, ventral view. Scale bars: A–C = 0.10 mm.

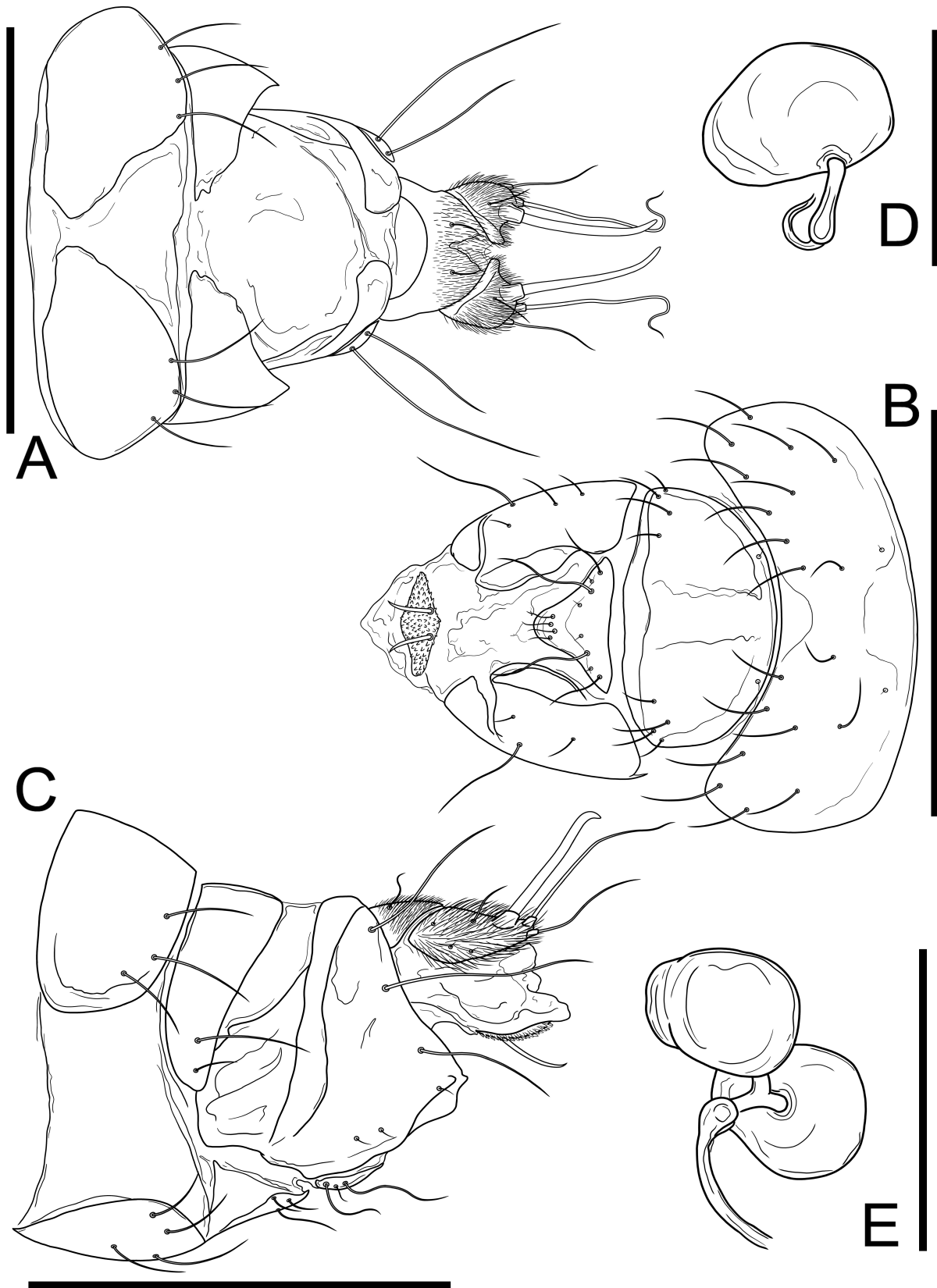


Fig. 45. *Pseudopterogramma aestivale* (Richards, 1973) (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

darker spots at middle of R_{2+3} and just beyond R_{2+3} . R_{2+3} almost straight with a slight sinuate curve about midlength.

MALE ABDOMEN (Fig. 44). S5 simple, right side $1.5 \times$ as long as left, uniformly setose, and posteromedially desclerotized. S6 long and thin, anterolateral corner flat. Epandrium wedge-shaped and relatively sparsely setose; cercus large, flattened, and shiny, distinctly paler than epandrium, with a long seta and several smaller setulae. Surstylus long, only slightly bent: anterior lobe long, subrectangular with a basal constriction and an apical emargination, inner surface with long setae, posterior lobe stout, rectangular with fine outer setulae and stout inner setae. Postgonite elongate, slender, basal half curved forwards, apical half straight and tapered. Phallapodeme long, slightly sinuate, and apically truncate; basiphallus tall, $3.0 \times$ as tall as long in lateral view, very slightly tapered apically with a small dorsobasal tooth. Distiphallus large, box-like, with a large, broad ventral sclerite whose apex is downcurved and ring-shaped, and a pair of long, dorsoventrally flattened, hoop-like dorsolateral sclerites supporting the membranous sides and apex.

FEMALE ABDOMEN (Fig. 45). T6 and T7 desclerotized dorsally to form separate lateral sclerites. Epiproct subtriangular, desclerotized posteromedially. Cercus semicircular with very long, very thick apical seta and two long preapical setae. S6 desclerotized anteromedially and posteromedially; S7 medially desclerotized; S8 small, entire. Hypoproct small, diamond-shaped, largely membranous, only with pair of thickened setae. Spermathecae stout, spherical, slightly constricted apically, and very lightly grooved.

Distribution

Australasian/Oceanian: Australia (NSW, QLD).

Remarks

Pseudopterogramma aestivale is a distinctive species, easily identified by the large, dorsoventrally flattened fore and hind tarsi; females are characterized by thick, finger-like apical cercal setae.

Pseudopterogramma annectens (Richards, 1964) Figs 46–47, 68B, 69

Leptocera (*Pterogramma*) *annectens* Richards, 1964: 609.

Pterogramma annectens – Marshall 1989: 606. — Roháček *et al.* 2001: 212.

Pseudopterogramma annectens – Marshall *et al.* 2011: 264.

Type material

Holotype

INDONESIA – Papua • ♂; Biak Island; 25 Apr. 1945; G.E. Bohart leg.; CAS.

Paratypes

INDONESIA – Papua • 8 ♂♂, 3 ♀♀; same collection data as for holotype; CAS.

SOLOMON ISLANDS • 1 ♂; Russell Islands, Pavuvu; 20 Apr. 1945; G.E. Bohart leg.; CAS.

Material examined

INDONESIA • 4 ♂♂, paratypes; Biak Island; CAS

SOLOMON ISLANDS • 1 ♂, paratype; CAS.

Redescription

BODY (Fig. 46). Length 1.1–1.4 mm. Head yellow-orange, frontal vitta and orbital plates paler. Interfrontal bristles in three pairs. Thorax brown with a pale lateral spot, shiny despite microtomentum.

Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Ventral surface of male mid tibia with two rows of stout setae along apical two-thirds; mid femur with two corresponding rows of proximoventral setae; female mid tibia with a large apicoventral bristle. Hind tibia with only fine dorsal setulae. Wing (Fig. 68B) hyaline, without spots. R_{2+3} sinuate, curves symmetrical.

MALE ABDOMEN (Fig. 47). S5 simple, right side $1.5\times$ longer and $1.5\times$ wider than left, sparsely setose, and posteromedially emarginate, flanked on either side by a stout, tooth-like seta. S6 long and thin, anterolateral corner slightly produced. Epandrium subquadrate and uniformly setose; cercus large, shield-like and flattened with several setae. Surstylus large, elongate, and bilobed: anterior/dorsal lobe small, narrow, with three long apical setae and two long laterobasal setae, posterior/ventral lobe much larger, strongly sinuate and flattened laterally, with a row of thick, preapical, outer setae and a patch of tooth-like, medial, inner setae, apical third strongly tapered and pointed. Postgonite elongate, slender, strongly sinuate, and tapered, apex with a slight upper ridge. Phallapodeme long, apical third tapered and bent; basiphallus tall, $2.3\times$ as tall as long in lateral view, tubular, gently curved, and slightly tapered. Distiphallus large, elongate ($5.7\times$ as long as tall), basal half heavily sclerotized and split into a shorter upper and longer lower lobe, both emarginate apically, apical half largely membranous and supported by a thin, M-shaped upper sclerite.

FEMALE ABDOMEN. We have not seen female specimens, but Richards (1964) describes a yellowish cercus with several long setae including a short, stout, dorsal seta.

Distribution

Australasian/Oceanian: Indonesia (Biak Is.) (Richards 1964), Solomon Islands (Russell Is.) (Richards 1964).

Remarks

Pseudopterogramma annectens (Richards, 1964) is externally similar to *Ps. kasut* sp. nov., which also has largely hyaline wings and three pairs of weak interfrontal bristles. *Pseudopterogramma annectens* can be readily distinguished from *Ps. kasut* by the tubular M_4 beyond dm-m, the male mid tibia with a double row of stout apicoventral setae, and the male genitalia.

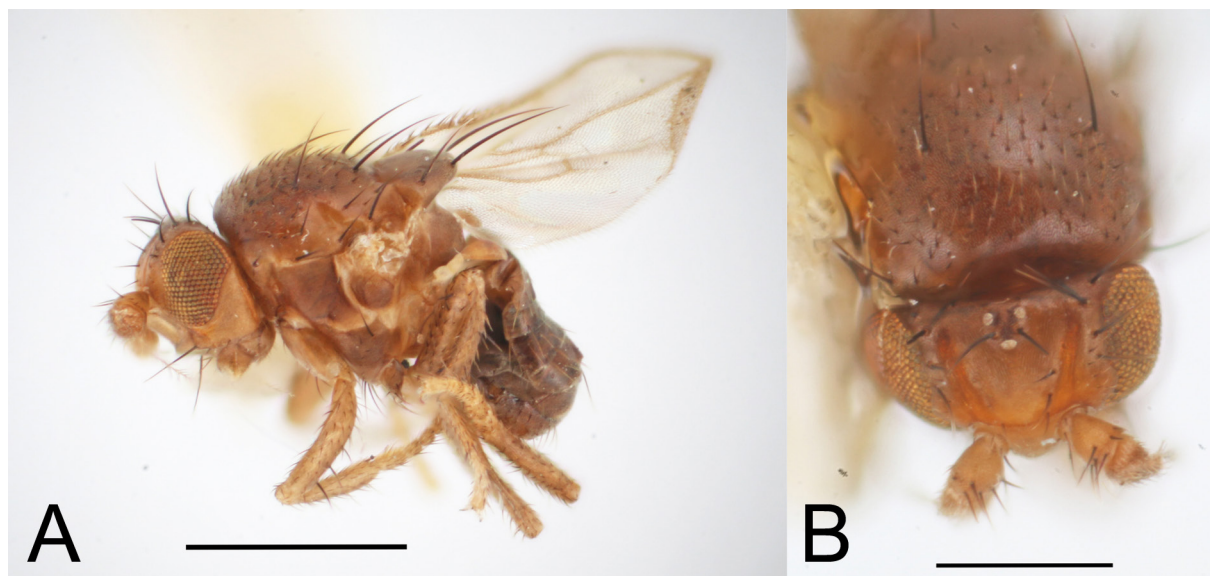


Fig. 46. *Pseudopterogramma annectens* (Richards, 1964) (CAS). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

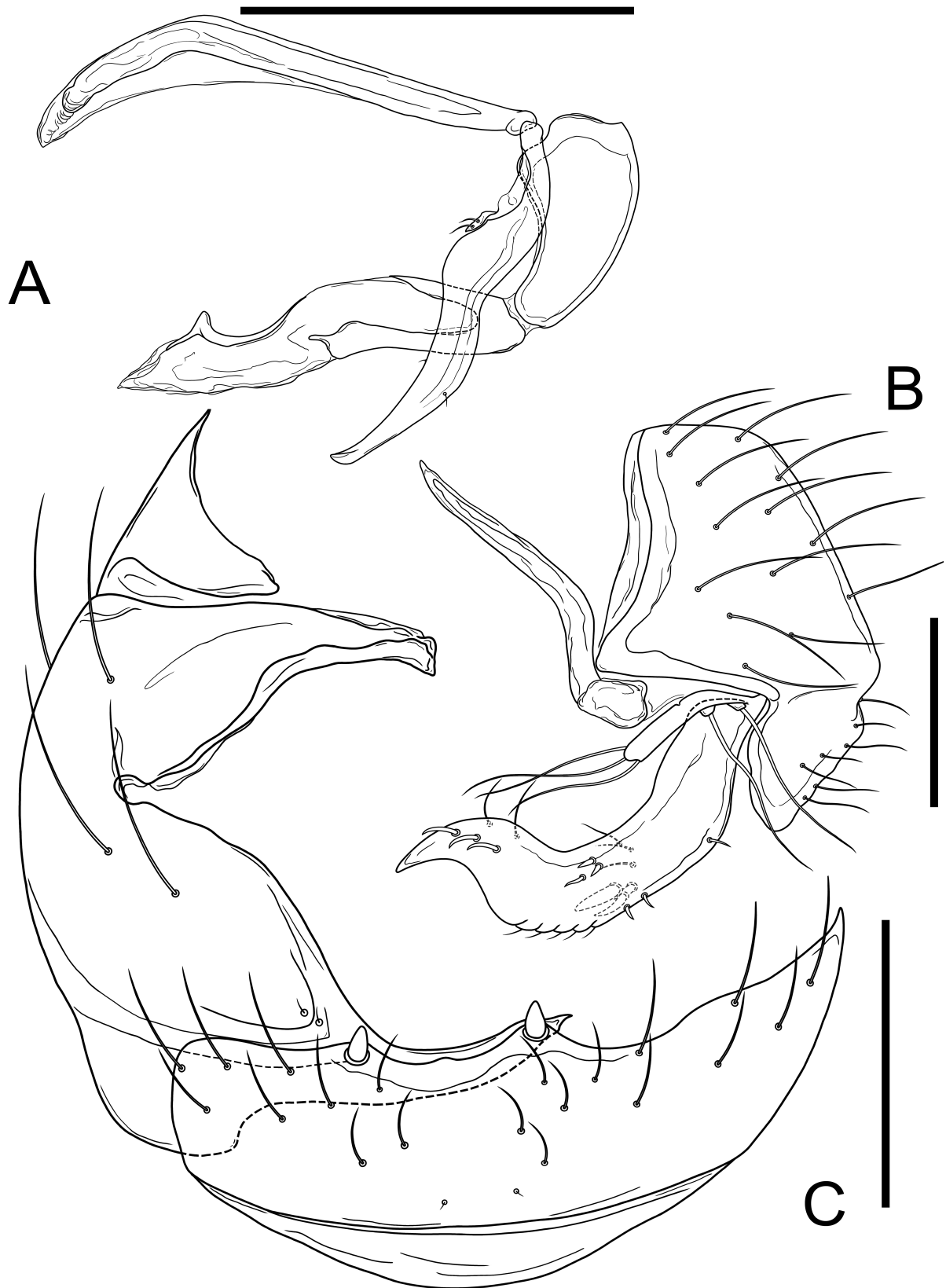


Fig. 47. *Pseudopterogramma annectens* (Richards, 1964) (CAS). **A.** Aedeagus and associated structures, lateral view. **B.** Male terminalia, lateral view. **C.** Male S5-8, ventral view. Scale bars: A–C = 0.10 mm.

Pseudopterogramma brevivenosum (Tenorio, 1967)

Figs 48–50, 68C, 69

Leptocera (Limosina) brevivenosum Tenorio, 1967: 425.

Pterogramma brevivenosum – Marshall, 1989: 606. — Roháček *et al.* 2001: 212.

Pseudopterogramma brevivenosum – Marshall *et al.* 2011: 264.

Type material

Holotype

UNITED STATES OF AMERICA – **Hawaii** • ♂; Oahu, Mount Tantalus; Nov. 1953; D.E. Hardy leg.; BPBM.

Allotype

UNITED STATES OF AMERICA – **Hawaii** • ♀; same collection data as for holotype; BPBM.

Paratypes

Tenorio (1967) noted 60 male and 57 female paratypes but did not specify how many from each locality listed below; he also noted that “Some paratypes to be deposited in BPBM” but did not specify how many or from which localities, or where the others would be deposited.

UNITED STATES OF AMERICA – **Hawaii** • same collection data as for holotype • Hawaii, Hualālai, Bishop Trust Road; 14 Jul. 1965; D.E. Hardy leg. • Hawaii, Kohala Ditch trail • Hawaii, N. of Keaau Orchard, N. Oiaa; Nov. 1956; R. Namba leg. • Hawaii, Waipio Valley; Aug. 1952; W.C. Mitchell leg. • Maui, Ke‘anae; Jul. 1953; D.E. Hardy leg. • Oahu, Castle trail; 14 Oct. 1934; E.H. Bryan, Jr. leg. • Oahu, Halawa Ridge; 10 Dec. 1952; C.P. Hoyt leg. • Oahu, Halawa Ridge; Nov. 1952; D.E. Hardy leg. • Oahu, Halawa; 17 Dec. 1922; O.H. Swezey leg. • Oahu, Ka‘au Crater; 29 Nov. 1964; K. Frogner leg. • Oahu, Kalihi Valley; Sep. 1953; A. Suehiro leg. • Oahu, Kamananui Gulch; 28 Jul. 1945 • Oahu, Kuliouou; 7 Feb. 1953; C.P. Hoyt leg. • Oahu, Mānoa Valley; Feb. 1952; D.E. Hardy leg. • Oahu, Nu‘uanu Pali; 27 Jan. 1967; J.A. Tenorio leg.; in litter along roadside • Oahu, Pōhākea Pass; Apr. 1959; D.E. Hardy leg. • Oahu, Pūpūkea, Dec. 1952; D.E. Hardy leg. • same collection data as for preceding; Jun. 1963 • Oahu, University of Hawaii fields; 2 Jan. 1938; C.A. Brown leg.; on ginger root • Oahu, Wahiawa swamp; 27 Dec. 1965; D.E. Hardy leg. • Oahu, Wai‘alae Iki; 20 Jan. 1924; E.H. Bryan, Jr. leg.

Material examined

Paratypes

UNITED STATES OF AMERICA – **Hawaii** • 1 ♂; O‘ahu, Nu‘uanu Pali; 27 Jan. 1967; J.A. Tenorio leg.; in litter along roadside; BPBM.

Other material examined

COOK ISLANDS • 1 ♂; Rarotonga, Te Kou trail; 21°14' S, 159°46' W; 27 Dec. 1998; S.A. Marshall leg.; rotting plantain; DEBU.

FIJI - **Kadavu** • 4 ♂♂, 1 ♀; 0.25 km SW of Solodamu Village, Moanakaka Bird Sanctuary; 19°04'41" S, 178°07'16" E; 60 m a.s.l.; 28 May–11 Jun. 2003; Schlinger and Tokoka‘a leg.; Malaise; DEBU • 1 ♂; same collection data as for preceding; 6–18 Jul. 2003; DEBU • 1 ♀; same collection data as for preceding; 23 Oct.–19 Dec. 2003; DEBU • 1 ♀; same collection data as for preceding; 18 Jan.–1 Feb. 2004; DEBU • 9 ♂♂, 6 ♀♀; same collection data as for preceding; 9–15 Feb. 2004; BPBM • 2 ♂♂; same collection data as for preceding; 7 Mar.–11 Jun. 2004; BPBM • 2 ♀♀; Solodamu Village; 19°04' S, 178°07' E; 128 m a.s.l.; 25 Aug.–23 Oct. 2003; Irwin, Schlinger, and Tokoka‘a leg.; Malaise

in coastal limestone forest; BPBM • 1 ♀; same collection data as for preceding; 23 Oct.–19 Dec. 2003; DEBU. – **Taveuni** • 1 ♀; Cakaudrove, 3.2 km NW of Lavena; 16°51'18" S, 179°53'20" W; 217 m a.s.l.; 1–24 Jan. 2004; Schlinger and Tokoka'a leg.; Malaise; DEBU • 9 ♂♂, 13 ♀♀; Cakaudrove, Soqulu House in Soqulu Estate; 16°51'59" S, 180°00'00" W; 140 m a.s.l.; 21 Nov.–13 Dec. 2002; Schlinger and Tokoka'a leg.; Malaise; BPBM. – **Vanua Levu** • 1 ♀; Bua, 4 km NW of Kilaka Village, Wainibequa; 16°48'29" S, 178°59'13" E; 87 m a.s.l.; 9–20 Dec. 2004; P. Manuelli leg.; Malaise; BPBM • 1 ♂; Bua, 6 km NW of Kilaka, Batiqere Range; 16°48'54" S, 178°59'06" E; 146 m a.s.l.; 28 Jun.–21 Jul. 2004; Irwin, Schlinger, and Tokoka'a leg.; Malaise; BPBM • 1 ♂; same collection data as for preceding; 16°48'24" S, 178°59'29" E; 98 m a.s.l.; 15–24 Jun. 2004; DEBU • 2 ♂♂; Macuata, Dogotuki, 2.5 km E of Nasavu River; 16°15'07" S, 179°47'00" E; 226 m a.s.l.; 7 Jul. 2003; Irwin, Schlinger, and Tokoka'a leg.; Malaise; BPBM • 1 ♂, 5 ♀♀; Macuata, 0.4 km S of Rokosalase Village; 16°31'55" S, 179°01'08" E; 118 m a.s.l.; 23 Apr.–8 May 2004; Schlinger and Tokoka'a leg.; Malaise; DEBU • 1 ♂; Macuata, 0.6 km S of Rokosalase Village; 16°32'00" S, 179°01'05" E; 180 m a.s.l.; 22 May–8 Jun. 2004; Schlinger and Tokoka'a leg.; Malaise in forest; BPBM • 4 ♀♀; Macuata, Rokosalase Village; 16°31'09" S, 179°01'15" E; 105 m a.s.l.; 26 Mar.–9 Apr. 2004; Irwin, Schlinger, and Tokoka'a leg.; Malaise in forest; BPBM. – **Viti Levu** • 1 ♂, 1 ♀; S Viti Levu, 10 km N of Galoa; 300 m a.s.l.; 29 Aug.–1 Sep. 1978; S. and J. Peck leg.; 2nd forest; DEBU • 1 ♂, 2 ♀♀; 15 km N of Suva, Tholoisuva watershed; 200 m a.s.l.; 25–31 Aug. 1978; S. and J. Peck leg.; rainforest; DEBU • 1 ♂; Naitasiri, Mount Nakobalevu; 18°03' S, 178°25' E; 340 m a.s.l.; 22 Sep.–9 Oct. 2002; Irwin, Schlinger, and Tokoka'a leg.; rainforest Malaise; BPBM • 4 ♂♂, 3 ♀♀; Naitasiri, 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'18" S, 178°25'26" E; 372 m a.s.l.; 25 Feb.–17 Mar. 2003; Schlinger and Tokoka'a leg.; Malaise; DEBU • 1 ♂; Naitasiri, Sovi Basin, Wainivalau; 17°54' S, 178°14' E; 300 m a.s.l.; 8–16 May 2003; Irwin, Schlinger, and Tokoka'a leg.; BPBM • 2 ♀♀; Naitasiri, 3.8 km N of Veisari Settlement, logging road to Waivudawa; 18°04'44" S, 178°21'47" E; 12 Dec. 2002–3 Jan. 2003; 300 m a.s.l.; Schlinger and Tokoka'a leg.; Malaise; BPBM • 1 ♀; Namosi, 2 km SE of Nabukavesi Village, Ocean Pacific Resort; 18°10'16" S, 178°15'29" E; 40 m a.s.l.; 13–27 Feb. 2003; Schlinger and Tokoka'a leg.; Malaise; BPBM • 1 ♂; same collection data as for preceding; 22 Jun.–7 Jul. 2003; DEBU • 5 ♂♂, 13 ♀♀; same collection data as for preceding; 26 Apr.–5 May 2004; BPBM • 3 ♂♂, 1 ♀; Vuda, Abaca Village, Koroyanitu EcoPark; 17°40' S, 177°33' E; 400 m a.s.l.; 21 Sep.–7 Oct. 2002; Irwin, Schlinger, and Tokoka'a leg.; Malaise in montane forest; DEBU • 1 ♂; same collection data as for preceding; 7–12 Oct. 2002; BPBM • 1 ♂, 2 ♀♀; same collection data as for preceding; Savuione Trail; 450 m a.s.l.; 21 Sep.–7 Oct. 2002; BPBM • 1 ♀; Vuda, 0.5 km N of Abaca Village, Koroyanitu EcoPark; 17°40'01" S, 177°33'00" E; 800 m a.s.l.; 12–19 Nov. 2002; Schlinger and Tokoka'a leg.; Malaise; BPBM • 3 ♂♂, 8 ♀♀; Vuda, 1 km of E Abaca Village, Koroyanitu EcoPark, Kokabula Trail; 17°40'01" S, 177°33'00" E; 800 m a.s.l.; 26 Nov.–3 Dec. 2002; Schlinger and Tokoka'a leg.; Malaise; DEBU • 1 ♀; Vuda, 1 km E of Abaca Village, Koroyanitu EcoPark, Kokabula Trail; 17°40' S, 177°33' E; 800 m a.s.l.; 12–19 Nov. 2002; Irwin, Schlinger, and Tokoka'a leg.; Malaise; BPBM • 1 ♂; same collection data as for preceding; Savuione Trail; 7–12 Oct. 2002; BPBM • 1 ♀; same collection data as for preceding; 26 Oct.–5 Nov. 2002; BPBM.

