



## Notes on *Manota* Williston (Diptera: Mycetophilidae) from Australia and Papua New Guinea, with description of two new species

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### Abstract

Two new species, *Manota williamsi* **sp. n.** and *Manota kerri* **sp. n.**, are described from Australia and Papua New Guinea, respectively. The former represents the second *Manota* species recorded from continental Australia. Characterised by setose anepisternum and non-setose laterotergite, *M. williamsi* is similar to *M. gemella* Hippa, 2007, but the presence of the mid tibial organ would group it together with five species from New Zealand. *Manota kerri* resembles *M. alulata* Kurina & Hippa, 2015 in having a bilobed gonostylus and sternite 9 entirely fused with the gonocoxa, but differs by other details of the hypopygium. New records of *M. subspathula* Hippa, 2007 from Australia and Papua New Guinea, and *M. biungulata* Hippa, 2007, *M. evexa* Hippa 2007, *M. hamulata* Colless, 1966, *M. perissochaeta* Hippa, 2007 and *M. serawei* Hippa, 2007 from Papua New Guinea are presented.

**Key words:** Sciaroidea, *Manota*, fungus gnats, South Pacific, taxonomy, new species

### Introduction

The genus *Manota* Williston (type species *Manota defecta* Williston) owns an almost cosmopolitan distribution, with a huge species richness particularly in tropical areas. Altogether 300 species of *Manota* are so far known all over the world, which however, represents only a portion of the actual diversity (see Kurina *et al.* 2018 and references therein). In addition to the tropical speciosity of the genus, there are 18 species recorded from temperate Holarctic areas (Jaschhof *et al.* 2011; Hippa & Saigusa 2016). The species have a uniform appearance throughout the genus, characterized by yellow to brownish coloration, small size, humpbacked habitus and reduced wing venation (cf. Fig. 1A). Species-specific features are exclusively at the morphology of the male terminalia. Monophyly of the genus has been established by morphological and molecular data (Hippa *et al.* 2005, Ševčík *et al.* 2013).

The Australian-Oceanian fauna of the genus was reviewed by Kurina & Hippa (2015), including records of 37 species. The island of New Guinea is the most intensively studied area in the region so far, with 24 recorded species, five of them known to be more widely distributed in the southern Pacific. However, there are available data only from the eastern part of the island, i.e., from Papua New Guinea. One species—*Manota subspathula* Hippa, 2007—has so far been recorded from the continental Australia (Kurina & Hippa 2015), but according to Jaschhof and Jaschhof (2010), an unnamed species has also been found from Queensland.

The current paper is prompted by the discovery of two new *Manota* species, one from New South Wales, Australia, and one from Papua New Guinea. Alongside that, new records are added of six previously described species.

## Material and methods

A total of 241 male specimens from Australia and Papua New Guinea were studied. In the Australian continent, most of the material was collected from Carrai and Werrikimbe Plateaus, both in New South Wales (NSW), during the tree trunk invertebrate survey by sticky traps on *Eucalyptus* species (for details see Bickel and Tasker 2004). These sticky trap samples were studied earlier by Kurina and Oliveira (2013) working on fungus gnat material of *Cordyla* Winnertz that resulted in description of a new species—*C. australica* Kurina & Oliveira. In addition, several specimens were collected by Malaise traps from: (1) Lorient Wildlife Refuge and Conservation Area (in NSW), dominated by lowland rainforest and wet sclerophyll forest; and (2) coastal rainforest of Sea Acres National Park (in NSW). The Papua New Guinean material was collected mostly from lowland rainforest of Madang, Gulf and Morobe provinces. Some specimens were collected during a biodiversity survey on a transect of Mt Wilhelm (see Bickel & McEvey 2014; Leponce *et al.* 2016).

All specimens were initially preserved in ethyl alcohol. A substantial proportion of the specimens were identified under a stereomicroscope in alcohol without any slide-mounting, especially those collected by sticky traps from Carrai and Werrikimbe Plateaus. That material was partially damaged and is not included in the type material, but referred to as additional material studied. The slide-mounting followed the procedure described in our earlier papers (e.g. Hippa & Kurina 2012; Kurina *et al.* 2017).

The morphological terminology follows mainly Söli *et al.* (2000), while the term “parasegment” is used according to Jaschhof & Hippa (2005). The terminology of the hypopygium follows Hippa & Papp (2007) except for the tegmen, which is referred to here as the aedeagus. The terminology of the hypopygium is also explained in Fig. 2. The mid and hind tibial organs are areas of tightly distributed setae on the tibiae basoventrally and apicoventrally, respectively (Jaschhof & Jaschhof 2010; Jaschhof *et al.* 2011). Wing length was measured from wing base to wing tip. Description of colour was made from specimens on slides under a stereomicroscope. Illustrations were made with the aid of a drawing tube attached to a Leitz Diaplan compound microscope. The slide mounting was done under a Leica S8APO stereomicroscope, and a compound microscope Leica DM 6000 B was used for identification of species. The habitus and male hypopygium photos were combined using the software LAS V.4.5.0. from multiple gradually focused images taken by a Leica DFC 450 camera attached to a Leica 205C stereomicroscope or Leica DM 6000 B compound microscope, respectively (see also Kurina *et al.* 2015).

