



## The genus *Manota* Williston (Diptera: Mycetophilidae) in Melanesia and Oceania

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## Abstract

The following new species of *Manota* are described: *M. biunculata* (Papua New Guinea), *M. evexa* (Papua New Guinea), *M. explicans* (Papua New Guinea), *M. gemella* (Ambon, Maluku Utara, Indonesia), *M. hirsuta* (Papua New Guinea), *M. orthacantha* (Papua New Guinea), *M. parilis* (Papua New Guinea), *M. pentacantha* (Solomon Islands), *M. perissochaeta* (Papua New Guinea and Solomon Islands), *M. serawei* (Papua New Guinea), *M. sicula* (Papua New Guinea), *M. spathula* (Papua New Guinea), *M. subspathula* (Papua New Guinea) and *M. tricuspis* (Fiji). *Manota ctenophora* Matile (New Caledonia), *M. maorica* Edwards (New Zealand) and *M. taedia* Matile (New Caledonia) are redescribed. *Manota hamulata* Colless, previously known from Palau, is redescribed and recorded from Papua New Guinea. *Manota pacifica* Edwards from Samoa is discussed and compared with the other species of the region. A key to the Melanesian and Oceanian species of *Manota* is given.

**Key words:** Mycetophilidae, *Manota*, morphology, taxonomy, new species, Melanesia, Oceania

## Introduction

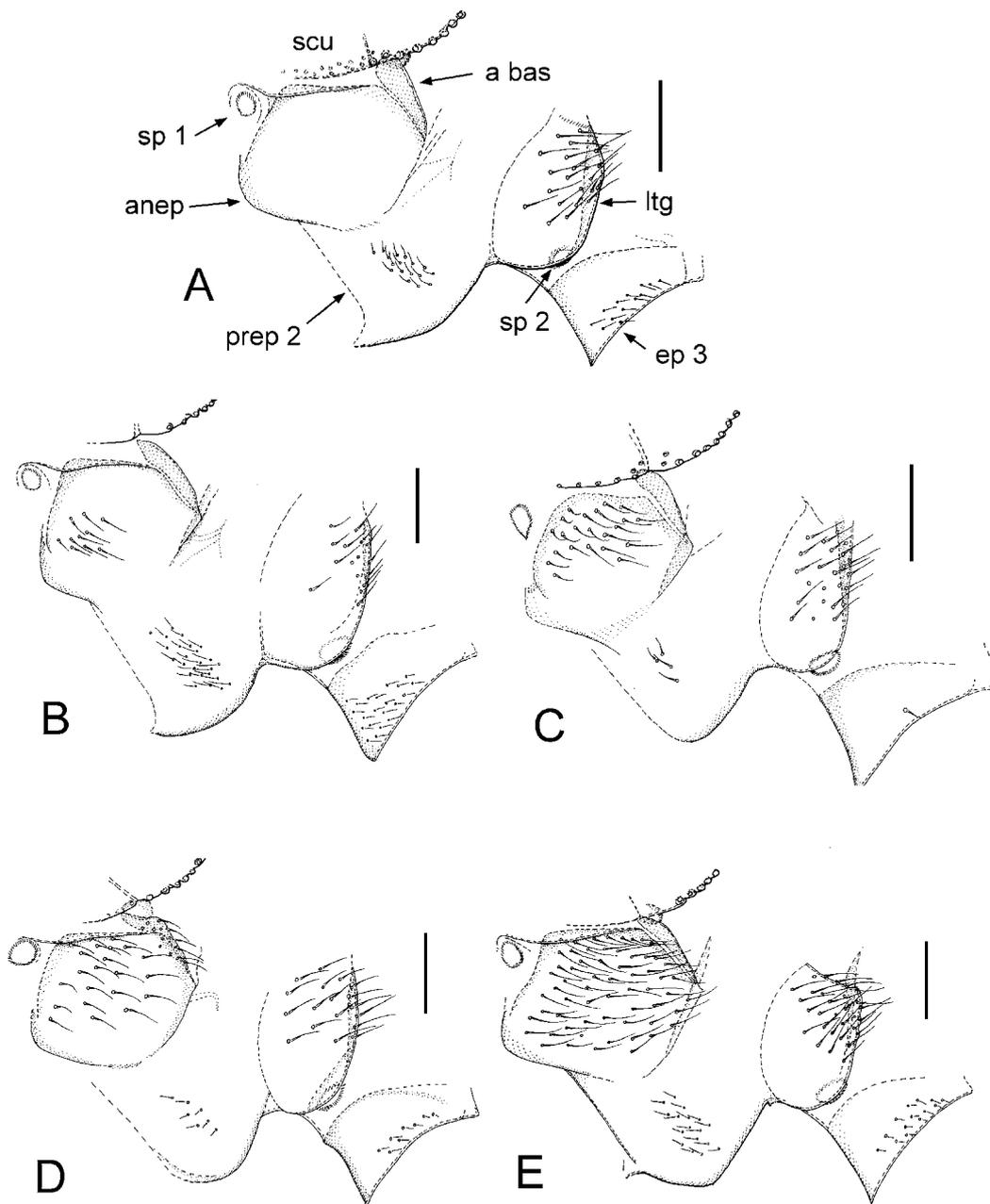
Knowledge of the species diversity of the Mycetophilidae genus *Manota* Williston (type species *M. defecta* Williston) has increased rapidly in recent years. Bechev (2000) gave a total of 27 known species in the world fauna. He missed two Oceanian species and included an unnamed Nearctic species (Sherman 1920) (Bechev in litt.) so that the number of described species at that time was 28, divided between the zoogeographic regions as follows: Afrotropical 18, Australasian 5, Neotropical 3, Oriental 1 and Palaeartic 1. Since then, 27 new species have been described from the Neotropical region (Jaschhof and Hippa 2005), 35 from the Oriental region (Hippa 2006, Hippa and Papp 2007, and Papp 2004), two from Afrotropical region (Jaschhof and Mostovski 2006) and 2 from the Palaeartic region (Ševčík 2002 and Papp 2004), increasing the number of described *Manota* species to 94 prior to the present paper.

The five previously known Oceanian *Manota* are all from South Pacific islands: *M. ctenophora* Matile and *M. taedia* Matile from New Caledonia, *M. hamulata* Colless from Palau, *M. maorica* Edwards from New Zealand and *M. pacifica* Edwards from Samoa. The present work was initiated by my discovery of several species of *Manota* in Malaise trap samples from Papua New Guinea. I have also had the opportunity of studying specimens from some further Melanesian and Oceanian localities: Ambon (Maluku Utara, Indonesia), Fiji, New Caledonia and the Solomon Islands. The aim of this work is to review all the described Melanesian and Oceanian *Manota* and to describe the fourteen new species, which I have recognised from this area.

## Material and methods

The material from Papua New Guinea was preserved in ethanol, whilst that from other sources was dry, either pinned or glued on pieces of card or celluloid. Most of the specimens from New Caledonia are still dry with the macerated abdomen placed in glycerol in a microvial on the same pin as the specimen. I have mounted other specimens in Euparal after maceration in 10% potassium hydroxide and step-wise dehydration in ethanol. In some cases I have made mounts of the hypopygium and other parts of abdomen between two pieces of cover glass, which enables the specimen to be studied from both sides under a compound microscope. Such preparations are now attached to glass slides by a couple of strips of adhesive tape across their edges and are easily detached when needed. With the dry holotype of *Manota maorica* Edwards, I have detached the abdomen and the existing basal part of the right side maxillary palpus and have slide-mounted them as described above; the rest of the specimen is still pinned with one of the wings and hind legs glued on the same piece of celluloid through which the type is pinned.

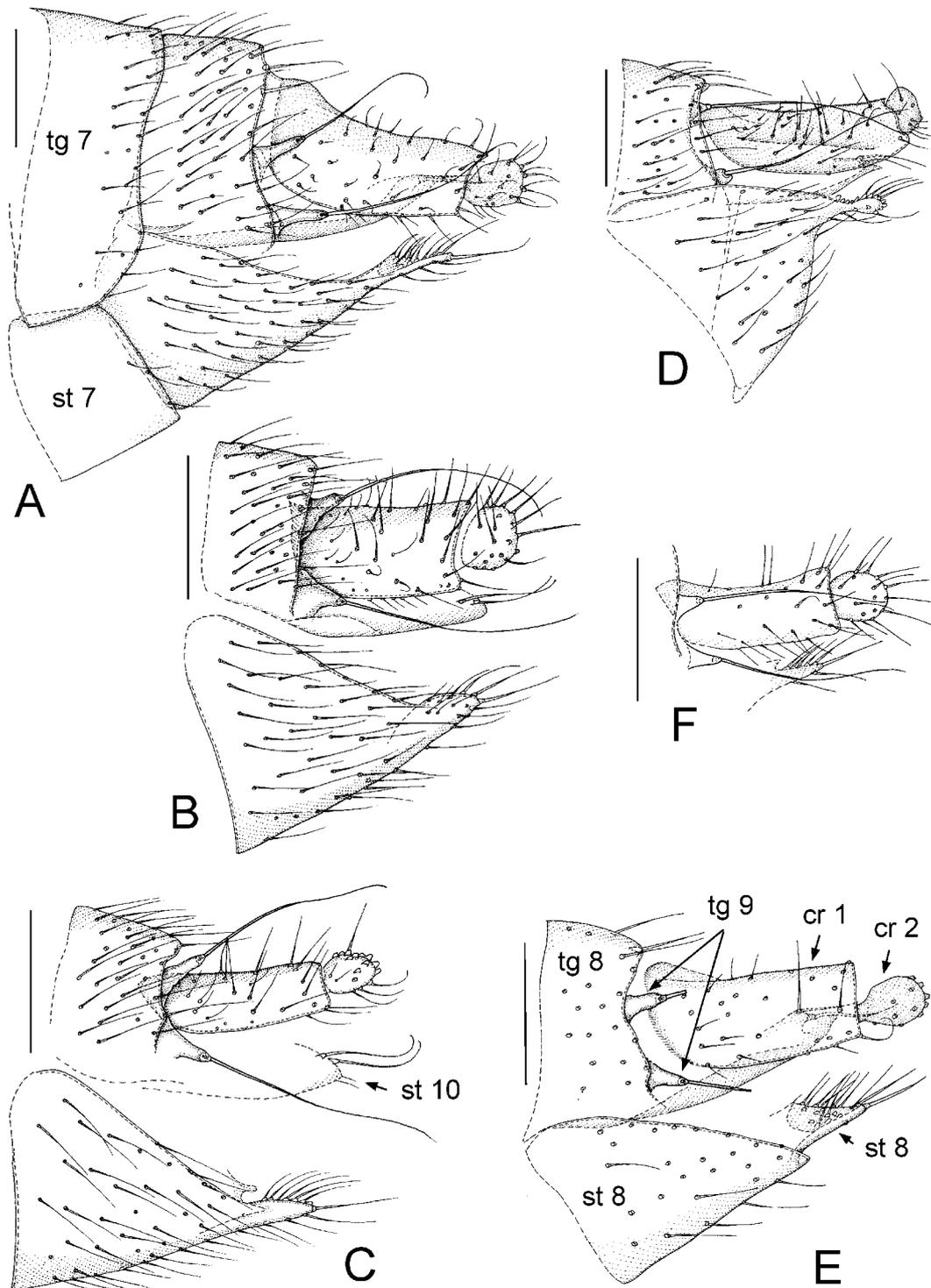
The morphological terminology follows Hippa and Papp (2007). The terminology of the hypopygium is explained in Figs 3 and 4, that of female terminalia in Fig. 2, and that of the pleura in Fig. 1. Other essential characters are shown in figures as the necessity arises. Characters dealing with the setosity of the apical part of Sc, the setae marking A1 and the presence or absence of scattered setae on the posterior part of the wing membrane are not described because observation of the setae has been very difficult and uncertain in most of the species. Illustrations were made by the author with a drawing tube attached to a Leitz Diaplan compound microscope.



**FIGURE 1.** Pleura, lateral view. **A.** *Manota serawei* sp. n. (holotype). **B.** *M. explicans* sp. n. (paratype). **C.** *M. perisochaeta* sp. n. (paratype). **D.** *M. spathula* sp. n. (holotype). **E.** *M. bicuspis* sp. n. (paratype). Scale 0.10 mm.

The material is deposited in the following institutions: The Natural History Museum, London (BMNH), Museum National d'Histoire Naturelle, Paris (MNHN), and The Swedish Museum of Natural History, Stockholm (NRM).

The following abbreviations are used in the figures: a bas = anterior basalare, anep = anepisternum, cr = cercus, cr 1 = basal segment of cercus, cr 2 = distal segment of cercus, dm 1 = lobe at dorsal mesial margin of gonocoxa, ep 3 = episternum 3, gs = gonostylus, gx = gonocoxa, gx a = gonocoxal apodeme, gx l = apicolateral lobe of gonocoxa, gx d = dorsal mesial margin of gonocoxa, gx v = ventral mesial margin of gonocoxa, hpr = hypoproct, jg b = basal body of juxtagonostylar seta or setae, jg s = juxtagonostylar seta or megaseta, ltg = laterotergite, pa 1 = paraapodemal lobe, prep 2 = preepisternum 2, ps 1 = parastylar lobe, scu = scutum, sp 1 = anterior spiracle, sp 2 = posterior spiracle, st 7–st 10 = sternite 7–sternite 10, tg 7–tg 9 = tergite 7–tergite 9, tm = tegmen, tm a = apodeme of tegmen.



**FIGURE 2.** Apical part of female abdomen, lateral view. **A.** *Manota orthacantha* sp. n. **B.** *M. taedia* Matile. **C.** *M. ctenophora* Matile. **D.** *M. spathula* sp. n. **E.** *M. explicans* sp. n. **F.** *M. serawei* sp. n. Scale 0.10 mm.

## The species of *Manota* in Melanesia and Oceania

### Key to species

1. Anepisternum non-setose (Fig. 1A) ..... 2
  - Anepisternum setose (Figs 1B–E) ..... 5
2. Wing bicolorous, the basal half yellowish, apical half greyish; gonostylus complicated, with several lobes (Figs 3A, B) ..... *M. maorica* Edwards
  - Wing unicolorous greyish or yellowish; gonostylus simple (e.g. Figs 4A, B) ..... 3
3. The juxtagonostylar megaseta simple, not branched, its basal body as long as the megaseta (Fig. 4A) .....  
..... *M. serawei* **sp. n.**
  - The juxtagonostylar megaseta two- or three-branched, its basal body one-fifth or less of the length of the megaseta (Figs 5C, 6C) ..... 4
4. Parastylar lobe with one strong seta (Fig. 5A); the juxtagonostylar megaseta three-branched (Fig. 5C) .....  
..... *M. ctenophora* Matile
  - Parastylar lobe with numerous fine setae (Fig. 6B); the juxtagonostylar megaseta two-branched (Fig. 6C)  
..... *M. taedia* Matile
5. Laterotergite non-setose ..... *M. gemella* **sp. n.**
  - Laterotergite setose (Figs 1B–E) ..... 6
6. Sternite 9 laterally fused with gonocoxa except for a short posterolateral part (Figs 9B, 10B, 11B, 12B) ... 7
  - Sternite 9 laterally separated from gonocoxa by a long lateral margin (e.g. Figs 13B, 14B) ..... 10
7. Sternite 9 short, posteriorly extending to halfway between the base of gonocoxa and the base of gonostylus (Fig. 9B); hypoproct posteriorly extending to the level of the base of gonostylus (Fig. 9B) .....  
..... *M. explicans* **sp. n.**
  - Sternite 9 long, posteriorly extending nearly as far as the ventral side of gonocoxa or to the level of parastylar lobe (Figs 10B, 11B, 12B); hypoproct posteriorly extending much over the base of gonostylus (Figs 10B, 11B, 12B) ..... 8
8. Gonostylus round, nearly as broad as long (Figs 12A, B); the lobe with blunt setae at the dorsal mesial margin of gonocoxa subapical in position (Fig. 12A) ..... *M. hirsuta* **sp. n.**
  - Gonostylus elongate, at least twice as long as broad (Figs 10A, 11A, B); the lobe with blunt setae at the dorsal mesial margin of gonocoxa submedial in position (Figs 10A, 11A) ..... 9
9. Posterior margin of sternite 9 slightly convex (Fig. 10B); the two long setae apically on gonostylus close to one another (Fig. 10A) ..... *M. spathula* **sp. n.**
  - Posterior margin of sternite 9 deeply notched (Fig. 11B); the two long setae apically on gonostylus wide apart (Figs 11A, B) ..... *M. subspathula* **sp. n.**
10. Hypoproct at anteroventral margin with a pair of unusually strong and long setae which greatly differ from the other setae (Figs 7B, 8B) ..... *M. perissochaeta* **sp. n.**
  - Hypoproct with the usual setosity (e.g. Figs 13B, 14B) ..... 11
11. Gonocoxa dorsally with an apicomerial setose lobe (Figs 14A, 16B, 17A, 18 B, 19C, 20A, 21A, 22A); one juxtagonostylar megaseta present, which is usually accompanied by a normal seta (e.g. Figs 14A, B, 16B, 17A, B, 18B, 19B, 20A, 21D, 22A) ..... 12
  - Gonocoxa dorsally without an apicomerial lobe (Fig. 13A); two subequal juxtagonostylar megasetae present (Fig. 13A, B) ..... *M. biunculata* **sp. n.**
12. Gonostylus apically with 3 very strong divergent setae, which greatly differ from the other apical setosity (Fig. 14A, B) ..... *M. tricuspis* **sp. n.**
  - Gonostylus apically without 3 very strong divergent setae (e.g. Figs 16 A, B, C, 17A, B, 18A, B, 19A, B, 20A, 21 A, B, D, 22 A, B) ..... 13

13. Parastylar lobe a small plate, the setae several times longer than the dimensions of the sclerite (Figs 19B, 21D) ..... 14
- Parastylar lobe large, lobe-like, the setae as long as or shorter than the greatest dimension of the sclerite (Figs 16A, 17B, 18A, 20B, 22B) ..... 15
14. Antennal flagellomere 4 about twice as long as broad (Fig. 21E); apical margin of sternite 9 notched, with three strong setae diverging from the other setosity on each side (Fig. 21D) ..... *M. sicula* **sp. n.**
- Antennal flagellomere 4 about as long as broad (Fig. 19C); apical margin of sternite 9 convex, with all the setae similar (Fig. 19B).....*M. evexa* **sp. n.**
15. The dorsal apicomesial lobe of gonocoxa bilobate ..... *M. pacifica* Edwards
- The dorsal apicomesial lobe of gonocoxa apically simple (e.g. Figs 16B, 17A, 18B, 20A, 22A) ..... 16
16. Gonostylus with five megasetae, or setae diverging from the other setosity, at apical margin (Figs 22A, B); hypoproct longer than broad (Fig. 22B) ..... *M. pentacantha* **sp. n.**
- Gonostylus with at most three megasetae or setae diverging from the other setosity at apical margin (Figs 16B, C, 17A, B, 18A, B, 20A,); hypoproct broader than long (Figs 16A, 17B, 18A, 20B) ..... 17
17. The dorsal apicomesial lobe of gonocoxa broader basally than apically (Figs 16B, 17A); the apical margin of gonostylus with two or three stronger setae/megasetae diverging from other setae (Fig 16B, C, 17A, B); sternite 9 apically acuminate (Figs 16A, 17B) ..... 18
- The dorsal apicomesial lobe of gonocoxa narrower on basal part than apically (Figs 18B, 20A); the apical margin of gonostylus with one stronger seta/megasetae diverging from the other setae (Figs 18A, B, 20A); sternite 9 apically broadly rounded or notched (Figs 18A, 20B) ..... 19
18. Parastylar lobe three-lobed, with two small lobes at the base of the longer main part (Fig. 16A) .....  
..... *M. hamulata* Colless
- Parastylar lobe two-lobed, with one small lobe at the base of the longer main part (Fig. 17B).....  
.....*M. bicuspis* **sp. n.**
19. Antennal flagellomere 4 twice as long as broad (Fig. 20C); the dorsal apicomesial lobe of gonocoxa three times as long as broad (Fig. 20A)..... *M. orthacantha* **sp. n.**
- Antennal flagellomere 4 as long as broad (Fig. 18C); the dorsal apicomesial lobe of gonocoxa twice as long as broad (Fig. 18B).....*M. parilis* **sp. n.**

## Descriptions of species

### *Manota maorica* Edwards

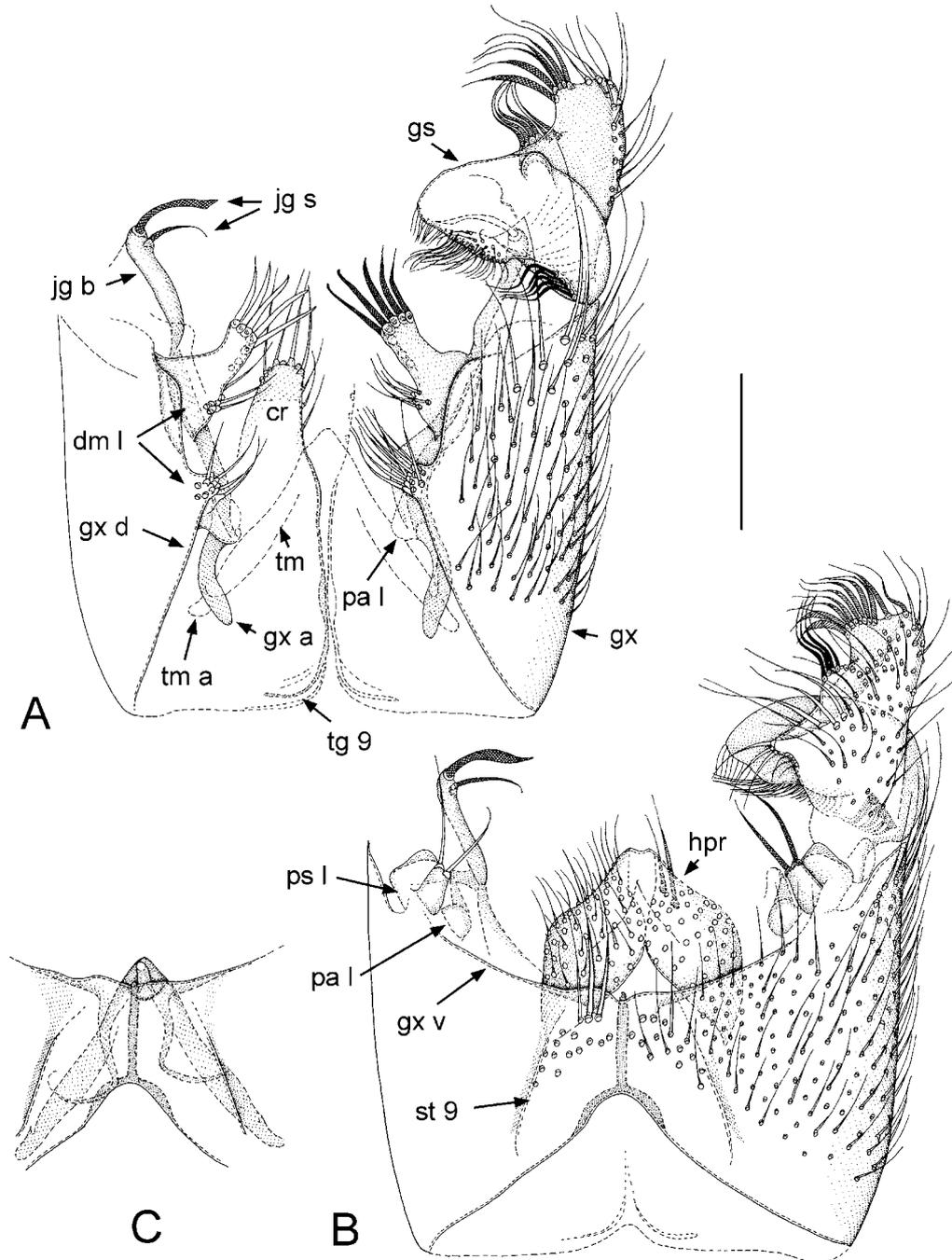
(Figs 3A, B, C)

*Manota maorica* Edwards in Tonnoir and Edwards, 1927: 801.

