



## Notes on Oriental and Australasian Manotinae (Diptera, Mycetophilidae), with the description of thirteen new species

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### Abstract

The following new species are described: *Manota acehensis* (Sumatra), *M. anceps* (Sumatra), *M. bruneiensis* (Borneo), *M. capillata* (Sumatra), *M. dolichothrix* (Borneo), *M. hexacantha* (Borneo), *M. hyboloma* (Borneo), *M. perangulata* (Borneo), *M. radula* (Borneo), *M. sinepollex* (Sumatra), *M. stricta* (Sumatra), *M. subforceps* (Sumatra) and *Eumanota vilkamaai* (New Guinea). New records of the following species are given: *Manota bifida* Hippa & Papp (Borneo), *M. clausa* Hippa (Borneo), *M. curvata* Hippa (Sumatra), *M. ferrata* Hippa (Borneo), *M. forceps* Hippa & Papp (Thailand), *M. horrida* Hippa (Borneo), *M. pectinata* Hippa (Borneo, Sulawesi), *M. pappi* Hippa (Borneo), *M. perpusilla* Hippa (Sumatra), *M. simplex* Hippa (Borneo), *M. ulu* Hippa (Sumatra), *Eumanota humeralis* Edwards (Borneo), *E. malukuensis* Søli (Seram), *E. suthepensis* Søli (Thailand) and *Promanota malaisei* Tuomikoski (Thailand).

**Key words.** Diptera, Mycetophilidae, Manotinae, *Eumanota*, *Manota*, *Promanota*, Oriental Region, new species

### Introduction

The subfamily Manotinae (Diptera, Mycetophilidae) currently comprises four extant genera (Hippa *et al.* 2004): *Manota* Williston, 1896 (type species *M. defecta* Williston), *Eumanota* Edwards, 1933 (*E. leucura* Edwards), *Paramanota* Tuomikoski, 1966 (*P. orientalis* Tuomikoski) and *Promanota* Tuomikoski, 1966 (*P. malaisei* Tuomikoski). *Paramanota* and *Promanota* are exclusively oriental, the former with 4 species (Tuomikoski 1966, Hippa *et al.* 2004), the latter with 2 species (Tuomikoski 1960, Papp 2004). *Eumanota* is Oriental-Australasian with 6 species in the Oriental Region (Edwards 1933, Søli 2002, Papp 2004, Hippa *et al.* 2004) and two in the Australasian Region (Søli 2002, Papp 2004). *Manota* is distributed worldwide with ca. 150 described species (for details see Hippa & Huerta 2009). The number of species in the Oriental Region is 66 (Senior-White 1922, Papp 2004, Hippa 2006, 2008a, 2009, Hippa & Papp 2007) and in the Australasian Region 20 (Edwards 1928, Colless 1966, Hippa 2007). One species is found in both regions (Hippa & Papp 2007). None of the five species described from the eastern part of the Palaearctic Region (Ševčík 2002, Papp 2004, Hippa & Kjærandsen *in print*) have been recorded from the Oriental Region, but species that occur in both regions are found in Japan (Hippa, Saigusa & Kjærandsen, *in prep.*).

This contribution is based on the material selected by J. Ševčík from unsorted Malaise trap samples deposited in the Natural History Museum (London) and in the Royal Ontario Museum (Toronto), material collected by the 'TIGER' project (www.sharkeylab.org) and a few specimens from the Swedish Museum of Natural History. The objective of this study is to describe 13 new species, to discuss the taxonomy of some previously described species and to give new records of species, some of which were only known from their type localities.

## Material and methods

The material was preserved in ethanol, but it seems that originally most of the specimens studied were collected into some other liquid, perhaps formaldehyde. The abdomen or only the apical part of the abdomen was detached from the specimen and macerated in warm concentrated potassium hydroxide (KOH). In most cases we also detached the hypopygium beyond segment 8. After washing in water and dehydration in stages of increasing concentrations of alcohol, we placed the parts of the abdomen for a few seconds in clove oil (eugenol), after which we mounted them in "Euparal between two pieces of coverslip, which allows the specimen to be studied from both sides under a compound microscope. These preparations are now attached to normal microscope slides by two strips of adhesive tape across their edges and are easily detached when needed. Other parts of the body were not macerated, but after dehydration we mounted them as they were in "Euparal".

The descriptions of the hypopygium should only be taken as rough guidelines to interpret the drawings. The medial parts of the hypopygium are movable in relation to the gonocoxa and gonostylus so that their extension posteriad may vary between different mounts. The colour of most specimens in this study seems faded, making the pattern of paler and darker areas difficult to interpret.

The morphological terminology follows Hippa and Papp (2007) except for the tegmen which is here called aedeagus. The latter term is more logical because in *Manota* the vas deferens terminates at the apex of this structure. The terminology of the male hypopygium is explained in Figs 2, 11, 13 and 14 and that of the wing venation in Fig. 1. The setae marking the reduced sections of M, A1 and A2 and the presence or absence of scattered setae on the posterior part of the wing membrane are not included in descriptions because it was not possible to observe the setae in most specimens.

Illustrations were made with the aid of a drawing tube attached to a Leitz Diaplan compound microscope.

The material is deposited in the following institutions: The Natural History Museum, London (NHM), Queen Sirikit Botanic Garden, Chiang Mai (QSBG), The Royal Ontario Museum, Toronto (ROM), The Swedish Museum of Natural History, Stockholm (SMNH). The holotypes of *Manota acehensis* and *M. anceps*, currently deposited in ROM, will be transferred to the Museum Zoologi Bogor (MZB), Bogor (Indonesia).