The material is deposited in the following collections:

AMSA	Australian Museum, Sydney, Australia
IZBE	Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences [former Institute of Zoology and Botany], Tartu, Estonia
MZUSP	Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil
RBINS	Royal Belgian Institute of Natural Sciences, Brussels, Belgium

## The new species

### *Manota williamsi* sp. n.

Figs 1A–C, 2A–F

Male. **Colour.** Head brown, face somewhat paler. Antenna light brown, including scape and pedicel. Clypeus and mouthparts yellowish. Thorax brown to dark brown, medial part of scutum and scutellum somewhat darker due to their curvature on slide. Legs yellowish, mid- and hind femora basally infuscated. Wing with brownish tinge because of microtrichia; halter mostly yellow, with blackish knob. Abdomen brown to dark brown, tergites laterally and sternites lighter. All setosity pale, yellowish or brownish, thicker setae darker than finer ones. **Head.** Fourth antennal flagellomere 1.0–1.2 times as long as wide. Palpomere 3 of maxillary palpus with apicomeres thumb-like extension, with 3 curved apical sensillae; palpomere 4 with parasegment; palpomere 5 ca. 1.5 times longer than palpomere 4. Number of strong postocular setae 11. **Thorax.** Anepisternum with 11–17 setae; anterior basalare and laterotergite non-setose; preepisternum 2 with 11–18 setae; metepisternum with 19–28 setae. **Legs.** Mid tibial organ present, extending over about one third of tibial length (Fig. 1B). Hind tibial organ absent. **Wing.** R<sub>1</sub> meeting C

within basal half of costal margin; sclerotized part of  $M_2$  extending to level of tip of  $R_1$ ; wing length 1.8–2.1 mm. **Hypopygium** (Figs. 1C, 2A–F). Sternite 9 tapering, laterally free from gonocoxa, posteriorly blunt, extending to about middle between the bases of gonocoxa and gonostylus, anterior margin with deep and narrow V-shaped medial incision dividing sternite almost into two halves, anterior part non-setose, setae on posterior part similar to those on ventral side of gonocoxa. Parastylar lobe small, finger-like, with 2–3 setae apically. Paraapodemal lobe not observed. Ventral and dorsal medial margins of gonocoxa simple, both slightly bulging medially. Ventrally from dorsal medial margin of gonocoxa an anterior finger-like lobe with 5–6 apical setae and a large posterior lobe that is posteromedially drawn out, bearing ca. 30 apically curved setae. Dorsal setae on anterior half of gonocoxa similar to those on ventral side; dorsal setae on posterior half of gonocoxa somewhat longer. Two juxtagonostylar setae present, a flattened, sub-apically geniculate megaseta, with a sub-apical medially directed whip-like branch and a weak and shorter normal seta, both arising from a common basal body shorter than the megaseta. Gonostylus elongate-oval, setigerous, with 1–2 sub-apical, medially directed stronger setae. Aedeagus wide, with prominent lateral shoulders, apex curved ventrad. Hypoproct posteriorly extending near base of gonostylus, ventral part (sternite 10) with ca. 40 scattered setae on each half. Cerci medially separate, elongated, apically widening, with setae apically and medially.

Female. Unknown.

**Etymology.** The species is named after Geoff Williams, the owner of Lorient Wildlife Refuge and Conservation Area, northeast of Taree, New South Wales. Geoff Williams is an authority on the natural history of the northern New South Wales, and has been recognized nationally for his service to conservation as an ecologist, biologist, author and wildlife refuge custodian.

**Discussion.** In having a setose anepisternum and a non-setose laterotergite, *Manota williamsi* sp. n. resembles *M. gemella* Hippa, 2007 (from Maluku Ultra, Indonesia) — into which it would run in the key by Hippa (2007). However, it differs in details of the male hypopygium as follows: (1) dorsal medial margin of gonocoxa with anterior finger-like lobe and large posterior lobe at a more ventral level (with small subapical lobe only in *M. gemella*); (2) juxtagonostylar megaseta flattened, with a subapical, medially directed whip-like branch (simple, without branch in *M. gemella*); (3) gonostylus elongate-oval, with 1–2 sub-apical setae stronger (with two small medial lobes in *M. gemella*); (4) hypoproct wide, with ca. 40 scattered ventral setae on each half (narrow, with ca. 8 ventral setae on each half); (5) aedeagus wide, with prominent lateral shoulders (narrow with weak lateral shoulders in *M. gemella*). The presence of the mid tibial organ in *M. williamsi* resembles the group of five species from New Zealand (cf. Jaschhof & Jaschhof 2010). Some characters in the male hypopygium of *M. williamsi* are also typical to the New Zealand species, e.g., sternite 9 laterally free from the gonocoxa and dorsal medial margin of the gonocoxa with anterior and posterior lobes (= positions I and II by Jaschhof & Jaschhof 2010). However, *M. williamsi* has the gonostylus elongate-oval without lobes, instead of being composed of several lobes as in New Zealand's species. The similarities between *M. williamsi* and the New Zealand species could be homoplastic, although a similar distribution pattern is known from some other sciaroid groups, e.g., the keroplatid genus *Arachnocampa* Edwards (Baker *et al.* 2008).

**Type material.** *Holotype. Male*, AUSTRALIA, N.S.W., Carrai State Forest, 30°54'33"S 152°16'26"E, 1075m, E. Tasker 3.xii–8.xii.1997, sticky trap on *Eucalyptus saligna*, CS-CR-127-2 (on slide, AMSA: K377226). *Paratypes. 1 male*, AUSTRALIA, N.S.W., Taree, Lorient Wildlife Refuge, 3 Km N of Landsdowne, sclerophyll forest, Malaise trap, 1–14.xi.2011, 31° 45' 04" S, 152° 32' 03" E. G. & B. Williams col. (on slide # 5, MZUSP); **1 male**, same data except 14–31.xii.2011 (on slide # 4, MZUSP); **1 male**, same data except 17.i–4.ii.2012 (on slide # 6, MZUSP); **1 male**, AUSTRALIA, N.S.W., Carrai State Forest, 30°54'35"S 152°16'26"E, 1090m, 3.xii–8.xii.1997, sticky trap on *Eucalyptus obliqua* E. Tasker leg., CC-FK-127-3 (AMSA: K377230); **2 males**, AUSTRALIA, N.S.W., Carrai State Forest, 31°00'19"S 152°16'24"E, 940m; E. Tasker 3.xii–8.xii.1997; sticky trap on *Eucalyptus campanulata*, CS-GP-127-3 (on slides, AMSA: K377228); **1 male**, AUSTRALIA, N.S.W., E. Kunderang Rd OWRNP, 30°49'19"S 152°02'9"E, 6.xi–14.xi.2015, 850 m, pitfall trap SR1 (open eucalypt forest on ridge, westerly aspect), Bray, Lamb, Nzama & Smith leg., (on slide, AMSA: K379411).