A large-sized *Manota*.

Male. **Coloration.** See the original description (Tonnoir and Edwards 1927): **Head.** Antennal flagellomere 4 similar to *M. pentacantha*, Fig. 22C. Palpomere 3 of maxillary palpus with apicomesial extension, with 2 curved sensilla; palpomere 4 with parasegment. **Thorax.** Anepisternum non-setose. Laterotergite setose. Preepisternum 2 and episternum 3 appearing non-setose under a stereomicroscope, but the presence of setae is not excluded. **Wing.** Length 1.9 mm. Vein R1 unusually long, meeting C near the middle of wing and much beyond the base of the sclerotized part of M1. **Hypopygium** (Figs 3A,B,C). Tergite 9 united with gonocoxites, but the lateral margin partly distinct, anterior margin deeply notched, posterior margin with a small notch, the setae slightly stronger than the adjacent ventral setae of gonocoxa, with a couple of stronger setae subapically on each side. Parastylar lobe exposed, composed of three parts, a more sclerotized part in the middle,

with two strong setae directed obliquely posteriad, and a more weakly sclerotized part on both its anterior and posterior sides, the latter not sharply separate from gonocoxa. Paraapodemal lobe small, but exposed in ventral view. The dorsal mesial margin of gonocoxa with a setose lobe at the middle and a large lobe in a more posterior position bearing 4 megasetae at apex and 3 at the apical part of the mesial margin and a group of the usual setae subbasally at the mesial margin. Two juxtagonostylar setae present: a megaseta and a rather strong seta, both apically flattened, arising from a common basal body which is longer than the megaseta, the megaseta being apical, the seta subapical. Gonostylus large, unusually complicated, with several lobes and groups of different types of modified setae. Tegmen triangular, nearly equilateral, without distinct lateral shoulders. Hypoproct posteriorly extending to the level of the basal part of gonostylus, with ca. 50 scattered ventral setae. Cerci medially separate.



**FIGURE 3.** *Manota maorica* Edwards (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Sternite 9 with associated structures. Scale 0.10 mm.

Female and preimaginal stages unknown.

**Discussion.** Only the holotype male of this species is known. It is a dry specimen pinned from the side through the pleura, with one wing and hind leg glued to the piece of celluloid through which the specimen is pinned. I have dissected the abdomen and also the hypopygium, and have mounted them between two cover glasses as described under Material and methods.

Because of its non-setose anepisternum, *M. maorica* is similar to three other species in the Australasian region, *M. ctenophora*, *M. taedia* and *M. serawei*, but differs e.g. by its bicolorous wing. In addition to these four species, only the Palaearctic *M. unifurcata* Lundström is known to have the anepisternum non-setose, but there are many Afrotropical and several Neotropical species in which this character has not been studied. *M. unifurcata* differs from all the species mentioned above by also having the laterotergite non-setose. Its wing is unicolorous, as in *M. ctenophora*, *M. taedia* and *M. serawei*, and R1 is long as in *M. maorica*. In its hypopygium *M. maorica* differs from all other described *Manota* except for *M. sicula* by the complicated many-lobed gonostylus, but there are species in which the male is unknown (Afrotropical) or the hypopygium has not been studied (Neotropical). In *M. sicula* and *M. maorica* the detailed structure of the gonostylus as well as all other parts of the hypopygium are abundantly different (cf. Figs 3A–C and 21A–D). *M. maorica* is the only species I have seen which has the apical part of tergite 9 fused with the gonocoxa but has the lateral margin more basally distinct. Usually when the tergite is fused with gonocoxa it begins from the base. The dorsal aspect of the gonocoxa is reminiscent of *M. serawei*, but differs e.g. by much stronger apical setae on the more apical of the two lobes at the dorsal mesial margin of the gonocoxa and by having two juxtagonostylar setae instead of one. The hypopygium of *M. unifurcata*, which was mentioned above, differs from all the species discussed here by the totally non-lobed dorsomesial margin of gonocoxa and by having two angulate projections on the ventral margin of gonostylus.

**Material studied.** Holotype male, New Zealand, West Coast, S. I., ii.1923, T. R. Harris. B.M. 1923-230 (in BMNH).

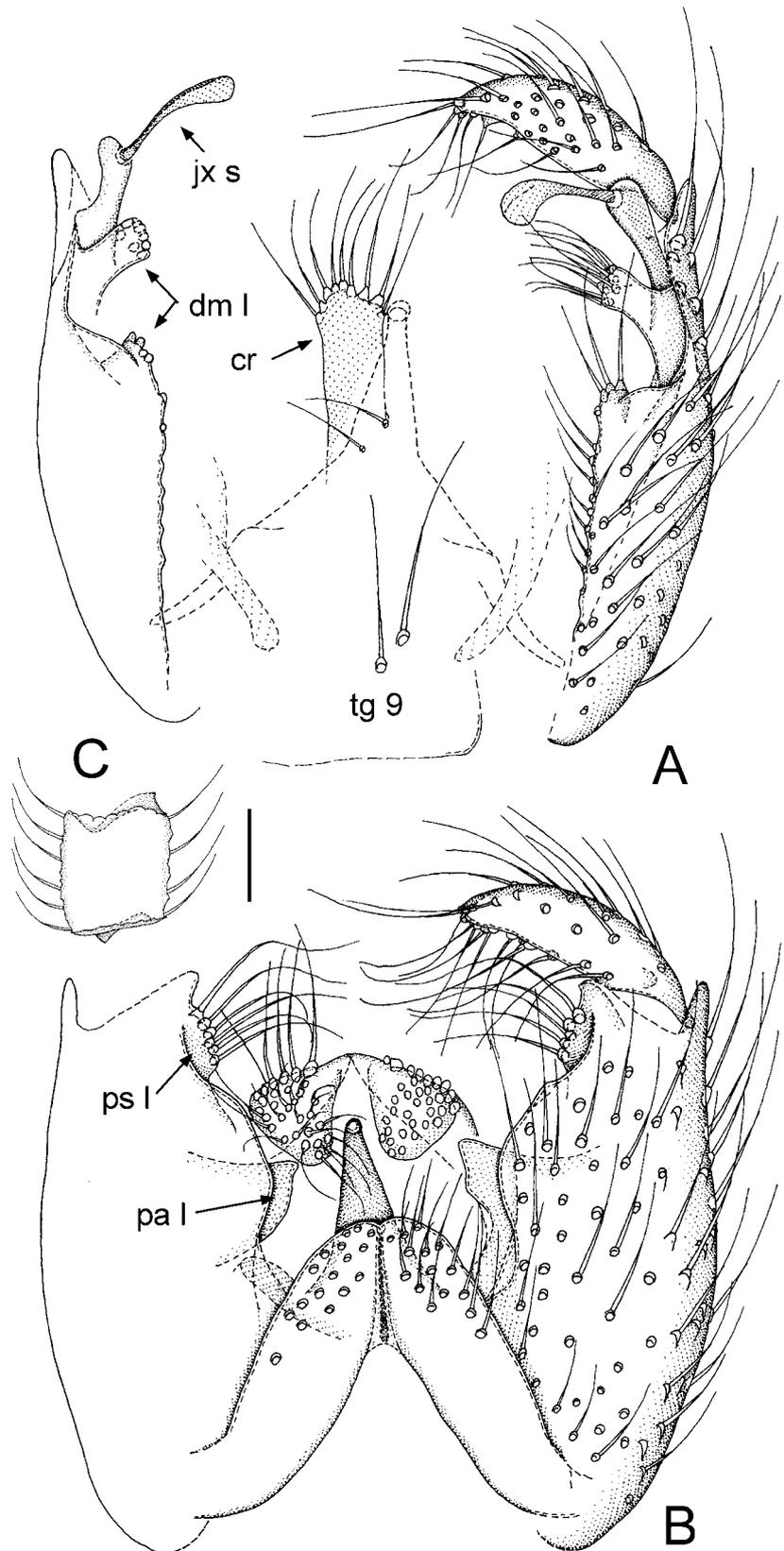
### *Manota serawei* sp. n.

(Figs 1A, 2F, 4A–C)

A small-sized *Manota*.

**Male. Coloration.** Almost unicolorous yellowish-brown, vertex and occiput darker brown, mouthparts, coxae and femora slightly paler than other parts but the apices of coxa 2 and 3 and their trochanters darker brown, wing unicolorous, hyaline, pale greyish yellowish-brown, knob of haltere dark. **Head.** Antennal flagellomere 4, Fig. 4C. Palpomere 3 of maxillary palpus with apicomerial extension, with ca. 4 apically expanded curved sensilla, and in addition with at least two sensilla which seem to be intermediate between the curved and apically flattened sensilla and the blunt sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern, Fig. 1A: anepisternum non-setose; anterior basalare non-setose; preepisternum 2 setose, with 17 setae; laterotergite setose, with ca. 23 setae; episternum 3 setose, with 13 setae. **Wing.** Length 1.4 mm. **Hypopygium** (Figs 4A, B). Sternite 9 extending posteriorly to halfway between the base of gonocoxa and the base of gonostylus, laterally sharply delimited, posterior margin convex, anterior margin deeply notched, the setae similar to adjacent ventral setae of gonocoxa. The ventral mesial margin of gonocoxa convex at middle. Parastylar lobe exposed but partly fused with the mesial margin of gonocoxa, with 5–6 long setae directed obliquely posteriad. Paraapodemal lobe well exposed in ventral view of hypopygium. The dorsal mesial margin of gonocoxa narrowed angulately just beyond the middle, with a small setose lobe at the angle, with a larger apically setose lobe in a more apical position. One juxtagonostylar seta present: an apically flattened and expanded megaseta, arising from a large clavate basal body, which is as long as the megaseta. Gonostylus elongate, simple, the setae similar to the ventral setae of gonocoxa. Tegmen triangular, basally very broad,

with indistinct lateral shoulders. Hypoproct posteriorly just reaching the level of the base of gonostylus, with about 30 scattered ventral setae on each half. In the holotype there are 4 setae dorsally in the membranous area between the gonocoxae and which probably belong to tergite 9. Cerci separate.



**FIGURE 4.** *Manota serawei* sp. n. (holotype): **A.** Hypopygium in dorsal view. **B.** Hypopygium in ventral view. **C.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.

Female. Similar to male. Antennal flagellomere 4 in the single specimen seen in oblique ventral view with its length/width ratio 0.8. Palpomere 3 with 3 curved sensilla. Anepisternum non-setose, anterior basalare non-setose, preepisternum 2 with 14 setae, laterotergite with 16 setae, episternum 3 with 7 setae. Wing length 1.4 mm. Apical part of abdomen, Fig. 2F: the long setae on tergite 9 arising from basal bodies, which are much longer than basally wide. Cercus two-segmented.

Preimaginal stages unknown.

**Discussion.** *M. serawei* is similar to *M. ctenophora* and *M. taedia*. It differs from both by having the parastylar lobe fused with the ventral mesial margin of gonocoxa, by having a narrow subapical lobe at the dorsal mesial margin of gonocoxa instead of a very broad one, by having the juxtagonostylar megaseta apically entire, not bi- or trifurcate, by having the basal body of the juxtagonostylar megaseta as long as the megaseta instead of a low tubercle only, and by lacking a strong seta apically on the gonostylus. All three species are similar to *M. maorica* and *M. unifurcata* in the non-setose anepisternum, and to *M. maorica* also in some hypopygial characters. For further discussion, see under *M. maorica*. The hypopygium of *M. serawei* is reminiscent of *M. explicans*, especially in the dorsal aspect. It differs by having one apically setose subapical lobe at the dorsal mesial margin of gonocoxa instead of two and by having the juxtagonostylar megaseta arising from a basal body as long as the megaseta; in *M. explicans* the basal body is almost non-existent. In ventral aspect, the hypopygium of the two species is greatly different: e.g. in *M. serawei* the lateral margin of sternite 9 is long, the paraapodemal lobe is large and well exposed, the parastylar lobe is exposed and the hypoproct is of the usual dimensions, whereas in *M. explicans* the sternite 9 is laterally fused with the gonocoxite so that there is only a short lateral margin posteriorly, the paraapodemal lobe is small and wholly concealed under the gonocoxa, the parastylar lobe is concealed under the gonocoxa and the hypoproct is unusually large, larger than the space between gonocoxae and sternite 9. In addition, *M. serawei* differs from *M. explicans* by the non-setose anepisternum. *M. serawei* is also similar to a lesser extent to *M. perissochaeta*, which is similar to *M. explicans*. See under *M. explicans*.

**Types.** *Holotype.* Male, Papua New Guinea, Morobe province, Lakekamu basin, Tekadu, 470 m a. s. l., Malaise trap close to Yenina river, 17–20.XI.1999, H. Hippa, R. Norberg D. Borisch (in NRM).

*Paratypes.* 3 males, Papua New Guinea, Madang province, Hapurpi village, nr. Halopa mission, 700 m, S 5° 05', E 145° 41', primary forest, Malaise trap, January 2001, Amari & Novotny leg. (in NRM); 1 male, Papua New Guinea, Madang province, Halopa village, primary forest, 600 m a. s. l., Malaise trap, November 2000, Lukáš Čížek leg. (in NRM); 1 male, Papua New Guinea, Madang province, Baitang village, Kau wild-life area, 50 m a. s. l., S 5° 08', E 145° 46', primary forest, Malaise trap, 2–19.2.2000, Lukáš Čížek leg. (in NRM).

*Other material.* 1 female with same data as the holotype (in NRM).

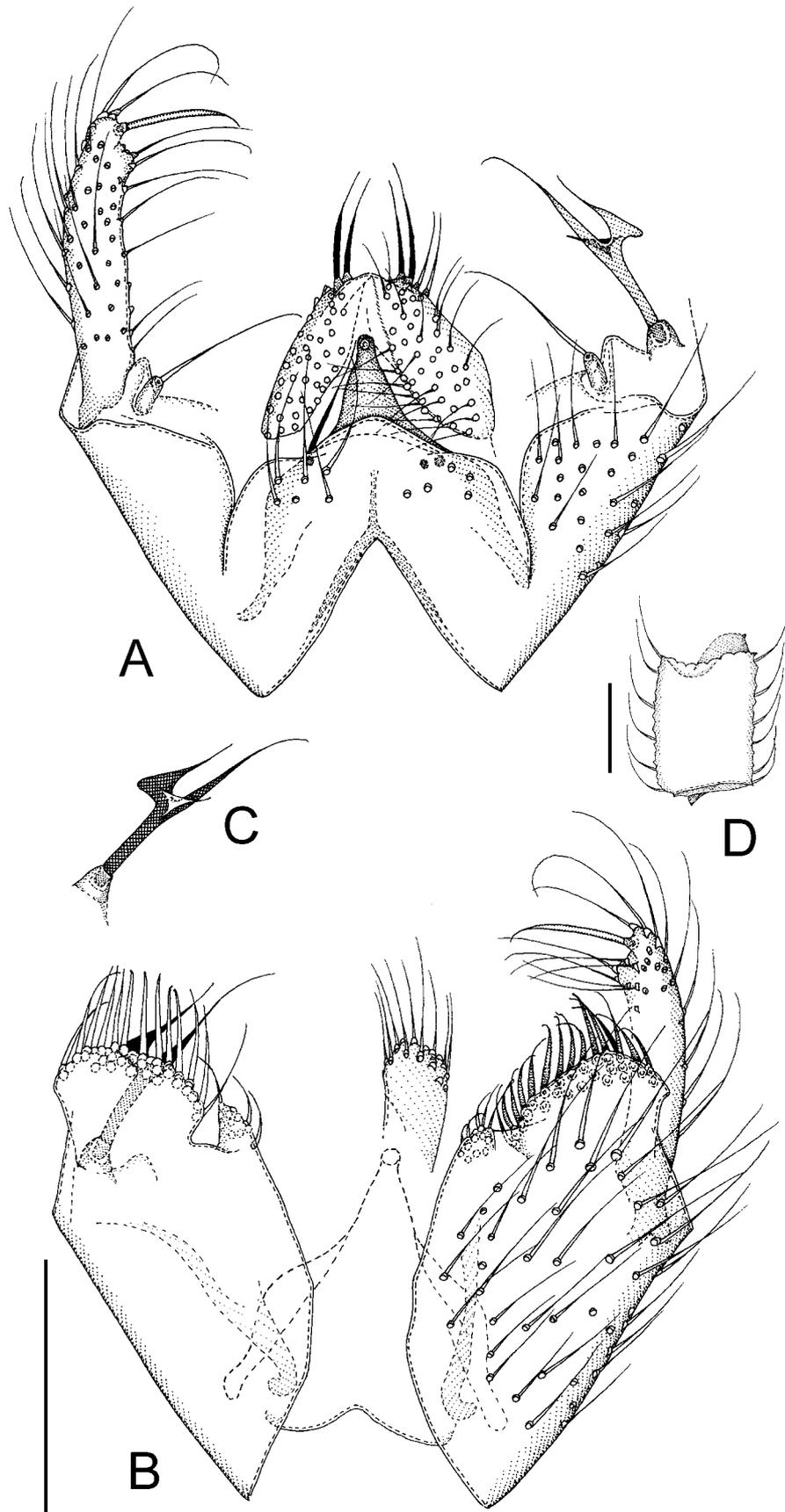
**Etymology.** The species is named for Mr. Stuart Serawe, Conservation Officer, Lakekamu ICDA Project, Foundation for People & Community Development, Inc., Boroko, Papua New Guinea.

### ***Manota ctenophora* Matile** (Figs 2C, 5A–D)

*Manota ctenophora* Matile, 1993: 208.

A small-sized *Manota*.

Male. **Coloration.** See Matile (1993). **Head.** Antennal flagellomere 4, Fig. 5D. Palpomere 3 of maxillary palpus with apicomerial extension, with 3–4 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity similar to *M. serawei*, Fig. 1A: anepisternum non-setose; anterior basalare non-setose; preepisternum 2 setose, with 5 setae; laterotergite setose, with ca. 29 setae; episternum 3 setose,



**FIGURE 5.** *Manota ctenophora* Matile: **A.** Hypopygium, ventral view. **B.** Hypopygium, dorsal view. **C.** Juxtagonostylar megaseta, dorsal view. **D.** Male antennal flagellomere 4, lateral view. Scale for A, B and C 0.10 mm, for D 0.05 mm.

with ca. 9 setae. **Wing.** Length 1.6 mm. **Hypopygium** (Figs 5A–C). Sternite 9 extending posteriorly near to the level of the base of gonostylus, laterally sharply delimited, the posterior margin medially with a lobe-like convexity, the anterior margin deeply notched, the setae similar to adjacent ventral setae of gonocoxa. The ventral mesial margin of gonocoxa convex at the middle. Parastylar lobe exposed, with a narrower more sclerotized anterior part and a broader more weakly sclerotized posterior part, the anterior part with one seta directed obliquely posteromesad. Paraapodemal lobe exposed in ventral view of hypopygium, not shown in Fig. 5A. The dorsal mesial margin of gonocoxa with a narrower setose lobe beyond the middle and a large broad setose lobe occupying all the more apical part. One juxtagonostylar seta present: a strong megaseta, arising from a low basal body, which is scarcely more than the socket of the megaseta; this megaseta with a narrow basal half and an expanded, flattened bifurcate apical half with a third smaller branch dorsally. Gonostylus elongate, simple, the setae simple except for one apicomèsial seta which is stronger than the other setosity. Tegmen triangular, with distinct lateral shoulders. Hypoproct posteriorly extending to the level of the middle of gonostylus, with about 40 scattered ventral setae on each half. Cerci separate.