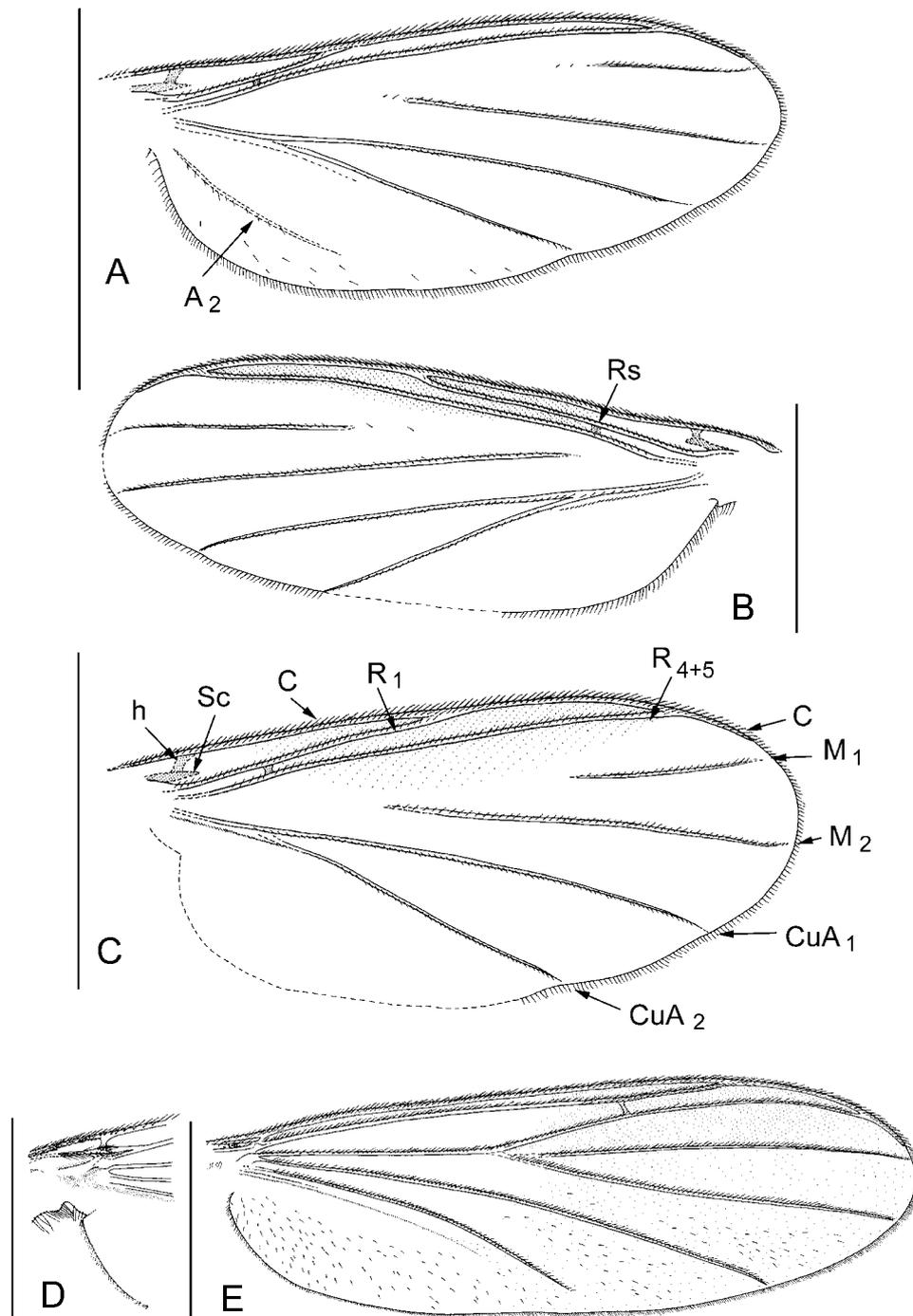
## Descriptions of new species

### *Manota acehensis* sp. n.

Figs 2 A, B, C, D

**Male. Colour.** The single specimen seems rather faded. Head pale brown, frons and vertex darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish. Thorax unicolorous pale brown. Legs unicolorous pale yellowish. Wing unicolorous yellowish; haltere yellowish-brown, knob not distinctly darker. Abdominal tergites brownish, sternites paler yellowish. All setosity pale, yellowish or brownish, thicker setae appearing darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 2 A. Palpomere 3 of maxillary palpus with apicomerial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 1.8 times as long as palpomere 4. About 9 strong postocular setae. **Thorax.** Anepisternum setose, with 48 setae; anterior basalare non-setose; preepisternum 2 setose, with ca. 15 setae; laterotergite non-setose; episternum 3 setose, with 8 setae. **Wing.** Similar to Fig. 1 A; wing length 1.7 mm. **Hypopygium,** Figs 2 B, C. Sternite 9 about two thirds of the ventral length of gonocoxa, lateral margin sharply delimited, slightly convergent, posterior margin transverse, anterior margin deeply incised, setae similar to the adjacent ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, slightly sigmoid. Parastylar lobe transverse, with 4 setae at margin. Paraapodemal lobe distinct, well exposed in ventral view. Dorsal mesial margin of gonocoxa simple, inconspicuously lobe-like produced posteriorly. Gonocoxa with a large, simple apical apophysis with a dense patch of unmodified setae apicomerially. Two juxtagonostylar

setae present, the more ventral one a long apically curved megaseta, the more dorsal one a shorter unmodified seta, both arising from a common basal body which is nearly as long as the megaseta. Gonostylus roundish, flat, with base very narrow, apex weakly divided into two lobes, ventrally with moderately long unmodified setae, which are longer at the mesial margin, dorsally non-setose, dorsally at apical margin with three sigmoid setae deviating from other gonostylar setosity. Aedeagus elongate-subtriangular, with weak lateral shoulders, with apex curved ventrad; the constricted basal part in the mount of the holotype (Figs 2 A, C) may be an artefact. Hypoproct posteriorly extending to the level of base of gonostylus, ventrally with ca. 20 scattered setae on each half. Cerci mesially separate.



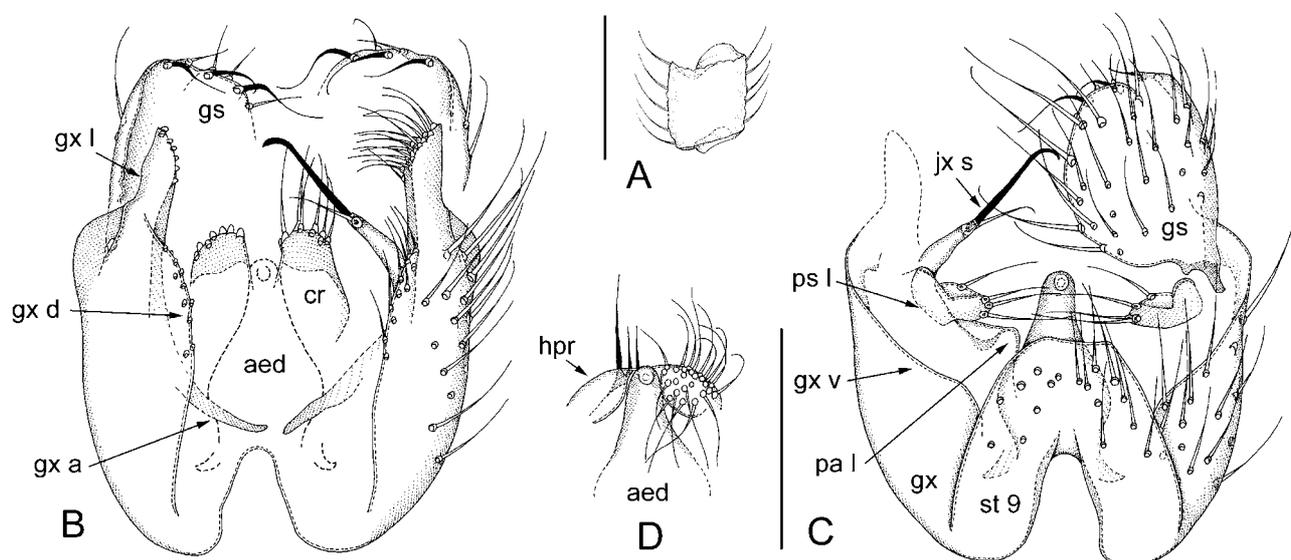
**FIGURE 1.** Wing, dorsal view (A, B, C, E) and basal part of wing, ventral view (D). **A.** *Manota bruneiensis* sp. n. (paratype) **B.** *M. subforceps* sp. n. (holotype). **C.** *M. sinepollex* sp. n. (holotype). **D, E.** *Eumanota vilkamaai* sp. n. (holotype). Scale 1.0 mm.

Female unknown.