PAPUA NEW GUINEA • 2 ♂♂; 29 km N of Port Moresby, Brown River; 3 m a.s.l.; 14–15 Jul. 1974; S. Peck leg.; forest, dung; DEBU • 1 ♂; 38.6 km E of Port Moresby, Kokoda Trail; 670 m a.s.l.; 16–17 Jul. 1974; S. Peck leg.; pitfall traps; DEBU • 1 ♂; Kokoda Trail, Iora Creek, 17 km S of Kokoda; 3–6 Aug. 1976; O. Kukal leg.; dung; CNCI.

SAMOA • 1 ♀; Upolu, Malololelei; Feb. 1965; N.L.H. Krauss leg.; BMNH.

UNITED STATES OF AMERICA – **Hawaii** • 3 ♂♂, 10 ♀♀; O'ahu, 'Aiea Loop Trail; 12 Dec. 1996; S.A. Marshall leg.; sweep; DEBU.

Redescription

BODY (Fig. 48). Length 1.1–1.4 mm. Head dark brown, lower portion of frons orange. Interfrontal bristles in four pairs. Thorax brown, shiny despite microtomentum. Anterior dorsocentral bristles separated by 8–9 rows of acrostichal setulae. Ventral surface of male mid tibia with two rows of stout setae along apical quarter; mid femur with two corresponding rows of proximoventral setae; female mid tibia with a large apicoventral bristle. Hind tibia with only fine dorsal setulae. Wing (Fig. 68C) hyaline, basally with a small, indistinct darker spot. R_{2+3} almost straight with a slight sinuate curve about midlength.

MALE ABDOMEN (Fig. 49). S5 simple, right side $1.5\times$ as long as left, uniformly setose, and slightly desclerotized posteromedially. S6 long and thin. Epandrium relatively large, wedge-shaped and relatively sparsely setose, ventrolateral margins with two distinct emarginations (for hypandrial arm and for posterodorsal corner of surstylus); cercus large, flattened, and shiny, without any enlarged setae. Hypandrial arms stout basally. Surstylus large, inverted V-shaped: anterior lobe rectangular with an apical emargination, outer surface with two large preapical setae, inner surface with long setae and setulae, posterior lobe triangular with three long laterobasal setae and a row of long setae along entire ventral margin. Postgonite elongate, slender, slightly sinuate, apex slightly broadened and truncate. Phallapodeme long and gently curved; basiphallus tall, $3.1\times$ as tall as long in lateral view, slightly constricted subbasally with a small posterodorsal tooth. Distiphallus large, box-like, with a large, broad ventral sclerite, a pair of long, dorsoventrally flattened, hoop-like dorsolateral sclerites supporting the membranous sides, and curved, wedge-shaped apical sclerite; lateral membrane setulose.

FEMALE ABDOMEN (Fig. 50). T7 desclerotized posteromedially. Epiproct broad, rectangular, emarginate anteromedially. Cercus semicircular with slightly thickened apical seta and two long preapical setae. S8 slightly desclerotized medially. Hypoproct trough-shaped. Spermathecae stout, subcylindrical, and lightly grooved with small apical invagination.

Distribution

Australasian/Oceanian: Cook Islands (**new record**), Fiji (**new record**), French Polynesia (Marquesas, Tahiti, Tubuai Is.) (Roháček *et al.* 2001), Hawaii (USA) (Tenorio 1967), Papua New Guinea (**new record**), Samoa, Tonga (Roháček *et al.* 2001).

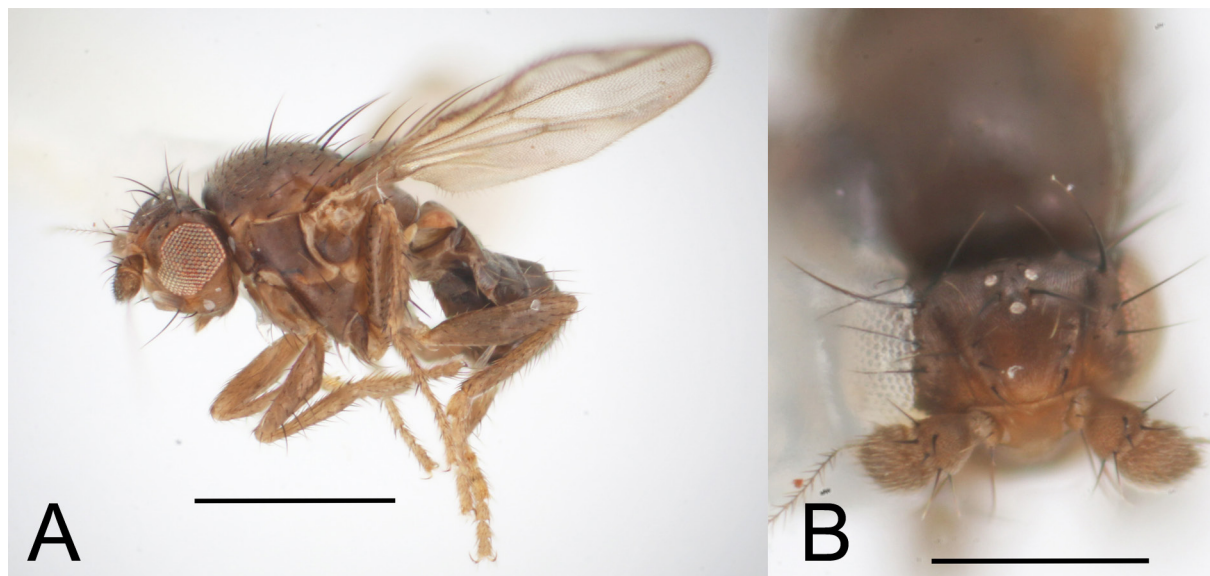


Fig. 48. *Pseudopterogramma brevivenosum* (Tenorio, 1967) (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

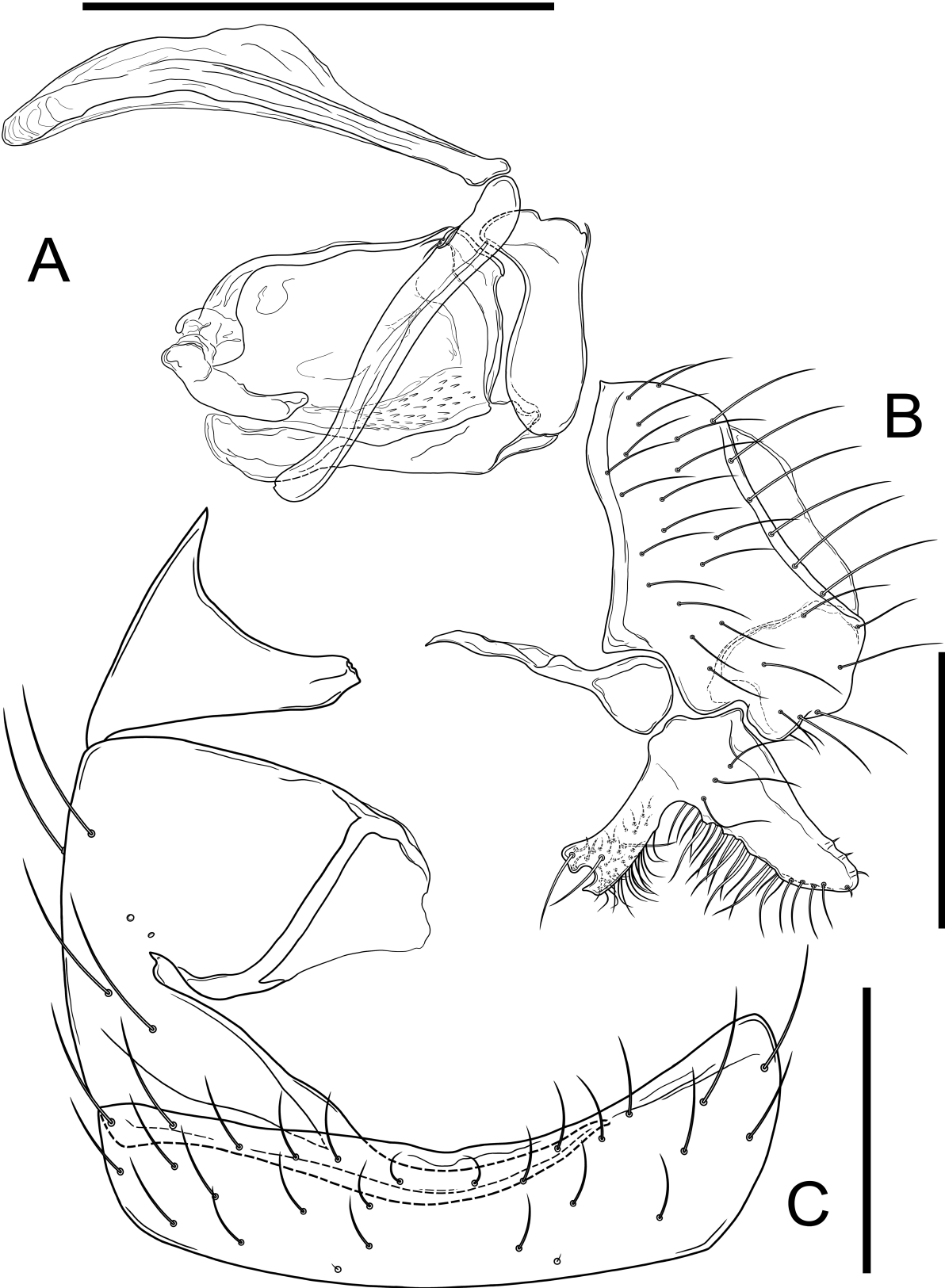


Fig. 49. *Pseudopterogramma brevivenosum* (Tenorio, 1967) (DEBU). **A.** Aedeagus and associated structures, lateral view. **B.** Male terminalia, lateral view. **C.** Male S5-8, ventral view. Scale bars: A–C = 0.10 mm.

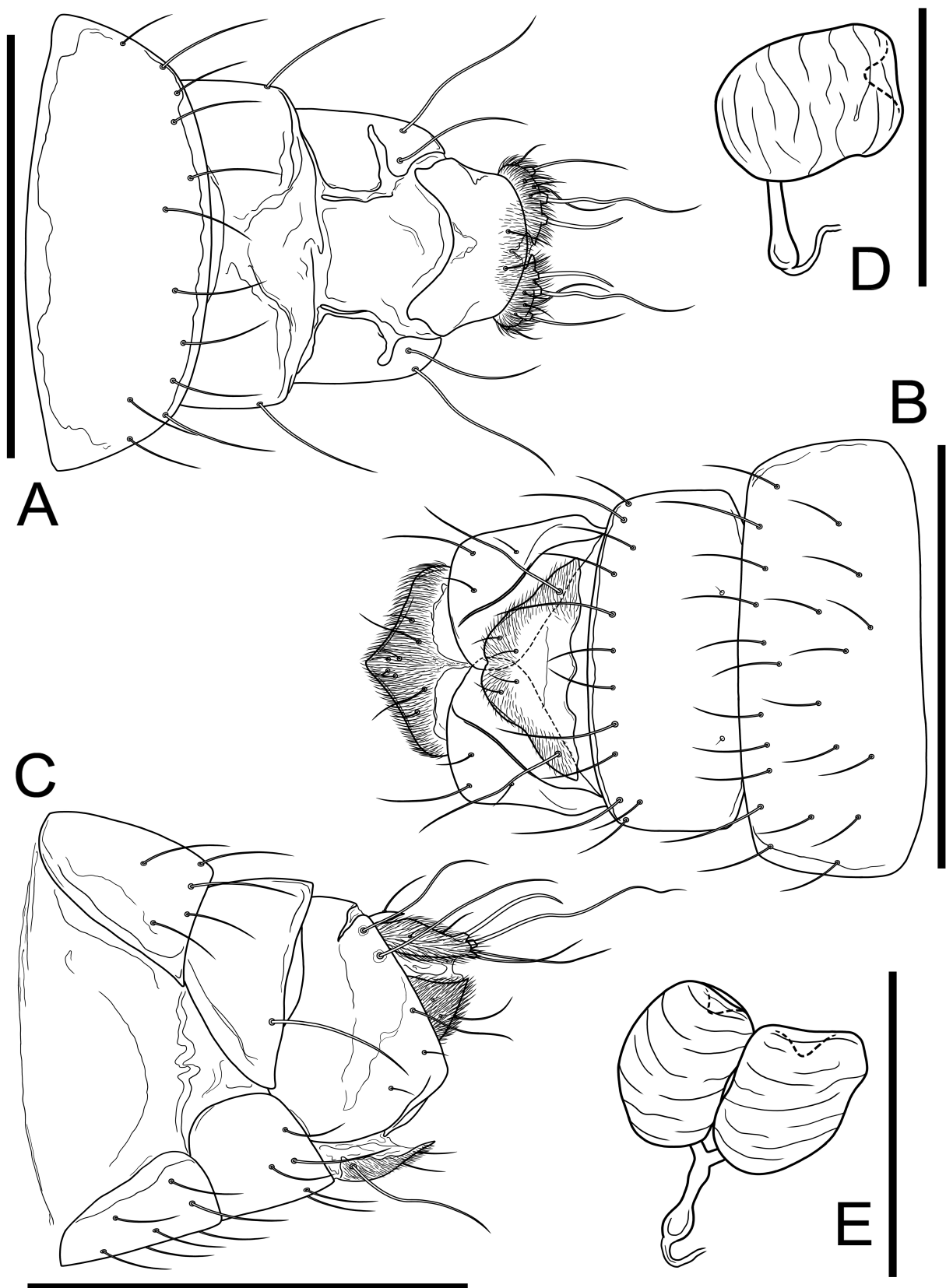


Fig. 50. *Pseudopterogramma brevivenosum* (Tenorio, 1967) (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

Remarks

Given the apparent abundance of *Ps. brevivenosum* on most of the Pacific Islands from which we have sphaerocerid samples, it is likely that this species is also found throughout Polynesia.

Pseudopteroграмма conicum (Richards, 1946)
Figs 51–53, 68D, 69

Leptocera (*Poecilosomella*) *conica* Richards, 1946: 130.

Leptocera (*Pterogramma*) *conica* – Richards 1963: 121.

Pterogramma conicum – Marshall 1989: 606. — Roháček *et al.* 2001: 213.

Pseudopteroграмма conicum – Marshall *et al.* 2011: 264.

Type material

Holotype

GUAM • ♂; Pago; 27 Oct. 1945; G.E. Bohart leg.; USNM.

Material examined

AUSTRALIA – **Queensland** • 1 ♀; 9 km ENE of Mount Tozer; 12°25'48" S, 143°10'12" E; 5–10 Jul. 1986; D.H. Colless leg.; Malaise trap; ANIC • 1 ♀; 11 km ENE of Mount Tozer; 12°25'48" S, 143°10'48" E; 11–16 Jul. 1986; D.H. Colless leg.; Malaise trap; ANIC • 3 ♂♂; Atherton Tablelands, Lake Eacham, Chambers Lodge; 6–8 Apr. 1999; S.A. Marshall leg.; dung; DEBU • 2 ♀♀; Atherton, Lake Eacham National Park, Wrights Creek; 720 m a.s.l.; 21 Jun–10 Aug. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 27 ♂♂, 16 ♀♀; Brandy Creek, 18 km E of Proserpine; 100 m a.s.l.; 21 Jun–10 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♀; Cape Tribulation; 16°03' S, 145°16' E; 15 Apr. 1999; S.A. Marshall leg.; sweep; DEBU • 1 ♀; Cooktown, Keatings Gap; 100 m a.s.l.; 28–31 Jun. 1982; S. and J. Peck leg.; rainforest, dung trap; DEBU • 1 ♀; Crystal Cascades, Cairns; 19 Apr. 1967; D.H. Colless leg.; ANIC • 1 ♂; Daintree National Park, Mossman Gorge; 12 Apr. 1999; S.A. Marshall leg.; sweeping 4–6 PM; DEBU • 1 ♀; same collection data as for preceding; 13–17 Apr. 1999; pans; DEBU • 1 ♀; Gap Creek, 5 km of ESE Mount Finnigan; 15°30' S, 145°12' E; 15 May 1981; D.H. Colless leg.; Malaise trap; ANIC • 1 ♀; 4 km S of Hartley's Creek; 16°41' S, 145°35' E; 5 m a.s.l.; 3–11 Feb. 1999; Monteith and Cook leg.; littoral, fungus pitfall; QMBA • 1 ♂; Kuranda State Forest, 3 km N of Kuranda; 360 m a.s.l.; 25 Jun.–3 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 2 ♂♂; Laceys Creek, 10 km SE of El Arish, near Mission Beach; 40 m a.s.l.; 23 Jun.–5 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♀; Maple Creek, W of Innisfail; 17°41' S, 145°42' E; 23 Apr. 1980; S.F. McEvey leg.; rainforest, swept; ANIC • 1 ♂; Millaa-Millaa Falls; 17°30' S, 145°37' E; 800 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♂; Mount Finnigan Slopes, 30 km S of Cooktown; 400 m a.s.l.; 2–5 Jul. 1982; S. and J. Peck leg.; rainforest, carrion trap; DEBU • 1 ♂; Noah Creek, 20 km N of Daintree; 4 m a.s.l.; 12–18 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 1 ♂; Rex Range, 12 km S of Mossman; 10–18 Jul. 1982; S. Peck leg.; rainforest, carrion trap; DEBU • 1 ♂; Upper Mulgrave River, 16 km on Goldsborough Road; 9 May 1967; D.H. Colless leg.; ANIC.

Redescription

BODY (Fig. 51). Length 1.5–1.9 mm. Head orange, darkened at level of ocelli. Interfrontal bristles in four pairs. Thorax brown with paler posterolateral edges, shiny despite microtomentum. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Ventral surface of male mid tibia with two rows of stout setae along apical half; mid femur with two corresponding rows of proximoventral setae; female mid tibia with a large apicoventral bristle. Hind tibia with a very large dorsal preapical seta (length equal to that of first two hind tarsomeres) and a large preapical ventral spur. Wing (Fig. 68D) pale with two indistinct darker spots at middle of R_{2+3} and just beyond R_{2+3} . R_{2+3} sinuate, apical curve stronger than basal curve.

MALE ABDOMEN (Fig. 52). S5 simple, right side $1.5\times$ as long as left, uniformly setose on posterior half, with a curved, tapered lobe at the posterior left third. S6 long but relatively broad, anterolateral corner expanded. Epandrium wedge-shaped and uniformly setose; cercus large, subtriangular, slightly paler than epandrium, with two long setae and several smaller setulae. Surstylus large, V-shaped: anterior lobe subrectangular with a dorsobasal constriction, small anteroapical and posteroventral lobes, and inner posteroventral surface with dense setae, posterior lobe elongate, somewhat sinuate with several patches of long setae and a large subapical anterior seta. Postgonite elongate with three distinct bends separating it into four sections: gradually broadened from base to first bend, wide and parallel-sided to the third bend, and then strongly tapered and thin to apex. Phallapodeme long, curved, and apically rounded; basiphallus tall, constricted in the basal third and rounded beyond, with a large, triangular epiphallus broadly and strongly fused to posterodorsal surface. Distiphallus large, box-like, with a large, broad ventral sclerite whose apex is sinuate, thickened and ring-shaped, and a pair of long, dorsoventrally flattened, hoop-like dorsolateral sclerites supporting the membranous sides and apex; basal half of the membrane with dense outer setulae.

FEMALE ABDOMEN (Fig. 53). T7 short (i.e. weakly developed anteriorly). Epiproct pentagonal. Cercus subrectangular with thickened apical seta and three long preapical setae. S8 with transverse desclerotized strip splitting large anterior part (with large posterolateral setae) from small posterior part (with four thick setae). Hypoproct trough-shaped. Spermathecae stout, subcylindrical, slightly constricted apically, and lightly grooved with apical invagination.

Distribution

Australasian/Oceanian: Australia (**new record**), Guam (USA) (Richards 1946), Micronesia (Pohnpei) (Richards 1963), Palau (Richards 1963), Papua New Guinea (Roháček *et al.* 2001).

Remarks

Although this species was not previously known from Australia, it seems to be common in north Queensland.