Female. Similar to male. Palpomere 3 with 3 curved sensilla. Preepisternum 2 with 8 setae, laterotergite setose but it is not possible to count the number of setae in the single specimen studied, episternum 3 with 8 setae. Apical part of abdomen, Fig. 2C: the long setae on tergite 9 arising from basal bodies, which are much longer than basally wide. Cercus two-segmented.

**Discussion.** *M. ctenophora* is similar to *M. taedia*. The male differs from *M. taedia* e.g. by having one long seta on the parastylar lobes instead of several short ones, and by having the setae on the wide dorsal apicomèsial lobe of gonocoxa shorter and more robust (Figs 5B and 6A). Furthermore, in *M. ctenophora* the juxtagonostylar megaseta is three-branched and it has a long narrow basal part, whereas in *M. taedia* it is two-branched and the narrow basal part is very short. The females of the two species may be inseparable using current methods. The difference in the width of cercus between Figs 2B and 2C apparently depends only on the angle of view.

*M. ctenophora* and *M. taedia* are similar to *M. maorica*, *M. serawei* and *M. unifurcata* because of the non-setose anepisternum and to the first two also because of certain hypopygial characters. For further discussion, see under *M. maorica* and *M. serawei*.

**Material studied.** 1 male, Nouvelle Calédonie, Rivière Bleue, Mont Pani, 164° 46' E, 20° 35' 30" S, forêt dense humide, alt. 400 m, piège de Malaise (paratype, in MNHN), 1 male, Nouvelle Calédonie, Rivière Bleue, Parc 7, alt. 170 m, forêt humide sur pente, 3/22.04.1987, L. Bonnet de Larbogne, J. Chazeau & A. et S. Tillier (paratype, in MNHN). 1 male, Nouvelle Calédonie, Rivière Bleue, P. 7, 7–21.XI. 1988, L. Bonnet de Larbogne & J. Chazeau 525 (in MNHN). 1 female, Nouvelle Calédonie, Rivière Bleue, P. 7, 12–27.V.1989, 521, L. Bonnet de Larbogne & J. Chazeau (in MNHN).

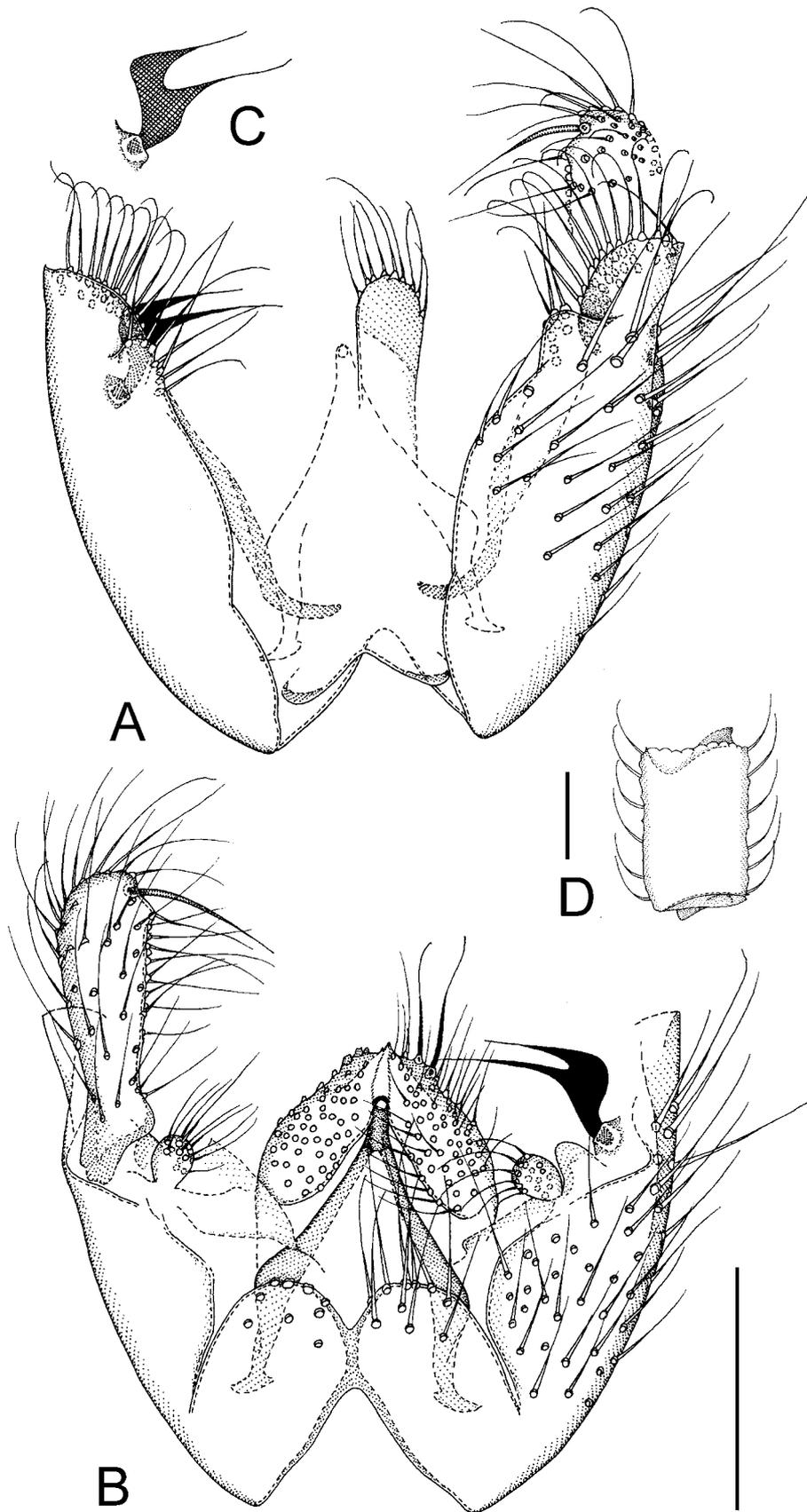
### *Manota taedia* Matile

(Figs 2B, 6A–D)

*Manota taedia* Matile 1993, 206.

A small-sized *Manota*.

Male. **Coloration.** See, Matile (1993). **Head.** Antennal flagellomere 4, Fig. 6D. Palpomere 3 of maxillary palpus with apicomèsial extension, with 4 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to *M. serawei*, Fig. 1A: anepisternum non-setose; anterior basalare non-setose; preepisternum 2 setose, with 3 setae; laterotergite setose, with ca. 28 setae; episternum 3 setose, with ca. 5 setae. **Wing.** Length 1.6–1.7 mm. **Hypopygium** (Figs 6A–C). Sternite 9 extending posteriorly to halfway between the base of gonocoxa and the base of gonostylus, laterally sharply delimited, the posterior



**FIGURE 6.** *Manota taedia* Matile: **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Juxtagonostylar megaseta, dorsal view. **D.** Male antennal flagellomere 4, lateral view. Scale for A, B and C 0.10 mm, for D 0.05 mm.

margin medially deeply notched, the anterior margin deeply notched, the setae similar to adjacent ventral setae of gonocoxa. The ventral mesial margin of gonocoxa convex at the middle. Parastylar lobe exposed, with a more anterior globular part and a less distinct flat posterior part, the anterior part with many setae. Paraapodemal lobe exposed in ventral view of hypopygium. The dorsal mesial margin of gonocoxa with a narrower setose lobe well on the posterior half and a large broad setose lobe occupying all the more apical part. One juxtagonostylar seta present: a strong megaseta, arising from a low basal body, which is scarcely more than the socket of the megaseta, the megaseta flattened and expanded from near base and apically bifurcate. Gonostylus elongate, simple, the setae simple except for one apicomésial seta, which is stronger than the other setosity. Tegmen triangular, with distinct lateral shoulders. Hypoproct posteriorly extending to the middle of gonostylus, with about 50 scattered ventral setae on each half. Cerci separate.

Female. Similar to male. Palpal sensilla not observable in the specimen studied. Preepisternum 2 with 5 setae, laterotergite with 19 setae, episternum 6 with 6 setae. Wing length 1.5 mm. Apical part of abdomen, Fig. 2B: the long setae on tergite 9 arising from basal bodies, which are much longer than basally wide. Cercus two-segmented.

**Discussion.** See under *M. ctenophora*.

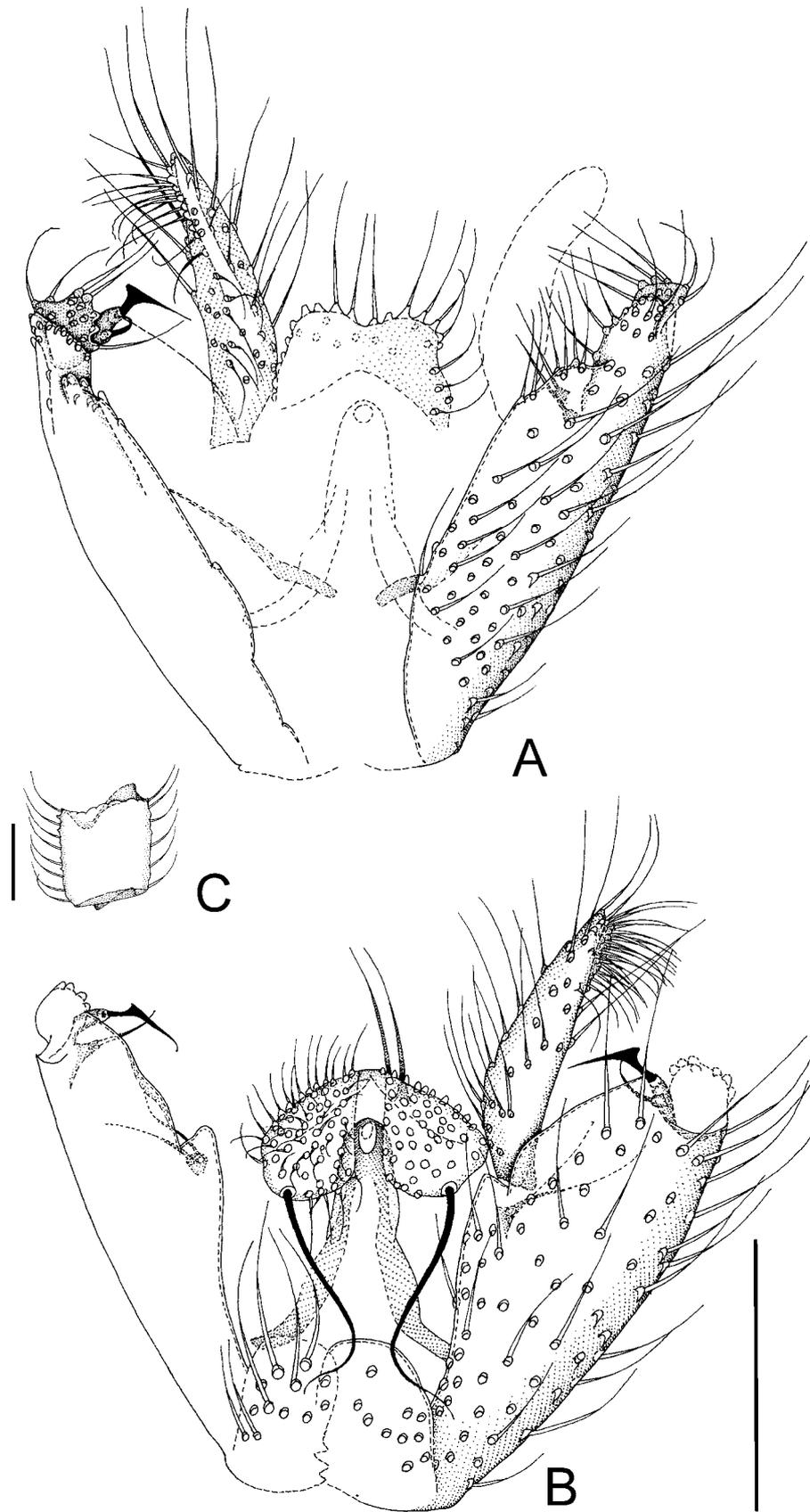
**Material studied.** 2 males, Nouvelle Calédonie, Rivière Bleue, Parc 6, alt 160 m, 25.XII.86–5. I. 1987, L. Bonnet de Larbogne & J. Chazeau, J. Chazeau & A. et S. Tillier forêt humide sur alluvions, piège de Malaise (paratype, in MNHN); 10 males and 1 female with same data except for P 6, 12–25.II., 160 m, L. Bonnet de Larbogne & A. Tillier (in MNHN). 1 male, Nouvelle Calédonie, Rivière Bleue, Parc 7, alt. 170 m, forêt humide sur pente, 9–22.04.1987, L. Bonnet de Larbogne & J. Chazeau, J. Chazeau & A. et S. Tillier (paratype of *M. ctenophora*, in MNHN); 3 males, with same data except for P. 7 (522), 8–22.II.1989, L. Bonnet de Larbogne & J. Chazeau, J. Chazeau (in MNHN), 1 male with same data except for alt. 170 m, forêt humide sur pente, 29.IX–13.X.1986, L. Bonnet de Larbogne & J. Chazeau & A. et S. Tillier (in MNHN). 4 males, Nouvelle Calédonie, Rivière Bleue, P 5, 20–31, 150 m, forêt humide sur alluvions, I.1987, L. Bonnet de Larbogne & J. Chazeau & A. et S. Tillier, (in MNHN).

### *Manota perissochaeta* sp. n.

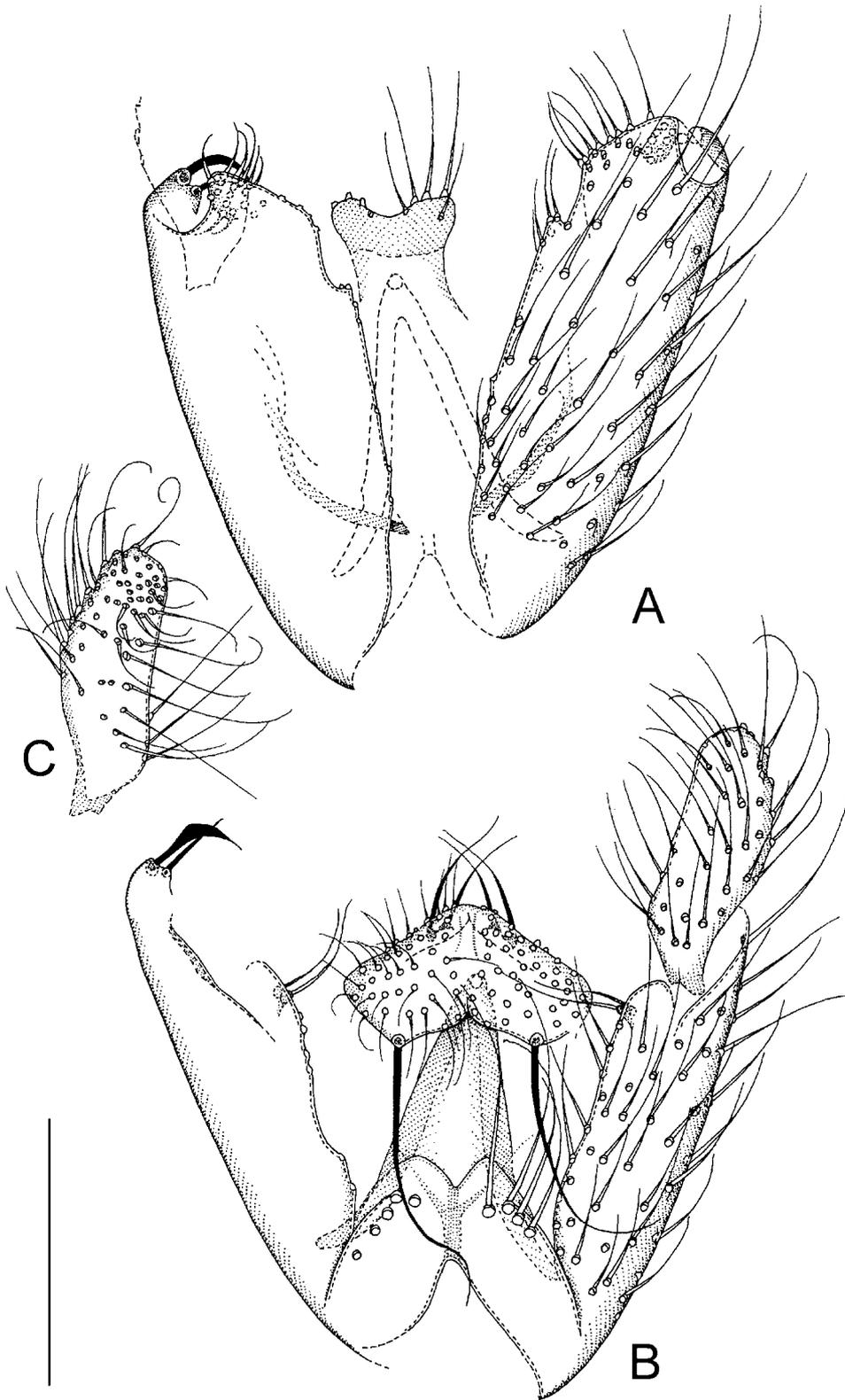
(Figs 1C, 7A–C, 8A–C)

A small-sized *Manota*

Male. **Coloration.** The probably strongly faded specimens are pale yellowish-brown, frons vertex and dorsal part of occiput darker brown, antennal flagellum becoming darker brown towards the apex, apex of coxa, trochanter and base of femur on legs 2 and 3 darker brown, wing unicolorous, hyaline, with greyish tinge, the knob of haltere darker greyish-brown. **Head.** Antennal flagellomere 4, Fig. 8C. Palpomere 3 of maxillary palpus with apicomésial extension, with 4–5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern, Fig. 1C: anepisternum with 21–31 setae; anterior basalare non-setose; preepisternum 2 setose, with 4–5 setae; laterotergite setose, with 22–26 setae; episternum 3 setose, with 1–3 setae. **Wing.** Length 1.3 mm. **Hypopygium** (Figs 7A–C, 8A, B). Sternite 9 rather small, not reaching halfway between the base of gonocoxa and the base of gonostylus, laterally sharply delimited, the posterior margin notched, the anterior margin deeply notched, the setae mostly similar to the ventral setae of gonocoxa but with some slightly stronger setae apicolaterally, in the specimen from New Guinea there are only the stronger posterior setae present. The ventral mesial margin of gonocoxa straight, with an angulate or rounded lobe posteriorly. Parastylar lobe small, not exposed in ventral view but covered by the lobe on the ventral mesial margin of gonocoxa, with two setae directed mesad or obliquely posteriad. Paraapodemal lobe not exposed in ventral view of hypopygium. The dorsal mesial margin of gonocoxa with three weakly expressed setose lobes on apical half. The juxtagonostylar setae two in number, consisting of a flattened and slightly expanded megaseta and a strong seta, both arising from a short separate basal body, in the specimens from the



**FIGURE 7.** *Manota perissochaeta* sp. n. (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.



**FIGURE 8.** *Manota perissochaeta* sp. n. (from New Guinea): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Gonostylus, dorsal view. Scale 0.10 mm.

Solomon Islands (Figs 7A, B) the megaseta has a more pronounced angle on posterior margin than the specimen from New Guinea (Figs 8A, B). Gonostylus elongate, simple, rather uniformly setose except for a mesial apicodorsal aggregation of densely placed rather short setae; in all the specimens from the Solomon Islands

the gonostyli are turned so that the mesial side is in lateral position. Tegmen narrow, with weakly defined lateral shoulders. Hypoproct reaching posteriorly the level of the basal part of gonostylus, with ca 40 scattered ventral setae on each half, with a very long stronger seta at anterior margin on each half. Cerci medially united.

Female and preimaginal stages unknown.

**Discussion.** The specimens from the Solomon Islands have sternite 9 more setose than the specimen from New Guinea. Their juxtagonostylar megaseta also seems to be more angular on the posterior margin, but this may result from a slightly different angle of view.

*M. perissochaeta* somewhat resembles *M. explicans*. It differs by having the dorsal lobes of gonocoxa much weaker, by having a long lateral margin on tergite 9, by the straight ventral mesial margin of gonocoxa, by a very small parastylar lobe, by having the hypoproct of the usual dimensions, not unusually large, by having a pair of very long setae at the posterior margin of hypoproct, and by having two juxtagonostylar setae, one megaseta and one normal seta, instead of only one megaseta. *M. perissochaeta* is the only *Manota* in which the hypoproct has the long setae as described here. The hypopygium of *M. perissochaeta* and *M. explicans* is not dissimilar to that of *M. serawei*, *M. ctenophora* and *M. taedia*, but the latter species have setose anepisternum. For further discussion, see under *M. serawei*.

**Types.** *Holotype*. Male, Solomon Islands, San Jorge, *Casuarina* Forest, nr. stream, vac. collector, low herbage and litter 26.ix.65, Roy. Soc. Exped., B.M. 1966-1, (in BMNH).

*Paratypes*. 2 males with same data as holotype (in BMNH).