**Discussion.** *M. acehensis* is similar to *M. bicuspis* Hippa known from Papua New Guinea. Among other differences it is distinguished as follows: the presence of four setae on the parastylar lobe, but three in *M. bicuspis*; all parastylar setae are at the margin of the lobe, in *M. bicuspis* there is one seta at the apex of the lobe and two more basally situated setae on its dorsal side; all parastylar setae are strong and long, about as long as the lobe, in *M. bicuspis* they are much shorter than the lobe and those on the dorsal side are very weak; the apicomesimal margin of the gonostylus is simple, in *M. bicuspis* there is a narrow crest on the dorsal side bearing a row of seven setae, and there are three long, widely separated sigmoid setae dorsally at the apical margin of the gonostylus, in *M. bicuspis* there are two closely placed short and more megaseta-like setae. *M. acehensis* is also similar to *M. hamulata*, known from Oceania, from which it differs in almost the same characters as from *M. bicuspis*, but also by having a simple, not three-lobed parastylar lobe.

**Etymology.** The name is derived by adding the Latin suffix *-ensis*, denoting place, to the name of the Territory of Aceh, Sumatra, Indonesia, where the type locality is situated.

**Types.** *Holotype.* Male, INDONESIA, Sumatra, Aceh, Gunung Leuser National Park, Ketambe res. st., 3°41'N, 97°39'E, young forest, light gap, 350 m, 1–31.i.1990, Malaise trap, D.C. Darling, IIS 900001 (in ROM).



**FIGURE 2.** *Manota acehensis* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. **D.** Apical part of aedeagus and hypoproct, ventral view. Scale 0.10 mm. aed = aedeagus, cr = cercus, gs = gonostylus, gx = gonocoxa, gx a = gonocoxal apodeme, gx l = apical lobe of gonocoxa, gx d = dorsal mesial margin of gonocoxa, gx v = ventral mesial margin of gonocoxa, hpr = hypoproct, jx s = juxtagonostylar setae, pa l = paraapodemal lobe, ps l = parastylar lobe, st 9 = sternite 9.

### *Manota anceps* sp. n.

Figs 3 A, B, C

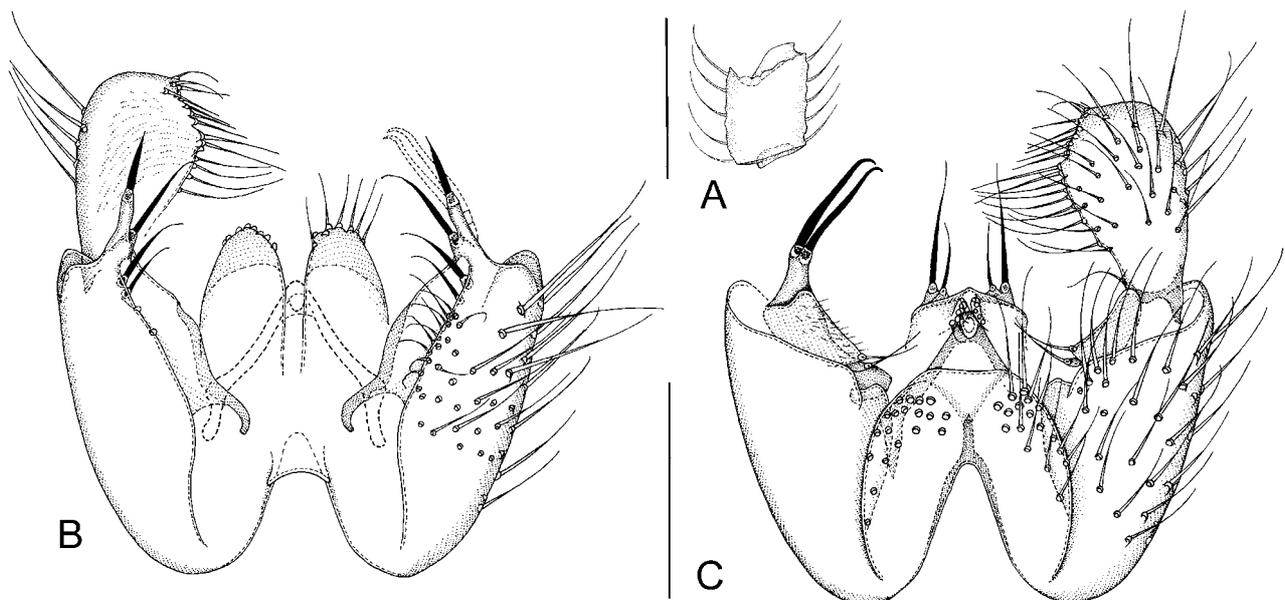
**Male. Colour.** Head pale brown, frons and vertex darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish-brown. Thorax unicolorous pale brown. Legs unicolorous pale yellowish. Wing unicolorous yellowish; haltere yellowish-brown with darker brown knob. Abdominal tergites brownish, sternites paler yellowish-brown, sternites 7 and 8 almost as dark as tergites. All setosity yellowish or brownish, thicker setae seeming darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 3 A. Palpomere 3 of maxillary palpus with apicomesimal extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 1.4 times as long as palpomere 4. Nine strong postocular setae. **Thorax.**

Anepisternum setose, with 41 setae; anterior basalare non-setose; preepisternum 2 setose, with ca. 20 setae; laterotergite non-setose; episternum 3 setose, with ca. 15 setae. **Wing.** Similar to Fig. 1 A; wing length 1.6 mm. **Hypopygium,** Figs 3 B, C. Sternite 9 about two thirds of ventral length of gonocoxa, with sharply delimited convex sides, posterior margin transverse, anterior margin deeply incised, setae similar to the adjacent ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, roundly curved, with a discontinuity at the middle. Parastylar lobe oblique, slightly sickle-shaped, with two setae antero-mesially. Paraapodemal lobe well exposed in ventral view. Dorsal mesial margin of gonocoxa simple, convex, subapically with two stronger setae and apically with two strong setae arising from large basal bodies, united basally. Two juxtagonostylar setae present, both long almost straight megasetae, arising from a common basal body nearly half the length of the megasetae. Gonostylus simple, obovate in outline, ventrally with moderately long setosity, at mesial margin forming a fringe of more tightly placed setae, dorsally non-setose. Aedeagus short subtriangular with weak lateral shoulders, the apex curved ventrad. Hypoproct posteriorly extending to the level of base of gonostylus, ventrally with a mesial row of 5 setae (sternite 10) on each half. Cerci mesially separate.

Female unknown.