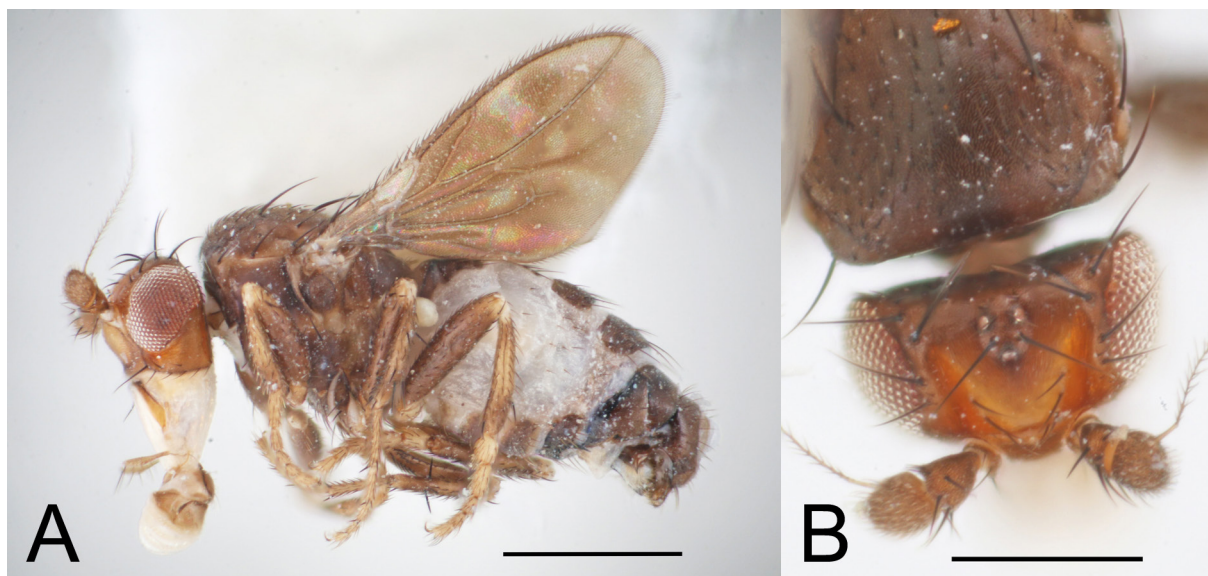


Fig. 51. *Pseudopterogramma conicum* (Richards, 1946) (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

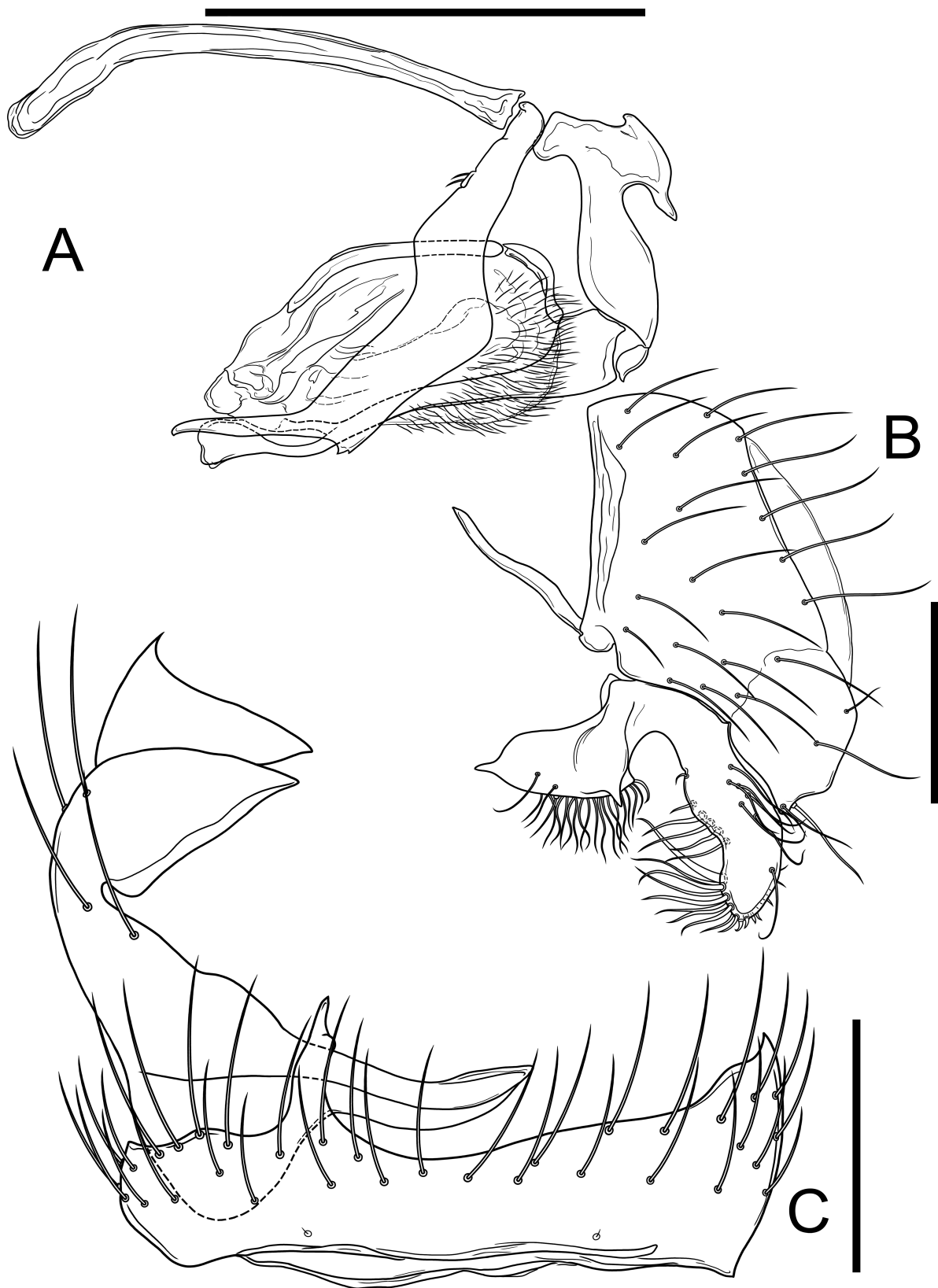


Fig. 52. *Pseudopterogramma conicum* (Richards, 1946) (DEBU). **A.** Aedeagus and associated structures, lateral view. **B.** Male terminalia, lateral view. **C.** Male S5-8, ventral view. Scale bars: A–C = 0.10 mm.

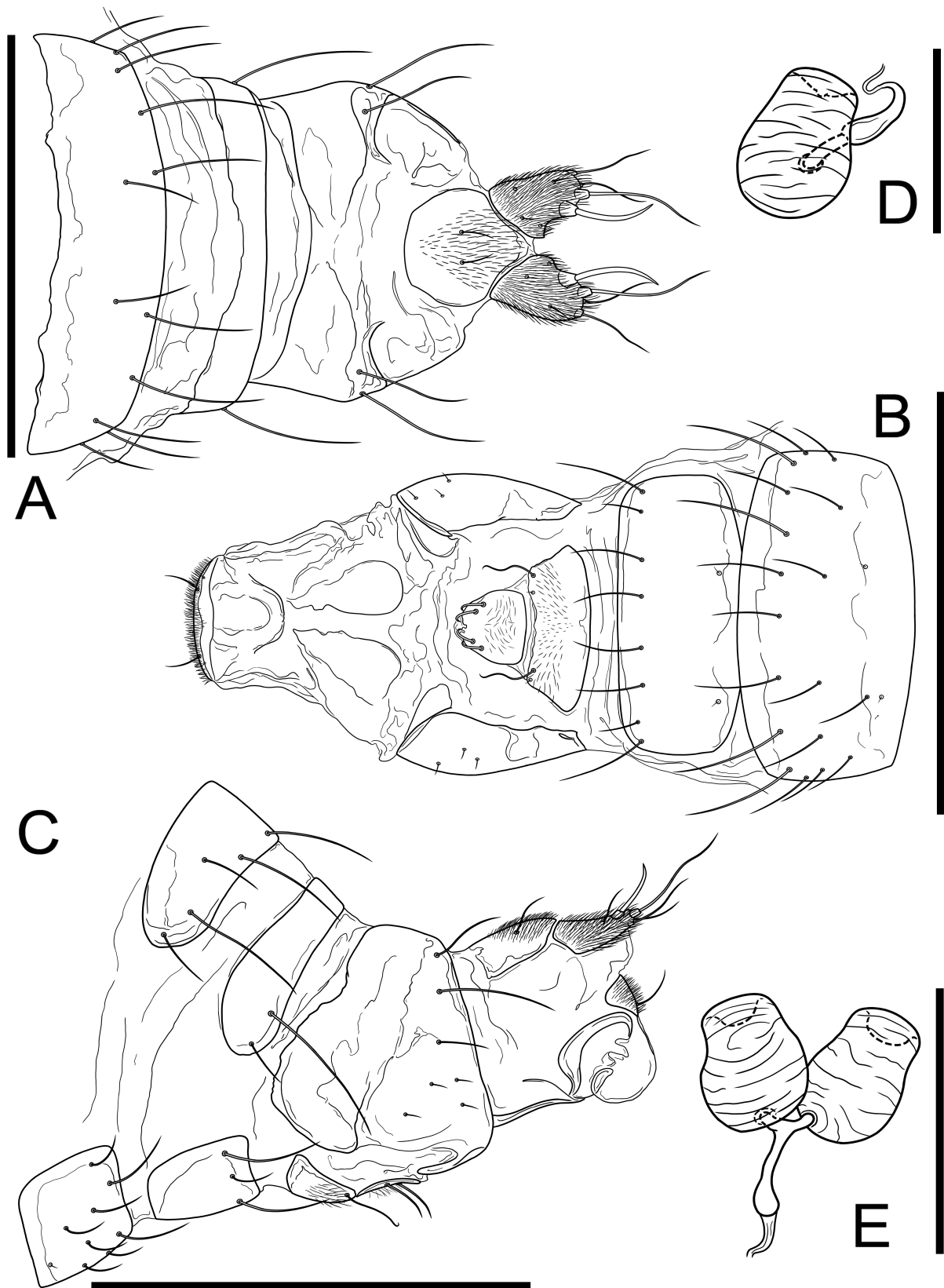


Fig. 53. *Pseudopterogramma conicum* (Richards, 1946) (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

Pseudopterogramma deemingi (Richards, 1973) comb. nov.

Fig. 69

Leptocera (*Pterogramma*) *deemingi* Richards, 1973: 367.

Pterogramma deemingi – Marshall 1989: 606. — Roháček *et al.* 2001: 213.

Type material

Holotype

PAPUA NEW GUINEA • ♂; Mafulu; 1219 m a.s.l.; Jan. 1934; L.E. Cheesman leg.; BMNH.

Paratypes

PAPUA NEW GUINEA • 3 ♂♂, 2 ♀♀; same collection data as for holotype; BMNH. One of the males is labelled as “on fungus”.

Material examined

The type series was examined by SAM in the Natural History Museum in 1989.

Redescription

BODY. Length 1.3–1.5 mm. Head reddish-brown, darkened posteriorly. Thorax dark brown with pale pleural sutures. Ventral surface of male mid tibia with two rows of stout setae along apical quarter; mid femur with one short corresponding row of proximoventral setae; female mid tibia with a large apicoventral bristle. Hind tibia with only fine dorsal setulae. Wing infusate with pale base and wide, pale vertical band just beyond R_{2+3} . R_{2+3} strongly curved forwards.

MALE ABDOMEN. Preabdomen dark brown. Epandrium wedge-shaped; cercus slightly enlarged; hypandrium curved upwards. Surstylus long and low, projecting anteroventrally as a long, thin lobe with three ventral setae. Postgonite long, tapered and curved forwards. Distiphallus large, with a long, apically bifurcated ventral sclerite supporting two large membranous dorsoapical flaps. Other characters not described or illustrated.

FEMALE ABDOMEN. Cerci apparently similar to those of *Ps. conicum*. Other characters not described.

Distribution

Australasian/Oceanian: Papua New Guinea.

Remarks

The above redescription of *Ps. deemingi* is based on Richards (1973), supplemented by SAM’s examination of the type series in 1989. This species certainly belongs in the genus *Pseudopterogramma*, as it has all characters noted in the diagnosis above, as well as male genitalia that are similar to those of other species of *Pseudopterogramma*, with bilobed, slightly V-shaped surstylus, long, curved postgonite, and large, membranous distiphallus with a long ventral sclerite. Illustrations of the male genitalia are not provided here as those in Richards (1973) are adequate.

Pseudopterogramma fenestrata (Richards, 1973)

Figs 54–56, 68E, 69

Leptocera (*Limosina*) *fenestrata* Richards, 1973: 379.

As unplaced species of Limosininae – Marshall 1989: 607.

Biroina fenestrata – Roháček *et al.* 2001: 125.

Pseudopterogramma fenestrata – Kuwahara & Marshall 2022: 9.

Type material

Holotype

AUSTRALIA – Queensland • ♀; Binna Burra, Lamington National Park; 1 Feb. 1961; D.K. McAlpine leg.; AMSA.

Paratype

AUSTRALIA – New South Wales • 1 ♂; Otford; 3 Mar. 1962; D.K. McAlpine leg.; AMSA.

Material examined

AUSTRALIA – Queensland • 1 ♂; 12 km ENE of Ravenshoe; 14 Nov. 1981; D.H. Colless leg.; ANIC • 4 ♂♂, 3 ♀♀; 14.5 km SSE of Ravenshoe; 840 m a.s.l.; 21 Apr. 1969; I.F.B. Common and M. Upton leg.; ANIC • 2 ♂♂, 2 ♀♀; Atherton Tablelands, Lake Eacham, Chambers Lodge; 6–8 Apr. 1999; S.A. Marshall leg.; dung; DEBU • 1 ♀; same collection data as for preceding; 6–12 Apr. 1999; Malaise; DEBU • 36 ♂♂, 14 ♀♀; Atherton Tablelands, Lake Eacham; 5–8 Apr. 1999; S.A. Marshall leg.; sweep; DEBU • 1 ♂, 2 ♀♀; Atherton, Lake Eacham National Park; 760 m a.s.l.; 23 Jul. 1982; S. Peck leg.; log and fungi litter; DEBU • 1 ♂; Atherton, Lake Eacham, Wrights Creek; 720 m a.s.l.; 31 Jul. 1982; S. and J. Peck leg.; leaf litter and soil; DEBU • 3 ♂♂; Atherton, near Danbulla State Forest; 17°09' S, 145°17' E; 7 Apr. 1999; S.A. Marshall leg.; sweep; DEBU • 1 ♂; Cape Tribulation; 10 m a.s.l.; 15 Jul. 1982; S. Peck leg.; rainforest litter, carrion; DEBU • 1 ♀; Crystal Cascades, Cairns; 19 Apr. 1967; D.H. Colless leg.; ANIC • 9 ♂♂, 10 ♀♀; Daintree National Park, Mossman Gorge; 12 Apr. 1999; S.A. Marshall leg.; sweeping 4–6 PM; DEBU • 1 ♀; same collection data as for preceding; 13 Apr. 1999; sweeping; DEBU • 1 ♂, 8 ♀♀; same collection data as for preceding; 13–17 Apr. 1999; pans; DEBU • 1 ♂; Earl Hill, N of Cairns; 8 May 1967; D.H. Colless leg.; ANIC • 1 ♂; Gap Creek, 5 km ESE of Mount Finnigan; 15°30' S, 145°12' E; 15 May 1981; D.H. Colless leg.; Malaise trap; ANIC • 3 ♂♂, 3 ♀♀; Granite Creek, 64 km N of Gin Gin, 18 km W of Bulburin State Forest; 200 m a.s.l.; 19 Jun–14 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♀; 1 km SW of Kauri Creek; 17°09' S, 145°35' E; 700 m a.s.l.; 10–11 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♂; 2 km E of Kauri Creek; 17°08' S, 145°37' E; 700 m a.s.l.; 10–11 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♂, 1 ♀; Kjellberg Road, Malaan National Park (formerly Dirran State Forest) boundary; 17°32' S, 145°35' E; 920 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 1 ♂, 2 ♀♀; Kuranda State Forest, 3 km N of Kuranda; 360 m a.s.l.; 25 Jun–3 Aug. 1982; S. Peck leg.; rainforest, flight-intercept trap; DEBU • 3 ♂♂, 7 ♀♀; Lacey's Creek, 10 km SE of El Arish, near Mission Beach; 40 m a.s.l.; 23 Jun–5 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♀; Lake Euramoo; 17°10' S, 145°38' E; 700 m a.s.l.; 10–11 Feb. 1999; D.J. Cook leg.; rainforest, dung pitfall; QMBA • 1 ♀; Malanda, 3.5 km S; 17°23' S, 145°36' E; 760 m a.s.l.; 6–9 Feb. 1999; G.B. Monteith leg.; rainforest, dung pitfall; QMBA • 2 ♀♀; Maple Creek, W of Innisfail; 17°41' S, 145°42' E; 24 Apr. 1980; S.P. McEvey leg.; rainforest, swept; ANIC • 1 ♀; Mary Cairncross Park, 7 km SE of Maleny; 18 Jun–15 Aug. 1982; S. and J. Peck leg.; rainforest, flight-intercept trap; DEBU • 1 ♂, 1 ♀; Millaa-Millaa Falls; 17°30' S, 145°37' E; 800 m a.s.l.; 6–9 Feb. 1999; Monteith and Cook leg.; rainforest, fungus pitfall; QMBA • 2 ♀♀; Mount Hypipamee National Park; 19°26' S, 143°07' E; 11 Apr. 1999; S.A. Marshall leg.; dung; DEBU • 2 ♂♂, 1 ♀; Mount Hypipamee National Park; 8–11 Apr. 1999; S.A. Marshall leg.; pan traps; DEBU • 1 ♀; Shipton's Flat; 15°48' S, 145°14' E; 220 m a.s.l.; 19–22 Nov. 1998; G.B. Monteith leg.; rainforest, automatic dung trap (day); QMBA • 1 ♀; Whitfield Range Forest Reserve, Cairns; 19 Apr. 1967; D.H. Colless leg.; ANIC • 1 ♀; Yabba Creek, 7 km SW of Kenilworth; 150 m a.s.l.; 15 Aug. 1982; S. and J. Peck leg.; rainforest, litter; DEBU • 2 ♀♀; Yungaburra (State Forest 452); 29 Apr. 1967; D.H. Colless leg.; ANIC.

Redescription

BODY (Fig. 54). Length 1.3–1.7 mm. Head yellow-orange, darkened at level of ocelli. Interfrontal bristles in three pairs. Thorax brown with paler posterolateral edges, shiny despite microtomentum. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Ventral surface of male mid tibia with two rows of stout setae along apical half; mid femur with two corresponding rows of proximoventral setae; female mid tibia with a large apicoventral bristle. Hind tibia with only fine dorsal setulae. Wing (Fig. 68E) pale with four darker spots forming a pair of faint bands at middle of R_{2+3} and just beyond R_{2+3} . R_{2+3} sinuate, curves symmetrical.

MALE ABDOMEN (Fig. 55). S5 simple, long, right side $1.1\times$ as long as left, relatively sparsely setose, and broadly desclerotized posteromedially. S6 long but relatively broad, anterolateral corner slightly expanded. Epandrium wedge-shaped and relatively sparsely setose, left anteroventral corner strongly developed and triangular; cercus small, flattened, and slightly paler than epandrium, with a long seta and several smaller setulae. Surstylus large, subtriangular and somewhat flattened ventrolaterally, anterior edge with a distinct notch, outer surface densely long-setose, apical third with short inner setae, apex truncate. Postgonite broad, bent about midlength, basal part bulging anteriorly, apical part with many minute outer sensory setulae, apex bifurcate with elongate dorsal part and stout ventral part. Phallapodeme long, slightly curved, with a narrow dorsal “fin” and truncate apex; basiphallus relatively stout, saddle-shaped but flattened laterally. Distiphallus large, with a long, broad, ventral sclerite that is tubular in the basal quarter and flattened beyond, flattened part supports a very large dorsal ‘bubble’ of membrane.

FEMALE ABDOMEN (Fig. 56). T6 with setae restricted to posterolateral corners; T7 split into two rectangular lateral sclerites; halves of T8 strongly produced posteriorly. Epiproct broad, shield-like, medially desclerotized. Cercus semicircular with one long apical, one long subbasal and two long preapical setae. S8 subtriangular with three pairs of lateral setae (middle pair largest). Hypoproct trough-shaped. Spermathecae stout, bean-shaped (slightly curved), and lightly grooved in apical half (basal half smooth).

Distribution

Australasian/Oceanian: Australia (QLD).

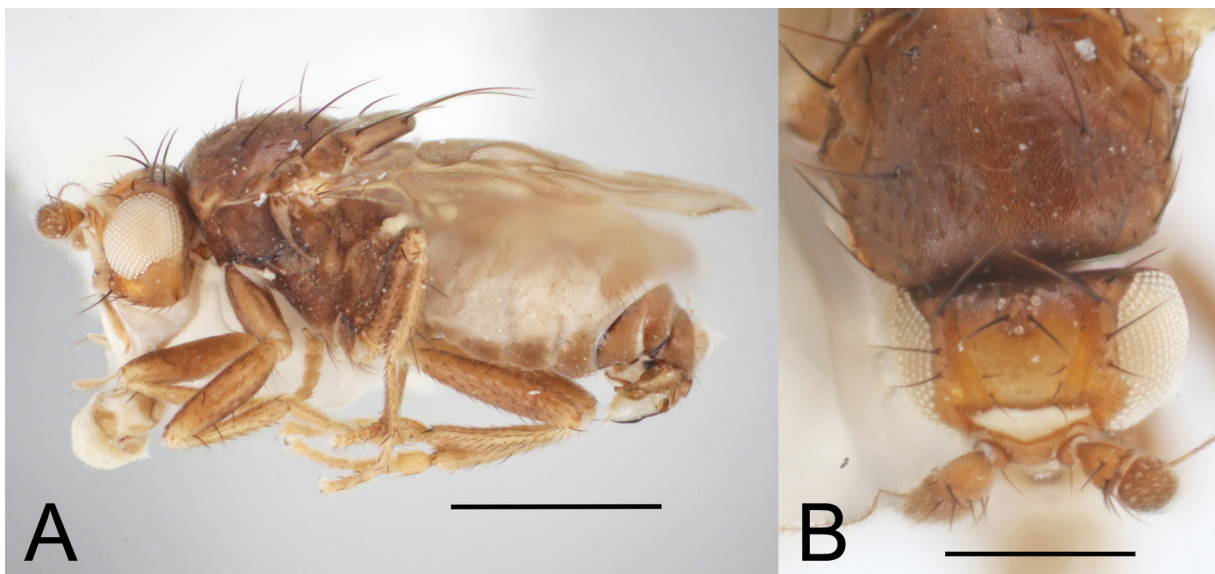


Fig. 54. *Pseudopterogramma fenestrata* (Richards, 1973) (debu00161721, QMBA). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

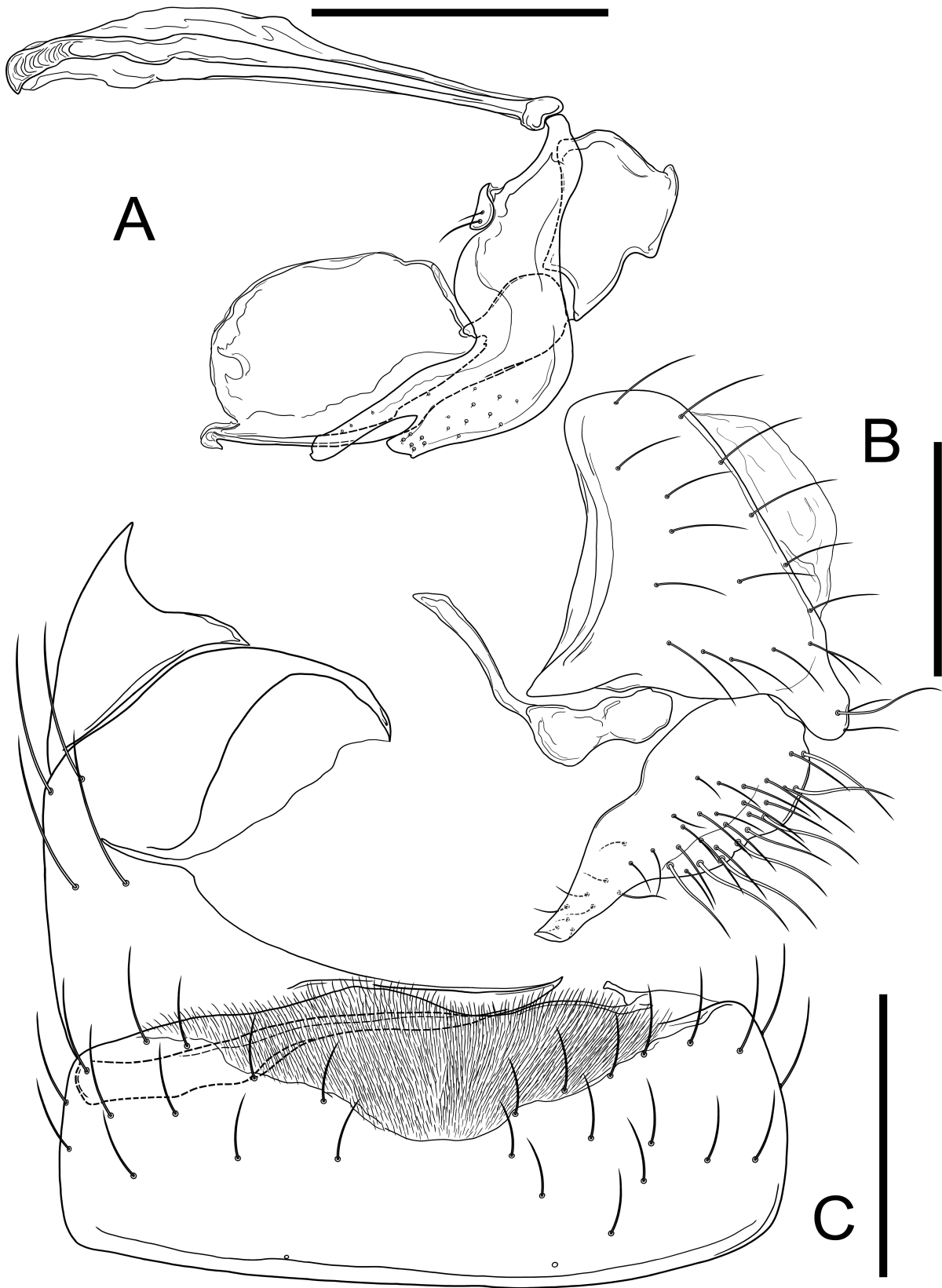


Fig. 55. *Pseudopterogramma fenestrata* (Richards, 1973) (debu00164172, DEBU). **A.** Aedeagus and associated structures, lateral view. **B.** Male terminalia, lateral view. **C.** Male S5-8, ventral view. Scale bars: A–C = 0.10 mm.