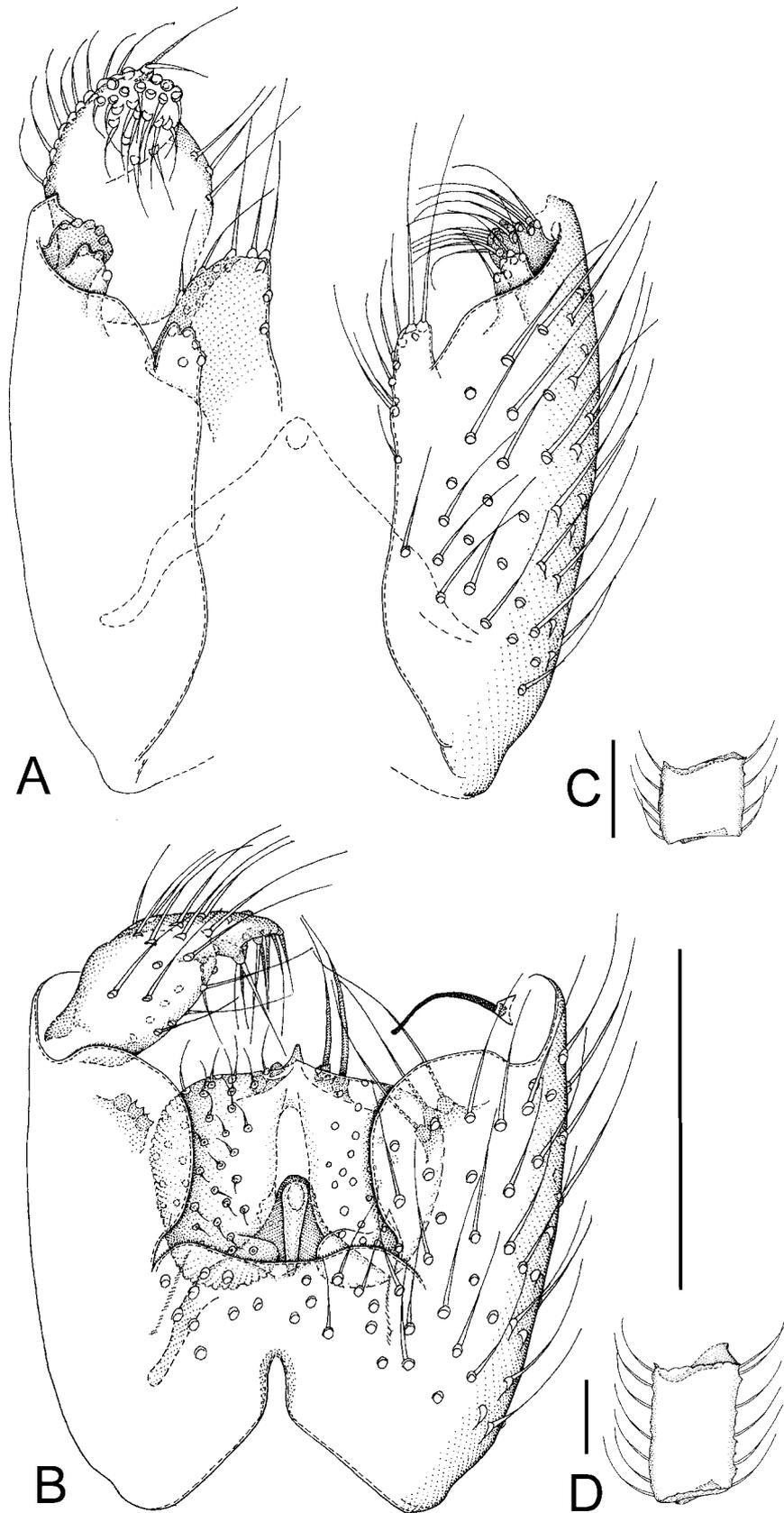
*Other material*. 1 male, Papua New Guinea, Madang province, Hapurpi village, nr. Halopa mission, 700 m a. s. l., S 5° 05', E 145° 41', primary rainforest, Malaise trap, February 2001, Amari & Novotny leg. (in NRM).

### ***Manota explicans* sp. n.**

(Figs 1B, 2E, 9A–D)

#### A small-sized *Manota*

Male. **Coloration.** Pale brown, dorsal part of head darker brown, mouthparts and legs paler than thorax but basal part of femur 3 darker, in some specimens the latter indistinct, in some specimens faint traces of darkening in the basal part of femur 2, wing unicolorous, hyaline pale yellowish-brown, knob of haltere dark. **Head.** Antennal flagellomere 4, Fig. 9D. Palpomere 3 of maxillary palpus with apicomeres extension, with 4–5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern, Fig. 1B: anepisternum setose, with 9–15 setae, the setae on anterior half of the sclerite; anterior basalare non-setose; preepisternum 2 setose, with 18–26 setae; laterotergite setose, with ca. 8–17 setae; episternum 3 setose, with 9–18 setae, the setae concentrated on anterior half. **Wing.** Length 1.6–1.9 mm. **Hypopygium** (Figs 9A, B). Sternite 9 posteriorly extending to approximately halfway between the base of gonocoxa and the base of gonostylus, laterally fused with gonocoxa except for the extreme posterior part, posterior margin slightly notched, anterior margin deeply incised, setae similar to ventral setae of gonocoxa. Parastylar lobe distinct but concealed under the large rounded mesial lobe of gonocoxa, with three setae directed obliquely posteriorly. Paraapodemal lobe indistinct, not exposed in ventral view. The dorsal mesial margin of gonocoxa with a setose lobe just beyond the middle and two similar lobes subapically. One juxtagonostylar seta present: a curved megaseta arising from a small basal body which is scarcely more than the socket of the megaseta, the megaseta probably expanded at apex, similar to *M. serawei* (Fig. 4A), but the character cannot be clearly seen in any of the specimens. Gonostylar apodemes not observable in the specimens studied, apparently because the hypopygia were not treated with KOH. Paraapodemal lobe not exposed, probably absent. Gonostylus elongate, tapering towards the apex, with rather uniform moderately long setae ventrally and laterally, mesially and



**FIGURE 9.** *Manota explicans* sp. n.: **A.** Hypopygium, dorsal view (holotype). **B.** Hypopygium, ventral view (paratype). **C.** Female antennal flagellomere 4, lateral view. **D.** Male antennal flagellomere 4, lateral view (paratype). Scale for A and B 0.10 mm, for C and D 0.05 mm.

dorsally non-setose except for an apicomerial area of long straight setae. Tegmen broadly triangular, with weak lateral shoulders, with an unusually long apicoventral tube. Hypoproct unusually large, filling the space between gonocoxae and tergite 9, with ca. 50 scattered ventral setae on each half. Cerci separate.

Female. Similar to male. Antennal flagellomere 4, Fig. 9C. Anepisternum with 6 setae, anterior basalar non-setose, preepisternum 2 with ca. 13 setae, laterotergite with ca. 9 setae, episternum 3 with 5 setae. Wing length 2.1 mm. Apical part of abdomen, Fig. 2E: setae on tergite 9 arising from basal bodies, which are much longer than they are basally wide. Cercus two-segmented.

Preimaginal stages unknown.

**Discussion.** *M. explicans* somewhat resembles *M. perissochaeta* even though the species are abundantly different. The lobes at the dorsal mesial margin of gonocoxa are reminiscent but much more strongly expressed in *M. explicans*, and the more apical of the two subapical lobes is exposed, not concealed under the more basal one. The latter lobe is also narrower and not similarly contiguous with the dorsalmost margin as it is in *M. perissochaeta*. In addition, the species are distinguished as follows: in *M. explicans* sternite 9 is laterally fused with the gonocoxa, without a long lateral margin, the ventral mesial margin of gonocoxa is strongly convex, not straight with a curvature at the parastylar lobe, the parastylar lobe is broad and with three setae instead of a tiny inconspicuous plate with two setae, there is only one juxtagonostylar seta instead of two, the hypoproct is unusually large, wider than the space between gonocoxae and anteriorly extending under the posterior part of tergite 9 instead of being of the usual proportions, the anterior margin of hypoproct lacks the strong long setae typical for *M. perissochaeta*, and the cerci are separate, not medially fused. The unusually large hypoproct separates *M. explicans* from all the other *Manota* for which this character is described. *M. explicans* and *M. perissochaeta* bear some resemblance to *M. serawei* in the characters of the hypopygium, but have a setose anepisternum unlike *M. serawei*. For more discussion, see under *M. serawei*. In *M. explicans* the setosity of anepisternum is limited to the anterior half of the sclerite and distinguishes both sexes of the species at least from other species in the Melanesian and Oceanian regions.

**Types.** *Holotype.* Male, Papua New Guinea, Morobe province, Ilauru, Mt. Kolorong, 2200 m, Malaise in primary forest close to field station, 30.X.–11.XI.1999, H. Hippa, R. Norberg and D. Borisch (in NRM).

*Paratypes.* 5 males with same data as holotype (in NRM); 1 male with same data as holotype except 26–30.X (in NRM). 2 males with same data as holotype except 2260 m, Malaise trap in primary mountain forest, 26–30.X.1999 (in NRM).

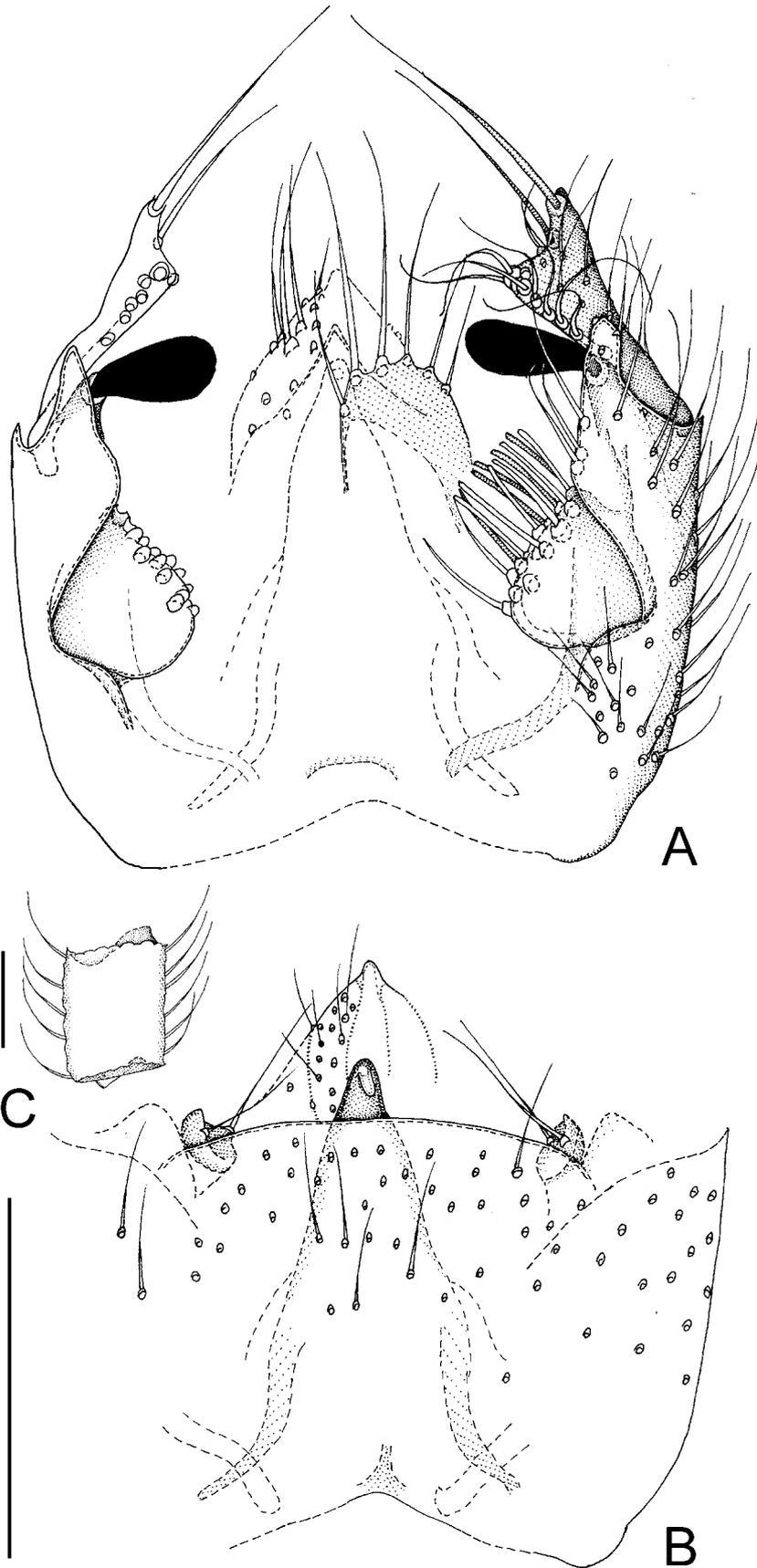
*Other material.* 1 female with same data as the holotype (in NRM).

### *Manota spathula* sp. n.

(Figs 1D, 2D, 10A–C)

A small-sized *Manota*.

Male. **Coloration.** Pale brown, frons, vertex and occiput darker brown, mouthparts and legs slightly paler than thorax but apex of coxa, trochanter and base and apex of femur on legs 2 and 3 darker brown, wing unicolorous, hyaline, pale yellowish-brown, knob of haltere black. **Head.** Antennal flagellomere 4, Fig. 10C. Palpomere 3 with apicomerial extension, with ca. 4 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern, Fig. 1D: anepisternum setose, with 21 setae; anterior basalar setose, with ca. 10 setae; preepisternum 2 setose, with 7 setae; laterotergite setose, with 18 setae; episternum 3 setose, with 8 setae. **Wing.** Length 1.6 mm. **Hypopygium** (Figs 10A, B). Sternite 9 laterally united with gonocoxa except for the extreme posterior part, posterior margin convex, at the level of the base of gonostylus, anterior margin shallowly notched, setosity similar to ventral setosity of gonocoxa. Parastylar lobe present, exposed but partly covered by the posterior part of sternite 9, short, associated with weakly sclerotized lobe in a more lateral position, with two setae directed obliquely posteriad. Paraapodemal lobe not exposed in ventral



**FIGURE 10.** *Manota spathula* sp. n. (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.

view of hypopygium. The dorsal mesial margin of gonocoxa with a large lobe at the middle, bearing many blunt-ended setae on the margin. Apicomeral angle of gonocoxa elongated lobe-like, covering the basal body of the juxtagonostylar megaseta. Number of juxtagonostylar setae one: it is a broad flattened megaseta arising from a basal body half the length of megaseta. Gonostylus elongate, widening towards the slightly bilobed apex, with two closely set very long apical setae, with a row of stronger dorsomesial setae diverging from the other rather weak setosity. Tegmen with weak lateral shoulders. Hypoproct long, extending posteriorly nearly as far as the apex of gonostylus, with ca. 15 scattered ventral setae on each half. Cerci separate.

Female. Similar to male. When seen in ventral view, antennal flagellomere 4 in both specimens with the length/width ratio 1.3–1.6. Palpomere 3 with 4–5 curved sensilla. Anepisternum with 30–49 setae, anterior basalare with 5–6 setae, preepisternum 2 with ca. 2–4 setae, laterotergite with 25–28 setae, episternum 3 with 11 setae. Wing length. 2.0–2.3 mm. Apical part of abdomen, Fig. 2D: the basal tubercles of the long setae on tergite 9 unusually small, as long as basally wide. Cercus two-segmented.

Preimaginal stages unknown.

**Discussion.** See under *M. subspathula*.

**Types.** *Holotype*. Male, Papua New Guinea, Morobe province, Ilauru, Mt. Kolorong, 2200 m, Malaise trap in forest close to field station, 26–30.X.1999, H. Hippa, R. Norberg and D. Borisch (in NRM).

*Additional material*. 1 female with same data as holotype (in NRM). 1 female with same data as holotype except for Malaise trap in forest near big lookout, 26–30.X.1999 (in NRM).

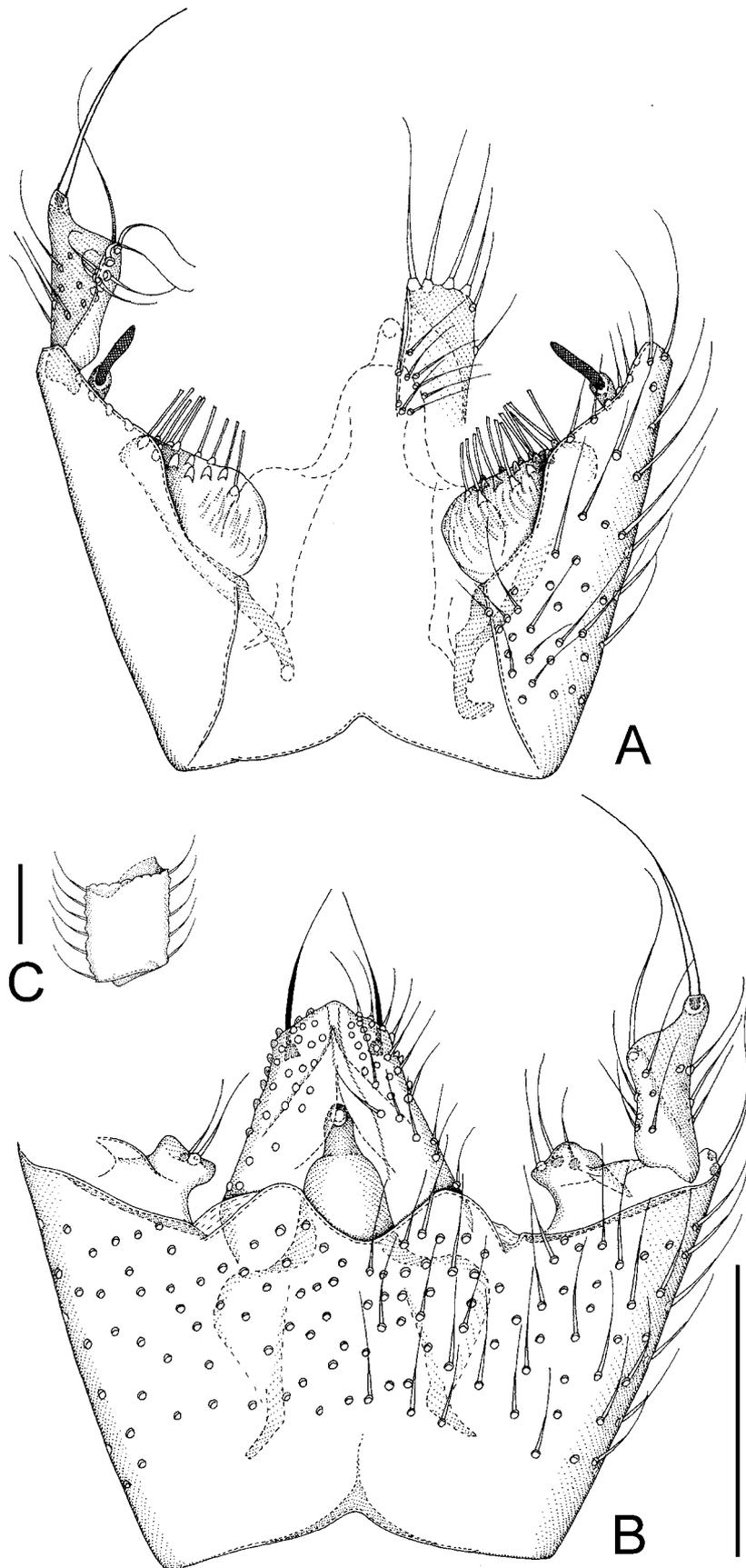
### *Manota subspathula* sp. n.

(Figs 11A–C)

A small-sized *Manota*.

Male. **Coloration.** Pale brown, frons, vertex and occiput darker brown, mouthparts and legs slightly paler than thorax but apex of coxa, trochanter and base and apex of femur on legs 2 and 3 darker brown, wing unicolorous, hyaline, pale yellowish-brown, knob of haltere black. **Head.** Antennal flagellomere 4, Fig. 11C. Palpomere 3 of maxillary palpus with apicomeral extension, with ca. 4 apically expanded curved sensilla; the two apical palpomeres absent on both sides of the single specimen. **Thorax.** Pleural setosity pattern similar to Fig. 1D: anepisternum setose, with 24 setae; anterior basalare setose, with 6 setae; preepisternum 2 non-setose; laterotergite setose, with 26 setae; episternum 3 setose, with ca. 4 setae. **Wing.** Length 1.5 mm. **Hypopygium** (Figs 11A, B). Sternite 9 laterally united with gonocoxa except for the extreme posterior part, posterior margin deeply emarginated, extending to the level of the base of gonostylus, anterior margin shallowly notched, setosity similar to ventral setosity of gonocoxa. Parastylar lobe present and well exposed, with two or three setae directed obliquely posteriad, associated with weakly sclerotized lobes on its lateral side. Paraapodemal lobe not exposed in ventral view of hypopygium. The dorsal mesial margin of gonocoxa with a large lobe in the middle, bearing many blunt-ended setae at the margin and a fur-like substance on the dorsal surface, unlike other similar species. Number of juxtagonostylar setae one: it is a strong non-flattened megaseta arising from a basal body, which is slightly shorter than half the length of the megaseta. Gonostylus elongate, widening towards the slightly bilobed apex, with two long apical setae, with a row of dorsomesial setae diverging from the other rather weak setosity. Tegmen unusually shaped, with very strong lateral shoulders. Hypoproct long, extending posteriorly nearly as far as the apex of gonostylus, with ca. 20 scattered ventral setae. Cerci separate.

Female and preimaginal stages unknown.



**FIGURE 11.** *Manota subspathula* sp. n. (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.

**Discussion.** *M. subspathula* is similar to *M. spathula* but can be distinguished e.g. by the following characters: 1) the posterior margin of sternite 9 is notched, not convex, 2) the large lobe at the middle of the dorsal mesial margin of gonocoxa has a fur- or velvet-like substance on its dorsal surface, bare in *M. spathula*, 3) the juxtagonostylar megaseta is narrow, greatly expanded in *M. spathula*, 4) the long apical setae of gonostylus are wide apart, with one at the apicolateral corner and the other at the apicomesial corner, in *M. subspathula* both the setae are close to each other at the apicolateral corner, and 5) the lateral shoulders of tegmen are much more strongly pronounced. Both species are similar to *M. hirsuta* and to many species outside the Melanesian and Oceanian region. For further discussion, see under *M. hirsuta*.

**Types.** *Holotype*. Male, Papua New Guinea, Madang province, Baitabag village, Kau Wildlife Area, 50 m a. s. l., S 5° 08' E 145° 46', primary forest, Malaise trap 8–21.11.1999, Lukáš Čížek leg. (in NRM).