**Additional material studied** (all in alcohol). **5 males**, AUSTRALIA, N.S.W., Carrai State Forest, 31°54'19"S 152°17'36"E, 1055m, 3.xii–8.xii.1997, sticky trap on *E. cameronii*, E. Tasker leg., CS-DP-127-6 (AMSA: K377135); **1 male**, same data except 30°54'33"S 152°16'28"E, 1075m, sticky trap on *E. campanulata*, CC-CR-127-6 (K377206, in AMSA); **2 males**, same data except CC-CR-127-5 (AMSA: K377208); **1 male**, same data except 30°54'35"S 152°16'26"E, 1090m, sticky trap on *E. campanulata*, CC-FK-127-2 (AMSA: K377209);

**3 males**, same data except 30°54'19"S 152°17'36"E, 1055m, sticky trap on *E. obliqua*, CS-DP-127-5 (AMSA: K377210); **2 males**, same data except 30°59'45"S 152°16'23"E, 930m, 11.i–16.i.1998; sticky trap on *E. campanulata*, CS-FZ-018-4 (AMSA: K377211); **3 males**, same data except 31°00'19"S 152°16'24"E, 940m, CS-GP-018-6 (AMSA: K377213); **3 males**, same data except 3.xii–8.xii.1997, CS-GP-127-6 (AMSA: K377212); **2 males**, same data except 30°59'45"S 152°16'23"E, 930m, 3.xii–8.xii.1997, sticky trap on *E. saligna*, CS-FZ-127-1 (AMSA: K377215); **1 male**, same data except CS-FZ-127-2 (AMSA: K377218); **3 males**, same data except 30°0'19"S 152°16'24"E, 940m, 3.xii–8.xii.1997, sticky trap on *E. campanulata*, CS-GP-127-1 (AMSA: K377221); **2 males**, same data except 30°58'48"S 152°17'0"E, 975m, sticky trap on *E. obliqua*, CS-RO-127-5 (AMSA: K377223); **3 males**, same data except 30°54'33"S 152°16'26"E, 1075m, sticky trap on *E. campanulata*, CS-CR-127-2 (AMSA: K377226); **3 males**, same data except 30°58'48"S 152°17'6"E, 975m, sticky trap on *E. viminalia*, CS-RO-127-1 (AMSA: K377229); **2 males**, same data except 30°54'35"S 152°16'26"E, 1090m, sticky trap on *E. campanulata*, CC-FK-127-6 (AMSA: K377231); **3 males**, same data except 30°54'19"S 152°17'36"E, 1055m, 11.i–16.i.1998, sticky trap on *E. campanulata*, CC-DP-018-2 (AMSA: K377232); **1 male**, same data except 30°54'19"S 152°17'36"E, 1055m, sticky trap on *E. obliqua*, CC-DP-018-4 (AMSA: K377235); **2 males**, same data except 30°58'48"S 152°17'6"E, 975m, sticky trap on *E. campanulata*, CS-RO-018-2 (AMSA: K377236); **1 male**, same data except 30°58'48"S 152°17'36"E, 975m, sticky trap on *E. obliqua*, CS-RO-018-5 (AMSA: K377239); **2 males**, same data except 30°58'48"S 152°17'6"E, 975m, sticky trap on *E. campanulata*, CS-RO-018-1 (AMSA: K377243); **1 male**, same data except 31°00'19"S 152°16'24"E, 940m, sticky trap on *E. campanulata*, CS-GP-018-5 (AMSA: K377244); **1 male**, same data except 30°59'45"S 152°16'23"E, 930m, sticky trap on *E. saligna*, CS-FZ-018-3 (AMSA: K377246); **1 male**, same data except 30°54'33"S 152°16'28"E, 1075m, sticky trap on *E. campanulata*, CC-CR-018-1 (AMSA: K377250); **1 male**, same data except 30°59'45"S 152°16'23"E, 930m, sticky trap on *E. saligna*, CS-FZ-018-5 (AMSA: K377252); **2 males**, same data except 30°58'48"S 152°17'6"E, 975m, sticky trap on *E. obliqua*, CS-RO-018-4 (AMSA: K377256); **1 male**, same data except 30°59'45"S 152°16'23"E, 930m, sticky trap on *E. campanulata*, CS-FZ-018-6 (AMSA: K377257); **1 male**, same data except 31°00'19"S 152°16'24"E, 940m, sticky trap on *E. saligna*, CS-FZ-018-3 (AMSA: K377258); **3 males**, same data except 30°59'45"S 152°16'23"E, 930m, sticky trap on *E. saligna*, CS-FZ-018-1 (AMSA: K377264); **2 males**, same data except 30°59'45"S 152°16'23"E, 930m, sticky trap on *E. campanulata*, CS-FZ-018-2 (AMSA: K379008); **2 males**, same data except 30°54'33"S 152°16'26"E, 1090m, sticky trap on *E. campanulata*, CC-FK-018-1 (AMSA: K379010); **3 males**, same data except 30°54'33"S 152°16'28"E, 1075m, 3.xii–8.xii.1997, sticky trap on *E. obliqua*, CC-CR-127-3 (AMSA: K377248); **2 males**, same data except CC-CR-127-4 (AMSA: K377249); **2 males**, same data except 30°58'48"S 152°17'6"E, 975m, sticky trap on *E. viminalia*, CS-RO-127-3 (AMSA: K377251); **1 male**, same data except 30°54'35"S 152°16'26"E, 1090m, sticky trap on *E. obliqua*, CC-FK-127-9 (AMSA: K379013); **3 males**, same data except 30°58'48"S 152°17'6"E, 975m, sticky trap on *E. viminalia*, CS-RO-127-2 (AMSA: K379016SA); **1 male**, same data except 31°00'19"S 152°16'24"E, 940m, sticky trap on *E. saligna*, CS-GP-127-2 (AMSA: K379017); **2 males**, same data except 30°59'49"S 152°16'23"E, 930m, sticky trap on *E. campanulata*, CS-FZ-127-3 (AMSA: K379105); **6 males**, same data except 30°54'33"S 152°16'28"E, 1075m, sticky trap on *E. obliqua*, CS-CR-127-1 (AMSA: K379106); **2 males**, same data except 30°54'19"S 152°17'36"E, 1055m, sticky trap on *E. campanulata*, CC-DP-127-4 (AMSA: K379107); **5 males**, same data except 31°00'19"S 152°16'24"E, 940m, sticky trap on *E. saligna*, CS-GP-127-5 (AMSA: K379110); **5 males**, same data except 30°58'48"S 152°17'6"E, 975m, sticky trap on *E. campanulata*, CS-RO-127-6 (AMSA: K379111); **2 males**, N.S.W., Werrikimbe NP 31°16'42"S 152°5'5"E, 1040m; E. Tasker 1.xii–7.xii.1997; sticky trap on *E. obliqua*, WS-GB-127-4 (AMSA: K377207); **1 male**, same data except 31°16'50"S 152°3'19"E, 1045m, sticky trap on *E. viminalis*, WS-FC-127-4 (AMSA: K377216); **1 male**, same data except 31°16'42"S 152°5'6"E, 1040m, sticky trap on *E. campanulata*, WS-GB-127-5 (AMSA: K377220); **3 males**, same data except 31°16'50"S 152°3'19"E, 1045m, WS-FC-127-1 (AMSA: K377222); **2 males**, same data except 31°11'24"S 152°9'39"E, 1030m, 29.i–4.ii.1998, sticky trap on *E. nobilis*, WC-WT-018-5 (AMSA: K377225); **4 males**, same data except 31°16'50"S 152°3'19"E, 1045m, 3.xii–7.xii.1997, sticky trap on *E. saligna*, WC-FC-127-6 (AMSA: K377227); **4 males**, same data except 31°11'56"S 152°10'23"E, 1025m, 29.i–4.ii.1998, sticky trap on *E. saligna*, WC-WN-018-03 (AMSA: K377233); **3 males**, same data except 31°11'24"S 152°9'39"E, 1030m, sticky trap on *E. obliqua*, WC-WT-018-04 (AMSA: K377234); **2 males**, same data except 31°11'56"S 152°10'23"E, 1025m, sticky trap on *E. campanulata*, WS-WIN-018-06 (AMSA: K377237); **2 males**, same data except 31°16'42"S 152°5'5"E, 1040m, sticky trap on *E. dives*, WS-GB-018-06 (AMSA: K377238); **1 male**, same data except 31°16'50"S