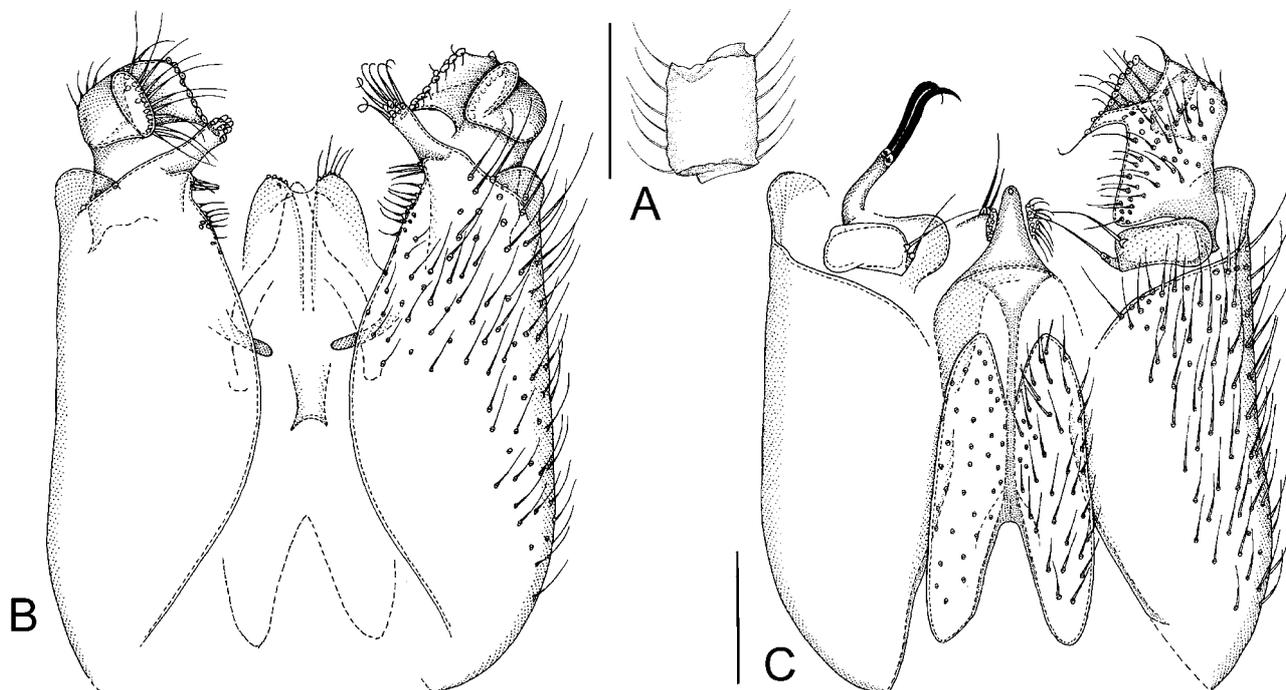
**Discussion.** *M. anceps* belongs to a common form of Oriental *Manota* by having a setose anepisternum and preepisternum 2, a non-setose anterior basalare and laterotergite, a short vein R1, a laterally free tergite 9, a sickle-shaped parastylar lobe, the two subequal juxtagonostylar megasetae arising from a long common basal body and a rather unmodified gonostylus. Among these species *M. anceps* resembles those which have one or more apicomerial setae arising from a long basal body on the dorsal side of the gonocoxa, strongly resembling the juxtagonostylar setae. These species are *M. duplex* Hippa (Malay Peninsula), *M. pelli* Hippa (Thailand), *M. perpusilla* Hippa (Malay Peninsula), and *M. vesicaria* Hippa (Thailand). *M. pelli*, *M. perpusilla* and *M. vesicaria* have one such seta strong and *M. duplex* 2–3 fine setae. *M. anceps* is the only species with two setae arising from separate basal bodies which unite at the base. *M. perpusilla* and *M. duplex* differ further from the species mentioned above e.g. by having a conspicuously longer and narrower gonostylus. *M. vesicaria* differs by having the paraapodemal lobe inflated and the setae of the hypoproct all placed laterally and *M. pelli* by having three setae on the parastylar lobe.

**Etymology.** The name is derived from the Latin *anceps*, two-headed, double. It refers to the two-headed lobe dorsally at the apex of the gonocoxa, resembling a duplicate of the juxtagonostylar megasetae.



**FIGURE 3.** *Manota anceps* sp. n. (holotype). A. Antennal flagellomere 4, lateral view. B. Hypopygium, dorsal view. C. Hypopygium, ventral view. Scale 0.10 mm.

**Types.** *Holotype.* Male, INDONESIA, Sumatra, Aceh, Gunung Leuser National Park, Ketambe res. st., 3°41'N, 97°39'E, young forest, light gap, 350 m, 1–31.i.1990, Malaise trap, D.C. Darling, IIS 900001 (in ROM).



**FIGURE 4.** *Manota bruneiensis* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. Scale 0.10 mm.

***Manota bruneiensis* sp. n.**

Figs 1 A, 4 A, B, C

**Male. Colour.** All specimens seem rather faded. Head pale brown, frons and vertex darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish-brown. Thorax unicolorous pale brown, postero-dorsal part seems a little darker. Legs unicolorous pale yellowish. Wing unicolorous yellowish; haltere yellowish-brown with darker knob. Abdominal tergites brownish, sternites paler yellowish-brown. All setosity pale, yellowish or brownish, thicker setae seeming darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 4 A. Palpomere 3 of maxillary palpus with apicomesial extension, with 4–5 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 1.2–1.4 times as long as palpomere 4. Nine to ten strong postocular setae. **Thorax.** Anepisternum setose, with 43–67 setae, anterior basalare non-setose, preepisternum 2 setose, with ca. 20–30 setae, laterotergite non-setose, episternum 3 setose, with ca. 5–13 setae. **Wing.** Fig. 1 A; wing length 1.8–2.0 mm. **Hypopygium,** Figs 4 B, C. Sternite 9 about two thirds of ventral length of gonocoxa, narrow, parallel-sided, completely free from gonocoxae, posterior margin with deep v-shaped indentation, anterior margin deeply incised, setae similar to adjacent ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, roundly curved. Parastylar lobe transverse, with 2 setae at mesial margin. Paraapodemal lobe well exposed in ventral view. Dorsal mesial margin of gonocoxa simple, with a small rounded setose lobe posteriorly at base of long oblique apical lobe, with a patch of non-modified setae at apex. Two juxtagonostylar setae, both long apically curved or sigmoid megasetae arising from a common basal body, as long as megasetae. Gonostylus complex, with a parallel-sided basal part, flattened oblique apical part and an angulate dorsal lobe, with an oblique, inflated apex; ventral side with short unmodified setae except for flat non-setose apical lobe, dorsal side non-setose except for a row of long setae on dorsal lobe and a row of

short setae at apex of apical lobe. Aedeagus rather small, subtriangular with weak lateral shoulders, the apex curved ventrad. Hypoproct unusually small, posteriorly extending to the level of base of gonostylus, ventrally with ca. 10 scattered setae on each half. Cerci mesially separate.

Female unknown.

**Discussion.** *M. bruneiensis* superficially resembles a number of other *Manota* species, but differs in detail. They all share the setose anepisternum and preepisternum 2, nonsetose anterior basalare and laterotergite, short vein R1, laterally free tergite 9, a long apical lobe dorsally on the gonocoxa and two subequal juxtagonostylar megasetae arising from a long common basal body. *M. bruneiensis* is easily distinguished by its quite unique gonostylus with a flat oblique apical lobe and an angled dorsal lobe.

**Etymology.** The name is derived from the State of Brunei, where the type locality is situated, by adding the Latin suffix *-ensis*, denoting place.

**Types.** *Holotype.* Male, BRUNEI, Ulu Temburong, 14.ii.–9.iii.1982, Malaise trap, M. C. Day leg. (in NHM).

*Paratypes.* 3 males with the same data as holotype (in NHM).