### ***Manota hirsuta* sp. n.**

(Figs 12A, B)

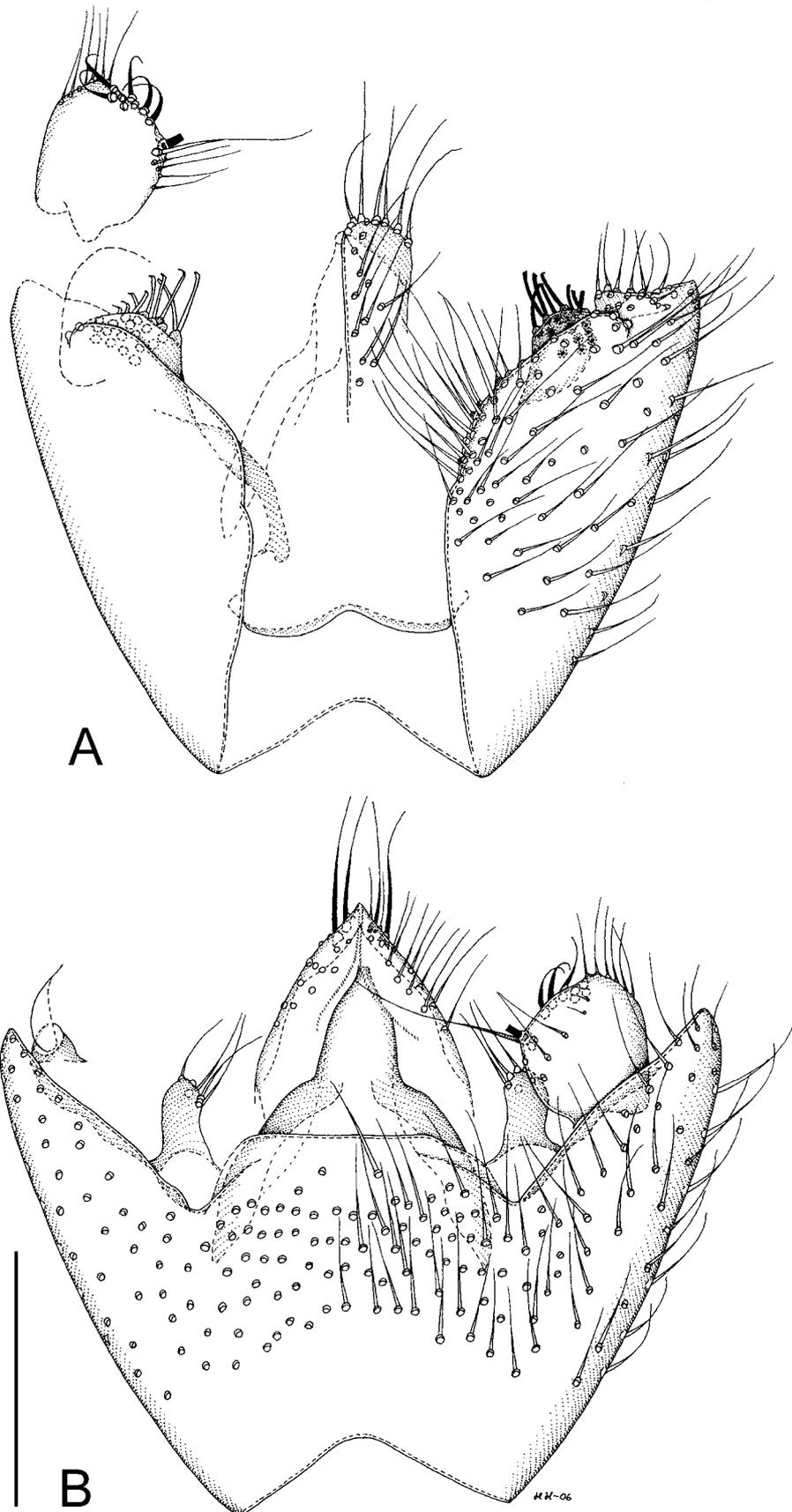
A small-sized *Manota*.

**Male. Coloration.** Pale brown, frons, vertex and occiput darker brown, mouthparts and legs slightly paler than thorax but apices of coxae, trochanters and base and apex of femur on leg 3 darker brown, wing unicolorous, hyaline, pale yellowish-brown, knob of haltere darker. **Head.** Antennal flagellomere 4 in the single specimen present only on one side and is seen in oblique ventral view but is not illustrated, in lateral view apparently similar to Fig. 10C. Palpomere 3 of maxillary palpus with apicomesial extension, with 3 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to Fig. 1C: anepisternum setose, with 24 setae; anterior basalare setose, with 8 setae; the setosity of preepisternum 2 not observed; laterotergite setose, with 33 setae; episternum 3 setose, with ca. 7 setae. **Wing.** Length 1.5 mm. **Hypopygium** (Figs 12A, B). Sternite 9 laterally fused with gonocoxa except for the extreme posterior part, posterior margin straight, at the level of the base of gonostylus, anterior margin shallowly notched, setosity similar to ventral setosity of gonocoxa. Parastylar lobe well exposed, large, longer than broad, with 5 setae directed obliquely posteriad. Paraapodemal lobe not exposed when hypopygium is viewed ventrally. Dorsal mesial margin of gonocoxa with an aggregation of long setae near the middle. More posteriorly the margin curves laterad, forming a weak lobe on the ventral side of which there is another lobe with blunt setae on the margin and on the ventral surface. There is also one indistinct setose lobe posteriorly from these two lobes. The juxtagonostylar setae cannot be clearly observed in the single specimen: there seems to be one flattened, pale, transparent megaseta arising from a strong but rather short basal body. Gonostylus short, almost round, apicomesially with two prominent setae, the thicker one of which is broken on both sides in the single specimen, apicodorsally with thick short setae diverging from the other scanty setosity. Tegmen with rather strong sloping lateral shoulders. Hypoproct extending further posteriad than the apex of gonostylus, with ca. 12 scattered ventral setae on each side. Cerci separate.

Female and preimaginal stages unknown.

**Discussion.** *M. hirsuta* is similar to *M. spathula* and *M. subspathula*. It is distinguished from both e.g. by the following characters: 1) the posterior margin of sternite 9 is straight, not convex or notched, 2) the parastylar lobe is longer than basally broad, not as long as broad or shorter, 3) there is an aggregation of long setae at the middle of the dorsal mesial margin of gonocoxa, 4) the lobe with blunt setae on the same margin is placed far into the apical (posterior) half, not in the middle, and 5) the gonostylus is short, almost round, instead of elongated and with distinct apicolateral and apicomesial corners.

These three species are similar to two Neotropical species: *M. squamulata* Jaschhof and Hippa and *M. major* Jaschhof and Hippa but it is difficult to find any common characters for distinguishing them. *M. spathula* and *M. subspathula* with the slightly bilobed gonostylus resemble *M. squamulata* but *M. squamulata*



**FIGURE 12.** *Manota hirsuta* sp. n. (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. Scale 0.10 mm.

has the apical lobes more distinct and it has the gonostylus shorter and broader, almost as in *M. hirsuta*. Furthermore, *M. spatula* is distinguished by its greatly expanded juxtagonostylar megaseta and *M. subspathula* by its notched apical margin of tergite 9. *M. hirsuta* differs e.g. by the aggregation of long setae at the middle of the dorsal mesial margin of the gonostylus and by having the lobe with blunt setae on the same margin more posterior in position, the Neotropical species resembling *M. spathula* and *M. subspathula* in this respect; the gonostylus is similar to *M. major* but in that species the two long apicomesial setae are equally thick.

*M. hirsuta*, *M. spathula* and *M. subspathula* are also similar to those Oriental and Afrotropical species which have tergite 9 extending posteriorly to the level of the base of the gonostyli and laterally fused with the gonocoxa. In the Oriental region these species are *M. biloba* Hippa, *M. dentata* Hippa and Papp, *M. heptacantha* Hippa, *M. simplex* Hippa and *M. clausa* Hippa, and in the Afrotropical region at least *M. flavipes* (Enderlein), *M. serrata* Söli, *M. sespinea* Söli and *M. teocchi* Matile, but there are several Afrotropical species in which the exact character of the tergite 9 is not known. *M. dentata* and *M. biloba*, *M. heptacantha*, and all the Afrotropical species differ from *M. hirsuta*, *M. spathula* and *M. subspathula* by having megasetae on the dorsal mesial margin of gonocoxa. *M. heptacantha* in which the megasetae are relatively weak and may resemble the blunt-ended setae in the New Guinean species does not have these setae on a prominent lobe that is exposed in dorsal view. In *M. simplex* and *M. ulu* Hippa there is a dorsal mesial lobe with sharp setae and the lobe is covered by the more dorsal part of the gonocoxa. All the Oriental species have one fine juxtagonostylar seta unlike the New Guinea species, which have a megaseta.

**Types.** *Holotype*. Male, Papua New Guinea, Madang Prov., Hapurpi village, nr. Halopa mission, 700 m a. s. l., S 5° 05' E 145° 41', primary rainforest, Malaise trap, January 2001, Amari & Novotny leg. (in NRM).

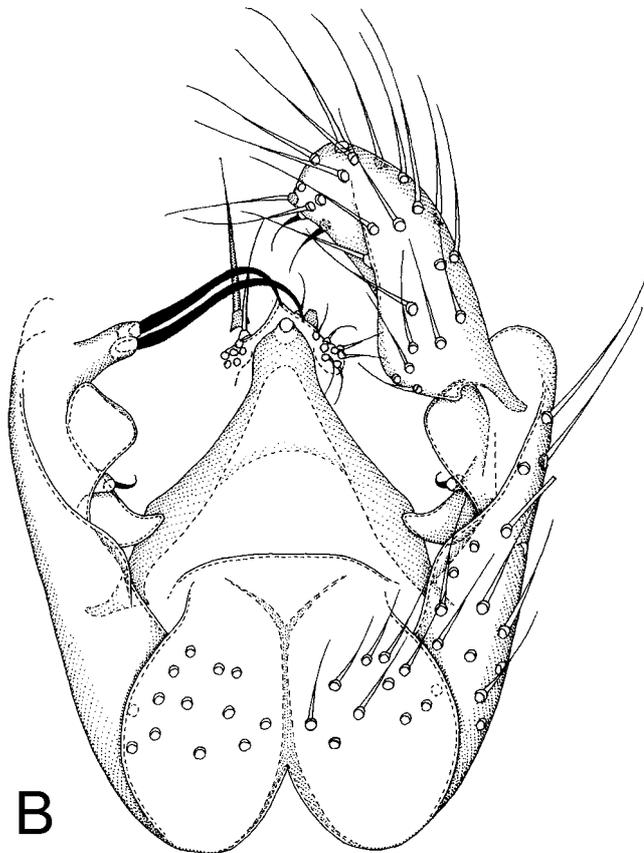
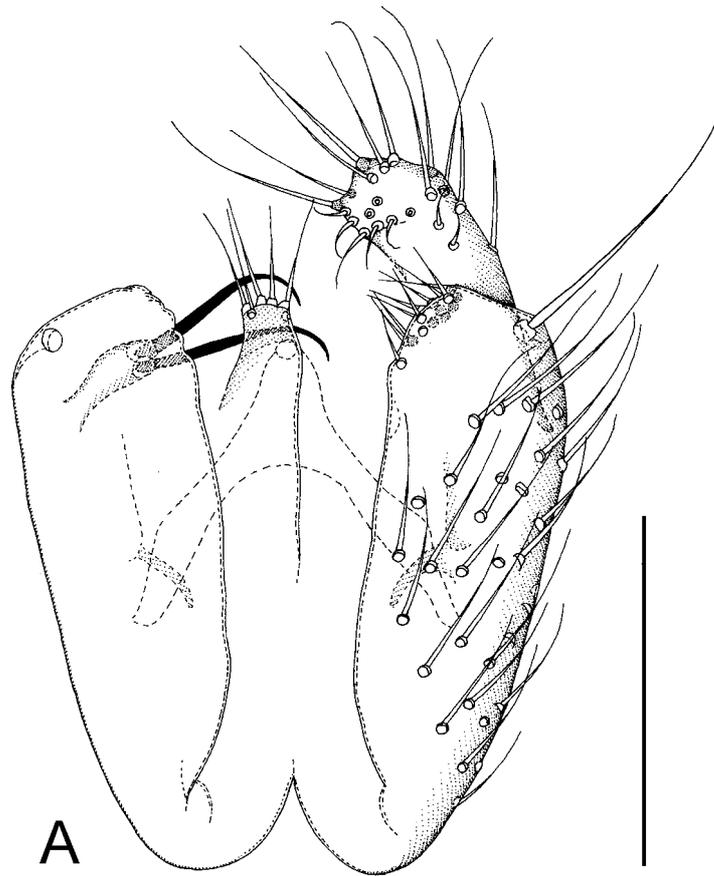
### ***Manota biunculata* sp. n.**

(Figs 13A, B)

A small-sized *Manota*.

Male. **Coloration.** Pale yellowish-brown, frons, vertex and occiput darker, mouthparts and legs slightly paler than thorax, wing unicolorous, hyaline, pale yellowish-brown, haltere yellowish-brown. **Head.** Antennal flagellomere 4, in the single specimen, seen in oblique ventral view and not illustrated, the lateral view apparently similar to Fig. 10C. Palpomere 3 of maxillary palpus with apicomesial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Anepisternum setose, with 37 setae; anterior basalare non-setose; preepisternum 2 setose, with 9 setae; laterotergite setose, with 9 setae; episternum 3 setose, with 8 setae. **Wing.** Length 1.4 mm. **Hypopygium** (Figs 13A, B). Sternite 9 extending halfway between the base of gonocoxa and the base of gonostylus, laterally sharply delimited, posterior margin transversely straight, anterior margin deeply incised, setae similar to ventral setae of gonocoxa. Parastylar lobe exposed, with 1 transverse seta arising from a small lobe on its anterior part. Paraapodemal lobe exposed in ventral view. The dorsal mesial margin of gonocoxa simple, subapically with an aggregation of setae, mostly on ventral side. Two long apically curved juxtagonostylar megasetae present, arising from a large basal body, which is about half the length of megasetae. Gonostylus elongate, with long setae, dorsally also with short setae some of which are on a low subapical transverse crest. Tegmen broadly triangular, with weakly expressed shoulders. Hypoproct small, posteriorly extending to the level of the middle of gonocoxa, with ca. 7 ventral setae on each side in a rather tight anterolateral group. Cerci separate.

Female and preimaginal stages unknown.



**FIGURE 13.** *Manota biunculata* sp. n.: **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. Scale 0.10 mm.

**Discussion.** *M. biunculata* resembles *M. gemella* and *M. tricuspis*. It is distinguished from both by having two subequal juxtagonostylar megasetae, not one megaseta and a shorter normal seta, and by lacking a long apical lobe dorsally on gonocoxa, which is apicomesial in *M. tricuspis* and apicolateral in *M. gemella*. Furthermore, it differs from *M. tricuspis* by lacking the three huge setae apically on gonostylus and from *M. gemella* by lacking a small lobe in the middle of the mesial margin of gonostylus. *M. biunculata* is also similar to the Oriental *M. orientalis* Senior-White but differs by the same characters as *M. gemella*. *M. biunculata* resembles the Oriental *M. angustata* Hippa but differs e.g. by having the gonostylus much broader, 1/3 of the length instead of 1/5, by lacking a distinct subapical mesial lobe on the gonostylus, and by having the two juxtagonostylar megasetae subequal in size, not conspicuously unequal. *M. biunculata* also resembles the Oriental *M. ovata* Hippa but differs e.g. by having the mesial margin of gonostylus concave, not convex, by lacking a conspicuous fringe of long setae on this margin, and by lacking a distinct transverse lobe dorso-apically on the gonocoxa. The hypopygium of *M. biunculata* is not dissimilar to the Oriental *M. calcarata* Hippa, *M. pro-cera* Hippa and *M. transversa* Hippa, but all these species have a long apicolateral lobe dorsally on the gonocoxa and a non-setose laterotergite.

**Types.** *Holotype.* Male, Papua New Guinea, Madang prov., Halopa village, primary rainforest, 600 m a. s. l., Malaise trap, November 2000, Lukáš Čížek leg. (in NRM).

***Manota tricuspis* sp. n.**  
(Figs 14A–C)

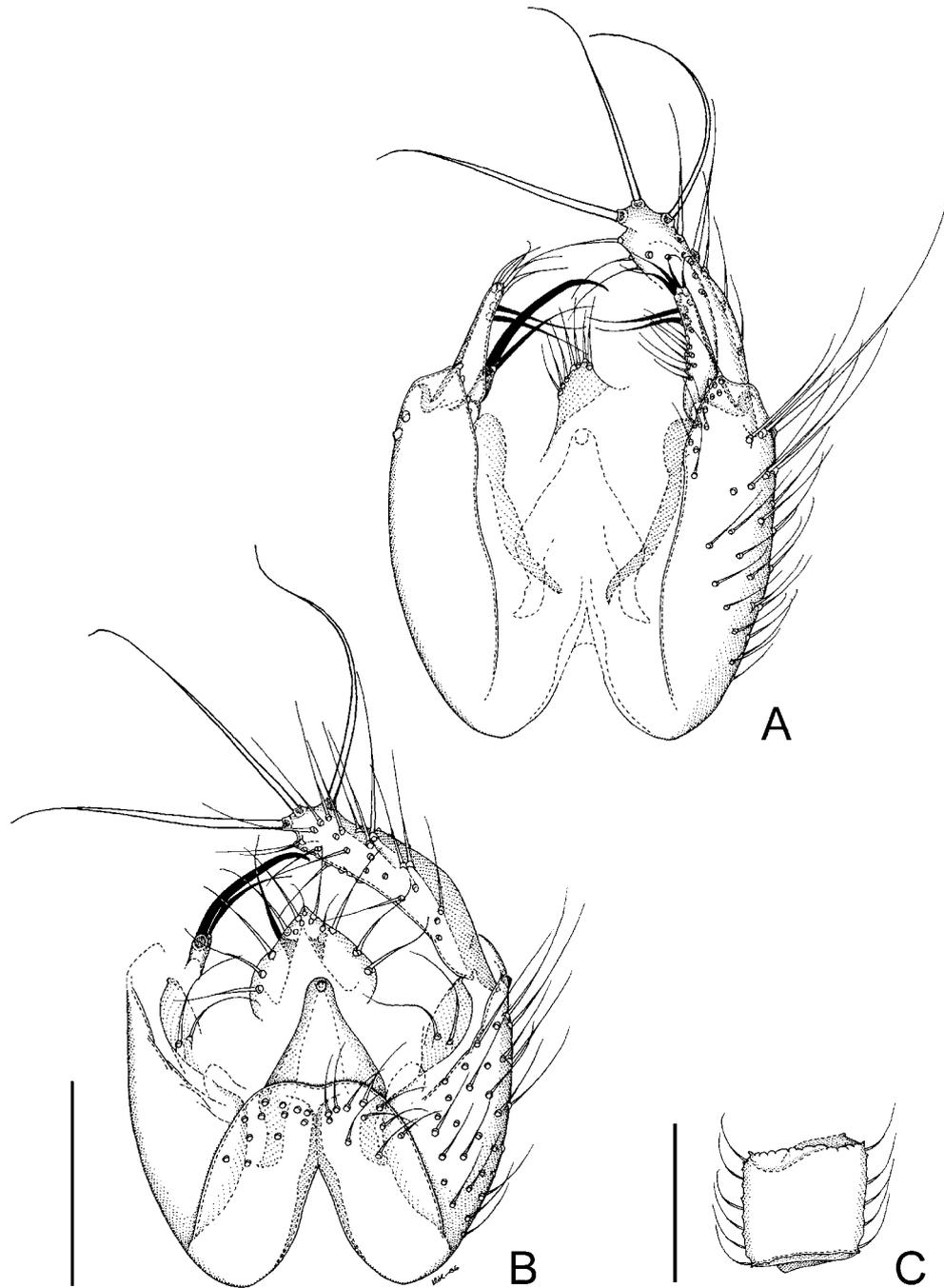
A small-sized *Manota*.

Male. **Coloration.** Almost unicolorous pale yellowish-brown. **Head.** Antennal flagellomere 4, Fig. 14C. Palpomere 3 of maxillary palpus with apicomesial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to *M. bicuspis*, Fig. 1E: anepisternum setose, with 52 setae; anterior basalar non-setose; preepisternum 2 setose, with 19 setae; laterotergite setose, with ca. 28 setae; episternum 3 setose, with ca. 10 setae. **Wing.** Length 1.6 mm. **Hypopygium** (Figs 14A, B). Sternite 9 extending halfway between the base of gonocoxa and the base of gonostylus, laterally sharply delimited, posterior margin slightly notched, anterior margin deeply incised, setae similar to ventral setae of gonocoxa. Parastylar lobe well exposed, flat, with 2 posteriorly directed setae. Paraapodemal lobe exposed in ventral view of hypopygium. The dorsal mesial margin of gonocoxa simple except for a large setose lobe apically. Two juxtagonostylar setae present, a long slightly curved megaseta and a slightly shorter seta, arising from a basal body, which is about one-fourth of the length of the megaseta. Gonostylus elongate, simple, with long setae, apically with three strong setae, which are nearly as long as the gonostylus. Tegmen narrowly triangular, with weakly expressed shoulders. Hypoproct posteriorly extending to the level of the middle of gonocoxa, with ca. 7 setae on each side, mostly placed at the lateral margin. Cerci separate.

Female and preimaginal stages unknown.

**Discussion.** *M. tricuspis* resembles *M. gemella* but differs in its quite different gonostylus, which is twice as long, has three huge apical setae and lacks a small setose lobe at the middle of the mesial margin. Furthermore, the setose lobe apicodorsally on the gonocoxa is more mesial in position and has at its mesial margin two transversely directed setae, which diverge from the other setosity.

**Types.** *Holotype.* Male, Fiji, Viti Levu, Karst de Qalimare, Toga, 50 m, PM, 21.VIII. 1998, 17° 59' S 177° 36' E, forêt sclerophylle, P. Bouchet (in MNHN).