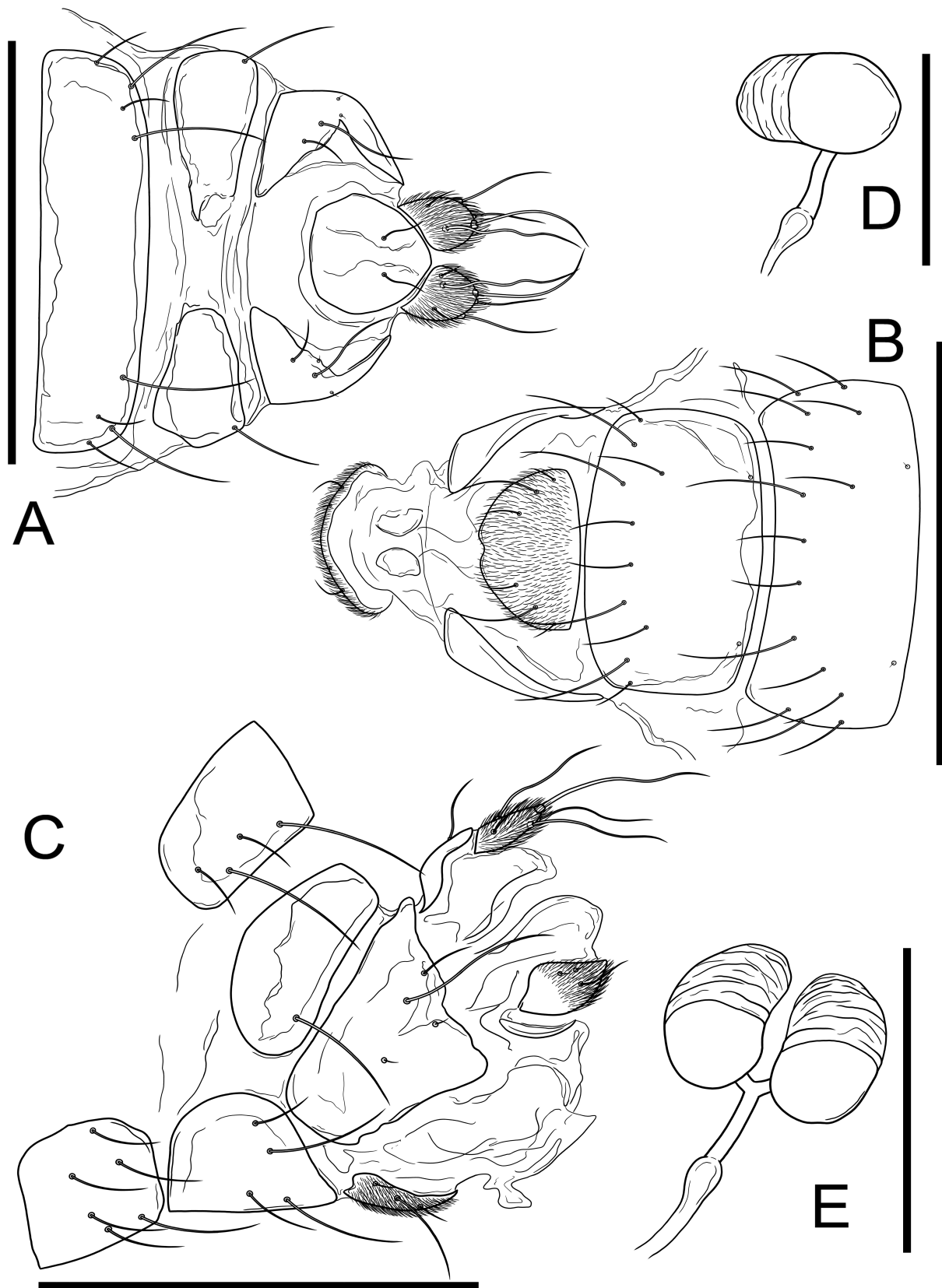


Fig. 56. *Pseudopterogramma fenestrata* (Richards, 1973) (debu00122453, DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

Remarks

Kuwahara & Marshall (2022) moved *Biroina fenestrata* to the genus *Pseudopterogramma* on the basis of its very large anterior dorsocentral bristles, patterned wings with a short R_{2+3} , banded legs, mid tibia with pairs of proximal and distal dorsal bristles and, most importantly, its simple hypandrium.

Pseudopterogramma fijiensis sp. nov.

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Figs 1, 57–59, 68F, 69

Etymology

This name reflects the apparent restriction of this species to the islands of Fiji. One congener, *Pseudopterogramma brevivenosum*, also occurs in Fiji, but *Ps. fijiensis* sp. nov. is far more common and is known from more of the Fijian islands.

Material examined

Holotype

FIJI – **Viti Levu** • ♂; Vuda, Koroyanitu National Park, Savuione Trail; 17°40' S, 177°33' E; 450 m a.s.l.; 21 Sep.–7 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; Malaise in montane forest; BPBM.

Paratypes

FIJI – **Kadavu** • 9 ♂♂, 18 ♀♀; 0.25 km SW of Solodamu Village, Moanakaka Bird Sanctuary; 19°04'41" S, 178°07'16" E; 60 m a.s.l.; 23 Oct.–19 Dec. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 9 ♂♂, 18 ♀♀; same collection data as for preceding; DEBU • 4 ♂♂, 6 ♀♀; Solodamu; 19°04' S, 178°07' E; 128 m a.s.l.; 25 Aug.–23 Oct. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise in coastal limestone forest; BPBM. – **Lakeba** • 2 ♂♂, 1 ♀; Lakeba, 3.2 km NE of Tubou Village; 18°12'55" S, 178°47'25" W; 100 m a.s.l.; 25 Nov.–7 Dec. 2005; D. Saubaleinayau leg.; Malaise; DEBU. – **Moala** • 1 ♀; Yasayasamoala, 1.5 km NE of Maluku Village, Nakorovusa Bay; 18°34'41" S, 179°53'02" E; 0 m a.s.l.; 8–20 Jul. 2005; J. Vulatini leg.; Malaise; BPBM. – **Taveuni** • 2 ♂♂, 3 ♀♀; Cakaudrove, Koronibuabua; 16°51'28" S, 179°53'44" W; 233 m a.s.l.; 24 Oct.–19 Nov. 2003; Irwin, Schlinger, and Tokota'a leg.; rainforest, Malaise; BPBM • 2 ♀♀; Cakaudrove, Taveuni Estate; 16°50' S, 179°59' W; 140 m a.s.l.; 31 Oct.–21 Nov. 2002; Irwin, Schlinger, and Tokota'a leg.; Malaise in garden; DEBU. – **Vanua Levu** • 14 ♂♂, 27 ♀♀; Bua, 6 km NW of Kilaka, Batiqere Range; 16°48'24" S, 178°59'29" E; 98 m a.s.l.; 15–24 Jun. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM • 11 ♀♀; Bua, 6 km NW of Kilaka, Batiqere Range; 16°48'40" S, 178°59'17" E; 61 m a.s.l.; 3–10 Jun. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; Bua, 6 km NW of Kilaka, Batiqere Range; 16°48'55" S, 178°59'07" E; 146 m a.s.l.; 15–28 Jun. 2004; Schlinger and Tokota'a leg.; Malaise; DEBU • 3 ♂♂, 5 ♀♀; Bua, Kilaka; 16°48'41" S, 178°59'02" E; 154 m a.s.l.; 28 Jun.–2 Jul. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU • 2 ♀♀; Bua, Kilaka; 16°48'41" S, 178°59'29" E; 98 m a.s.l.; 3–10 Jun. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂; Bua, Kilaka; 16°48'41" S, 178°59'29" E; 98 m a.s.l.; 28 Jun.–2 Jul. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 6 ♀♀; Bua, Kilaka; 16°48'55" S, 178°59'07" E; 146 m a.s.l.; 3–10 Jun. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♂, 3 ♀♀; Macuata, Dogotuki, 2.5 km E of Nasavu River; 16°15'07" S, 179°47'00" E; 226 m a.s.l.; 7 Jul. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 7 ♂♂, 8 ♀♀; Macuata, Rokosalase; 16°31'55" S, 179°01'08" E; 105 m a.s.l.; 26 Aug.–9 Sep. 2004; Irwin, Schlinger, and Tokota'a leg.; Malaise in forest; DEBU. – **Viti Levu** • 3 ♂♂, 5 ♀♀; same collection data as for holotype; BPBM • 4 ♂♂, 5 ♀♀; same collection data as for holotype; DEBU • 1 ♂; 10 km N of Galoa; 300 m a.s.l.; 29 Aug.–1 Sep. 1978; S. and J. Peck leg.; second forest; DEBU • 1 ♂; same collection data as for preceding; 1 Sep. 1978; DEBU • 3 ♂♂, 3 ♀♀; 15 km N of Suva, Tholoisuva watershed; 200 m a.s.l.; 25–31 Aug. 1978; S. and J. Peck leg.; rainforest; DEBU • 1 ♂; Naitasiri, Mount Nakobalevu; 18°03' S, 178°25' E;

340 m a.s.l.; 22 Sep.–8 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; rainforest, Malaise; BPBM • 1 ♂, 3 ♀♀; Nandarivitu, Y00 Microwave Station; 1100 m a.s.l.; 16–23 Aug. 1978; S. and J. Peck leg.; forest dung; DEBU • 1 ♂; Sigatoka, Sigatoka Sand Dunes National Park; 18°10'00" S, 177°28'55" E; 44 m a.s.l.; 31 Jan.–12 Feb. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU.

Other material examined

FIJI – **Kadavu** • 2 ♂♂, 3 ♀♀; 0.25 km SW of Solodamu Village, Moanakaka Bird Sanctuary; 19°04'41" S, 178°07'16" E; 60 m a.s.l.; 9–15 Feb. 2003; S. Lau leg.; Malaise; DEBU. – **Taveuni** • 5 ♂♂, 10 ♀♀; Cakaudrove, 3.2 km NW of Lavena Village, Mount Koronibuabua; 16°51'18" S, 179°53'20" W; 217 m a.s.l.; 1–24 Feb. 2004; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♀; same collection data as for preceding; 235 m a.s.l.; 4–19 Nov. 2003; BPBM • 1 ♀; same collection data as for preceding; 229 m a.s.l.; 19 Nov.–19 Dec. 2003; BPBM • 6 ♂♂, 6 ♀♀; Cakaudrove, Tavuki Village, Mount Devo; 16°49'52" S, 179°58'48" W; 734 m a.s.l.; 7–23 Oct. 2004; P. Vodo leg.; Malaise; BPBM • 18 ♂♂, 34 ♀♀; Cakaudrove, 5.3 km SE of Tavuki Village, Mount Devo; 16°50'28" S, 179°58'05" W; 1054 m a.s.l.; 17–24 Oct. 2002; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂; same collection data as for preceding; 16°50'28" S, 179°58'05" W; 23 Oct.–15 Nov. 2004; P. Vodo leg.; BPBM • 3 ♂♂, 2 ♀♀; Cakaudrove, 5.5 km SE of Tavuki Village; 16°50'35" S, 179°57'58" W; 1188 m a.s.l.; 30 Jun.–14 Aug. 2004; Schlinger and Tokota'a leg.; rainforest, Malaise; DEBU • 3 ♂♂, 14 ♀♀; Cakaudrove, 5.6 km SE of Tavuki Village; 16°50'35" S, 179°57'54" W; 1187 m a.s.l.; 3–10 Jan. 2003; Schlinger and Tokota'a leg.; rainforest, Malaise; BPBM • 5 ♂♂, 29 ♀♀; Cakaudrove, Devo Forest Reserve; 16°50' S, 179°59' W; 800 m a.s.l.; 3–10 Jan. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 1 ♀; Cakaudrove, Devo Peak Radio Tower; 16°51' S, 179°58' W; 1200 m a.s.l.; 2–10 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; Malaise in rainforest; BPBM • 3 ♂♂, 8 ♀♀; same collection data as for preceding; 31 Oct.–21 Nov. 2003; DEBU • 2 ♂♂, 3 ♀♀; Cakaudrove, Koronibuabua; 16°51'29" S, 179°53'42" W; 233 m a.s.l.; 24 Oct.–19 Nov. 2003; Irwin, Schlinger, and Tokota'a leg.; rainforest, Malaise; BPBM • 6 ♂♂, 14 ♀♀; same collection data as for preceding; 11–26 Mar. 2004; BPBM • 5 ♂♂, 14 ♀♀; Cakaudrove, Lavena; 16°51'18" S, 179°53'20" W; 212 m a.s.l.; 4–19 Nov. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise in rainforest; BPBM • 2 ♂♂, 7 ♀♀; Cakaudrove, Soqulu House in Soqulu Estate; 16°49'59" S, 180°00'00" W; 140 m a.s.l.; 4–21 Nov. 2002; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♂, 3 ♀♀; Cakaudrove, Tavuki Village, Mount Devo; 16°50'13" S, 179°58'23" W; 892 m a.s.l.; 31 Jul.–14 Aug. 2004; Schlinger and Tokota'a leg.; Malaise; DEBU. – **Vanua Levu** • 2 ♂♂; Bua, 4 km NW of Kilaka Village, Wainibequa; 16°48'29" S, 178°59'13" E; 135 m a.s.l.; 9–20 Dec. 2004; P. Manuelli leg.; Malaise; BPBM. – **Viti Levu** • 13 ♂♂, 16 ♀♀; 3.5 km N of Veisari Settlement, logging road to Waivudawa; 18°04'44" S, 178°21'47" E; 300 m a.s.l.; 12 Dec. 2002–3 Jan. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 1 ♀; Naitasiri, 0.75 km E of Navai Village, old trail to Mount Tomaniivi; 17°37'16" S, 177°59'20" E; 700 m a.s.l.; 22 Jan.–3 Feb. 2005; E. Namatalau leg.; Malaise; BPBM • 1 ♀; Naitasiri, 2 km E of Navai Village, old trail to Mount Tomaniivi; 17°37'16" S, 178°00'00" E; 700 m a.s.l.; 26 Sep.–11 Oct. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 2 ♀♀; Naitasiri, 2 km SE of Nabukavesi Village, Ocean Pacific Resort; 18°10'16" S, 178°15'29" E; 40 m a.s.l.; 13–27 Feb. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 5 ♂♂, 3 ♀♀; same collection data as for preceding; 5–22 Jun. 2003; DEBU • 2 ♂♂, 3 ♀♀; same collection data as for preceding; 26 Apr.–5 May 2004; BPBM • 4 ♂♂, 2 ♀♀; Naitasiri, 3.8 km N of Veisari Settlement, logging road to Waivudawa; 18°04'05" S, 178°22'01" E; 300 m a.s.l.; 14 Feb.–8 Mar. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 7 ♂♂, 8 ♀♀; Naitasiri, 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'22" S, 178°25'19" E; 325 m a.s.l.; 17 Mar.–9 Apr. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 2 ♂♂, 3 ♀♀; same collection data as for preceding; 14–28 Jul. 2003; BPBM • 2 ♀♀; same collection data as for preceding; 4–14 Nov. 2003; BPBM • 4 ♂♂, 2 ♀♀; Naitasiri, 4 km WSW of Colo-I-Suva Village, Mount Nakobalevu; 18°03'18" S, 178°25'26" E; 372 m a.s.l.; 12–24 Feb. 2003; Schlinger and Tokota'a leg.; Malaise; BPBM • 6 ♂♂, 4 ♀♀; same collection data as for preceding; 18°03'18" S, 178°25'26" E; 12 Oct. 2004–24 Oct. 2002; Timoci leg.; BPBM • 34 ♂♂, 45 ♀♀; same collection data as for preceding;

25 Feb.–17 Mar. 2003; BPBM • 11 ♂♂, 15 ♀♀; same collection data as for preceding; 17 Mar.–9 Apr. 2003; BPBM • 1 ♂, 3 ♀♀; Naitasiri, Mount Nakobalevu; 18°03' S, 178°25' E; 340 m a.s.l.; 22 Sep.–9 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; rainforest, Malaise; BPBM • 7 ♂♂, 12 ♀♀; same collection data as for preceding; 24–29 Oct. 2003; BPBM • 11 ♂♂, 11 ♀♀; Naitasiri, Navai Village, Eteni; 17°37' S, 177°59' E; 700 m a.s.l.; 6 Jun.–15 Jul. 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; DEBU • 1 ♀; Naitasiri, Sovi Basin, Wainivalau; 17°54' S, 178°14' E; 300 m a.s.l.; 8–16 May 2003; Irwin, Schlinger, and Tokota'a leg.; Malaise; BPBM • 5 ♂♂, 2 ♀♀; Rewa, 4 km NW of Lami Town, Mount Korobaba; 18°06'14" S, 178°22'52" E; 1–13 Dec. 2004; 260 m a.s.l.; L. Koto leg.; BPBM • 8 ♂♂, 10 ♀♀; Rewa, Mount Nakobalevu, below tower; 18°03' S, 178°25' E; 461 m a.s.l.; 22 Sep.–8 Oct. 2002; Irwin, Schlinger, and Tokota'a leg.; near *Scaevola* in bloom; BPBM • 1 ♀; Sigatoka, 1.1 km SSW of Volivoli Village, Sigatoka Sand Dunes; 18°10'08" S, 177°29'06" E; 55 m a.s.l.; 14–22 Jul. 2002; Schlinger and Tokota'a leg.; Malaise; BPBM • 4 ♂♂, 3 ♀♀; Sigatoka, Sigatoka Sand Dunes National Park; 18°10' S, 177°30' E; 10 m a.s.l.; 14–22 Jul. 2002; Irwin, Schlinger, and Tokota'a leg.; coastal forest, Malaise; BPBM • 15 ♂♂, 12 ♀♀; Vuda, Koroyanitu EcoPark, 1 km E of Abaca Village; 17°40'01" S, 177°33'00" E; 800 m a.s.l.; 2–16 Nov. 2004; L. Tuimereke leg.; Malaise; BPBM.

Description

BODY (Fig. 57). Length 1.2–1.5 mm. Head caramel-brown, slightly darkened at level of ocelli. Interfrontal bristles in four pairs. Thorax brown, scutum caramel-brown and shiny, lower half of anepisternum and below dark brown; scutellum dark brown. Anterior dorsocentral bristles separated by 8–9 rows of acrostichal setulae. Ventral surface of male mid tibia with two rows of stout setae along apical quarter; mid femur with two corresponding rows of proximoventral setae; female mid tibia with a large apicoventral bristle. Hind tibia with a very large, dorsal preapical seta (slightly longer than first hind tarsomere) and a thick, curved, apicoventral spur. Wing (Fig. 68F) dark with several pale vertical bars. R_{2+3} gently sinuate to almost straight.