### *Manota capillata* sp. n.

Figs 5 A, B, C

Male. **Colour.** Both specimens seem strongly faded. Head pale brown, frons, vertex and part of occiput darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish. Thorax brownish, darker than legs. Legs pale yellowish, apical third of femur 3 slightly infuscated. Wing unicolorous pale yellowish-brown. Haltere yellowish brown, knob blackish (blackish granules inside). Abdomen (treated with KOH) pale brown. All setosity pale, yellowish or brownish, thicker setae appearing darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 5 A. Palpomere 3 of maxillary palpus with apicomeresial extension, with 3–4 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 ca. 1.1 times as long as palpomere 4. Nine to eleven strong postocular setae. **Thorax.** Anepisternum setose, with 21–35 setae; anterior basalare non-setose; preepisternum 2 setose, with 15–16 setae; laterotergite non-setose; episternum 3 setose, with 9–12 setae. **Wing.** Similar to Fig 1 A; wing length 2.0 mm. **Hypopygium,** Figs 5 B, C. Sternite 9 short, less than half ventral length of gonocoxa, laterally fused with gonocoxa, posterior margin convex, anterior margin nearly straight, without any indication of medial incision, setae similar to ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, basal part united with anterior part of parastylar lobe, the latter with several setae which are similar to gonocoxal setae. Paraapodemal lobe a curved sclerotized stripe (Fig. 5 B), in holotype concealed under mesial margin of gonocoxa in ventral view, in paratype partly exposed. Dorsal mesial margin of gonocoxa indistinct, fused with a large crescent-shaped lobe bearing a sub-marginal zone of long setae on its ventral side. Gonocoxa without an apico-dorsal lobe or apophysis. Two juxtagonostylar setae present: a curved megaseta and a much smaller similarly curved normal seta, both arising from a common low basal body. Gonostylus short, transverse, narrowing apically, apico-ventral part forming an indistinct lobe, setae on ventral side moderately long, on apico-ventral lobe longer, in a row on posterior margin, dorsal side nonsetose. Aedeagus elongate subtriangular, rather broad apically, constricted basally, the lateral shoulders distinct, apex curved ventrad. Hypoproct large, posteriorly extending as far as gonostylus, ventrally with ca. 40 scattered setae on each half. Cerci mesially separate.

Female unknown.

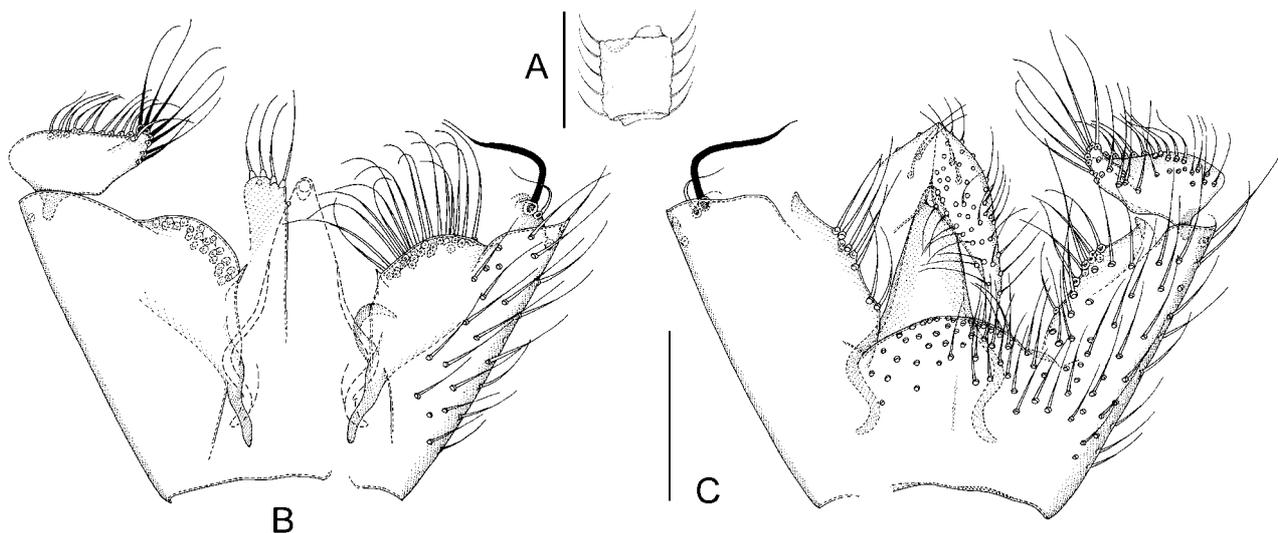
**Discussion.** *M. capillata* is similar to *M. parvistylata* Hippa known from the Malay Peninsula. It is distinguished e.g. by having few and short setae at the postero-ventral and posterolateral margin of the gonocoxa, similar to the more anteriorly placed setae, while in *M. parvistylata* these setae are very long, the longest ones more than twice the length of the more anteriorly placed setae and appear as a more or less distinct transverse row. In *M. capillata* the setae on the dorsomesial lobe of the gonocoxa are longer, as long as or longer than the juxtagonostylar megaseta, whereas in *M. parvistylata* they are shorter than the megaseta. In

both mounts of *M. capillata* the gonostylus appears similar, with broad base and narrow apex, and rather different from the more parallel sided one in the holotype of *M. parvistylata* (Hippha 2008). In both species the gonostylus is very similar, but its position in a mount is very critical.

**Etymology.** The name is from the Latin, *capillata*, hairy, and refers to the long hairs on the dorsal lobe on the gonocoxa.

**Types.** *Holotype.* Male, INDONESIA, Sumatra, Sumatera Utara, Semangat Gunung, 1300 m, Malaise in jungle, 16.03.1992, H. Hippha (in SMNH).

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



**FIGURE 5.** *Manota capillata* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. Scale 0.10 mm.

***Manota dolichothrix* sp. n.**

Figs 6 A, B, C

**Male. Colour.** The single specimen seems strongly faded. Head pale brown, vertex darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish-brown. Thorax unicolorous pale brown, scutum postero-medially and scutellum medially apparently darker brown. Legs with coxae and trochanters yellowish, more distal parts of all legs broken off. Wing unicolorous pale yellowish-brown; haltere yellowish-brown, knob slightly darker. Abdominal tergites pale brownish, sternites paler than tergites. All setosity yellowish or brownish, thicker setae apparently darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 6 A. Palpomere 3 of maxillary palpus with apicomésial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 1.4 times as long as palpomere 4. Ten strong postocular setae. **Thorax.** Anepisternum setose, with 30 setae; anterior basalare non-setose; preepisternum 2 setose, with ca. 9 setae; laterotergite non-setose; episternum 3 setose, with 14 setae. **Wing.** Similar to Fig. 1 A; wing length 1.5 mm. **Hypopygium,** Figs 6 B, C. Sternite 9 about one half of ventral length of gonocoxa, with sharply delimited convex sides, posterior margin convex with a medial indentation, anterior margin deeply incised, the setae similar to adjacent ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, slightly angulate at middle. Parastylar lobe oblique, slightly subtriangular, with 4–5 setae antero-mesially (at apex). Paraapodemal lobe well exposed in ventral view. The dorsal mesial margin of gonocoxa simple, convex, apicomésially lobe-like and partly covering an oblique, apically setose apophysis. Two juxtagonostylar setae, both long megasetae, one strongly sigmoid, the other curved, both arising from a common basal body, nearly half the length of megasetae. Gonostylus elongate and slightly curved, ventrally with moderately long