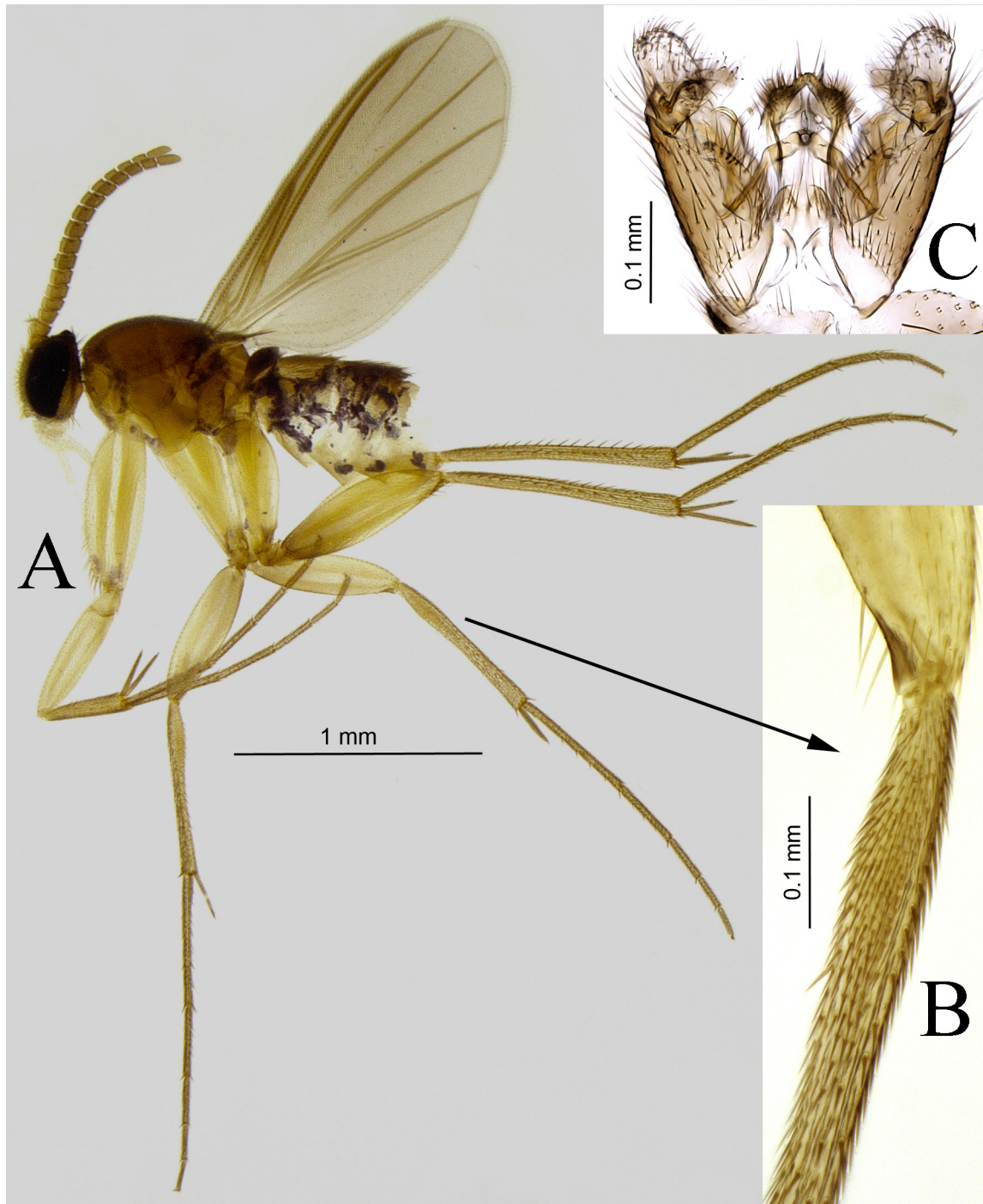
152°3'19"E, 1045m, sticky trap on *E. campanulata*, WS-FC-018-1 (AMSA: K377240); **3 males**, same data except 31°12'0"S 152°9'0"E, 1060m, sticky trap on *E. obliqua*, WC-MR-018-2 (AMSA: K377241); **8 males**, same data except 31°10'23"S 152°9'46"E, 1060m, sticky trap on *E. campanulata*, WS-KF-018-4 (AMSA: K377242); **3 males**, same data except 31°10'23"S 152°9'45"E, 1060m, sticky trap on *E. obliqua*, WC-KF-018-2 (AMSA: K377245); **3 males**, same data except 31°12'0"S 152°9'0"E, 1060m, sticky trap on *E. nobilis*, WC-MR-018-6 (AMSA: K377247); **2 males**, same data except 31°16'42"S 152°5'5"E, 1040m, sticky trap on *E. obliqua*, WS-GB-018-1 (AMSA: K377253); **2 males**, same data except 31°12'0"S 152°5'5"E, 1060m, sticky trap on *E. obliqua*, WS-GB-018-1 (AMSA: K377254); **2 males**, same data except 31°10'23"S 152°9'45"E, 1060m, sticky trap on *E. obliqua*, WS-KF-018-5 (AMSA: K377255); **14 males**, same data except 31°11'24"S 152°9'39"E, 1030m, sticky trap on *E. campanulata*, WS-WT-018-1 and WS-WT-018-3 (AMSA: K377259, K377260); **2 males**, same data except 31°12'0"S 152°9'0"E, 1060m, sticky trap on *E. campanulata*, WC-MR-018-3 (AMSA: K377261); **4 males**, same data except 31°11'56"S 152°10'23"E, 1025m, sticky trap on *E. campanulata*, WC-WIN-018-3 (AMSA: K377262); **5 males**, same data except 31°10'23"S 152°9'45"E, 1060m, sticky trap on *E. campanulata*, WS-KF-018-3 (AMSA: K377263); **1 male**, same data except 31°10'23"S 152°9'45"E, 1060m, sticky trap on *E. nobilis*, WS-KF-018-6 (AMSA: K377265); **1 male**, same data except 31°16'50"S 152°3'19"E, 1045m, sticky trap on *E. obliqua*, WS-FC-018-2 (AMSA: K379011); **2 males**, same data except 31°16'42"S 152°5'5"E, 1040m, sticky trap on *E. dives*, WS-GB-018-4 (AMSA: K379015); **5 males**, same data except 31°16'50"S 152°3'19"E, 1045m, 1.xii–7.xii.1997, sticky trap on *E. campanulata*, WS-FC-127-3 (AMSA: K379104); **4 males**, same data except 31°16'50"S 152°3'19"E, 1045m, 1.xii–7.xii.1997, sticky trap on *E. saligna*, WS-FC-127-5 (AMSA: K379108); **1 male**, Werrikimbe NP, Gunny Bag, 31°16'42"S 152°5'6"E, 1040m, E. Tasker & R. German 29.i–4.ii.1998, sticky trap, WS-GB-018-2 (AMSA: K379012).