MALE ABDOMEN (Fig. 58). S5 significantly reduced, arched medially, right side tapered and curled upwards apically, setae restricted to a row of eight anterior to a membranous posteromedial area and a single seta on far-left side. S6 long and sinuate, length reduced. Epandrium wedge-shaped and uniformly setose,

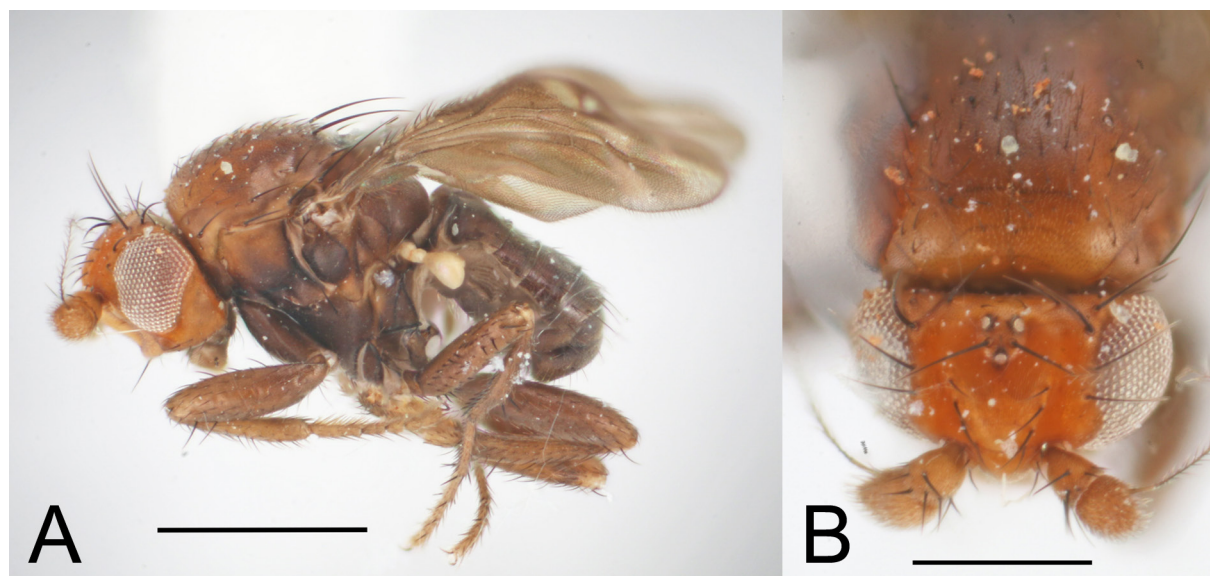


Fig. 57. *Pseudopterogramma fijiensis* sp. nov., paratype (BPBM). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

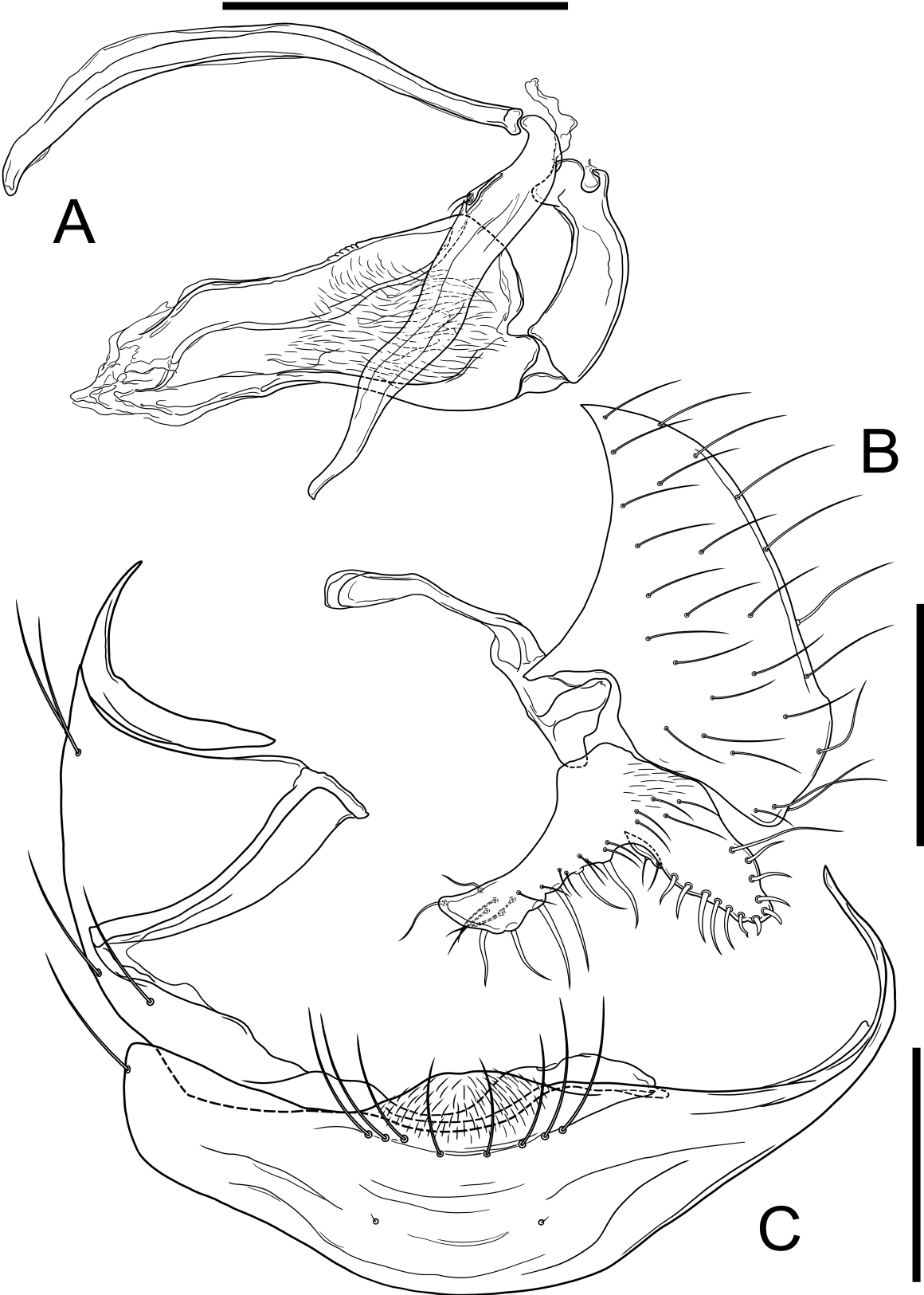


Fig. 58. *Pseudopterogramma fijiensis* sp. nov., paratype (DEBU). **A.** Aedeagus and associated structures, lateral view. **B.** Male terminalia, lateral view. **C.** Male S5-8, ventral view. Scale bars: A–C = 0.10 mm.

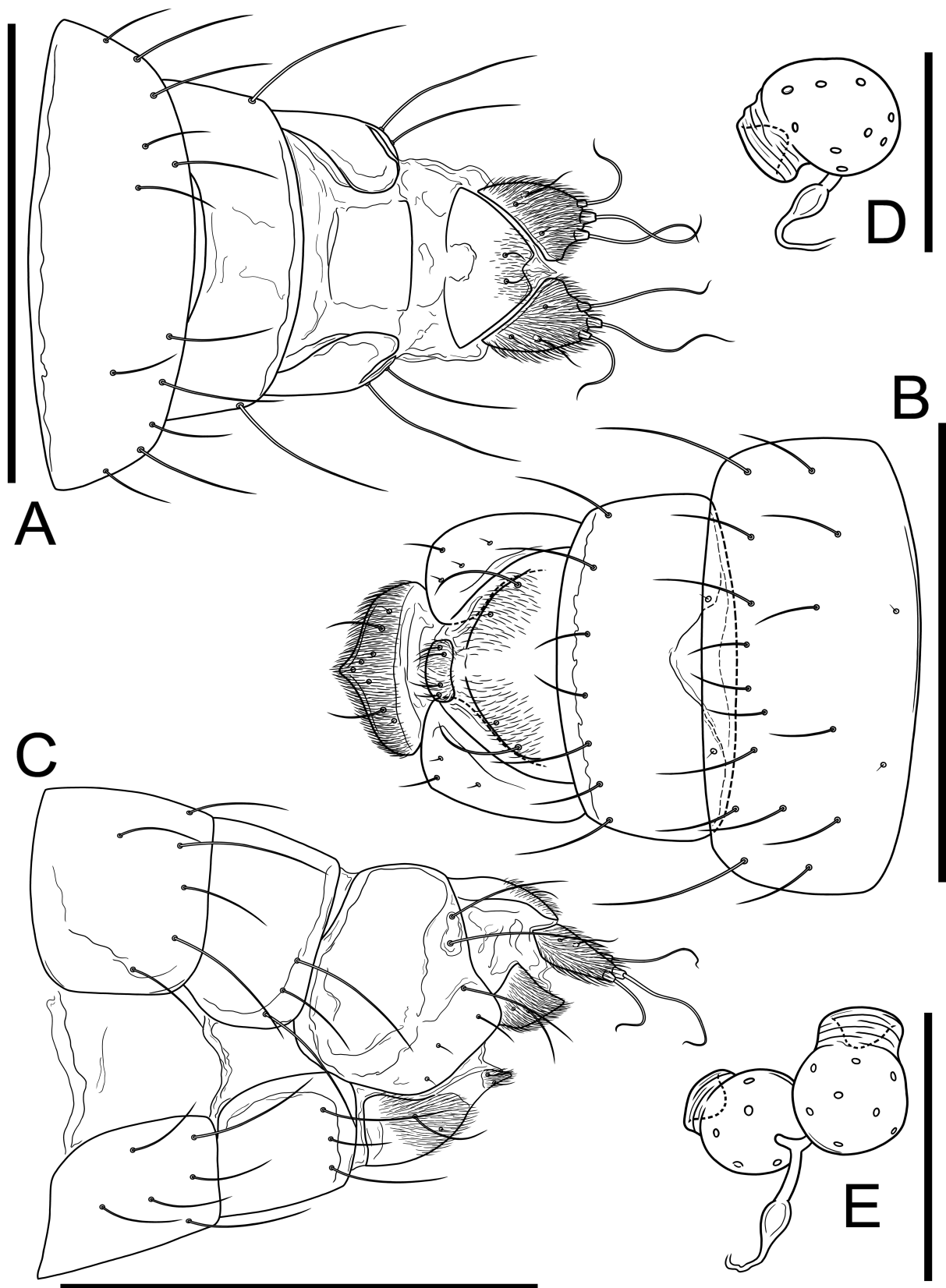


Fig. 59. *Pseudopterogramma fijiensis* sp. nov., paratype (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

ventrolateral margin distinctly notched; cercus large, flattened, and slightly paler than epandrium, with several long setae. Surstylus large, inverted V-shaped: anterior lobe rectangular with a patch of setulae on outer surface, inner surface with several long preapical setae, ventral margin with a row of long but thick setae, posterior lobe triangular with a patch of long laterobasal setae and a row of stout, tooth-like setae running along outer margin. Postgonite elongate, slender, bisinuate, and tapered. Phallapodeme long, curved, and apically pointed; basiphallus tall, $3.5 \times$ as tall as long, curved, constricted around basal third with large dorsal notch. Distiphallus large, box-like, with a broad, apically bifid ventral sclerite and a pair of thin, sinuate dorsolateral sclerites; basolateral membrane between dorsal and ventral sclerites slightly sclerotized and setulose.

FEMALE ABDOMEN (Fig. 59). Epiproct broad, subtriangular, desclerotized anteromedially. Cercus subtriangular with slightly thickened apical seta and two long preapical setae. S8 subtriangular with transverse desclerotized strip splitting large anterior part (with long lateral setae) from small posterior part (with four fine setae). Hypoproct trough-shaped. Spermathecae stout, urn-shaped (with globose basal part and constricted cylindrical apical part), basal part covered in small depressions, apical part lightly grooved with apical invagination.

Remarks

Specimens of *Pseudopterogramma fijiensis* sp. nov. constitute almost 85% of the *Parapterogramma* genus group specimens collected in Malaise traps during the Fiji Arthropod Survey (see Evenhuis & Bickel 2005). Relatively few specimens of *Ps. fijiensis* were found in the pitfall trap samples provided by S. and J. Peck, which were otherwise rich in *Parapterogramma* genus group specimens.

Pseudopterogramma insulare (Papp, 1972)

Fig. 69

Pterogramma insularis Papp, 1972: 101.

Pterogramma insulare – Marshall 1989: 506. — Roháček *et al.* 2001: 213.

Pseudopterogramma insularis – Papp 2008: 102.

Pseudopterogramma insulare – Marshall *et al.* 2011: 265.

Type material

Holotype

PAPUA NEW GUINEA • ♀; Lae, along Lae-Bulolo road, beyond bridge of Markham River; 6 Sep. 1968; J. Balogh leg.; about 25 m above flood area, decaying wood of fallen trunk in forest; HNHM.

Material examined

Holotype photo provided by Petra Szöllősi-Tóth, HNHM.

Redescription

BODY. Length 1.0–1.2 mm. Interfrontal bristles in four pairs. Thorax brownish-yellow, likely darker when alive. Anterior dorsocentral bristles separated by 5–6 rows of acrostichal setulae. Ventral surface of male mid tibia with two rows of stout setae along apical quarter; mid femur with two corresponding rows of proximoventral setae; female mid tibia with a large apicoventral bristle. Hind tibia with a long but fine dorsal preapical seta (length equal to first hind tarsomere) and a stout preapical ventral spur. Wing pale with several darker spots forming a tessellated pattern. R_{2+3} sinuate, apical curve much stronger than basal curve.

MALE ABDOMEN. Sternite 5 broad, sparsely setose with a broad posteromedial emargination. Surstylus bilobed, anterior lobe smaller and triangular, posterior lobe larger and rectangular, both lobes with several longer ventral setae. Postgonite long, slightly sinuate and tapered but apex blunt. Phallapodeme long, curved apically and with a broad dorsomedial ‘fin’; basiphallus large, angled and frame-like; distiphallus stout, with a pair (?) of long ventrolateral sclerites and a sinuate dorsal sclerite connected by desclerotized sections.

FEMALE ABDOMEN. Cercus with three sinuate setae (one apical, one subapical, one dorsomedial). No other characters are described, though they are likely to be similar to those of *Ps. siamense*.

Distribution

Australasian/Oceanian: Papua New Guinea (Papp 1972); Indomalayan: Indonesia (Papp 2008).

Remarks

The above redescription of *Ps. insulare* is based on Papp’s (1972, 2008) descriptions of the species. Papp’s (2008) illustrations and description of the male genitalia of *Ps. insulare* (based on an Indonesian specimen) seem identical to those of *Ps. siamense*, suggesting that the latter species may be a synonym of the former. However, the male specimen of *Ps. insulare* that Papp described and illustrated in 2008 was collected in North Sulawesi, Indonesia, far from the type locality of *Ps. insulare* in Papua New Guinea and well within the range of the much more widely distributed *Ps. siamense*. This suggests that this male actually does belong to *Ps. siamense*, which would mean that either these two species are synonyms or the Indonesian male is not conspecific with the holotype of *Ps. insulare* as Papp (2008) claimed. We suspect that they are synonyms but better material of *Ps. siamense*, including confidently associated males and females, is needed to be sure.

Pseuopteroqramma kasut sp. nov.

[urn:lsid:zoobank.org:act:F48A9B40-DE5F-4F69-BA7B-17865058BF15](https://zoobank.org/urn:lsid:zoobank.org:act:F48A9B40-DE5F-4F69-BA7B-17865058BF15)

Figs 60–62, 68G, 69

Etymology

The species name (from the Malay ‘kasut’, ‘shoe’) refers to the distinctive, shoe-shaped surstylus.

Material examined

Holotype

SINGAPORE • ♂; National University of Singapore, Prince George Park Residence; 3 May 2017; NUS Insect Survey leg.; LKCNHM.

Paratypes

INDONESIA – Java • 1 ♂; Ujung Kulon, Gunung Payung; 21 Sep. 1984; 1984 Zoological Expedition Krakataus leg.; Malaise; ANIC.

SINGAPORE • 1 ♂; Nee Soon Swamp Forest (NS1); 23 May 2012; Singapore Mangrove Insect Project leg.; DEBU • 1 ♂, 1 ♀; same collection data as for preceding; 15 May 2013; DEBU • 1 ♀; same collection data as for preceding; 26 Jun. 2013; DEBU • 1 ♂; same collection data as for preceding; 10 Jul. 2013; LKCNHM • 1 ♂; same collection data as for preceding; 6 Nov. 2013; DEBU • 2 ♂♂, 1 ♀; Nee Soon Swamp Forest (NSM1); 3 Dec. 2014; Singapore Mangrove Insect Project leg.; LKCNHM.

Description

BODY (Fig. 60). Length 1.1–1.4 mm. Head caramel-brown, slightly darkened at level of ocelli, orbital plates, and interfrontal plate. Interfrontal bristles in four fine pairs. Thorax brown, scutum caramel-

brown and shiny; scutellum brown. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Fore tibia and basal two-thirds of hind tibia yellow, mid tibia and femora brown. Ventral surface of male mid tibia with a small midventral bristle and a small apicoventral bristle. Hind tibia with several long, fine, dorsal preapical setae (slightly shorter than first hind tarsomere). Wing (Fig. 68G) hyaline with a dark spot around R_{2+3} ; R_{2+3} very slightly sinuate; M_4 not extending beyond dm-m.

MALE ABDOMEN (Fig. 61). S5 simple, broad, right side subequal to left, uniformly setose laterally, and slightly desclerotized posteromedially. S6 long but relatively broad with a setulose membranous part under (dorsal to) posteromedial part of S5, anterolateral corner slightly expanded and flared. Epandrium large, wedge-shaped, longer on left side, and uniformly setose, ventrolateral margin greatly enlarged and fused to cercus; cercus large, flattened, and slightly paler than epandrium, with several long setae, ventral surface with a narrow fused bar (superficially similar to a subepandrial sclerite?). Surstylus long but low, strongly curved (L-shaped), ventral margin with several long setae, apex densely setulose on both inner and outer surfaces (more-so on inner surface). Postgonite elongate, anterior margin sinuate, apex curved forwards (J-shaped) with several stout, tooth-like ventral lobes along inner surface. Phallapodeme relatively short and apically bent; basiphallus small, ring-shaped with a small posterodorsal point. Distiphallus very large, largely membranous with a small, ring-like sclerotized basal part and a U-shaped apical sclerite supporting membranous apex; membrane with large, densely creased and setulose dorsal flaps.

FEMALE ABDOMEN (Fig. 62). Epiproct broad, slightly pentagonal, desclerotized anteromedially and entirely setulose. Cercus subtriangular with long, sinuate apical seta and preapical setae. S8 subrectangular, well-developed. Hypoproct trough-shaped. Spermathecae stout and asymmetrical, single spermatheca large and spherical with rows of small basal pits, paired spermathecae significantly reduced and balloon-shaped.

Remarks

Pseudopterogramma kasut sp. nov. and *Ps. annectens* have similar largely hyaline wings and both species have three pairs of weak interfrontal bristles, but *Ps. kasut* is characterized by an indistinct M_4 beyond dm-m, a small mid ventral mid tibial seta, and a stout apicoventral mid tibial seta.



Fig. 60. *Pseudopterogramma kasut* sp. nov., paratype (ANIC). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

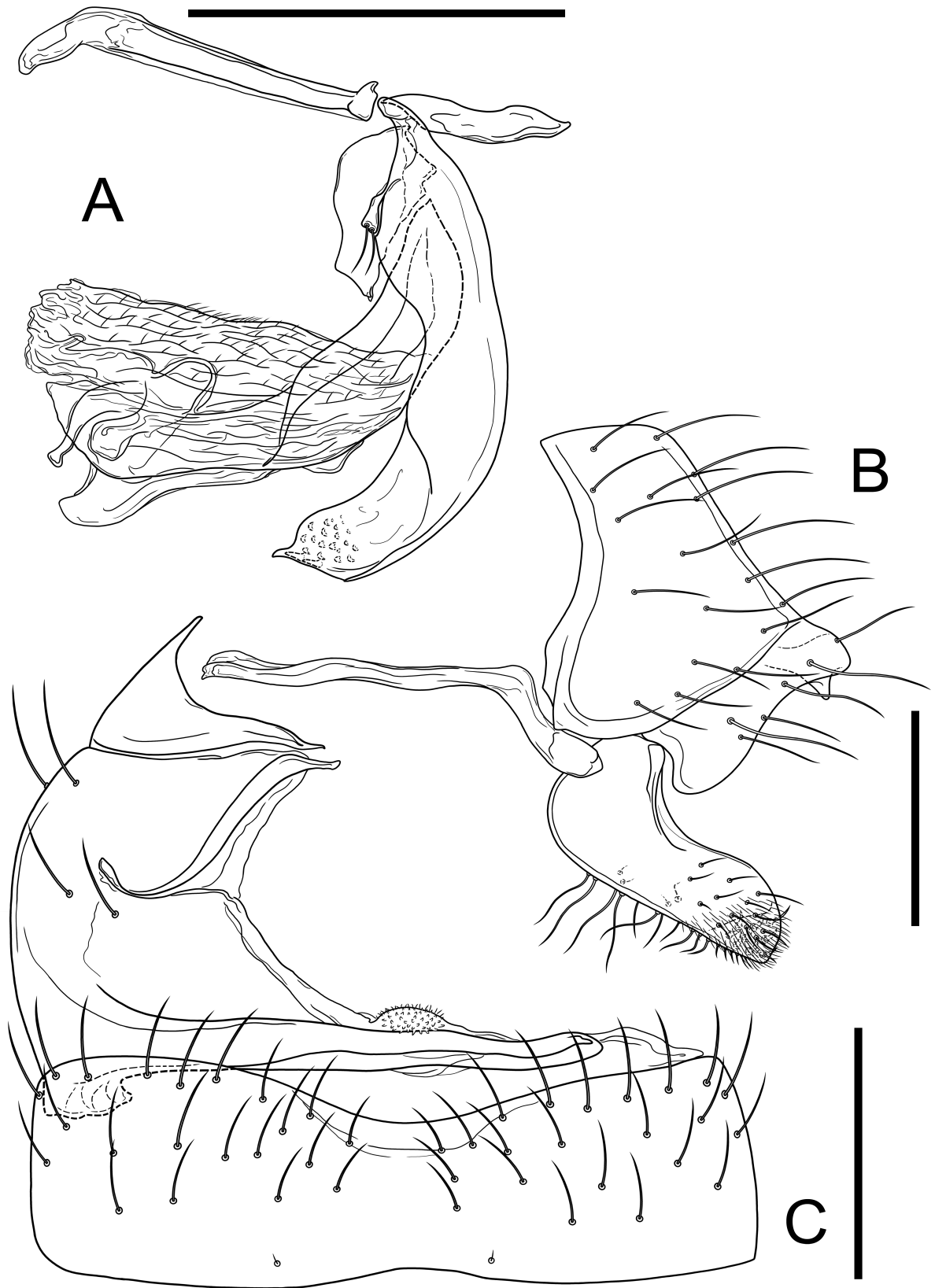


Fig. 61. *Pseudopterogramma kasut* sp. nov., paratype (ANIC). **A.** Aedeagus and associated structures, lateral view. **B.** Male terminalia, lateral view. **C.** Male S5-8, ventral view. Scale bars: A–C = 0.10 mm.

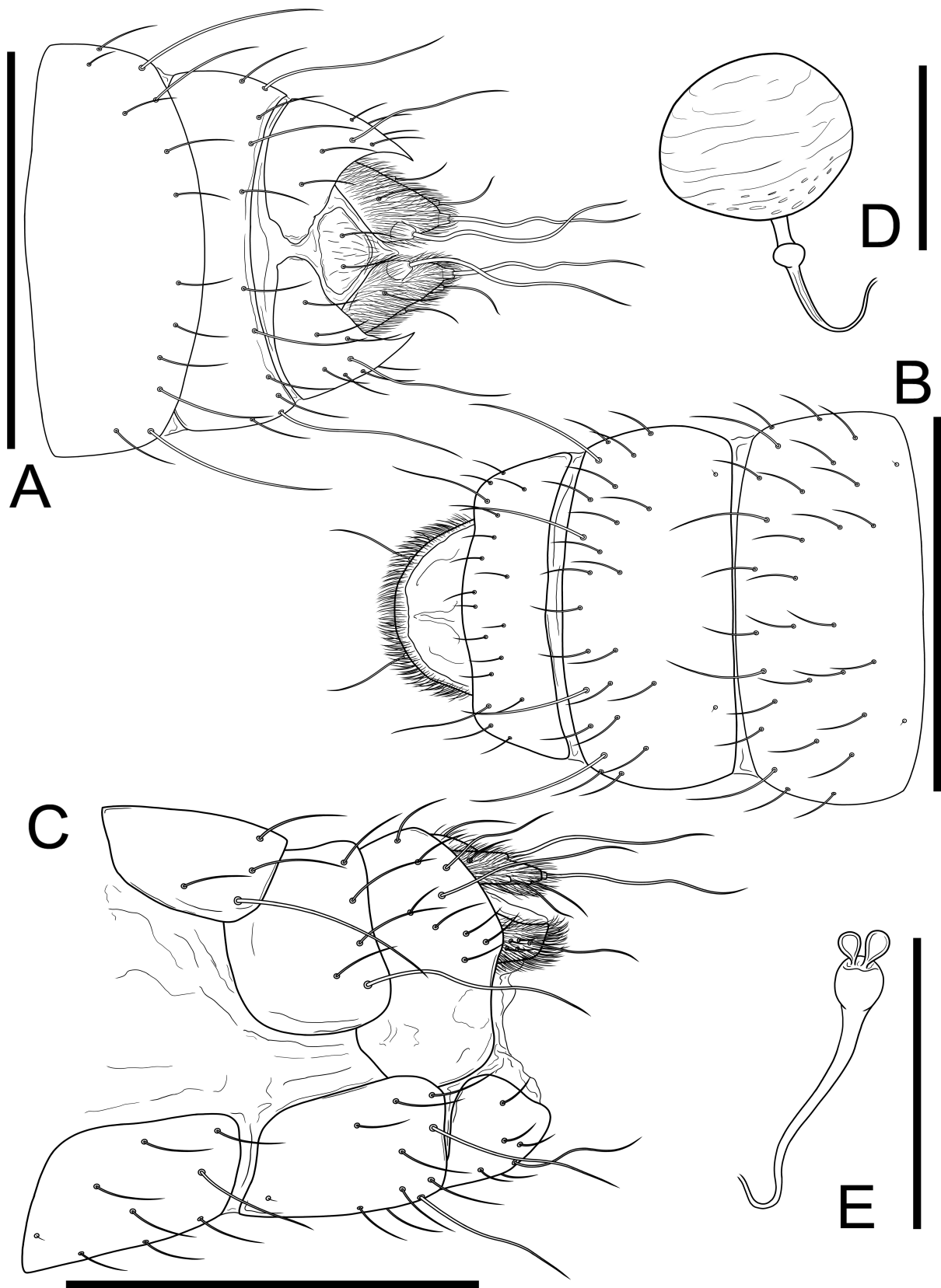


Fig. 62. *Pseudopteroграмма kasut* sp. nov., paratype (ZRC_BDP 0104778, DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

Pseudopterogramma ketambensis sp. nov.

urn:lsid:zoobank.org:act:6186D844-2094-4D39-BCE9-E6247FA45393

Figs 63–64, 68H, 69

Etymology

This name refers to the type locality of this species, Ketambe Research Station in Indonesia.