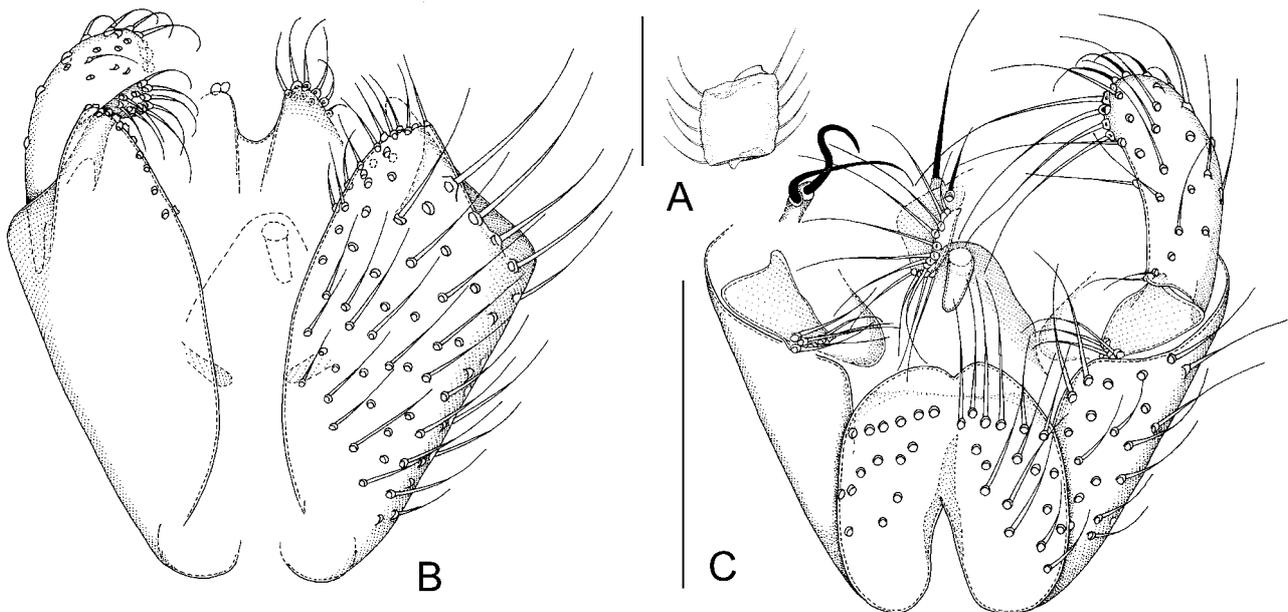
setosity, with a few very long setae at apicomesimal margin, dorsal side only setose apically. Aedeagus short subtriangular, basal part not clearly visible in the mount, apex curved ventrad as a long tube. Hypoproct posteriorly extending to level of middle of gonostylus, ventrally with a mesial row of ca. 10 setae (sternite 10) on each half. Cerci mesially separate, apparently fused at base.

Female unknown.

**Discussion.** *M. dolichothrix* is not very similar to any other *Manota*. It belongs to a large group of species, common in the Oriental region, all of which have a well-developed apicomesimal apophysis on palpomere 3, a setose anepisternum and preepisternum 2, a nonsetose anterior basalare and laterotergite, a short vein R1, tergite 9 laterally free, an oblique sickle-shaped or subtriangular parastylar lobe, an apically setose apophysis at the apico-dorsal margin of the gonocoxa, two juxtagonostylar megasetae arising from a long common basal body, a rather unmodified gonostylus and the hypoproct with a ventral mesial row of setae, flanking the apex of the aedeagus. *M. dolichothrix* is distinguished from all species in this group by the extremely long setae apicomesially on the evenly broad, curved gonostylus and on the mesial stripes of the hypoproct. *M. perangulata* (Figs 9 A, B) has a curved gonostylus with equally long setae at the apex, but it has only two very thick setae and the gonostylus has a prominent basomesial angle. The setae on the hypoproct are long, but not so extremely long as in *M. dolichothrix*.

**Etymology.** The name is derived from the Greek words *dolichos*, long, and *thrix*, hair, and refers to the very long setae on the hypoproct and gonostylus.

**Types.** *Holotype*. Male, MALAYSIA, Sabah, Danum Valley, WO (south), 18.xii.1986–18.i.1987, Malaise trap, M. Still leg. (NHM).



**FIGURE 6.** *Manota dolichothrix* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. Scale 0.10 mm.

### *Manota hexacantha* sp. n.

Figs 7 A–E

**Male. Colour.** The single specimen seems strongly faded. Head pale brown, vertex darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish. Thorax unicolorous pale brown. Legs unicolorous pale yellowish. Wing unicolorous yellowish; haltere yellowish-brown with darker knob. Abdominal tergites pale brownish, sternites paler but not clearly visible. All setosity yellowish or brownish, thicker setae apparently

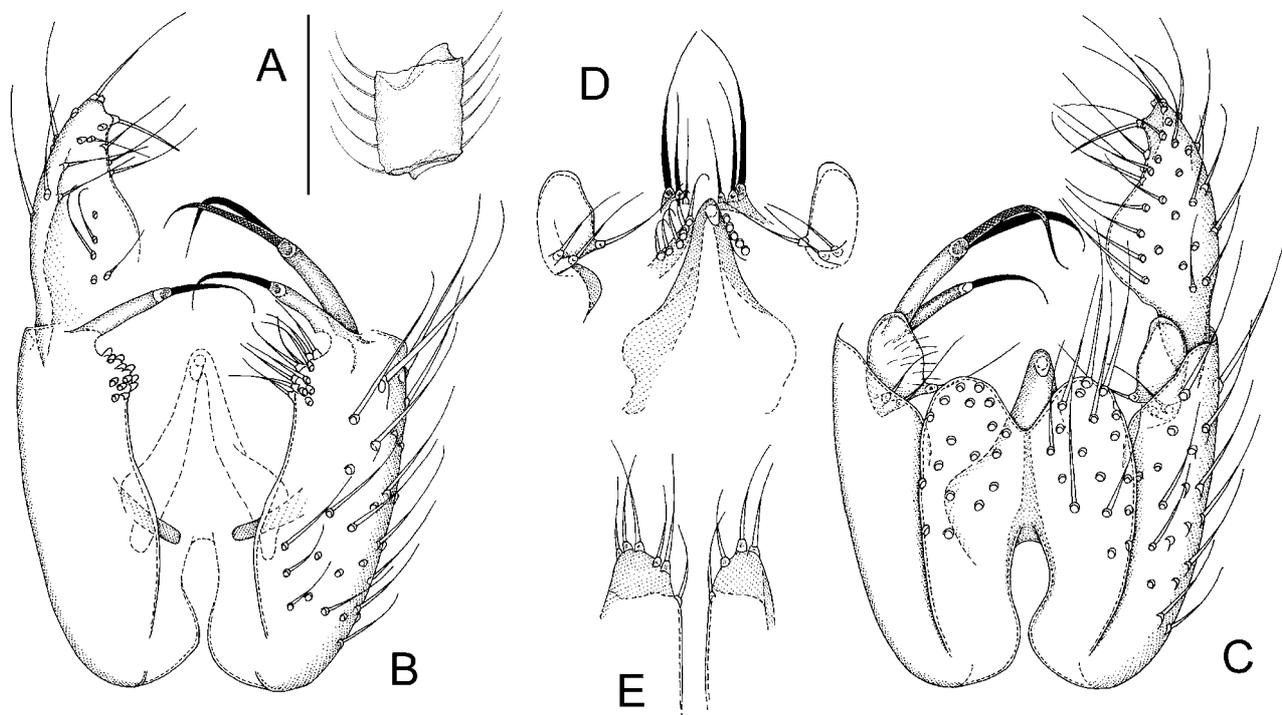
darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 7 A. Palpomere 3 of maxillary palpus with apicomésial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 broken off on both sides. Eleven strong postocular setae. **Thorax.** Anepisternum setose, with 31 setae; anterior basalare non-setose; preepisternum 2 setose, with ca. 19 setae; laterotergite non-setose; episternum 3 setose, with 8 setae. **Wing.** Similar to Fig. 1 A; wing length 1.5 mm. **Hypopygium,** Figs 7 B–E. Sternite 9 rather long, posteriorly extending to level of parastylar lobes, with sharply delimited convex lateral margin, posterior margin with deep indentation, anterior margin deeply incised, setae similar to adjacent ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, sigmoid. Parastylar lobe oval in outline, with three setae anteriorly. Paraapodemal lobe present, but not clearly visible in the single mount and not drawn in Figs 7 B and C. The dorsal mesial margin of gonocoxa simple, slightly sigmoid, with a small setose lobe subapically and a prominent strong seta arising from a long basal body apically. Two juxtagonostylar setae present, both long apically curved megasetae arising from a common basal body, as long as megasetae. Gonostylus elongate falcate in outline, simple, dorsal side concave, ventral side with moderately long setosity, dorsal side with similar setosity on apical half. Aedeagus rather short subtriangular with weak lateral shoulders, apex curved ventrad. Hypoproct posteriorly extending to level of base of gonostylus, ventrally with a mesial row of 5–6 setae (sternite 10) on each half. Cerci mesially separate.