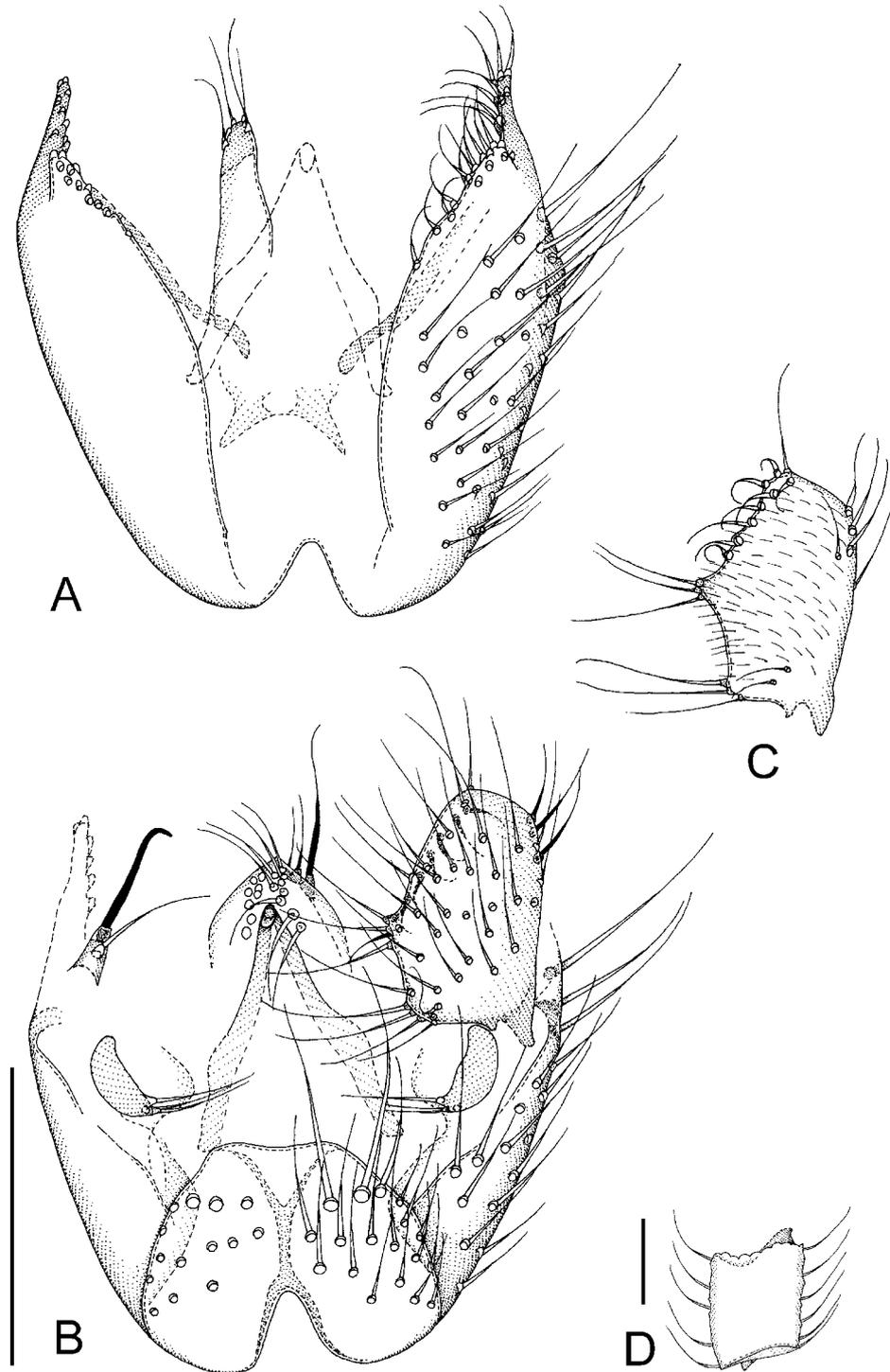


**FIGURE 14.** *Manota tricuspis* sp. n. (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.

***Manota gemella* sp. n.**  
(Figs 15A–D)

A small-sized *Manota*.

**Male. Coloration.** The apparently strongly faded coloration is pale yellowish-brown, antennal flagellum, posterior parts of thorax, including episternum 3, and a small basal patch posteriorly on hind coxa and the



**FIGURE 15.** *Manota gemella* sp. n. (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Gonostylus, dorsal view. **D.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.

abdominal tergites darker brown. **Head.** Antennal flagellomere 4, Fig. 15D. Palpomere 3 of maxillary palpus with apicomeresial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Anepisternum setose, with 45–56 setae; anterior basalare non-setose; preepisternum 2 setose, with 19–21 setae; laterotergite non-setose; episternum 3 setose, with 9–15 setae. **Wing.** Length 1.3–1.5 mm. **Hypopygium** (Figs 15A–C). Sternite 9 extending halfway between the base of gonocoxa and the base of gonostylus, laterally sharply delimited, posterior margin slightly notched, anterior margin deeply incised, setae similar to

ventral setae of gonocoxa except for a transverse row of the three or four most posterior setae which are much stronger. Parastylar lobe exposed, flat, with 3 transversely directed setae anteriorly. Paraapodemal lobe exposed in ventral view. The dorsal mesial margin of gonocoxa simple except for a small setose subapical lobe. Apically and laterally of the latter, the gonocoxa is produced as a narrow setose lobe. Two juxtagonostylar setae present, a long slightly curved megaseta and a slightly shorter normal seta, both arising from a basal body, which is nearly half the length of the megaseta. Gonostylus elongate-oval, with two small lobes on the mesial margin, one just basal of the middle, the other very inconspicuous one forming a basomesial corner of the gonostylus; with moderately long setae ventrally, dorsally with a row of short curved submarginal setae mesially on the apical half of gonostylus and with a row of three rather conspicuous longer setae on the opposite lateral side, otherwise almost non-setose but with rather conspicuous microtrichia. Tegmen narrowly triangular, with weakly expressed shoulders. Hypoproct extending posteriorly to the level of the apical half of gonocoxa, with ca. 8 ventral setae on each side in an indistinct mesial row. Cerci separate.

Female. Unknown.

**Discussion.** *M. gemella* is similar to *M. orientalis* Senior-White as interpreted by Edwards (1928), known from Sri Lanka. It differs by the shorter gonostylus, which is less than twice as long as broad instead of being over three times as long as broad, and by having the lobes on the mesial margin of the gonostylus smaller and more basally situated, the more basal one being at the basomesial corner and the other just basal of the middle; in *M. orientalis* the first is about one-third of the gonostylar length from the base and the second is distinctly in the apical half. Furthermore, in *M. orientalis* there are three very long setae apically on the gonostylus. The setae are about one third of the gonostylar length and possibly correspond to the rather short dorsal apicolateral setae of *M. gemella* as shown in Figs 15B and C. The apicodorsal structure of the gonocoxa in the two species is very similar except that the two lobes seem to be a little stronger in *M. orientalis*. *M. gemella* differs from all the species of the Australasian region by its non-setose laterotergite. The hypopygium resembles that of *M. tricuspis*, but is distinguished e.g. by lacking the three huge setae apically on the much longer gonostylus, by lacking the two strong transverse setae mesially on the apicodorsal lobe of gonocoxa and by having the setae posteriorly on tergite 9 much stronger than the more anterior ones.

**Types.** *Holotype.* Male, (Indonesia, Maluku Utara), Amboine (Ambon), Waii, 500 m, 15.X–7.XI.1991, Ph. Bouchet (in MNHN).

*Paratypes.* 1 male with same data as holotype (in MNHN).

### ***Manota hamulata* Colless** (Figs 16A–D)

*Manota hamulata* Colless, 1966: 656.

A small-sized *Manota*.

**Male. Coloration.** Pale yellowish-brown, frons, vertex and occiput darker brown, mouthparts and legs paler than other parts, wing unicolorous, knob of haltere black. **Head.** Antennal flagellomere 4, Fig. 16D. Palpomere 3 of maxillary palpus with apicomeresial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to *M. bicuspis*, Fig. 1E: anepisternum setose, with 39–69 setae; anterior basalar non-setose; preepisternum 2 setose, with 9–27 setae; laterotergite setose, with ca. 22–30 setae; episternum 3 setose, with ca. 5–26 setae. **Wing.** Length 1.4 mm. **Hypopygium** (Figs 16A–C). Sternite 9 extending posteriorly near to the level of the gonostylar base, sharply delimited laterally, posterior margin convex, medially acuminate, anterior margin deeply incised, the setae similar to adjacent ventral setae of gonocoxa. Parastylar lobe well exposed in ventral view, with a large lobe directed obliquely posteriorly and two lobe-like expansions at base, with one seta at the apex of the large lobe and two

setae more basally on the dorsal side of that lobe, one of these two setae more anterior and one more posterior. Paraapodemal lobe exposed in ventral view, not drawn in Fig. 16A, similar to *M. parilis*, Fig. 18A. The dorsal mesial margin of gonocoxa with a large rounded setose lobe at the middle and a large broad lobe apically with a few rather strong setae on mesial margin and with two or three long setae arising from the ventral surface. Two juxtagonostylar setae present, a curved megaseta and a strong seta, both arising from a common basal body which is longer than the megaseta, the megaseta at the apex of the basal body, the seta more basal in position. Gonostylus laterally flattened, the dorsal and ventral surfaces very narrow, in lateral view the gonostylus subtriangular with a narrow basal part and a broad apical part, the apicodorsal margin very indistinctly lobed, the setae on dorsal, lateral and ventral faces similar to ventral hairs of gonocoxa, the apical margin of gonostylus with a row of setae directed mesad with the two or three most dorsal setae thicker than the others but not conspicuously so, the mesial face of gonostylus non-setose and without prominent microtrichia. Tegmen elongate-triangular, without distinct lateral shoulders. Hypoproct posteriorly extending to the level of the base of gonostylus, with ca. 20 long scattered ventral setae on each half. Cerci separate.

Female and preimaginal stages unknown.

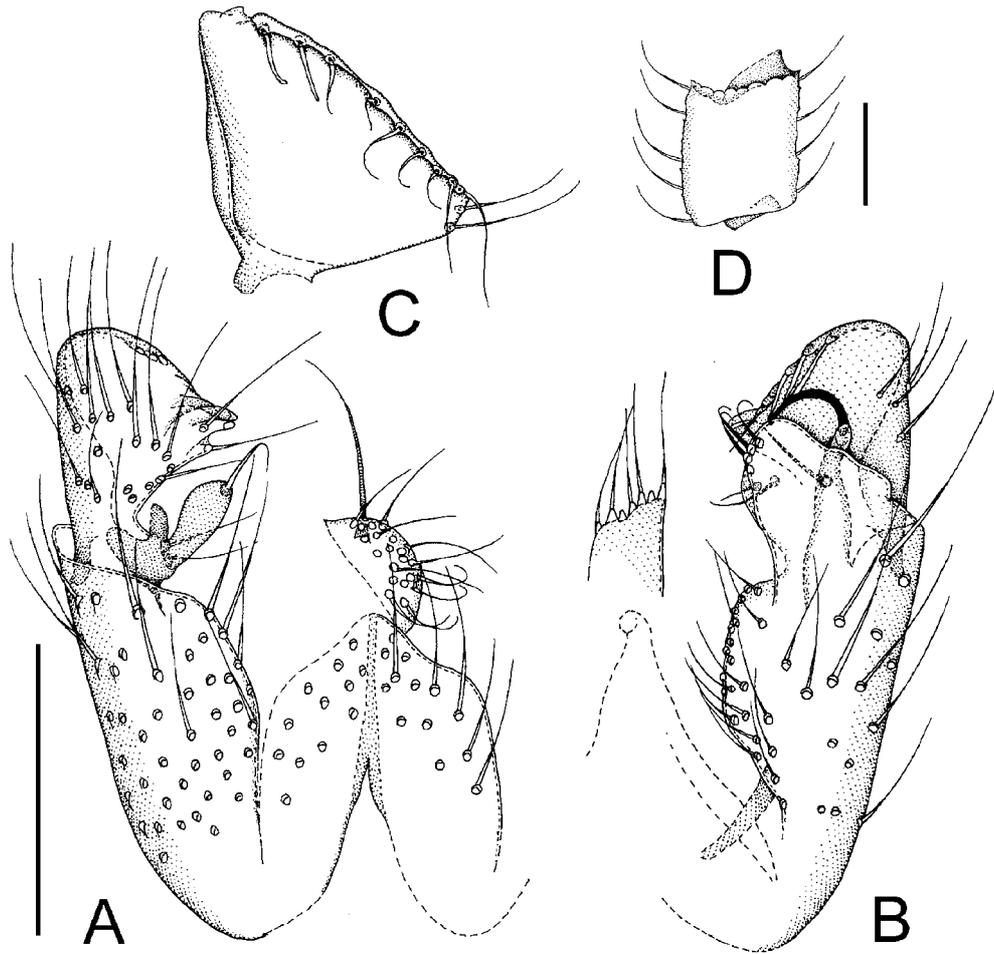
**Discussion.** *M. hamulata* was described from the Caroline Islands, Palau Islands: the holotype male from Angaur Island and a paratype male each from Babelthuap Island and Malakal Island, but it has not been recorded since. I have not studied the type-material, but the excellent description by Colless (1966) leaves scarcely any doubt as to the conspecificity of my present New Guinea specimens: The hypopygium is similar and the unusually shaped and complex parastylar lobe is exactly the same in the New Guinea specimens as in Colless' drawing.

The specimens from Tekadu differ from the other specimens by having three, not two, stronger setae dorsally at the apical margin of gonostylus. They may represent a new species, but the rather poor mounts do not permit a detailed analysis to be made.

*M. hamulata* is similar to *M. bicuspis*. It is distinguished as follows: 1) The parastylar lobe has two small lobes at the base of the long main part and the latter is slightly constricted at the base, but in *M. bicuspis* there is only one inconspicuous smaller lobe at the base of the parallel-sided main part. The shape of the parastylar lobe is somewhat sensitive to its position in the mount and the more dorsal of the two small basal lobes may be difficult to observe when the tip of the large lobe is moved in a dorsal direction from the position shown in Fig. 16A. 2) The two or three enlarged setae mesially at the dorsal part of the apical margin of gonostylus are relatively weak, not much stronger than the unmodified setae on the same margin, and they do not arise from a distinct small lobe, but in *M. bicuspis* the setae are conspicuously stronger than the other setae on the margin and they arise from a distinct small lobe. 3) The row of setae at the above-mentioned margin of gonostylus is contiguous instead of being interrupted by a gap ventral of the stronger setae, and the setae are rather wide apart so that the distance between them is longer than the diameter of their sockets, unlike *M. bicuspis* in which the distance is only one socket wide or shorter. 4) The lobe at the middle of the dorsal mesial margin of the gonocoxa is more strongly pronounced and has more setae, ca. 20 instead of ca 10. In the present material at least, *M. hamulata* is smaller than *M. bicuspis*, wing length 1.4 as opposed to 1.8. mm.

*M. hamulata* and *M. bicuspis* are similar to *M. parilis*. For the distinguishing characters, see under the latter.

**Material studied.** 2 males, Papua New Guinea, Morobe Province, Lakekamu basin, Tekadu, 470 m, bush close to Yenina river, Malaise trap, 17–20.XI. 1999. H. Hippa, R. Norberg and D. Borish (in NRM). 3 males, Papua New Guinea, Madang province, Hapurpi village, near Halopa mission, 700 m a. s. l., S 5° 05', E 145° 41', primary rain forest, Malaise, January and February 2001, Amari & Novotny leg. (in NRM). 1 male with same data except for Halopa village, November 2000 (in NRM).

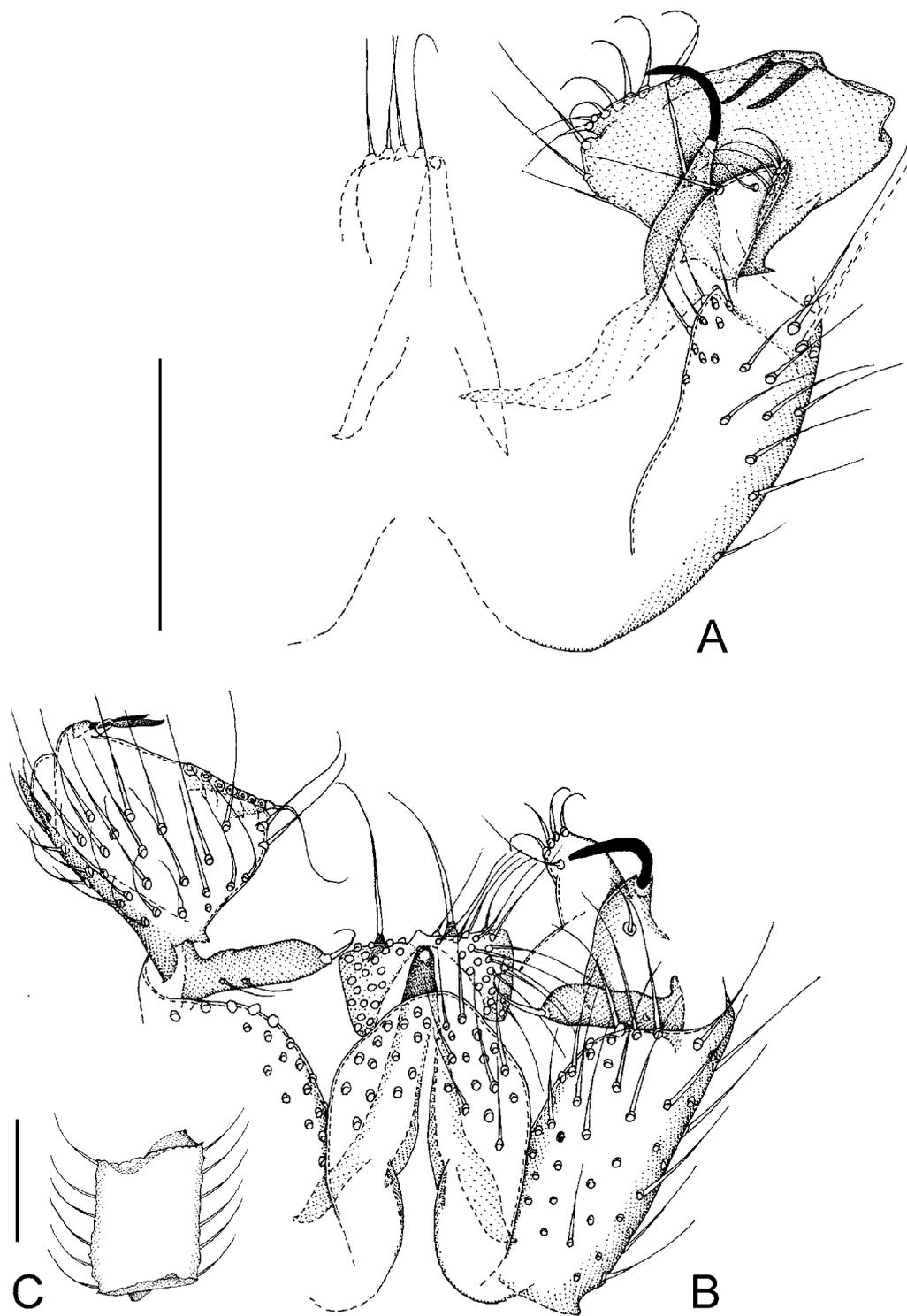


**FIGURE 16.** *Manota hamulata* Colless: **A.** Hypopygium, ventral view. **B.** Hypopygium, dorsal view. **C.** Gonostylus, mesial view. **D.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.

***Manota bicuspis* sp. n.**  
(Figs 1E, 17A–C)

A small-sized *Manota*.

Male. **Coloration.** Pale yellowish-brown, frons, vertex and occiput and abdominal tergites darker brown, mouthparts and legs slightly paler than thorax, wing unicolorous, almost colourless, knob of haltere dark. **Head.** Antennal flagellomere 4, Fig. 17C. Palpomere 3 of maxillary palpus with apicomesial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern, Fig. 1E: anepisternum setose, with 48–58 setae; anterior basalare non-setose; preepisternum 2 setose, with 16–25 setae; laterotergite setose, with 18–28 setae; episternum 3 setose, with 8–11 setae. **Wing.** Length 1.8 mm. **Hypopygium** (Figs 17A, B). Sternite 9 extending posteriorly near to the level of the gonostylar base, laterally sharply delimited, posterior margin convex, medially acuminate, anterior margin deeply incised, the setae similar to adjacent ventral setae of gonocoxa. Parastylar lobe well exposed in ventral view, with a large lobe directed obliquely posteriorly and an indistinct lobe-like expansions at base, with one seta at the apex of the large lobe and two setae more basally on the dorsal side of that lobe, one of these two setae more proximal and one more apical. Paraapodemal lobe exposed in ventral view, not shown in Fig. 17B, similar to *M. parilis*, Fig. 18A. The dorsal mesial margin of gonocoxa with a large rounded setose lobe at the middle and a large broad



**FIGURE 17.** *Manota bicuspis* sp. n.: **A.** Hypopygium, dorsal view (paratype). **B.** Hypopygium, ventral view (holotype). **C.** Antennal flagellomere 4, lateral view (holotype). Scale for A and B 0.10 mm, for C 0.05 mm.

lobe apically with a few rather strong setae on mesial margin and with two or three long setae arising from the ventral surface; the latter lobe similar to that in *M. hamulata*, Fig. 16B, but in Fig 17A it is turned so that the ventral side is exposed. Two juxtagonostylar setae present, a curved megaseta and a strong seta, both arising from a common basal body which is longer than the megaseta, the megaseta at the apex of the basal body, the seta more basal in position. Gonostylus laterally flattened with the dorsal and ventral surfaces very narrow, in

lateral view the gonostylus subtriangular with a narrow basal part and broad apical part, the apicodorsal margin weakly lobed, the setae on dorsal, lateral and ventral faces similar to ventral hairs of gonocoxa, the apical margin of gonostylus with a row of setae directed mesad with the two most dorsal of the setae distinctly thicker than the others and arising from a small lobe, the mesial face of the gonostylus non-setose and without prominent microtrichia. Tegmen elongate-triangular, without distinct lateral shoulders. Hypoproct posteriorly extending to the level of the base of gonostylus, with ca. 20 long scattered ventral setae on each half. Cerci medially separate.