Material examined

Holotype

INDONESIA – **Sumatra** • ♂; Aceh, Mount Leuser National Park, Ketambe Research Station; 350 m a.s.l.; 4 Sep. 1989; B. Hubley leg.; screen sweep along Alas River; ROME.

Paratypes

INDONESIA – **Sumatra** • 1 ♂; Aceh, Mount Leuser National Park, Ketambe Research Station; 350 m a.s.l.; 9–21 Sep. 1989; D.C. Darling leg.; lowland rainforest, mature forest (T4), light gap, Malaise with pans; ROME.

MALAYSIA – **Pahang** • 1 ♂; Kuala Tahan, Taman Negara National Park; 200 m a.s.l.; 20–21 Jun. 1990; J.M. Heraty leg.; rainforest; DEBU. – **Sabah** • 1 ♂; Mount Kinabalu National Park, Poring Hot Spring area, Eastern Ridge Trail; 700–850 m a.s.l.; 28 Aug. 1988; A. Smetana leg.; DEBU.

Description

BODY (Fig. 63). Length 1.5–1.6 mm. Head caramel-brown, slightly darkened at level of ocelli, orbital plates, and interfrontal plate. Interfrontal bristles in three fine pairs. Thorax brown, scutum caramel-brown and dull; scutellum brown. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Fore and hind tibia with yellow median band, mid leg and femora brown. Ventral surface of male mid tibia with two rows of stout setae along apical quarter; mid femur with two corresponding rows of proximoventral setae. Wing (Fig. 68H) infuscate with several pale vertical bands. R_{2+3} almost straight.

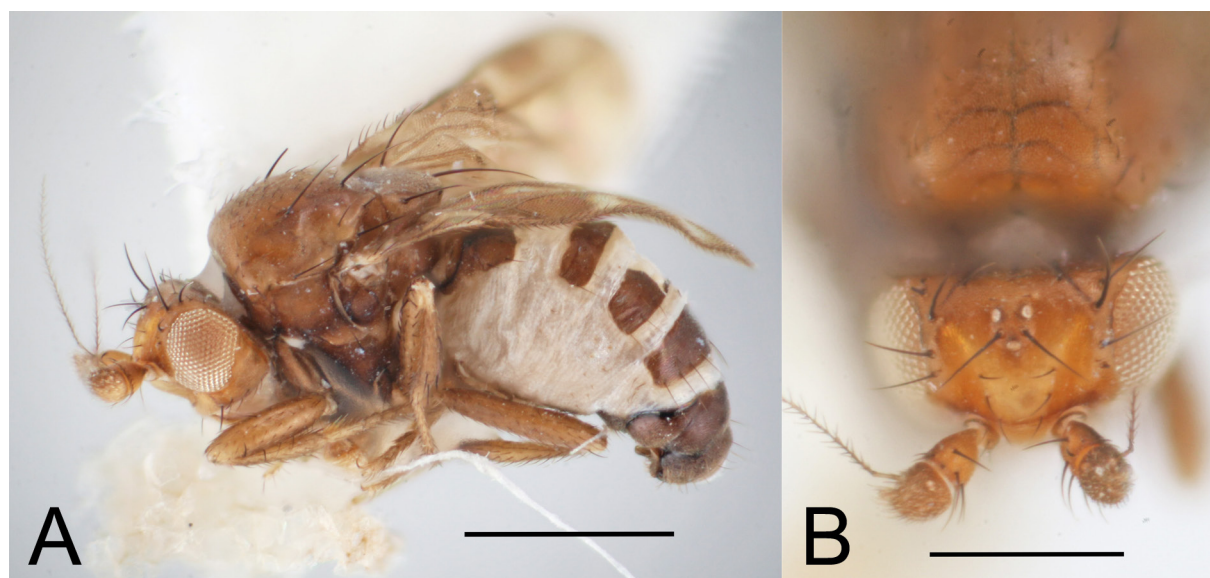


Fig. 63. *Pseudopterogramma ketambensis* sp. nov., holotype (ROME). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

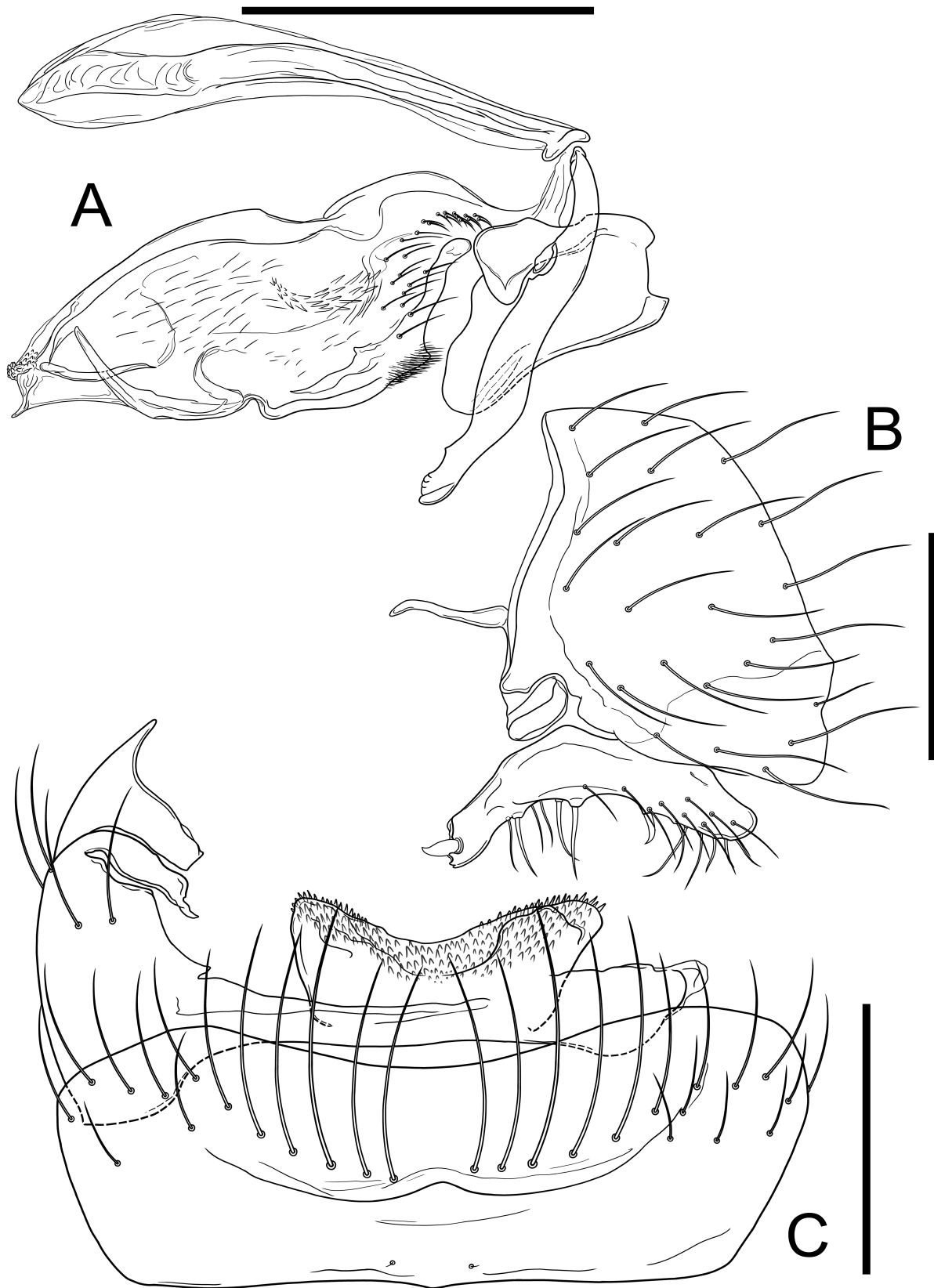


Fig. 64. *Pseudopterogramma ketambensis* sp. nov., paratype (ROME) **A.** Aedeagus and associated structures, lateral view. **B.** Male terminalia, lateral view. **C.** Male S5-8, ventral view. Scale bars: A–C = 0.10 mm.

MALE ABDOMEN (Fig. 64). S5 simple, broad, right side $1.1 \times$ as long as left, uniformly setose laterally, and broadly desclerotized posteromedially with a row of longer setae along anterior margin of desclerotization. S6 long but relatively broad with a trapezoidal sclerotized part under (dorsal to) posteromedial part of S5, anterolateral corner slightly expanded. Epandrium large, longer on left side, and uniformly setose, ventrolateral margin distinctly notched; cercus large, flattened, and slightly paler than epandrium, with several long setae. Surstylus long but low, slightly bent: anterior lobe long, subrectangular, bent inwards slightly with a stout, blade-like apical seta, ventral margin setose, posterior lobe stout, rectangular but rounded apically with long ventrolateral setae and some stout ventral setae. Postgonite elongate, slender, bisinuate, apex with a small tooth. Phallapodeme long, slightly sinuate, and apically rounded; basiphallus large, saddle-shaped with a pair of triangular, anterolateral lobes. Distiphallus large, box-like, with dorsal and ventral sclerites: basal half of ventral sclerite broad and posteriorly setulose, apical half split into thin, lateral lobes which connect to a U-shaped apical sclerite; dorsal sclerite Y-shaped, basal part triangular and arched, apical part split into narrow lateral arms; apex of distiphallus membranous and papillate, lateral membrane with dense setulae.

FEMALE ABDOMEN. Female unknown.

Remarks

Pseudopterogramma ketambensis sp. nov. is superficially most similar to *Ps. fenestrata*, from which it differs in having banded fore and hind tibiae, a relatively straight R_{2+3} , very long setae on the male S5, long but low surstyli, and very narrow postgonites.

Pseudopterogramma metatarsalis (Papp, 2008) comb. nov.

Figs 65, 68I, 69

Archipterogrammoides metatarsalis Papp, 2008: 87.

Archipterogrammoides metatarsalis – Marshall *et al.* 2011: 234.

Type material

Holotype

THAILAND – **Trang** • ♂; Khao Pu-Khao Ya National Park; 21 Nov. 2004; L. Papp and M. Földvári leg.; along a forest brook below the (Pak Yam) waterfall; HNHM.

Paratypes

THAILAND – **Trang** • 1 ♂; same collection data as for holotype; HNHM • 1 ♀; Khao Chong Botanical Garden; 14 Nov. 2004; L. Papp and M. Földvári leg.; along the stream below waterfall; HNHM • 1 ♂; same collection data as for preceding; 15 Nov. 2004; along a forest path; HNHM • 3 ♂♂, 2 ♀♀; same collection data as for preceding; 18 Nov. 2004; rainforest; HNHM • 7 ♂♂, 4 ♀♀; same collection data as for preceding; 22 Nov. 2004; HNHM • 1 ♀; Thung Khai Botanical Garden; 19 Nov. 2004; L. Papp and M. Földvári leg.; primary lowland rainforest; HNHM.

Material examined

Holotype photo provided by Petra Szöllösi-Tóth, HNHM.

SINGAPORE • 2 ♀♀; Bird Park Buffer (MIS_L08_MT); 2 May 2019; Mandai Insect Survey Project leg.; LKCNHM • 1 ♂, 2 ♀♀; Bird Park Buffer (MIS_L10_MT); 9 May 2019; Mandai Insect Survey Project leg.; DEBU • 2 ♂♂, 3 ♀♀; same collection data as for preceding; LKCNHM • 1 ♂, 1 ♀; Quarantine Area at Zoo (MIS_L05_MT); 30 May 2019; Mandai Insect Survey Project leg.; LKCNHM.

Redescription

BODY (Fig. 65). Length 1.0–1.5 mm. Head yellow, darkened medially. Interfrontal bristles in three pairs. Antennal scape with an enlarged anterior seta. Thorax yellow-brown, scutum caramel-brown. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Inner postpronotal seta minute. Femora yellow-brown, tibiae brown with broad yellow medial band. Ventral surface of male mid tibia with a long apicoventral bristle. Mid basitarsus with a slightly enlarged ventral setula. Hind tibia with a stout apicoventral spur. Wing (Fig. 68I) infuscate with several pale vertical blotches. R_{2+3} almost straight.

MALE ABDOMEN. S5 strongly asymmetrical, the left side much longer than the right, with a broad posteromedial emargination. S6+7 well-developed; apical third of S6 large and triangular, with a distinct constriction between it and the basal two-thirds, left third of S6 with a medially-projecting triangular lobe. Cercus low and semicircular with two long and several short setae; subepandrial sclerite broad, well-developed, U-shaped with a pair of thin connections to the surstylus. Anterior apodeme of hypandrium short and broad, lateral arms broad. Surstylus short, ovoid, relatively sparsely setose except subbasally and ventrally, with a thickened, tooth-like ventromedial seta. Postgonite elongate, thin, slightly sinuate and apically truncate. Phallapodeme elongate, narrow with a slightly enlarged apex; basiphallus large, thick, and tubular, slightly curved with an anterobasal lip and a subapical notch where the distiphallus articulates. Distiphallus large, “conspicuously empty”, and composed of several sclerites: a long, slightly tapered ventral sclerite with a downturned, bifurcate apex, a pair of S-shaped, subventral sclerites articulating with the apicolateral corners of the ventral sclerite, a broad, saddle-shaped posterodorsal sclerite, and an elongate, apically bifurcate, sinuate sclerite just ventral to the dorsal sclerite; the apex of the distiphallus is membranous between these sclerites.

FEMALE ABDOMEN. T2–4 reduced, leaving a narrow membranous area between T2 and T3, and a larger membranous area between T3 and T4. Epiproct and hypoproct small and weakly sclerotized. Cercus short, broad, and often angled upwards, with long apical, subapical, and lateral setae. Spermathecae stout, bowl-shaped, stem with a globular base, short in the single spermatheca and long in the paired spermathecae.

Distribution

Indomalayan: Singapore (**new record**), Thailand (Papp 2008).

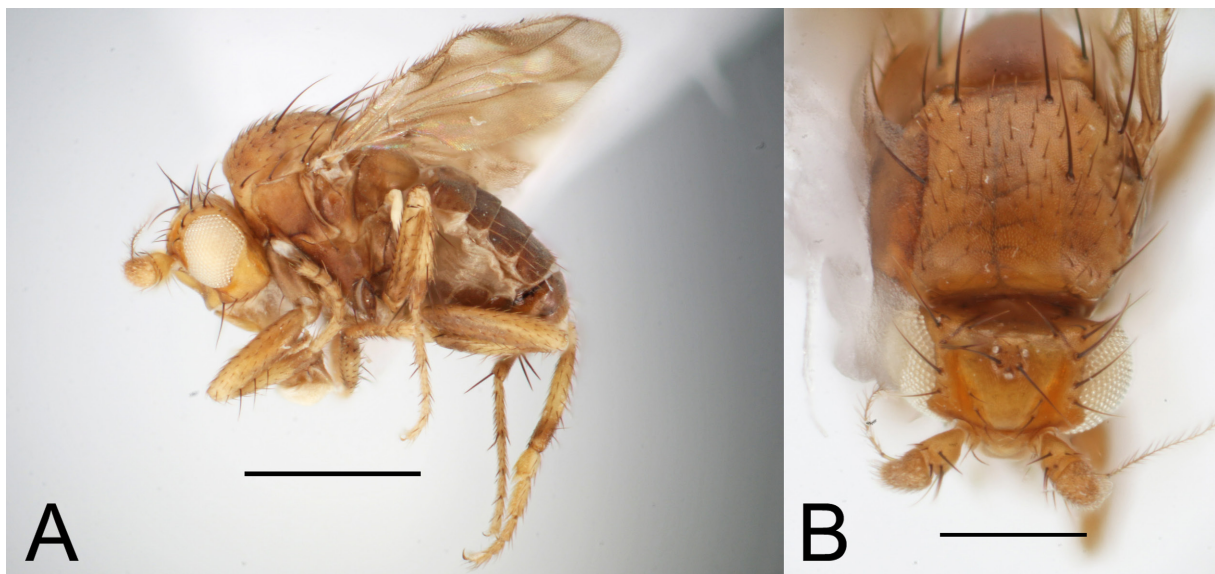


Fig. 65. *Pseudopterogramma metatarsalis* (Papp, 2008) (LKCNMH). A. Male habitus, lateral view. B. Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

Remarks

Several characters of the male genitalia (long, sinuate postgonite; large basiphallus roughly half the length of the distiphallus; distiphallus composed of many well-developed sclerites) seem to be synapomorphic with *Ps. aestivale*, *Ps. brevivenosum*, and *Ps. conicum*, suggesting that the treatment of *metatarsalis* as a separate genus *Archipterogrammoides* rendered *Pseudopterogramma* paraphyletic.

Pseudopterogramma siamense Papp, 2008

Figs 66–67, 68J, 69

Pseudopterogramma siamensis Papp, 2008: 102.

Pseudopterogramma siamense – Marshall *et al.* 2011: 264.

Type material

Holotype

THAILAND – **Phatthalung** • ♂; Khao Pu–Khao Ya National Park; 21 Nov. 2004; L. Papp and M. Földvári leg.; along a forest brook below the (Pam Yam) waterfall; HNHM.

Paratypes

THAILAND – **Chiang Mai** • 2 ♂♂; Doi Inthanon National Park, Pha Sum Ran Waterfall; 30 Oct. 2004; L. Papp and M. Földvári leg.; forest and along the brook; HNHM. – **Nan** • 3 ♀♀; along the rivulet above Mae Charim waterfall; 6 Nov. 2004; L. Papp leg.; HNHM • 1 ♀; Ban Na Lae, near Pua; 5 Nov. 2004; L. Papp and M. Földvári leg.; over a rocky forest brook; HNHM • 2 ♀♀; Mae Charim; 5 Nov. 2004; L. Papp and M. Földvári leg.; dry forest; HNHM • 1 ♂, 2 ♀♀; over and along the rivulet above Mae Charim waterfall; 7–8 Nov. 2004; L. Papp leg.; HNHM. – **Phatthalung** • 11 ♂♂, 7 ♀♀; same collection data as for holotype; HNHM • 1 ♂, 2 ♀♀; Phatthalung Wildlife Breeding Research Centre; 20 Nov. 2004; L. Papp and M. Földvári leg.; along a forest brook; HNHM. – **Trang** • 1 ♂; Ban Liphang; 16 Nov. 2004; L. Papp and M. Földvári leg.; over a shadowed slow brook; HNHM • 1 ♂; Khao Chong Botanical Garden; 20 Nov. 2004; L. Papp and M. Földvári leg.; along a forest path; HNHM • 11 ♂♂, 8 ♀♀; Khao Chong Botanical Garden; 22 Nov. 2004; L. Papp and M. Földvári leg.; rainforest; HNHM • 2 ♂♂, 1 ♀; same collection data as for preceding; 18 Nov. 2004; HNHM • 5 ♂♂, 2 ♀♀; Palian District, Nam Tok Nam Pan Forest Park; 17 Nov. 2004; L. Papp and M. Földvári leg.; over streams and vegetation around waterfalls; HNHM • 3 ♂♂, 3 ♀♀; Thung Khai Botanical Garden; 19 Nov. 2004; L. Papp and M. Földvári leg.; primary lowland rainforest; HNHM.

Material examined

INDIA – **Karnataka** • 5 ♂♂, 2 ♀♀; 12 km SW of Yellapur; 500 m a.s.l.; 7 Jul.–14 Aug. 1984; B. Gill leg.; flight-intercept trap; DEBU. – **Tamil Nadu** • 1 ♀; Mudumalai National Park; 900 m a.s.l.; 20–30 Jul. 1984; B. Gill leg.; flight-intercept trap; DEBU.

INDONESIA – **Aceh** • 1 ♂; Gunung Leuser National Park, Ketambe Research Station; 3°41' N, 97°39' E; 350 m a.s.l.; 9–21 Sep. 1989; D.C. Darling leg.; primary rainforest, young forest, terrace 3, closed canopy, Malaise trap pans; ROME • 2 ♂♂; Mount Leuser National Park, Ketambe Research Station; 350 m a.s.l.; 3–10 Sep. 1989; B. Hubley and D.C. Darling leg.; young forest, closed canopy, Malaise head; ROME • 1 ♀; Mount Leuser National Park, Ketambe Research Station; 350 m a.s.l.; 4 Sep. 1989; B. Hubley leg.; screen sweep along Alas River; ROME. – **Lampung** • 3 ♂♂, 5 ♀♀; Krakatoa Island, Rakata, west ridge; 260 m a.s.l.; 19–22 Sep. 1984; 1984 Zoological Expedition to the Krakataus; water (pan) trap; ANIC. – **West Kalimantan** • 2 ♀♀; Gunung Palung National Park, Cabang Panti Research Station; 1°15' S, 110°05' E; 100 m a.s.l.; 15 Jun.–1 Jul. 1991; Darling, Rosichon and Sutrisno leg.; primary rainforest (GP-11), sandstone, closed canopy, fine Malaise trap (head); ROME.