Female unknown.

**Discussion.** *M. hexacantha* resembles *M. pellii* Hippa (Thailand). It differs e.g. by having the juxtagonostylar megasetae almost parallel and as long as their basal body, not divergent and not much shorter than their basal body, by the outline of the gonostylus being falcate, not obovate and by lacking a row of short strong setae dorsally at the apical margin of the gonostylus.

**Etymology.** The name is derived from the Greek words *hex*, six and *akantha*, thorn, and refers to the six long, strong setae dorsally at the apical parts of the gonocoxae.

**Types.** *Holotype.* Male, Malaysia, Sabah, Danum Valley, 8.vii.–12.viii.1986 (in NHM).



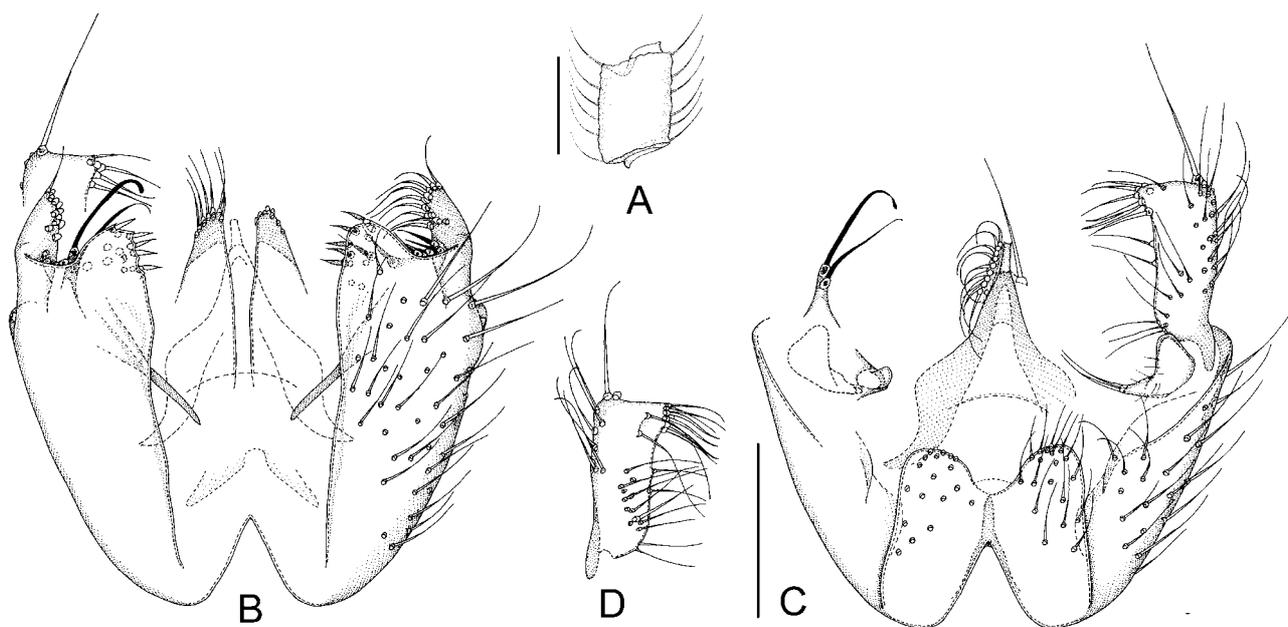
**FIGURE 7.** *Manota hexacantha* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. **D.** Aedeagus, hypoproct and parastylar lobes, ventral view. **E.** Cerci, dorsal view. Scale 0.10 mm.

*Manota hyboloma* sp. n.

Figs 8 A–D

Male. **Colour.** All specimens appear strongly faded. Head pale brown, vertex darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish. Thorax unicolorous pale brown. Legs unicolorous pale yellowish. Wing unicolorous yellowish or brownish; haltere yellowish-brown with darker knob. Abdominal tergites pale brownish, tergites 4, 5 and 6 apparently darker than others, sternites paler yellowish, sternites 5 and 6 brownish, nearly as dark as respective tergites. All setosity yellowish or brownish, thicker setae apparently darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 8 A. Palpomere 3 of maxillary palpus with apicomésial extension, with 4–5 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 1.4 times as long as palpomere 4. Ten to eleven strong postocular setae. **Thorax.** Anepisternum setose, with 45–50 setae; anterior basalar non-setose; preepisternum 2 setose, with 15–32 setae; laterotergite non-setose; episternum 3 setose, with ca. 15–20 setae. **Wing.** Similar to Fig. 1 A; wing length 1.8–2.1 mm. **Hypopygium,** Figs 8 B, C, D. Sternite 9 about half the ventral length of gonocoxa, with sharply delimited straight lateral margin, posterior margin with deep indentation, anterior margin deeply incised, setae similar to adjacent ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, sigmoid, with slight discontinuity at the middle. Parastylar lobe oblique, sickle-shaped, with a couple of setae anteriorly (at apex). Paraapodemal lobe exposed in ventral view, with submembranous appendix at mesial angle. Dorsal mesial margin of gonocoxa straight, subapically forming a large rounded lobe which is directed dorsad and has strong, short, sharp setae on ventral/mesial side, lobe in lateral view a prominent projection; long setose apicolateral apophysis, with indistinct additional lobe with strong sharp setae between it and lobe at mesial margin. Two juxtagonostylar setae, both long and more or less apically curved, one thin, the other thicker and megaseta-like, both arising from a common basal body, nearly half the length of setae. Gonostylus elongate sub-quadrangular with apicomésial appendix. Setae on ventral side moderately long, unevenly distributed, on dorsal side similar, apicomésially with a patch of setae, slightly thicker than other setosity, apicolaterally with 2 long and strong setae. Aedeagus elongate subtriangular, with rather strong lateral shoulders, apex straight, not angularly curved ventrad. Hypoproct posteriorly extending to level of apical third of gonostylus, ventrally with a mesial row of ca. 10 setae (sternite 10) on each half. Cerci mesially separate.