Female and preimaginal stages unknown.

**Discussion.** *M. bicuspis* is similar to *M. hamulata* and *M. parilis*. For the distinguishing characters, see under the two latter.

**Types.** *Holotype.* Male, Papua New Guinea, Morobe province, Wau, Wau Ecology Institute, 1200 m, forest near to hostel, Malaise trap, 24–27.XI.1999, H. Hippa, R. Norberg & D. Borisch (in NRM).

*Paratypes.* One male with same data as holotype (in NRM).

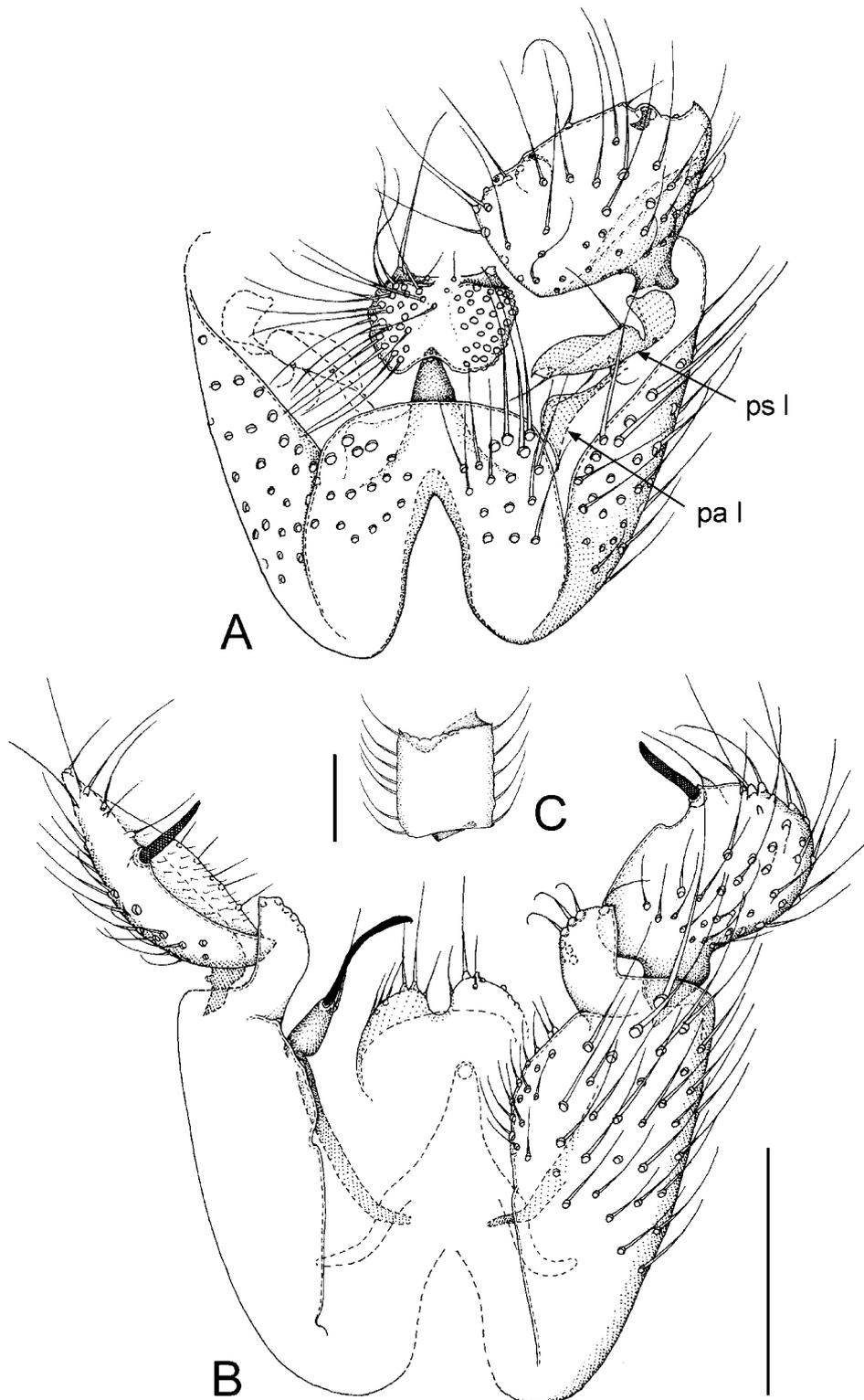
### ***Manota parilis* sp. n.**

(Figs 18A–C)

A small-sized *Manota*.

**Male. Coloration.** Almost unicolorous yellowish-brown, frons, vertex and occiput darker brown, mouth parts and legs paler than other parts but the base of femur 3 and less distinctly the base of femur 2 darker brown, the femoral colour pattern very indistinct in some specimens, wing unicolorous, pale yellowish-brown, knob of haltere dark. **Head.** Antennal flagellomere 4, Fig. 18C. Palpomere 3 of maxillary palpus with apicomeresial extension, with 5–6 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to *M. bicuspis*, Fig. 1E: anepisternum setose, with 46–80 setae; anterior basalare non-setose; preepisternum 2 setose, with 14–35 setae; laterotergite setose, with ca. 18–27 setae; episternum 3 setose, with 10–16 setae. **Wing.** Length 1.5–1.8 mm. **Hypopygium** (Figs 18A, B). Sternite 9 extending posteriorly to halfway between the base of gonocoxa and the base of gonostylus, laterally sharply delimited, posterior margin broadly convex, anterior margin deeply notched, the setae similar to ventral setae of gonocoxa, posterolaterally stronger than on other parts, similar to the stronger ventromesial setae of gonocoxa. Parastylar lobe well exposed in ventral view, bipartite with a short basal part and a long apical part directed obliquely anteromesially, the latter with one subbasal seta posteriorly and three or four more apical setae on dorsal side. The shape of the apical part of the parastylar lobe rather variable between individuals, depending on the angle of view, and it can be twice as broad as in Fig. 18A. Paraapodemal lobe distinct and exposed in ventral view. The dorsal mesial margin of gonocoxa with the slight indication of a very broad setose lobe at the middle and a large narrower lobe apically with a few setae on the mesial and the apical margins and with two or three long setae arising from the ventral surface. Two juxtagonostylar setae present, a curved megaseta and a strong seta, both arising at the apex of a common basal body which is about half as long as the megaseta. Gonostylus laterally flattened with the dorsal and ventral surfaces narrow, in lateral view the gonostylus higher than long with a narrow basal part, the setae on dorsal, lateral and ventral surfaces similar to ventral hairs of gonocoxa, the apical margin of gonostylus with a strong mesially directed megaseta on its dorsal part and a few weaker similarly-directed setae in a more ventral position, the mesial face of gonostylus non-setose but with long microtrichia. Tegmen elongate-triangular, with weakly indicated lateral shoulders. Hypoproct posteriorly extending to the level of the base of gonostylus, with ca. 30 long scattered ventral setae on each half. Cerci united.

Female and preimaginal stages unknown.



**FIGURE 18.** *Manota parilis* sp. n. **A.** Hypopygium, ventral view (paratype). **B.** Hypopygium, dorsal view (holotype). **C.** Antennal flagellomere 4, lateral view (paratype). Scale for A and B 0.10 mm, for C 0.05 mm.

**Discussion.** *M. parilis* is similar to *M. hamulata* and *M. bicuspis*. It is distinguished from both e.g. by the following characters: 1) The setae on the stergite 9 are not uniform but there is an area of distinctly stronger setae posterolaterally. 2) On the parastylar lobe there seems to be no apical seta, but the most apical of the

setae is well removed from the apex. 3) The apical lobe on the dorsal mesial margin of gonocoxa is narrower and its lateral margin forms an angle with the apical margin of gonocoxa. 4) The basal body of the juxtagonostylar setae is only half the length of the megaseta instead of being equally long and the two setae, the megaseta and the usual seta, are at the apex of the basal body, whereas in the two other species only the megaseta is apical and the seta is placed more basally at the side of the basal body. 5) There is one megaseta at the apical margin of the gonostylus instead of two megasetae or two or three thick setae diverging from the other apical setae. 6) The hypoproct has ca. 30 ventral setae instead of ca. 20. The setae are also longer than in *M. hamulata* and *M. bicuspis*. 7) The cerci are medially united, separated only by a notch apically instead of being separate, with a long free mesial margin each. *M. parilis* also differs from *M. hamulata* by having a two-lobed, not a three-lobed parastylar lobe. *M. parilis* is also similar to *M. evexa*. For the distinguishing characters, see under *M. evexa*.

**Types.** *Holotype*. Male, Papua New Guinea, Morobe province, Wau, Wau Ecology Institute, 1200 m, forest at border to coffee plantation, Malaise trap 11–22.XI.1999, H. Hippa, R. Norberg & D. Borisch (in NRM).

*Paratypes*. 3 males with same data as holotype except 8–11.XI. 2 males with same data except Malaise trap under bamboo, 10.–14.XI. 1 male with same data as holotype except Wau, Mt. Kaindi, ca. 1400 m, forested ravine, Malaise trap, 27. X.–08.XI. (in NRM).

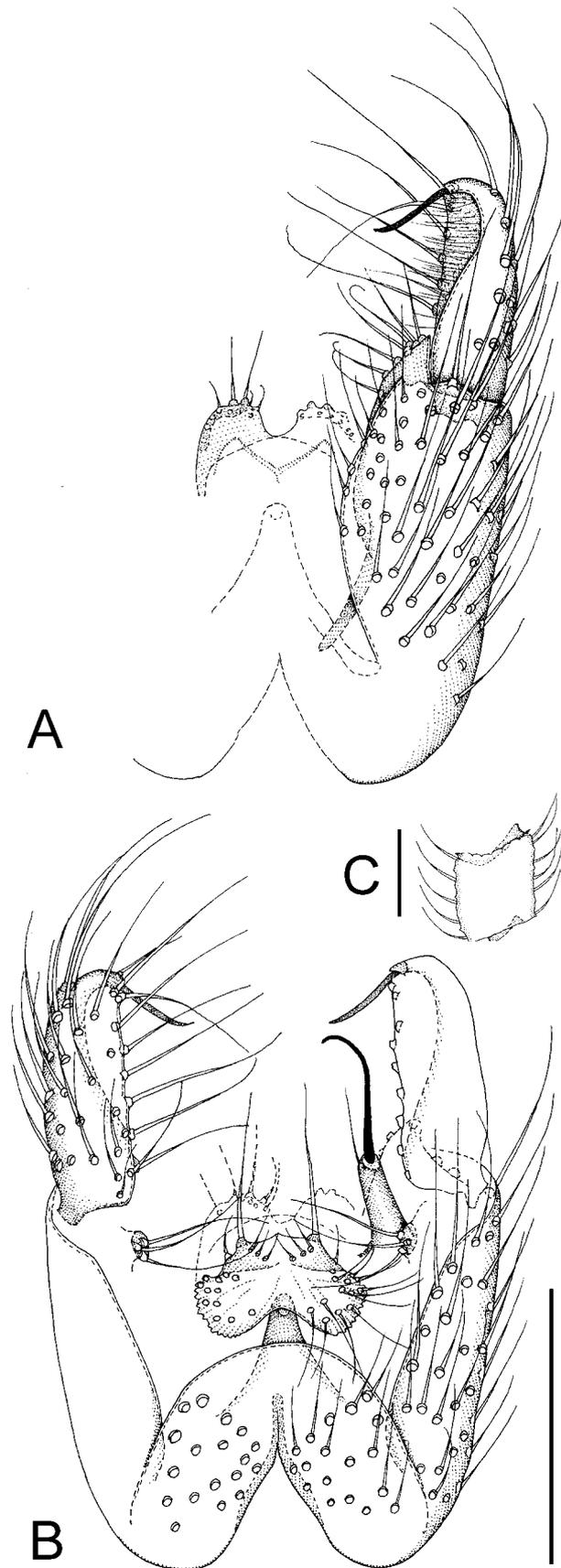
*Other material*. 2 males, Papua New Guinea, Madang province, Hapurpi village, near Halopa mission, 700 m a. s. l., S 5° 05', E 145° 41', primary rain forest, Malaise, January and February 2001, Amari & Novotny leg. (in NRM).

### ***Manota evexa* sp. n.**

(Figs 19A–C)

A small-sized *Manota*

**Male. Coloration.** Pale yellowish-brown but face, frons, vertex and occiput blackish-brown, mouthparts and legs paler than thorax, wing unicolorous pale yellowish-brown, knob of haltere blackish-brown. **Head.** Antennal flagellomere 4, Fig. 19C. Palpomere 3 of maxillary palpus with apicomeres extension, with 4–5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to *M. bicuspis*, Fig. 1E: anepisternum setose, with 36–46 setae; anterior basalare non-setose; preepisternum 2 setose, with 20 setae; laterotergite setose, with ca. 17 setae; episternum 3 setose, with 3–4 setae. **Wing.** Length 1.3–1.4 mm. **Hypopygium** (Figs 19A, B). Sternite 9 extending posteriorly to halfway between base of gonocoxa and base of gonostylus, laterally sharply delimited, posterior margin convex, anterior margin deeply incised, the setae similar to ventral setae of gonocoxa, posterolaterally stronger than on other parts. Parastylar lobe well exposed in ventral view, as a small membranous tubercle with a sclerotized plate at apex, with three transversely directed setae. Paraapodemal lobe distinct and exposed in ventral view, not shown in Fig. 19B, similar to *M. parilis*, Fig. 18A. The dorsal mesial margin of gonocoxa convex in the middle without giving the impression of being a lobe, and apically with a triangular lobe, which is setose along the mesial margin. Two juxtagonostylar setae present, an apically curved megaseta and a rather weak seta, both arising at the apex of a common basal body, which is nearly as long as the megaseta. Gonostylus laterally flattened with the dorsal and ventral surfaces rather narrow, in lateral view the gonostylus apparently slightly longer than high, but the character cannot be seen precisely in either of the two specimens; setae on dorsal, lateral and ventral surfaces mostly similar to ventral hairs of gonocoxa but becoming longer towards the apex, and with a conspicuous row of ca. 7 long setae at the ventral mesial margin; at the apical margin of gonostylus with a mesially directed megaseta on dorsal part, but apparently no additional setae diverging from the other setosity; the mesial surface of gonostylus with a few setae basally, with long microtrichia. Tegmen triangular, with weakly indicated lateral shoulders. Hypoproct posteriorly extending to the level of the base of gonostylus,



**FIGURE 19.** *Manota evexa* sp. n. (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.

with ca. 15 long scattered ventral setae on each half in the holotype, ca. 7 in the specimen from Madang province. In the holotype the cerci seem medially united, apically separated only by a notch between them, in the specimen from Madang province each cercus seems to have a long free mesial margin, the difference possibly because the cerci in the holotype are sloping rather strongly ventrad.

Female and preimaginal stages unknown.

**Discussion.** As described above, the two specimens studied differ in the setosity of the hypoproct and the mesial union of cerci.

*M. evexa* resembles *M. parilis*, *M. orthacantha*, *M. pacifica* and *M. sicula*. It is distinguished from all these by the row of long setae along the ventral mesial margin of the gonostylus and from all except *M. sicula* by the unusually small parastylar lobe. From *M. sicula*, *M. evexa* also differs e.g. by a simple, not many-lobed gonostylus, and a simple, not two-branched apical lobe on the dorsal mesial margin of the gonocoxa.

**Types.** *Holotype.* Male, Papua New Guinea, Morobe Province, Lakekamu basin, Tekadu, 470 m, bush close to Yenina River, Malaise trap, 17–20.XI.1999, H. Hippa, R. Norberg and D. Borisch (in NRM).

*Paratypes.* 1 male, Papua New Guinea, Madang province, Baitabag village, Kau Wildlife Area, 50 m a. s. l., S 5° 08', E 145° 46', primary forest, Malaise trap, 2.2–9.2.2000, Lukáš Čížek leg. (in NRM).

### ***Manota orthacantha* sp. n.**

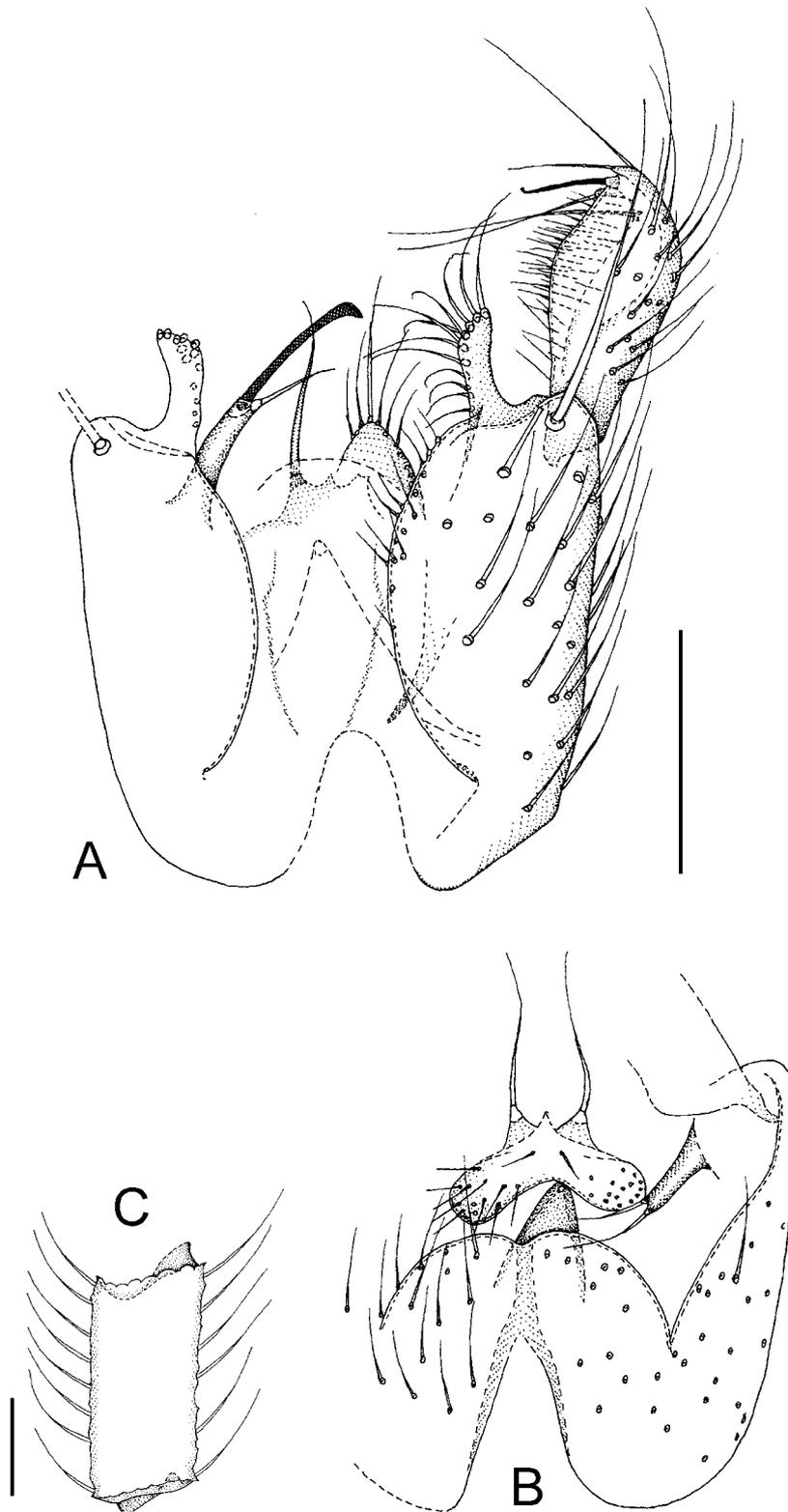
(Figs 2A, 20A–C)

A large-sized *Manota*

**Male. Coloration.** Brown, frons vertex and occiput darker brown, mouthparts and legs paler than thorax, the base of femur 3 slightly darkened, wing unicolorous, hyaline, pale yellowish-brown, knob of haltere dark. **Head.** Antennal flagellomere 4, Fig. 20C. Palpomere 3 of maxillary palpus with apicommesial extension, with 6 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to *M. bicuspis*, Fig. 1E: anepisternum setose, with 69 setae; anterior basalare non-setose; preepisternum 2 setose, with 25 setae; laterotergite setose, with ca. 25 setae; episternum 3 setose, with 11 setae. **Wing.** Length 2.2 mm. **Hypopygium** (Figs 20A–B). Sternite 9 extending posteriorly to halfway between the base of gonocoxa and the base of gonostylus, lateral margin anteriorly fused with gonocoxa, posteriorly confluent with convex posterior margin, which is notched medially, anterior margin deeply incised, the setae similar to adjacent ventral setae of gonocoxa. Parastylar lobe well exposed in ventral view, long and narrow, directed obliquely anteriorly, with two apical setae. Paraapodemal lobe distinct and exposed in ventral view, not shown in Fig. 20B, similar to *M. parilis*, Fig. 18A. The dorsal mesial margin of gonocoxa convex in the middle, apically with a narrow lobe which is setose at the mesial margin. Two juxtagonostylar setae present, a megaseta and a normal seta, both arising at the apex of a common basal body which is almost as long as the megaseta, the megaseta rather straight in Fig. 20A but on the other side (which is not illustrated) it is sigmoid. Gonostylus laterally flattened with the dorsal and ventral surfaces rather narrow, in lateral view the gonostylus apparently slightly longer than high, but the character cannot be seen precisely in the single specimen; setae on dorsal, lateral and ventral surfaces mostly similar to ventral hairs of gonocoxa but becoming longer towards the apex; at the apical margin of gonostylus with a mesially directed megaseta on its dorsal part, but apparently no additional setae diverging from the other setosity except for a couple of very long setae apicodorsally; the mesial surface of gonostylus non-setose but with very long microtrichia. Tegmen triangular, without distinct lateral shoulders. Hypoproct posteriorly extending to the level of the base of gonostylus, with ca. 15 scattered ventral setae on each half. Cerci medially united and apically separated by a deep notch, but this character cannot be seen very clearly in the single specimen.