MALAYSIA – **Kuala Lumpur** • 1 ♀; Kuala Lumpur; 29 Aug. 1979; C.M. Francis leg.; CNCI • 2 ♂♂, 3 ♀♀; Kuala Lumpur, Ulu Gombak Field Study Centre; 8–14 Feb. 1980; ROME • 2 ♂♂; same collection data as for preceding; 22 Feb. 1980; DEBU. – **Pahang** • 2 ♂♂; Ringlet; 1150 m a.s.l.; 12 Jan. 1990; J.R. Vockeroth leg.; stream in rainforest; CNCI. – **Sabah** • 1 ♀; Mount Kinabalu National Park, Poring Hot Springs; 500–530 m a.s.l.; 9 May 1987; A. Smetana leg.; DEBU • 1 ♂; same collection data as for preceding; 500 m a.s.l.; 19 Aug. 1988; DEBU. – **Terengganu** • 1 ♀; 7 km NW of Kg. Ayer Putek; 100 m a.s.l.; 27 Feb.–2 Mar. 1990; M.J. Sharkey leg.; pan & flight-intercept traps; DEBU.

NEPAL – **Madhesh** • 2 ♀♀; Lothar; 137 m a.s.l.; 11 Sep. 1967; Canadian Nepal Expedition leg.; Malaise trap; CNCI.

PHILIPPINES – **Laguna** • 1 ♀; Los Baños, Mount Makiling, trail; 14°08'46" N, 121°13'50" E; 300–500 m a.s.l.; 20–30 Mar. 2010; S.A. Marshall leg.; DEBU • 1 ♂; same collection data as for preceding, UPLB. – **Negros Oriental** • 1 ♀; Cuernos de Negros, 7 km W of Valencia; 700 m a.s.l.; 31 Mar.–8 Apr. 1987; D.C. Darling leg.; primary forest edge, Malaise trap & pans; ROME.

SINGAPORE • 1 ♂, 4 ♀♀; Bukit Timah Nature Reserve; 23 Jan. 1990; J.R. Vockeroth leg.; DEBU • 2 ♀♀; National University of Singapore, Prince George Park Residence; 5 Apr. 2017; NUS Insect Survey Project leg.; LKCNHM • 1 ♂; same collection data as for preceding; 26 Apr. 2017; LKCNHM • 1 ♂, 1 ♀; same collection data as for preceding; 3 May 2017; DEBU • 1 ♀; same collection data as for preceding; 28 Jun. 2017; DEBU • 1 ♂; National University of Singapore, Ridge View Residence; 14 Jun. 2017; NUS Insect Survey Project leg.; LKCNHM • 1 ♂; National University of Singapore, University Hall; 24 May 2017; NUS Insect Survey Project leg.; LKCNHM • 1 ♀; Nee Soon Swamp Forest (NSM2); 17 Dec. 2014; Singapore Mangrove Insect Project leg.; LKCNHM • 1 ♀; same collection as for preceding; 29 Apr. 2015; LKCNHM.

VIETNAM – **Ninh Bình** • 2 ♂♂; Cuc Phuong National Park; 20°21'13" N, 105°35'14" E; 350–500 m a.s.l.; 2 May 2013; Marshall & Paiero leg.; DEBU.

Redescription

BODY (Fig. 66). Length 1.2–1.5 mm. Head orange-brown, darkened at level of ocelli, orbital plates, and interfrontal plate. Interfrontal bristles in four pairs. Thorax brown, scutum orange-brown and dull;

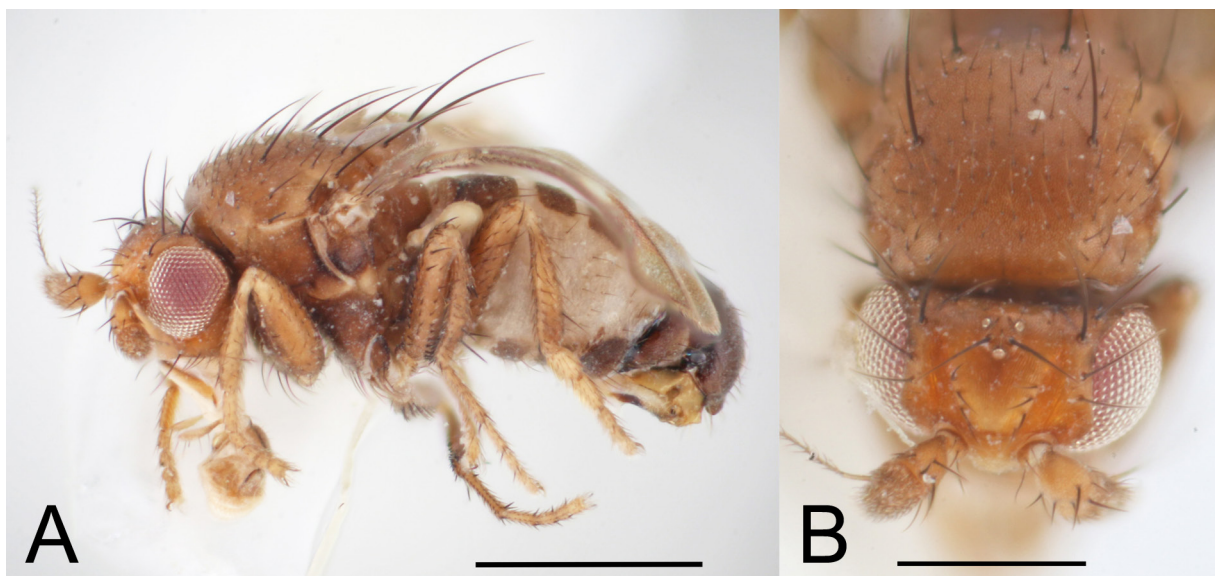


Fig. 66. *Pseudopterogramma siamense* Papp, 2008 (ROME). **A.** Male habitus, lateral view. **B.** Male head, anterodorsal view. Scale bars: A = 0.50 mm; B = 0.25 mm.

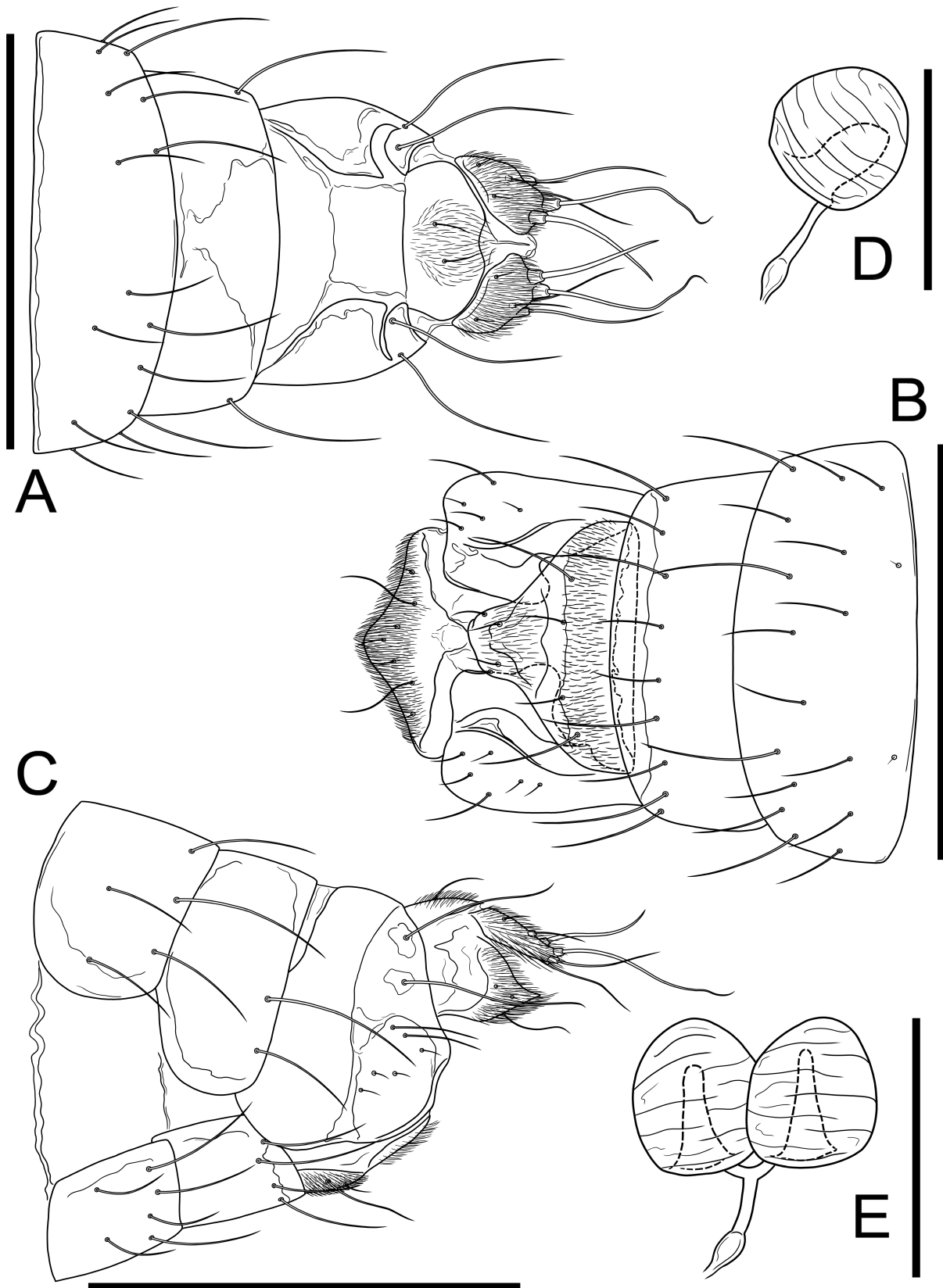


Fig. 67. *Pseudopterogramma siamense* Papp, 2008 (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Single spermatheca. **E.** Paired spermathecae. Scale bars: A–C = 0.30 mm; D–E = 0.01 mm.

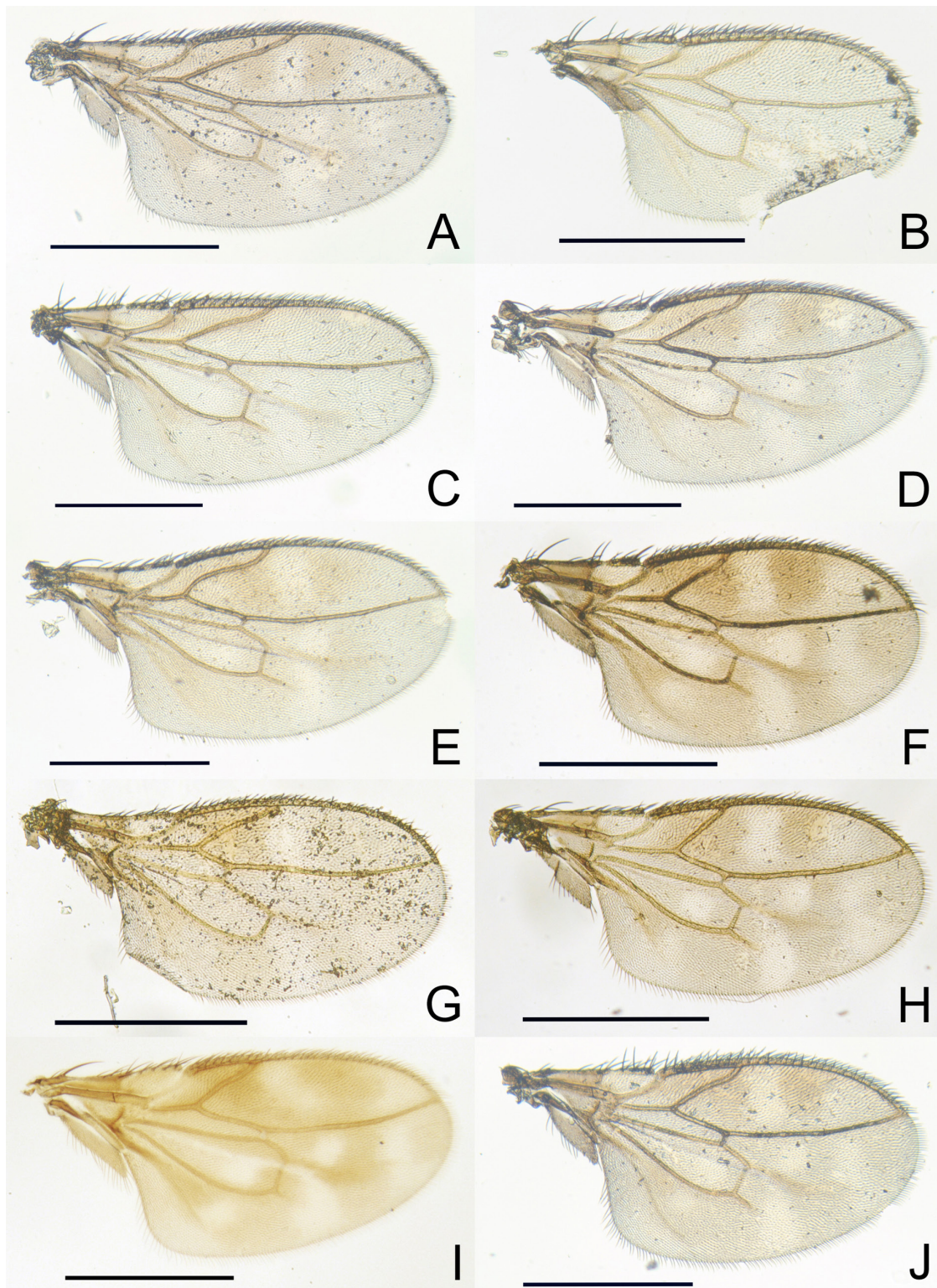


Fig. 68. *Pseudopterogramma* Papp, 2008, left wings, ventral views. **A.** *Ps. aestivale* (Richards, 1973) (QMBA). **B.** *Ps. annectens* (Richards, 1964) (CAS). **C.** *Ps. brevivenosum* (Tenorio, 1967) (DEBU). **D.** *Ps. conicum* (Richards, 1946) (DEBU). **E.** *Ps. fenestrata* (Richards, 1973) (QMBA). **F.** *Ps. fijiensis* sp. nov., paratype (BPBM). **G.** *Ps. kasut* sp. nov., paratype (DEBU). **H.** *Ps. ketambensis* sp. nov., paratype (ROME). **I.** *Ps. metatarsalis* (Papp, 2008) (LKCNMH). **J.** *Ps. siamense* Papp, 2008 (ROME). Scale bars: A–J = 0.50 mm.

scutellum brown. Anterior dorsocentral bristles separated by 7–8 rows of acrostichal setulae. Fore and hind tibia with yellow median band (sometimes indistinct), mid leg and femora brown. Ventral surface of male mid tibia with two rows of stout setae along apical quarter; mid femur with two corresponding rows of proximoventral setae. Wing (Fig. 68J) infuscate with several pale vertical bands. R_{2+3} gently sinuate, apical curve much stronger than basal curve.

MALE ABDOMEN. Sternite 5 broad, sparsely setose with a broad posteromedial emargination. S6 elongate, right side (apex) greatly expanded. Epandrium wedge-shaped and uniformly setose; cercus large, subtriangular, with 2 long setae and several smaller setulae. Surstylus bilobed: anterior lobe smaller and subrectangular, posteroventrally with a rounded emargination, posterior lobe larger and diamond-shaped (i.e. broadest at the middle and tapered apically), both lobes with several long ventral setae. Postgonite long, slightly sinuate and tapered with apex pointed. Phallapodeme long, curved apically and with a broad dorsal ‘fin’; basiphallus tall, $2.7\times$ as tall as long, constricted around basal third. Distiphallus large, box-like, with a large, broad ventral sclerite, a pair of long, dorsoventrally flattened, hoop-like dorsolateral sclerites supporting the membranous sides, and curved, wedge-shaped apical sclerite; lateral membrane with spinules.

MALE GENITALIA. Illustrated in Papp (2008: figs 121, 125–129).

FEMALE ABDOMEN (Fig. 67). T7 desclerotized posteromedially. Epiproct broad, pentagonal, emarginate posteromedially. Cercus semicircular with thickened apical seta and three long preapical setae. S8 subtriangular with transverse desclerotized strip splitting large anterior part (with long lateral setae) from small posterior part (with four fine setae). Hypoproct trough-shaped. Spermathecae stout, spherical, and lightly grooved with deep basal invagination.

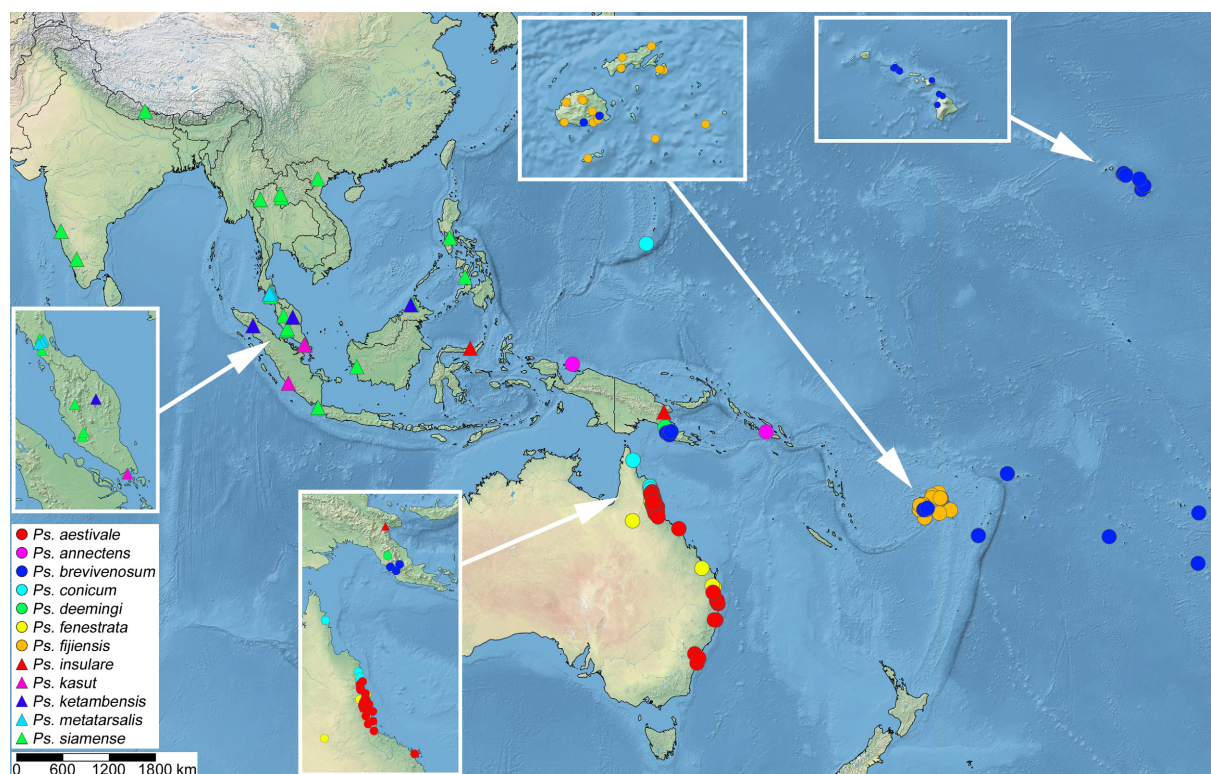


Fig. 69. Distribution map of *Pseudopterogramma* Papp, 2008.

Distribution

Indomalayan: India (**new record**), Indonesia (**new record**), Malaysia (**new record**), Nepal (**new record**), Philippines (**new record**), Singapore (**new record**), Thailand (Papp 2008), Vietnam (**new record**).

Remarks

The only difference Papp (2008) noted between *Ps. siamense* and *Ps. insulare*, originally described on the basis of a single female from Papua New Guinea, is that the postgonite of the latter is “less medially curved” than that of the former. Papp’s (2008) illustrations of the male terminalia of a specimen of *Ps. insulare* from Indonesia (Sulawesi) and the male terminalia of a specimen of *Ps. siamense* from Thailand seem to be almost identical, both corresponding to the several specimens of *Ps. siamense* we have examined (including specimens from western Indonesia). We suspect that the two species are the same but we have not had the opportunity to directly compare type specimens (see discussion under *Ps. insulare* above). Illustrations of the male genitalia are not provided here as Papp’s (2008) illustrations are adequate.

Genus *Pterogrammoides* Papp, 1972

Pterogrammoides Papp, 1972: 103 (masculine). Type species: *Pterogrammoides baloghi* Papp, 1972, original designation.

Pterogrammoides – Papp 1989: 328 (revision, key). — Roháček *et al.* 2001: 216 (world catalog).

Diagnosis

In addition to the synapomorphies of the *Parapterogramma* genus group, *Pterogrammoides* is diagnosed by the following characters: distal half of the mid tibia with a single dorsal bristle, proximal half without bristles; postpedicel conical; wing very narrow with crossveins shifted towards the wing base; preabdominal sclerites reduced in both males and females. Characters of the male terminalia, such as the greatly enlarged S6–8 that contrasts with the greatly reduced tergites, stout surstylus with tooth-like ventral setae, thin and elongate postgonite, and the large ejaculatory apodeme, allow for easy identification of the genus.

Definition

Pterogrammoides is defined by the following synapomorphies: strongly reduced, almost strap-like wings with significantly reduced venation, strongly reduced mid tibial chaetotaxy (with only a single distal dorsal bristle), conical postpedicel, stout surstylus with tooth-like ventral setae, thin and elongate postgonite, greatly enlarged S6–8 contrasting with strongly reduced abdominal tergites and sternites, and enlarged ejaculatory apodeme.

Redescription

BODY. Colour light to dark brown. Length 1.1–1.4 mm.

HEAD. Yellow to brown. Frontal width $1.5 \times$ interfrontal height. Interfrontal bristles in three minute pairs; two minute laterocline orbital bristles, anterior orbital smaller than posterior; ocellar bristles fine and diverging; inner orbital bristle very large; postvertical bristle absent; postocellar bristle absent. Lunule small, subtriangular; face slightly bulging centrally. Vibrissa strong, vibrissal angle with subvibrissal seta; gena with several smaller setulae. Palpus small, slightly clavate, narrow with 2–3 subapical setulae. Eye with a slight notch at about level of anterior edge of frons, eye height $3.5\text{--}4.0 \times$ genal height.

THORAX. Yellow to brown. Two large dorsocentral bristles (anterior pair just behind suture), separated by 4–5 rows of very fine acrostichal setulae. One postpronotal bristle; two notopleural bristles, anterior notopleural slightly larger than posterior; one strong supra-alar bristle; postalar bristles strong. Katepisternum with a small posterior seta. Scutellum subrectangular, with four large marginal bristles, apical pair $2.0 \times$ length of basal pair.

LEGS. Yellow to dark brown; tarsi pale. Fore and hind femora thickened. Mid tibia with no distinct anterodorsal bristles in proximal half and 1–3 dorsal bristles (one large dorsal bristle and sometimes a small anterodorsal or posterodorsal) in distal half. Ventral surface of mid tibia with a small apical bristle and two rows of stout setae in males (mid femur with two corresponding rows of strong proximoventral setae) and with a strong apical bristle in females; never with a distinct midventral bristle. Mid basitarsus without distinctly enlarged ventral setae. Hind tibia with a distinct apicoventral seta.

WING. Slightly infusate. Elongate (length $2.5\text{--}2.6 \times$ width) and almost parallel-sided (alar surface reduced). CS2 essentially non-existent (R_{2+3} never contacts costa). R_{2+3} very short, straight, petering out in membrane; R_{4+5} straight, meeting costa at wing tip; costa ending at apex of R_{4+5} . Crossveins shifted towards wing base, about in-line with end of R_1 . M_1 sometimes present as a coloured pseudovein beyond dm-m; M_4 indistinct beyond dm-m. CuA+CuP weak and sinuate. Halter pale.