### *Manota kerri* sp. n.

Figs 3A–D

**Male. Colour.** Head dark brown, face somewhat paler. Antenna light brown, including scape and pedicel. Clypeus and mouthparts pale yellowish. Thorax brown. Legs yellowish, except hind femora infuscated basally and light brown at apical fourth. Wing with brownish tinge because of microtrichia; halter yellow with blackish knob. Abdomen dark brown, sternites lighter. All vestiture pale, yellowish or brownish, thicker setae darker than finer ones. **Head.** Fourth antennal flagellomere 1.4 times as long as wide. Palpomere 3 of maxillary palpus with apicomeresial thumb-like extension, with 2 curved apical sensillae; palpomere 4 without parasegment; palpomere 5 ca. 1.6 times longer than palpomere 4. Number of strong postocular setae 11. **Thorax.** Anepisternum with 35 setae, anterior basallare with 9 setae, laterotergite with 35 setae, preepisternum 2 with 5 setae, metepisternum with 11 setae. **Legs.** Mid and hind tibial organs absent. **Wing.**  $R_1$  meeting C within basal half of costal margin; sclerotized part of  $M_2$  almost extending to level of tip of  $R_1$ ; wing length 1.6 mm. **Hypopygium** (Figs 3A–D). Sternite 9 entirely fused with gonocoxa laterally, posterior margin smoothly convex, anterior margin with wide and shallow V-shaped incision, and with unmodified setae, similar throughout sternite 9 and gonocoxa. Parastylar lobe large, plate-like, posterolaterally drawn out, with two strong setae at posteromedial corner. Paraapodemal lobe not observed. Dorsal medial margin of gonocoxa concave, basal third bulging medially, apically forming a right-angled lobe with dorsal posterior margin of gonocoxa. Dorsal medial margin of gonocoxa medially with a sub-globular lobe bearing ca. 10 strong, apically bent setae at posterior margin. Setae on dorsal side of gonocoxa similar to those on ventral side. One juxtagonostylar seta present as a flame-shaped, apically pointed megaseta arising from basal body that is shorter than megaseta. Gonostylus about half the length of gonocoxa, bilobed, with sub-quadrangular, apically emarginated ventral lobe and a small, hump-like more dorsal lobe; former lobe with a very long apical seta at lateral corner, a shorter apical seta at medial corner, three additional strong setae at the lateral and apical margins, and with a basolateral convexity bearing ca. 10 setae; dorsal lobe with six setae strong and apically curved. Aedeagus elongate, sub-triangular, swollen sub-apically, apex curved ventrad. Hypoproct posteriorly extending near apex of gonostylus, ventral part (sternite 10) with ca. 15 scattered setae on each half. Cerci medially separate, setae separated into apical and dorsomedial groups.