**Female.** The single specimen is in rather bad condition, e.g. leg 3 is missing from both sides. Similar to male. Antennal flagellomere 4 in the single specimen, seen in ventral view, with its length/width ratio 1.3.

Anepisternum with 84 setae, preepisternum 2 with 15 setae, laterotergite with 12 setae, episternum 3 with 9 setae. Wing length 2.5 mm. Apical part of abdomen, the basal bodies of the setae on tergite 9 very long, nearly three times as long as wide basally. Cercus two-segmented.



**FIGURE 20.** *Manota orthacantha* sp. n. (holotype): **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Antennal flagellomere 4, lateral view. Scale for A and B 0.10 mm, for C 0.05 mm.

Preimaginal stages unknown.

**Discussion.** The hypopygium of *M. orthacantha* perhaps resembles that of *M. evexa* most closely but differs by having sternite 9 anterolaterally fused with the gonocoxa, by having a long parastylar lobe instead of a small flat plate, by lacking a row of long hairs along the ventral mesial margin of gonostylus, and by having the apical lobe at the dorsal mesial margin of gonocoxa much longer and parallel-sided, not short-triangular. *M. orthacantha* differs from all similar species except for *M. sicula* by the long antennal flagellomeres, flagellomere 4 being about twice as long as broad instead of as long as or only slightly longer than broad, and by its large size with the wing length over 2 mm.

The identification of the female on the basis of the known characters may be difficult. The basal bodies of the setae on tergite 9 are narrower and longer than in any other females in the present material, but the difference from such species as *M. ctenophora*, *M. taedia* and *M. explicans* is not great. *M. orthacantha* differs from the other species in the present material in which the female is known by its large size, wing length 2.5 mm. The undescribed female of *M. sicula* can be expected to be similar in the size, and these two species appear to have the antennal flagellomeres longer than in other species.

**Types.** *Holotype.* Male, Papua New Guinea, Morobe Province, Ilauru, Mt. Kolorong, 2260 m, primary mountain forest, Malaise trap, 30.X.–11.XI.1999, H. Hippa, R. Norberg and D. Borisch (in NRM).

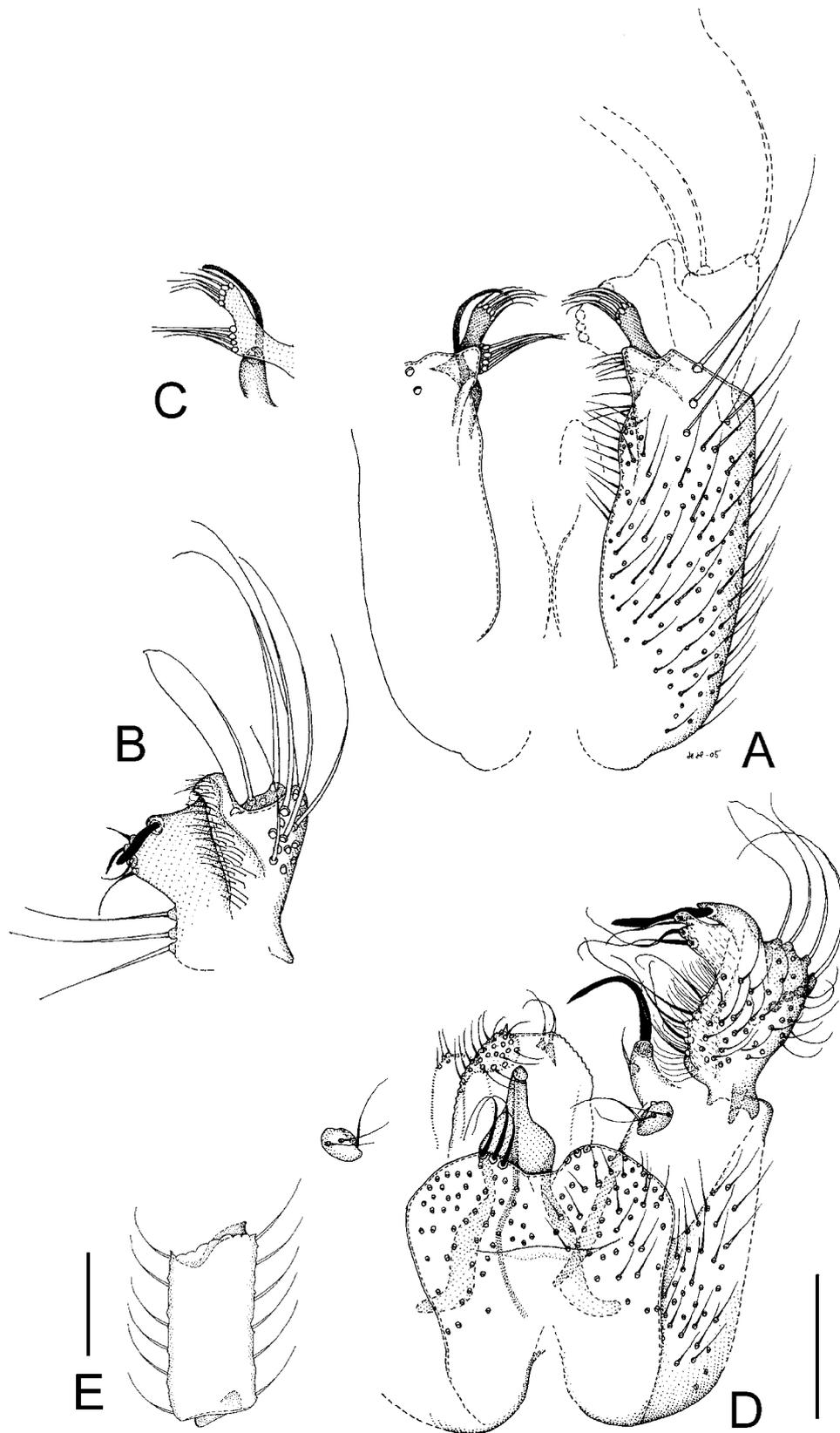
*Other material.* 1 female with same data as holotype (in NRM).

### ***Manota sicula* sp. n.**

(Figs 21A–E)

A large-sized *Manota*.

Male. **Coloration.** Pale brown, frons, vertex and occiput, and abdominal tergites darker brown, mouthparts and legs paler than thorax, wing unicolorous, hyaline, almost colourless, knob of haltere dark. **Head.** Antennal flagellomere 4, Fig. 21E. Palpomere 3 of maxillary palpus with apicomerial extension, with 4 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to *M. bicuspis*, Fig. 1E: anepisternum setose, with 40–50 setae; anterior basalare non-setose; preepisternum 2 setose, with 14–15 setae; laterotergite setose, with ca. 30–36 setae; episternum 3 setose, with 4–7 setae. **Wing.** Length 2.1 mm. **Hypopygium** (Figs 21A–D). Sternite 9 extending posteriorly just over halfway between the base of gonocoxa and the base of gonostylus, posteriorly broader than anteriorly, lateral margin distinct, posterior margin convex with a notch medially, anterior margin deeply incised, the setae similar to adjacent ventral setae of gonocoxa, at apical margin with a transverse row of three stronger setae on both sides. Parastylar lobe exposed in ventral view, a roundish flat plate with three setae directed mesiad. Paraapodemal lobe distinct and exposed in ventral view, not shown in Fig. 21D, similar to *M. parilis*, Fig. 18A. The dorsal mesial margin of gonocoxa slightly concave near middle, followed posteriorly by a very indistinct low setose lobe which in turn is followed by a more posterior, triangular, mesially setose lobe and in a more ventral position a weakly two-branched lobe with a group of setae at the tip of both branches. Two juxtagonostylar setae present, a curved megaseta and a normal seta, both arising from a common basal body which is nearly as long as the megaseta, the megaseta apical on the basal body, the seta more basal at the side of it. Gonostylus flattened, unusually complicated by several lobes, the setae similar to the ventral setae of gonocoxa, with a few long setae at ventral mesial margin, with several long setae on an apicodorsal lobe, on the ventral part of the apical margin with one mesially directed megaseta and three long setae arising from a lobe ventrally from the megaseta, the mesial surface of gonostylus with two crest-like longitudinal lobes, without setae but with an area of long microtrichia. Tegmen unusual in shape, constricted at middle. Hypoproct posteriorly extending just beyond the level of the base of gonostylus, with ca. 20 scattered ventral setae on each half. Cerci mesially united but separated posteriorly by a deep notch.



**FIGURE 21.** *Manota sicula* sp. n.: **A.** Hypopygium, dorsal view (paratype). **B.** Gonostylus, dorsomesial view (paratype). **C.** Dorsal apicomesimal lobe of gonocoxa and juxtagonostylar setae, dorsal view (paratype). **D.** Hypopygium, ventral view (holotype). **E.** Antennal flagellomere 4, lateral view (paratype). Scale for A–D 0.10 mm, for E 0.05 mm.

Female and preimaginal stages unknown.

**Discussion.** In its hypopygium, *M. sicula* resembles *M. hamulata*, *M. bicuspis*, *M. parilis*, *M. evexa*, *M. orthacantha*, *M. pentacantha* and *M. pacifica*. It is distinguished from all these species by having stergite 9 posteriorly broader than anteriorly, from all except possibly *M. pacifica* by the transverse row of strong setae on both sides at the posterior margin of stergite 9, from all but *M. evexa* by the low plate-like parastylar lobe, and from all by the many-lobed gonostylus and the tegmen constricted at middle. *M. pacifica* may have similar strong setae at the apical margin of stergite 9 as in *M. sicula*. For further discussion, see under *M. pacifica*. The many-lobed gonostylus of *M. sicula* is reminiscent of *M. maorica*, but the detailed structure of the gonostylus as well as other characters of the hypopygium are very dissimilar (cf. Figs 3A–C and 21A–D). *M. sicula* is similar to *M. orthacantha* in having the antennal flagellar segments long, flagellomere 4 about twice as long as broad instead of as long as or only slightly longer than broad. With their wing length over 2 mm, these two species are larger than the other similar species.

**Types.** *Holotype.* Male, Papua New Guinea, Morobe province, Ilauru, Mt. Kolorong, 2200 m, primary forest, Malaise trap, 30.X.–11.XI.1999, H. Hippa, R. Norberg and D. Borisch (in NRM).

*Paratypes.* 1 male with same data except 2260 m (in NRM).

### ***Manota pentacantha* sp. n.**

(Figs 22A, B)

A small-sized *Manota*.

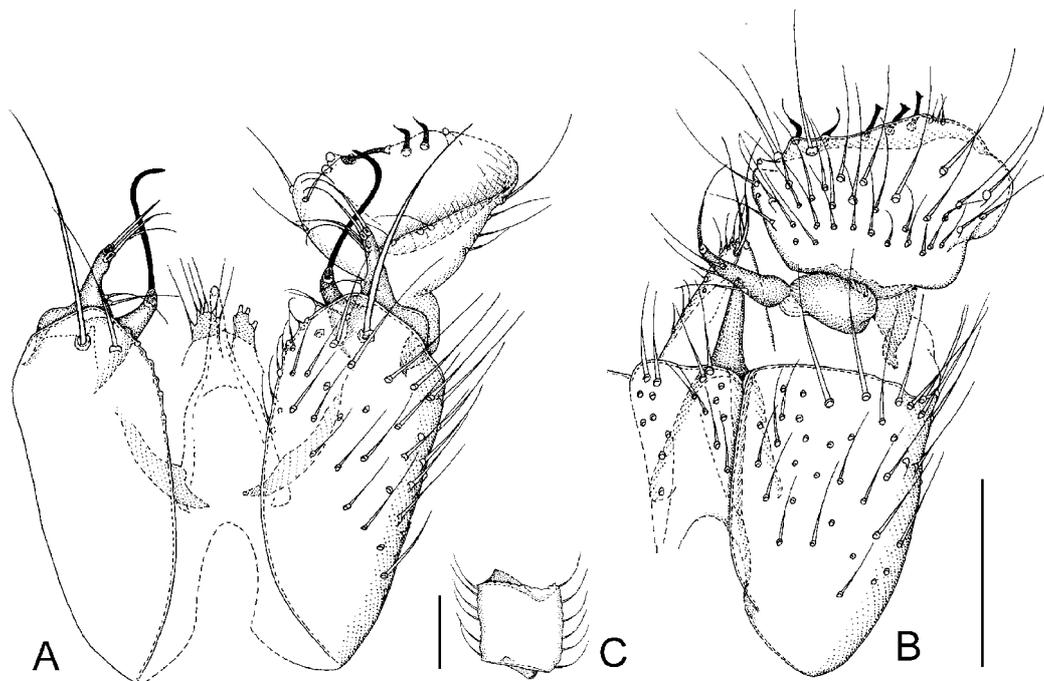
**Male. Coloration.** The specimens are probably strongly faded, but it seems that the coloration was blackish or greyish-brown with the following pale (yellowish) parts: face, mouthparts, antennal scape and pedicel, ventral parts of pleura, stem of haltere and all of legs, except for the extreme base of coxa 3 and base and apex of femur 3. The wings, mounted directly from dry specimens, are unicolorous pale greyish-brown. **Head.** Antennal flagellomere 4, Fig. 22C. Palpomere 3 of maxillary palpus with apicomerial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment. **Thorax.** Pleural setosity pattern similar to *M. bicuspis*, Fig. 1E: anepisternum setose, with 48–55 setae; anterior basalare non-setose; preepisternum 2 setose, with 16–17 setae, the number in the holotype uncertain; laterotergite setose, with ca. 21–32 setae; episternum 3 setose, with ca. 4–8 setae. **Wing.** Length 1.5 mm. **Hypopygium** (Figs 22A, B). Sternite 9 large, extending posteriorly just over halfway between the base of gonocoxa and the base of gonostylus, laterally sharply delimited, posterior margin slightly concave, anterior margin deeply notched, the setae similar to adjacent ventral setae of gonocoxa except for a couple of stronger setae on both sides near posterior margin. Parastylar lobe exposed in ventral view, large, directed transversely mesad, with a constriction separating a broader basal and narrower apical part, with one seta at the apex and ca. four setae more basally on the apical part. Paraapodemal lobe distinct and exposed in ventral view of hypopygium, not shown in Fig. 22B, similar to *M. parilis*, Fig. 18A. Dorsal mesial margin of gonocoxa simple, evenly curved, at apical margin with a large lobe with a few setae on basomesial margin and four setae apically. One juxtagonostylar seta present: a sigmoid megaseta arising from a basal body, which is nearly as long as the megaseta. Gonostylus flattened, in lateral view broader than long with a very narrow base, the lateral setae similar to the ventral setae of gonocoxa, at the apical margin, on mesial side, with 5–6 apically angulate strong setae or megasetae, the two most ventral arising from a small lobe, the mesial surface of gonostylus non-setose but partly covered by long microtrichia. Tegmen narrowly triangular, with weak but distinct lateral shoulders. Hypoproct posteriorly extending to the level of the basal part of the gonostylus, rather narrow, with ca. 20 scattered ventral setae. Cerci unusually small, mesially fused but apically separated by a notch which is as deep as the width of the free part of cercus.

Female and preimaginal stages unknown.

**Discussion.** *M. pentacantha* resembles *M. hamulata*, *M. bicuspis*, *M. parilis*, *M. evexa*, *M. orthacantha*, *M. sicula* and *M. pacifica*, but differs from all of these by the megasetae at the apical margin of gonostylus which are five or six in number instead of only one or two, or instead of two or three stronger pale setae as in *M. hamulata*, and by having only the juxtagonostylar megaseta present, the thinner seta being absent. The parastylar lobe of *M. pentacantha*, with its distinct basal and apical parts, is similar to that of *M. hamulata*, *M. bicuspis* and *M. parilis* but differs from all three by having the parts of the parastylar lobe inflated, not flat, and by having the basal part much larger than in the other species; *M. hamulata* also differs by having the basal part of the parastylar lobe composed of more than one lobe. The apical lobe on the dorsal side of the gonocoxa is more lateral than in the other similar species. Otherwise the lobe resembles that of *M. orthacantha*, *M. sicula* and *M. pacifica*. It differs from the former e.g. by having the setae on the mesial margin of the lobe divided into an apical and a more basal group instead of covering the whole mesial margin, and from the two latter by having the lobe non-branched or not divided into two sub-lobes.

**Types.** *Holotype.* Male, Solomon Islands, San Jorge, 26.ix.65, Roy. Soc. Exped., B.M.1966. *Casuarina* forest nr. stream. vac. collector, low herbage and litter (in BMNH).

*Paratypes.* 1 male with same data as holotype (in BMNH). 1 male, Solomon Is., San Cristoval, Huni-River camp, 14.VIII.1965, Roy. Soc. Exped., Brit. Mus. 1966-1 (in BMNH).



**FIGURE 22.** *Manota pentacantha* sp. n.: **A.** Hypopygium, dorsal view (holotype). **B.** Hypopygium, ventral view (holotype). **C.** Antennal flagellomere 4, lateral view (paratype). Scale for A and B 0.10 mm, for C 0.05 mm.

### *Manota pacifica* Edwards

*Manota pacifica* Edwards, 1928: 30.

For description, see Edwards (1928).

**Discussion.** *M. pacifica* was described from one male from Samoa, Savaii: Safune, rain forest above 2000 ft., which is also the only record of the species. I have not studied this holotype, but Edwards' (1928) description with a good illustration of the hypopygium is quite enough to establish the identity of the species. The

hypopygium of *M. pacifica* is similar to that of *M. hamulata*, *M. bicuspis*, *M. parilis*, *M. evexa*, *M. orthacantha*, *M. pentacantha*, and *M. sicula*. It is distinguished from all of these except *M. sicula* by the dorsal apicomeral lobe of gonocoxa, which is bilobate. The lobes in *M. sicula* and *M. pacifica* differ from each other so that the apical sub-lobes are approximately equal in size in *M. pacifica* whereas in *M. sicula* the more posterior one is much longer. Furthermore, *M. pacifica* differs from *M. sicula* by its simple gonostylus with all the setae much shorter than the gonostylus, whilst in *M. sicula* the gonostylus is unusually complicated, with several lobes, and basomesially and apicolaterally has setae which are as long as or longer than the gonostylus. In Edwards' (1928) drawing there appear to be two setae apicolaterally on stergite 9, which are reminiscent of the three strong setae in approximately the same position in *M. sicula*. The gonostylus of *M. pacifica* is similar to that of *M. parilis*. The hypoproct resembles that of *M. pentacantha* in having setae only on the lateral marginal area, but differs in being broad, not unusually narrow as in *M. pentacantha*. The character of the parastylar lobe is not quite clear from Edwards' (1928) drawing: it seems to be rather large, probably flat, and parallel with the mesial gonocoxal margin, not very different from that of *M. parilis* and *M. bicuspis*. It can be rather safely assumed that in *M. pacifica* the anepisternum, preepisternum 2, laterotergite and episternum 3 are setose as in all the species that share a similar structure of the hypopygium.

## Acknowledgements

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## References

- Bechev, D. (2000) World distribution of the genera of fungus gnats (Diptera: Sciaroidea, excluding Sciaridae). *Studia Dipterologica*, 7, 543–552.
- Colless, D.H. (1966) Insects of Micronesia, Diptera: Mycetophilidae. In: Bernice P. Bishop Museum, *Insects of Micronesia*, 12(6), 638–667.
- Edwards, F.W. (1928) Nematocera. In: British Museum (Natural History), *Insects of Samoa and other Samoan Terrestrial Arthropoda*, Part VI, Diptera, 23–108.
- Hippa, H. (2006) Diversity of *Manota* Williston (Diptera: Mycetophilidae) in a Malaysian rainforest: description of twenty-seven new sympatric species. *Zootaxa*, 1161, 1–49.
- Hippa, H. & Papp, L. (2007) *Manota* Williston (Diptera: Mycetophilidae) from Thailand with description of eight new species. *Zootaxa* (submitted).
- Jaschhof, M. and Hippa, H. (2005) The genus *Manota* in Costa Rica (Diptera: Mycetophilidae). *Zootaxa*, 1011, 1–154.
- Jaschhof, M. & Mostovski, M. (2006) First record of *Manota* (Diptera: Mycetophilidae: Manotinae) from southern Africa, with the description of two new species. *African Invertebrates* 47, 237–242.
- Matile, L. (1993) Diptres Mycetophiloidea de Nouvelle-Calédonie. 5. Mycetophilidae Leiinae et Manotinae. In: L. Matile, J. Najt & S. Tillier (eds), *Zoologia Neocaledonica*, Volume 3. *Memoires du Museum National d'Histoire Naturelle*, 157, 165–211.
- Papp, L. (2004) Seven new species of Manotinae (Diptera: Mycetophilidae) from Asia and Papua New Guinea. *Acta Zoologica Academiae Scientiarum Hungaricae*, 50(3), 227–244.
- Senior-White, R.A. (1922) New Ceylon Diptera (Part II.). *Spolia Zeylanica*, 12, 195–206.
- Ševčík, J. (2002) *Manota chinensis* sp.n., a second Palaearctic species of Manotinae (Diptera: Mycetophilidae). *International Journal of Dipterological Research*, 13, 23–26.
- Sherman, R.S. (1920) Notes on the Mycetophilidae of British Columbia. *Proceedings of the Entomological Society of British Columbia*, 14, 12–15.
- Tonnoir, A.L. & Edwards, F.W. (1927) New Zealand fungus gnats (Diptera, Mycetophilidae). *Transactions of the New Zealand Institute*, 57, 747–878.