MALE ABDOMEN. T2–5 and S2–4 very weakly sclerotized, uniformly setose posteriorly. S5 asymmetrical (right side slightly projecting posteriorly), broad, simple with scattered small setae and longer posterolateral setae. Synsternite 6+7 usually very large, comprising $0.2\text{--}0.3 \times$ total abdominal length, S6+7 broadly and strongly fused to S8 dorsally. Epandrium saddle-shaped and uniformly setose; cercus small, strongly fused to and indistinct from epandrium, with two long setae, cerci fused together to form subanal plate. Hypandrium V-shaped, posterolateral arms strongly fused to anteromedial apodeme but not to the anteroventral corners of the epandrium. Surstylus stout, usually subtriangular with a small, inner median lobe, posteroventrally with two enlarged tooth-like setae and anteroventrally with two smaller thorn-like setae. Postgonite relatively simple, curved or sinuate. Phallapodeme very large (projecting into 4th abdominal segment), elongate and sinuate with tall dorsal and ventral margins; basiphallus stout, boxy with a large, sclerotized, L-shaped dorsal ejaculatory apodeme (Papp (1989) refers to this structure as the ejaculatory pump). Distiphallus stout, usually with a tubular, sclerotized base and a bulbous, membranous, apical part supported by numerous thinner sclerites.

FEMALE ABDOMEN. T2–5 and S2–5 largely desclerotized, sometimes almost indistinct. Abdomen slightly shorter than length of head + thorax. Postabdomen short, non-telescoping. T6–7 and S6–7 usually rectangular and long-setose in posterior half. T8 sometimes divided into two large, setulose, lateral sclerites. Epiproct indistinct. Cercus small. S8 usually large, microtomentose, and with several posteromedial setae. Hypoproct indistinct. Spermathecae (2+1 in two of the three species with known spermathecae, only one in *Pt. thaii*) subspherical to elongate and ovoid, lightly grooved, stem short and membranous; accessory gland large.

Distribution

Pterogrammoides includes one species known from India, three from Papua New Guinea, and one from Thailand.

Species descriptions (in alphabetical order)

***Pterogrammoides baloghi* Papp, 1972**

Figs 70–71

Pterogrammoides baloghi Papp, 1972: 105.

Pterogrammoides baloghi – Marshall 1989: 606. — Papp 1989: 329. — Roháček *et al.* 2001: 216.

Type material

Holotype

PAPUA NEW GUINEA • ♂; Wau; 25 Sep. 1969; J. Balogh leg.; litter with humus of decaying *Tradescantia* sp. on bank of small valley near Field Station, Berlese funnel; HNHM.

Paratypes

PAPUA NEW GUINEA • 1 ♂, 2 ♀♀; same collection data as for holotype; HNHM • 1 ♂; Beier River; 4 Sep. 1969; J. Balogh leg.; lower rooty horizon below litter near big trees on higher (not moist or marshy) ground of virgin forest, Berlese funnel; HNHM • 2 ♂♂; Keravat, near Rabaul; 12 Sep. 1969; J. Balogh leg.; mainly ginger litter in secondary (three years old) forest, Berlese funnel; HNHM • 1 ♂; Wau; 10 Sep. 1968; J. Balogh leg.; very moist litter without humus of big tree with pilose leaves in lateral depression of valley, Berlese funnel; HNHM • 3 ♂♂, 1 ♀; same collection data as for preceding; detritus and roots of hygrophilous vegetation on bank of stream in valley at Field Station, Berlese funnel; HNHM.



Fig. 70. *Pterogrammoides baloghi* Papp, 1972 (DEBU). **A.** Male habitus, lateral view. **B.** Male head, anterior view. **C.** Left wing. Scale bars: A, C = 0.50 mm; B = 0.25 mm.

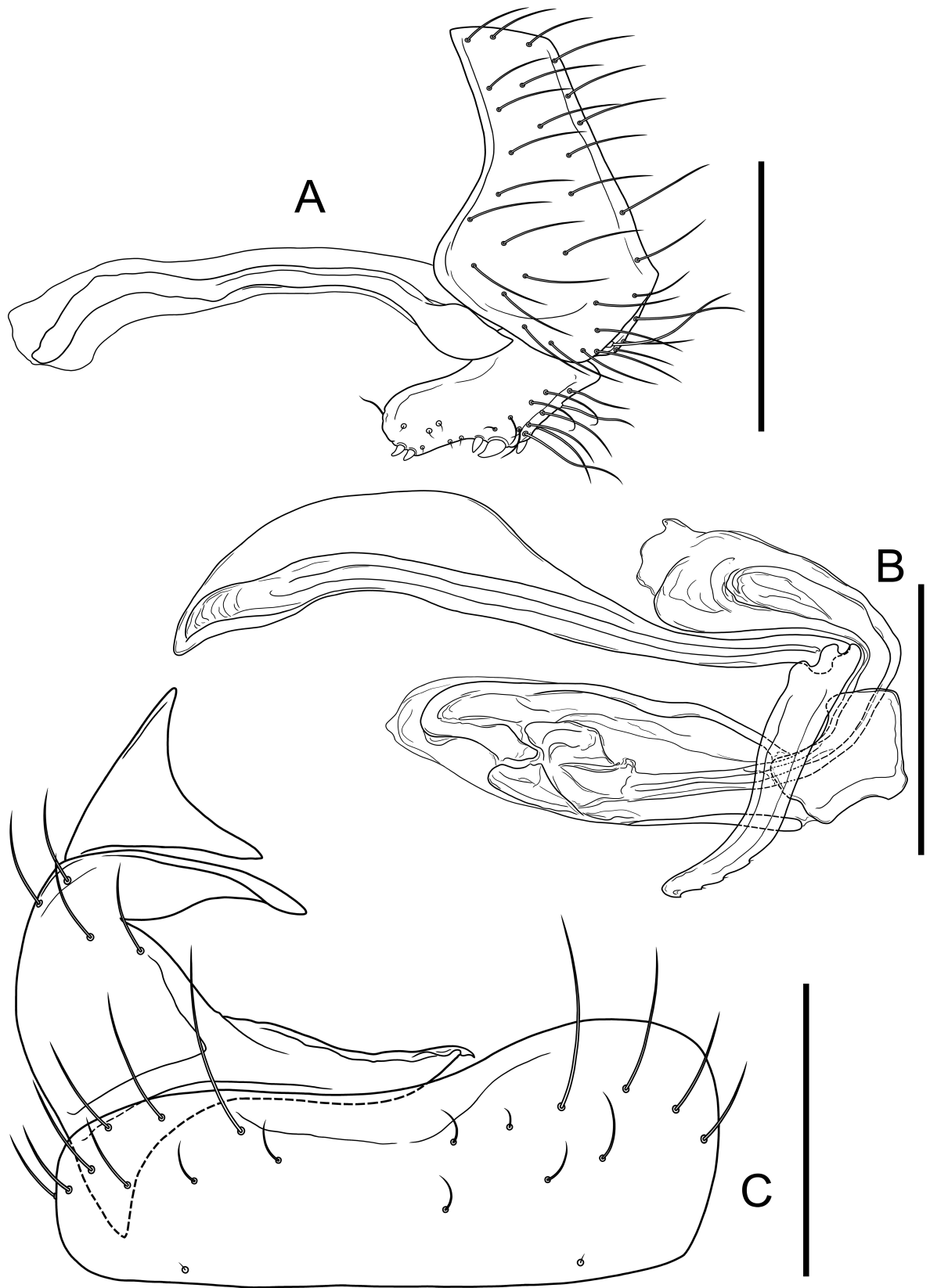


Fig. 71. *Pterogrammoides baloghi* Papp, 1972 (DEBU). **A.** Male epandrium, lateral view. **B.** Aedeagus and associated structures, lateral view. **C.** Male S5, S6+7, and S8, ventral view. Scale bars: A–C = 0.10 mm.

Material examined

PAPUA NEW GUINEA • 1 ♂; 19.3 km N of Wau; 400 m a.s.l.; 30 May 1974; S. Peck leg.; DEBU • 1 ♂; Wau; 1219 m a.s.l.; 29 Jun. 1974; S. Peck leg.; DEBU.

Distribution

Australasian/Oceanian: Papua New Guinea.

Remarks

Pterogrammoides baloghi is easily recognizable by its short wings (Fig. 70A,C). Wings of other species of *Pterogrammoides* extend beyond the apex of the abdomen.

Pterogrammoides indicus Papp, 1989

Pterogrammoides indica Papp, 1989: 330.

Pterogrammoides indicus – Roháček *et al.* 2001: 216.

Type material

Holotype

INDIA – **Meghalaya** • ♂; Garo Hills, Rongrengiri; 400 m a.s.l.; 3 Nov. 1978; C. Besuchet and I. Löbl leg.; “tamisage en forêt, au pied de grands arbres”; HNHM.

Paratype

INDIA – **West Bengal** • 1 ♂; Darjeeling District, Sukna; 200 m a.s.l.; 7 Oct. 1978; C. Besuchet and I. Löbl leg.; “tamisage en forêt”; HNHM.

Material examined

Paratype photo provided by Petra Szöllösi-Tóth, HNHM.

Distribution

Indomalayan: India (Papp 1989).

Remarks

Pterogrammoides indicus is almost identical to *Pt. thaii* but apparently has a slightly smaller S6+7 (1.3 × epandrial width) and a more J-shaped (bent in the apical third) postgonite.

Papp’s (1989) description and illustrations of *Pt. indicus* differ from *Pt. thaii* only in slight colour differences, slightly thinner legs, shorter wings, and apparently smaller overall genitalia. See comments under the latter species.

Pterogrammoides longipennis Papp, 1972

Pterogrammoides longipennis Papp, 1972: 108.

Pterogrammoides longipennis – Marshall 1989: 606. — Papp 1989: 334. — Roháček *et al.* 2001: 216.

Type material

Holotype

PAPUA NEW GUINEA • ♂; Baier River; 4 Sep. 1969; J. Balogh leg.; lower rooty layer below litter near big trees in higher (not moist or marshy) part of virgin forest; HNHM.

Material examined

Holotype photo provided by Petra Szöllősi-Tóth, HNHM.

Distribution

Australasian/Oceanian: Papua New Guinea (Papp 1972).

Remarks

While Papp (1989) reported examining a female specimen, he made no mention of any female characters in his additional notes on the species. *Pterogrammoides longipennis* is most similar to *Pt. baloghi* but has longer wings (extending beyond the tip of the abdomen), an apically setulose surstylus, and an apically serrate postgonite.

Pterogrammoides poecilosomus Papp, 1972

Pterogrammoides poecilosomus Papp, 1972: 107.

Pterogrammoides poecilosomus – Marshall 1989: 606. — Papp 1989: 335. — Roháček *et al.* 2001: 216.

Type material

Holotype

PAPUA NEW GUINEA • ♀; Mount Kumbak-ut; 28 Sep. 1968; J. Balogh leg.; in litter and rooty tangle with humus, accumulated in ditch along forest path near shelter hut in moss forest; HNHM.

Material examined

Holotype photo provided by Petra Szöllősi-Tóth, HNHM.

Distribution

Australasian/Oceanian: Papua New Guinea (Papp 1972).

Remarks

No other species of *Pterogrammoides* has a patterned thorax as in *Pt. poecilosomus* (all other species are unicolourous).

Pterogrammoides thaii Papp, 1989

Figs 72–73

Pterogrammoides thaii Papp, 1989: 336.

Pterogrammoides thaii – Roháček *et al.* 2001: 216.

Type material

Holotype

THAILAND – **Chanthaburi** • ♂; Khao Sabap National Park, near Phlin Waterfalls; 150–300 m a.s.l.; 23–24 Nov. 1986; D.H. Burckhardt and I. Löbl leg.; “tamisage de débris végétaux et de mousses à proximité de cours d’eau”; MHNG.

Paratype

THAILAND – **Phetchaburi** • 1 ♂; Kaeng Krachen National Park, 35 km from “Headquarters”; 450 m a.s.l.; 19 Nov. 1985; D.H. Burckhardt and I. Löbl leg.; “tamisage de débris végétaux dans la forêt”; HNHM.

Material examined

AUSTRALIA – Queensland • 1 ♂; 30 km S of Cooktown, Mount Finnigan slopes; 400 m a.s.l.; 1 Jul. 1982; S. and J. Peck leg.; rainforest litter and fungi; DEBU • 1 ♂, 3 ♀♀; same collection data as for preceding; 3 Jul. 1982; moist litter pockets; DEBU • 1 ♂, 1 ♀; Fitzroy Island, site 4; 15 m a.s.l.; 16°56' S, 145°59' E; 19–21 Apr. 1999; G.B. Monteith leg.; transition to rainforest, dung trap; QMBA • 2 ♂♂; Mossman Gorge National Park, 6 km SW of Mossman; 50 m a.s.l.; 11 Jul. 1982; S. Peck leg.; rainforest litter; DEBU.

Redescription

FEMALE ABDOMEN (Fig. 73). T3–5 completely indistinct, with only the posterior row of setae indicating their presence; S2–5 desclerotized but distinct. Abdomen $1.2\times$ length of head + thorax. T6 reduced, rectangular, desclerotized anteromedially and posteromedially with transverse medial row of six long setae; T7 well-developed, broad, rectangular with long posterolateral setae; T8 split into two large lateral plates with patch of setae in upper posterior corner. Epiproct membranous and indistinct with a pair of dorsal setae. Cercus stout, slightly flattened, with fine, sinuate apical and preapical setae. S6 rectangular, pale but distinct; S7 rectangular and slightly darker than S6, with posterior row of setae; S8 large,

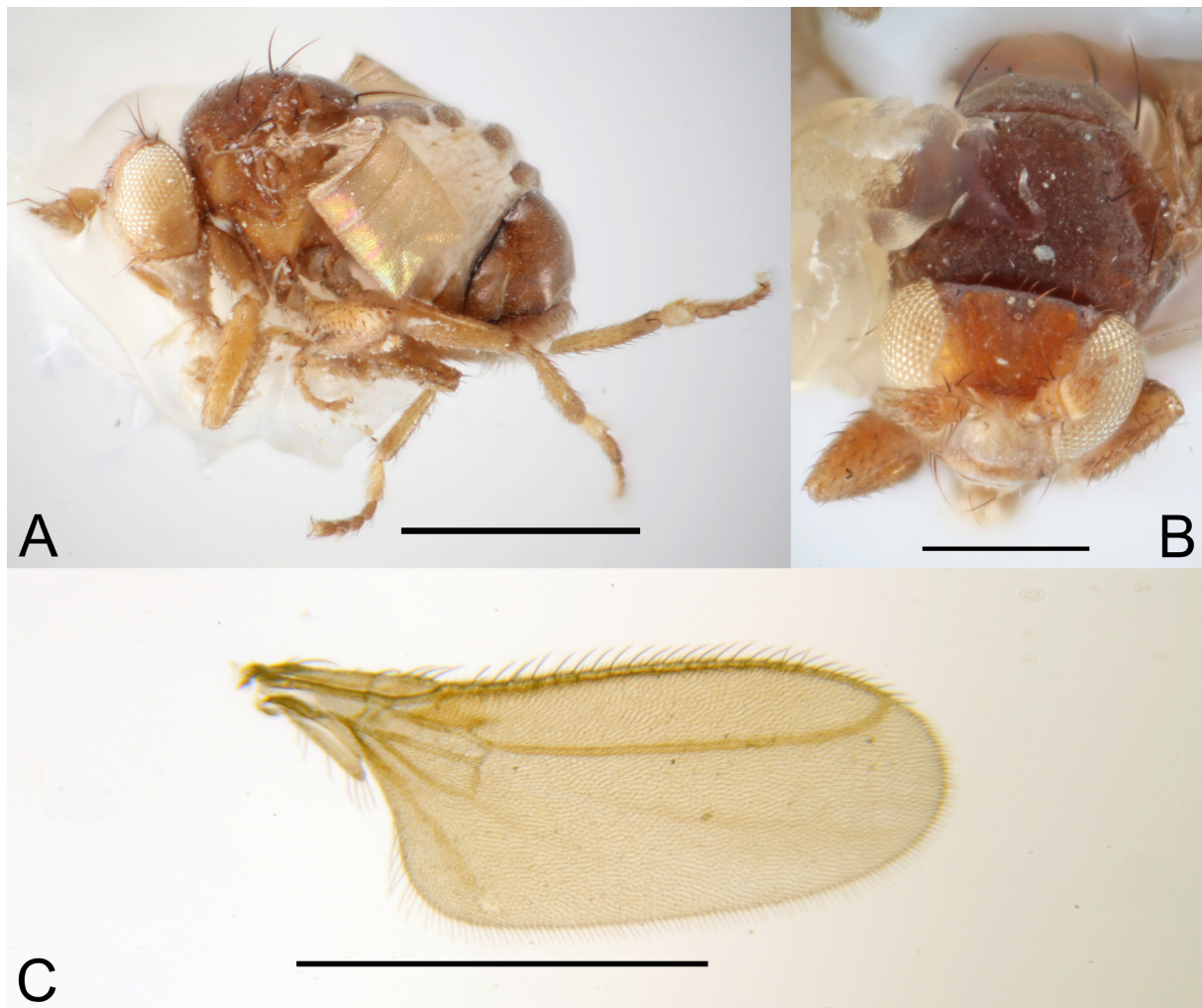


Fig. 72. *Pterogrammoides thalii* Papp, 1989. A. Male habitus, lateral view (debu00157157, QMBA). B. Male head, anterior view (debu00157157, QMBA). C. Left wing (DEBU). A, C = 0.50 mm; B = 0.25 mm.

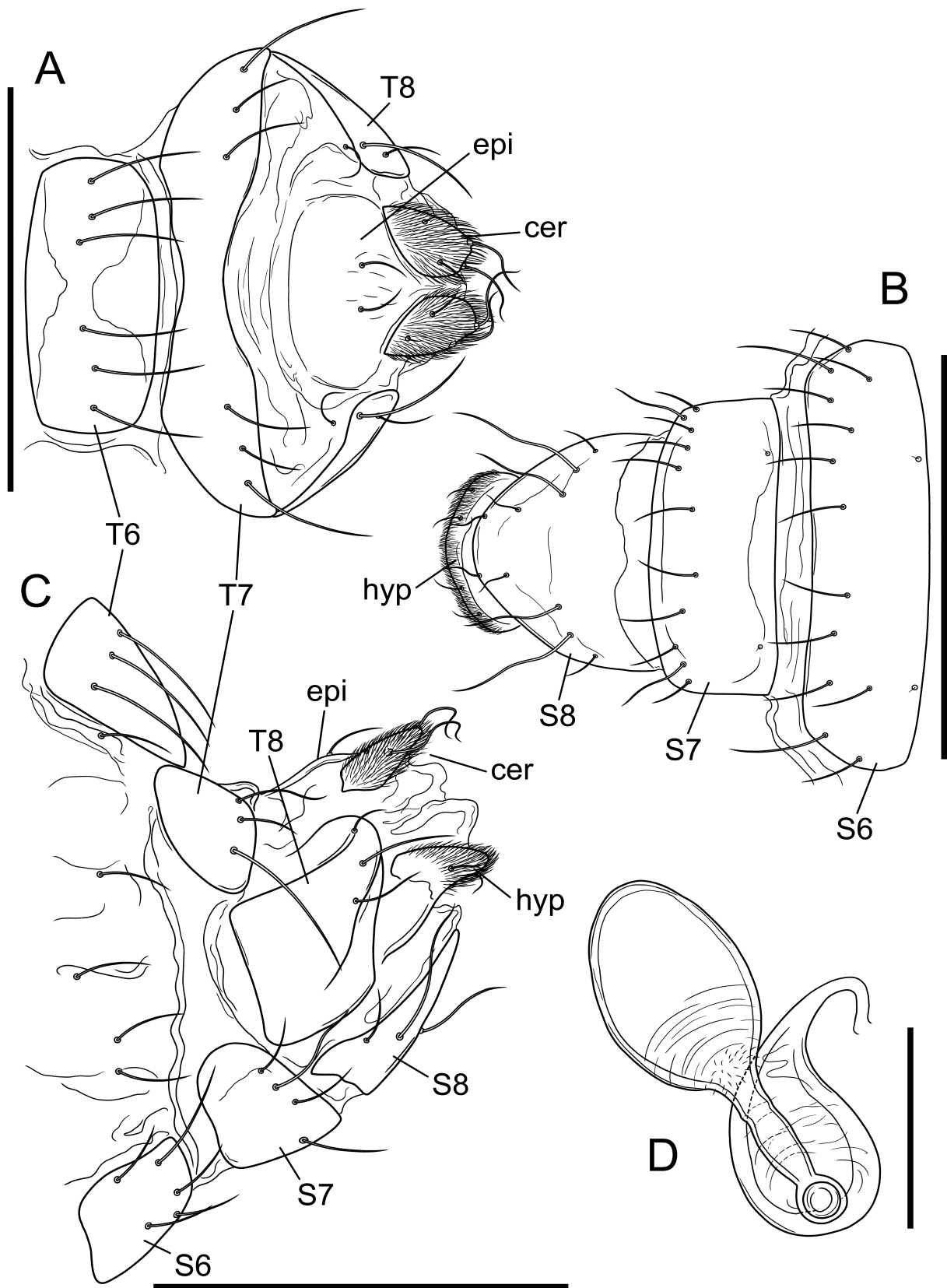


Fig. 73. *Pterogrammoides thaii* Papp, 1989 (DEBU). **A.** Female terminalia, dorsal view. **B.** Female terminalia, ventral view. **C.** Female terminalia, lateral view. **D.** Spermatheca. Abbreviations: cer = cercus; epi = epiproct; hyp = hypoproct. Scale bars: A–C = 0.30 mm; D = 0.01 mm.

subtriangular, with more anterior row of larger setae and two posterior rows of smaller setae. Hypoproct reduced, largely membranous with posterior row of small setae. Spermatheca (only one present) very large, ovoid and lightly grooved basally, stem elongate and smoothly tapered with ringlets of minute spinules apically.

Distribution

Australasian/Oceanian: Australia (**new record**). Indomalayan: Thailand (Papp 1989).

Remarks

Papp's (1989) description and illustrations of *Pt. thaii*, based on males only, are almost identical to those for *Pt. indicus* (still known only from males), with the only differences noted being colouration, slightly thicker legs, longer wings, and larger overall genitalia. No illustrations or description of the male genitalia are given here as the figures in Papp (1989) are adequate, but the previously unknown female abdomen of *Pt. thaii* is described. *Pterogrammoides thaii* is newly recorded from Australia.

Discussion

The *Parapterogramma* genus group includes widespread genera of the tropical rainforests of the Indomalayan and Australasian/Pacific Regions, with the highest diversity found in Fiji. Interestingly, no specimens of the *Parapterogramma* genus group are known from New Zealand, even though the country's sphaerocerid fauna has been thoroughly sampled by SAM. Prior to this revision, the genus *Parapterogramma* was known from a single species and *Pseudopterogramma* was known from five species. *Parapterogramma* now includes 17 species, including the three species formerly placed in *Minialula*; *Pseudopterogramma* now includes 11 species, including the species formerly placed in *Archipterogrammoides*. The vast majority of known *Parapterogramma* and *Pseudopterogramma* specimens have been collected in Australia and Fiji, though this may simply represent more thorough collecting efforts in these countries. Given the distribution of both genera, it is likely that there are still more unknown species of *Parapterogramma* and *Pseudopterogramma* throughout the Indomalayan and Pacific Regions.

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