Female. Unknown.



**FIGURE 1.** *Manota williamsi* sp. n. (paratype: # 6, MZUSP). **A.** Habitus, lateral view, last segments of abdomen including the hypopygium detached. **B.** Midtibial organ. **C.** Hypopygium, dorsal view.

**Etymology.** The species is named after Dr. Peter Kerr (California Department of Food & Agriculture, Sacramento), who made available to us most of the material from Papua New Guinea, including the holotype of this species.

**Discussion.** Following the key by Hippa (2007), *Manota kerri* sp. n. runs into couplet 8 and belongs to a group of five Oceanian species—*M. alulata* Kurina & Hippa, 2015, *M. hirsuta* Hippa, 2007, *M. lunata* Kurina & Hippa, 2015, *M. spathula* Hippa, 2007, and *M. subspathula* Hippa, 2007—that have setose anepisternum, anterior basalare and laterotergite, and sternite 9 very large, with at least its anterior part laterally fused to the gonocoxa (see also discussion in Kurina & Hippa 2015: 262). Among them, *M. kerri* resembles more closely *M. alulata*, in having the gonostylus bilobed, not elongated, and sternite 9 entirely fused to the gonocoxa. *Manota kerri* differs from *M.*



*alulata* in having: (1) posterior margin of sternite 9 smoothly convex (with sub-medial incisions in *M. alulata*); (2) the parastylar lobe large, plate-like, posterolaterally drawn out, with two strong setae at the posteromedial corner (bipartite, with a finger-like dorsomedial part in *M. alulata*); (3) the juxtagonostylar megaseta flame-shaped (simple in *M. alulata*); (4) ca. 10 strong setae on the sub-globular lobe ventrally from the dorsal medial margin of the gonocoxa apically bent at right angles and arranged at margin (*M. alulata* has ca. 17 strong, apically straight setae, arranged across the dorsal surface of the sub-globular lobe); (5) gonostylus with the ventral lobe apically blunt, somewhat emarginated (ventral lobe of the gonostylus apically tapering in *M. alulata*); and (6) aedeagus sub-apically swollen (apical half tapering, basal half with membranous lateral lobe in *M. alulata*).

**Type material.** Holotype. **Male**, PAPUA NEW GUINEA: Madang Prov., Wanang Cons. Area, hilltop clearing in forest behind Swire Research Station 172 masl, 5°13.682'S 145°4.752'E Malaise Trap, 17–22.xi.2015, coll. N. von Ellenrieder & R.W. Garrison CSCA16L013 (on slide, IZBE).

## New records

### *Manota biunculata* Hippha, 2007

**Material.** PAPUA NEW GUINEA. **2 males**, Madang Prov., Ohu Village Res., primary forest going down from Village to Wadub R., 124 masl, 5,2216°S 145,6804°E Malaise Trap, 15–27.xi.2015, coll. N. von Ellenrieder & R.W. Garrison, FFP15PNG06 (on slides, IZBE); **1 male**, Gulf: Ivimka Res. Station, Lakekamu Basin 120m, 7°44'S 146°30'E, 16–25.xi.1999, Malaise Trap, T.A. Sears coll., CSCA10L065 (on slide, IZBE).

**Remarks.** This species is only known so far from Papua New Guinea (Kurina & Hippha 2015).

### *Manota evexa* Hippha, 2007

**Material.** PAPUA NEW GUINEA. **1 male**, Gulf: Ivimka Res. Station, Lakekamu Basin 120 m, 7°44'S 146°30'E, 24.xi.1999, S.L. Heydon coll., CSCA11L041 (on slide, IZBE).

**Remarks.** This species is only known so far from Papua New Guinea (Kurina & Hippha 2015).

### *Manota hamulata* Colless, 1966

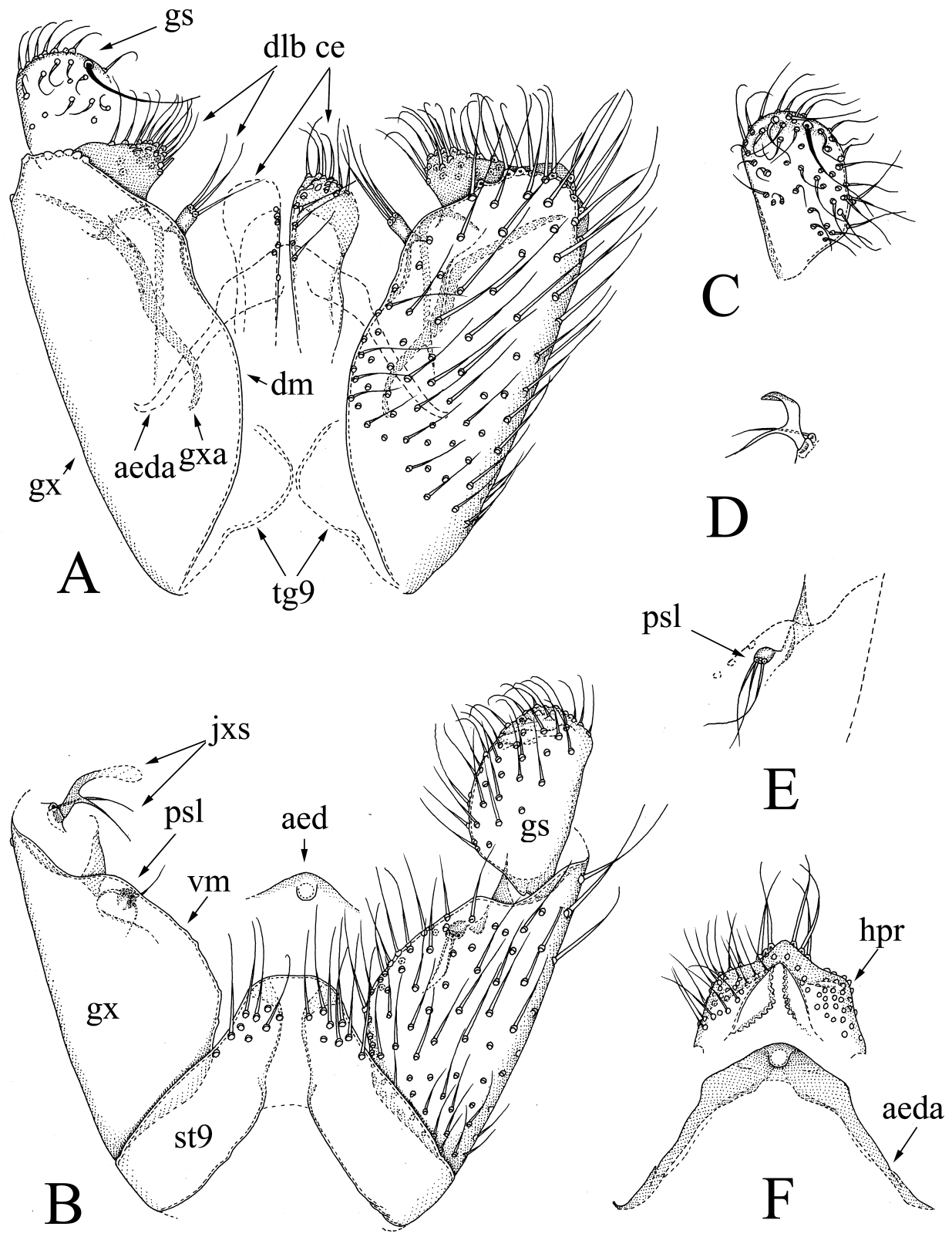
**Material.** PAPUA NEW GUINEA. **11 males**, Madang Prov., Wanang Cons. Area, hilltop clearing in forest behind Swire Research Station 172 masl, 5°13.682'S 145°4.752'E Malaise Trap, 17–22.xi.2015 coll. N.von Ellenrieder & R.W.Garrison, CSCA16L013 (2 on slides, 9 in alcohol, IZBE); **1 male**, Ivimka Res. Station, Lakekamu Basin 120 m , 7°44'S 146°30'E 24–Nov-1999 S.L. Heydon coll. CSCA11L041 (on slide, IZBE); **1 male**, Madang Prov., Wanang Cons. Area, forest edge by oxbow pond, 80 masl, 5.2252°S 145.0813°E Malaise Trap, 18–22.xi.2015, coll. N. von Ellenrieder & R.W. Garrison, FFP15PNG14 (on slide, IZBE); **2 males**, Madang Prov., Wanang Cons. Area, primary forest near Wanang 3 River, 86 masl, 5.2233°S 145.0793°E Malaise Trap, 17–22.xi.2015, coll. N. von Ellenrieder & R.W. Garrison, FFP15PNG07 (on slides, IZBE).

**Remarks.** The species was originally described from the Palau Islands (Colless 1966) and has subsequently been recorded from several localities in Papua New Guinea (Kurina & Hippha 2015) and from Bacan Island, Maluku Utara, Indonesia (Hippha & Kurina 2018).

### *Manota perissochaeta* Hippha, 2007

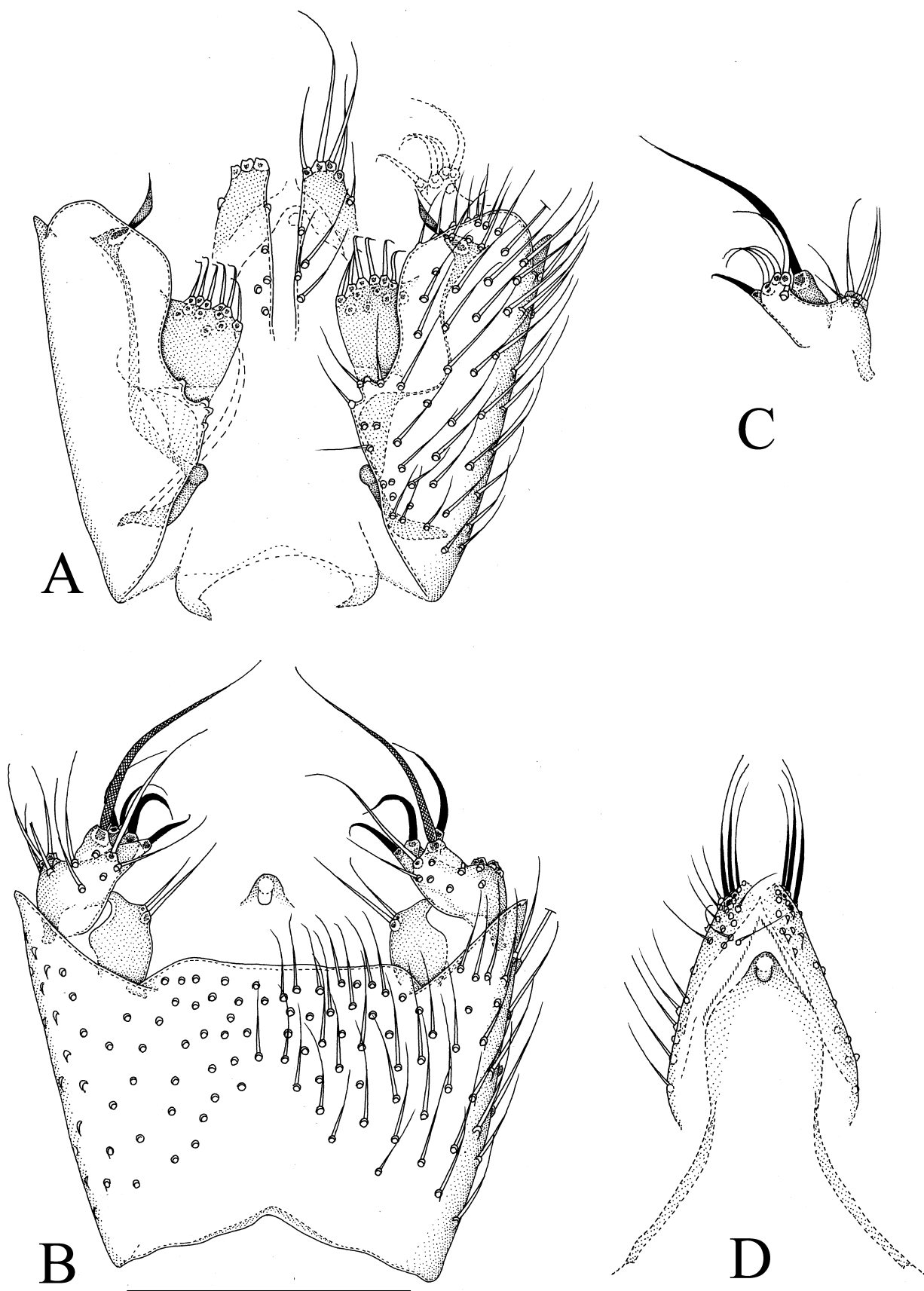
**Material.** PAPUA NEW GUINEA. **1 male**, Madang Prov., Ohu Village Res., primary forest going down from Village to Wadub R., 124 masl, 5,2216°S 145,6804°E Malaise Trap, 15–27.xi.2015, coll. N. von Ellenrieder & R.W. Garrison, FFP15PNG06 (on slide, IZBE).

**Remarks.** The type material of this species is from the Solomon Islands (Hippha 2007), with additional records from two localities in Papua New Guinea (Hippha 2007, Kurina & Hippha 2015)



**FIGURE 2.** *Manota williamsi* sp. n. (A, B, D, F holotype, C paratype). **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Right gonostylus, dorsal view. **D.** Right side juxtagonostylar setae, ventral view. **E.** Right side parastylar lobe with associated structures, ventral view. **F.** Hypoproct and aedeagus, ventral view. Scale 0.1 mm. aed = apex of aedeagus, aeda = aedeagal apodeme, ce = cercus, dlb = lobe at dorsal medial margin of gonocoxa, dm = dorsal medial margin of gonocoxa, gs = gonostylus, gx = gonocoxa, gxa = gonocoxal apodeme, hpr = hypoproct, jxs = juxtagonostylar seta, psl = parastylar lobe, st9 = sternite 9, tg9 = tergite 9, vm = ventral medial margin of gonocoxa.





**FIGURE 3.** *Manota kerri* sp. n. (holotype). **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Left gonostylus, dorsal view. **D.** Hypoproct and aedeagus, ventral view. Scale 0.1 mm.

### *Manota serawei* Hippa, 2007

**Material.** PAPUA NEW GUINEA. **1 male**, Oomsis, Lae, Malaise trap, Ground 3, 06° 40' S, 146° 48' E, 24.vii.2000, R.L. Kitching col. (on slide, AMSA: K379009); **1 male**, same data except Malaise trap, Ground 2 (on slide, AMSA: K377217); **1 male**, same data except Malaise trap, Ground 2, 23.vii.2000 (on slide, AMSA: K379014); **3 males**, same data except Malaise trap, Ground 3, 26.vii.2000 (on slide, AMSA: K379014); **1 male**, Mt. Wilhelm, Malaise trap, 5,721022129 S 145,2703094 E, 1200 m a.s.l., 25–26.x.2012, Philip, Alois, Novotny & Leponce col., Sample code: P1794; MAL-MW1200B-01/16-d01 (on slide, RBINS); **1 male**, Mt. Wilhelm, Malaise trap, 5,807418823 S 145,0736389 E, 3200 m a.s.l., 24–25.x.2012, Dahl, Kaupa, Novotny & Leponce col., Sample code: P3362; MAL-MW3200B-09/16-d09 (on slide, RBINS); **6 males**, Madang Prov., Wanang Cons. Area, hilltop clearing in forest behind Swire Research Station 172 masl, 5°13.682'S 145°4.752'E Malaise Trap, 17–22.xi.2015, coll. N. von Ellenrieder & R.W. Garrison, CSCA16L013 (on slides, IZBE).

**Remarks.** This species is only known so far from Papua New Guinea (Kurina & Hippa 2015).

### *Manota subspathula* Hippa, 2007

**Material.** AUSTRALIA. **1 male**, N.S.W., Taree, Lorient Wildlife Refuge, 3 Km N of Landsdowne, sclerophyll forest, Malaise trap, 31° 45' 04" S, 152° 32' 03" E, 17.i–4.ii.2012, G. & B. Williams col. (on slide, MZUSP); **1 male**, same data except 4–23.ii.2012 (on slide, MZUSP); **1 male**, same data except 23.ii–20.iii.2012 (on slide, MZUSP); **13 males**, N.S.W., Port Macquarie Sea Acres NR; 10m; 1–30.iii.1999, G. Williams col. (10 in alcohol, 3 on slides, AMSA: K379109). PAPUA NEW GUINEA. **1 male**, Oomsis, Lae, Malaise trap, Ground 1, 06° 40' S, 146° 48' E, 23.vii.2000, R.L. Kitching col. (on slide, AMSA: K377224).

**Remarks.** The species was previously known from Papua New Guinea (Hippa 2007, Kurina & Hippa 2015) and from the Australian mainland: Queensland (Kurina & Hippa 2015).

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