Female unknown.



**FIGURE 8.** *Manota hyboloma* sp. n. (A paratype, B, C, D holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. **D.** Gonostylus, dorsal view. Scale 0.10 mm.

**Discussion.** *M. hyboloma* is very similar to *M. calcarata* Hippa (Peninsular Malaysia), *M. procera* Hippa (Peninsular Malaysia, Sarawak, Thailand) and *M. transversa* Hippa (Malaysia), but differs by the large lobe postero-dorsally on the mesial margin of the gonocoxa. A homologous lobe is also seen in the other species, but it is rather inconspicuous and lacks the modified setosity. In addition, the apex of the aedeagus is straight in *M. hyboloma*, not curved ventrad as in the other three species. *M. hyboloma* also resembles *M. stricta* sp. n., but it differs by having the above-mentioned dorsal gonocoxal lobe and by having a normal aedeagus, not one with an unusually long, narrow and laterally winged apical part. See also under *M. stricta*.

**Etymology.** The name is derived from the Greek words *hybos*, hump, and *loma*, border, and refers to the large projecting lobe posteriorly at the dorsal mesial margin of the gonocoxa.

**Types.** *Holotype*. Male, BRUNEI, 13.iv.1991, without other data (in NHM).

*Paratypes*. 1 male with the same data as holotype (in NHM). 1 male, Malaysia, Sabah, Danum Valley, 14–17.vii.1986, Malaise trap, E. Smith leg. (in NHM).

### *Manota perangulata* sp. n.

Figs 9 A, B, C

**Male. Colour.** The specimens appear to be rather faded. Head pale brown, frons, vertex and dorsal part of occiput darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish. Thorax pale brown, postero-medial part of scutum and scutellum apparently slightly darker brown. Legs unicolorous pale yellowish. Wing unicolorous pale greyish-brown; haltere yellowish-brown with darker brown knob. Abdominal tergites 1, 2, 7 and 8 pale brown, remainder darker brown, sternites pale yellowish brown, sternites 5 and 6 darker brown. All setosity yellowish or brownish, thicker setae apparently darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 9 A. Palpomere 3 of maxillary palpus with apicomesial extension, with 5 (holotype)–6 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 1.3–1.5 (holotype) times as long as palpomere 4. Ten strong postocular setae. **Thorax.** Anepisternum setose, with 52 (holotype)–68 setae, anterior basalare non-setose, preepisternum 2 setose, with 16(holotype)–28 setae, laterotergite non-setose, episternum 3 setose, with 6(holotype)–20 setae. **Wing.** Similar to Fig 1 A; wing length 1.6 (holotype)–1.9 mm. **Hypopygium,** Figs 9 B, C (paratype damaged). Sternite 9 about half the ventral length of gonocoxa, with sharply delimited slightly convergent lateral margins, posterior margin transverse, indistinct, membranous, anterior margin deeply incised, setae laterally shorter, medially longer and forming a weak tuft. Ventral mesial margin of gonocoxa simple, sigmoid. Parastylar lobe oblique, of sickle-shaped form even if appearing a little different, especially on right side of mount of holotype (Fig. 9 C), with 4 setae anteriorly. Paraapodemal lobe exposed in ventral view, its mesial angle without a submembranous projection. Dorsal mesial margin of gonocoxa simple, slightly convex. Apex of gonocoxa dorsally with an apically setose apophysis. Two long juxtagonostylar setae, both rather unmodified megasetae arising from a common basal body, about half the length of setae. Gonostylus elongate, the basomesial corner produced as a prominent pointed lobe, apicomesially a small nose-like lobe with two extremely long setae, apico-dorsally with a small tuberculate lobe with short curved setae, otherwise setosity on ventral side rather short and sparse, on dorsal side largely absent. Aedeagus rather short, broadly subtriangular, with lateral shoulders, apical part curved ventrad, long. Hypoproct posteriorly extending to the level of basal part of gonostylus, ventrally with an irregular mesial row of ca. 10 long setae (sternite 10) on each half. In holotype a long seta arises from membrane between sclerotized basal margin of tergite 9 and cerci. Cerci mesially separate.

Female unknown.

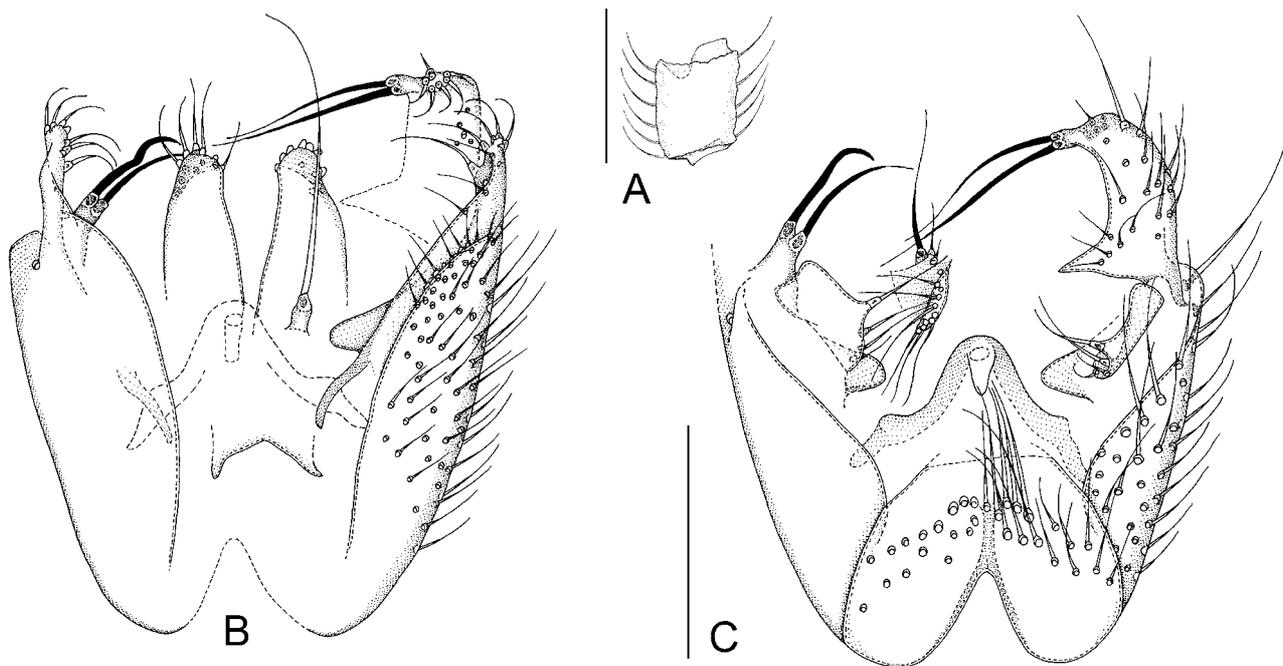
**Discussion.** *M. perangulata* belongs to a common group of *Manota* in the Oriental region. They are characterised by having a well-developed apicomesial apophysis on the palpomere 3, a setose anepisternum and preepisternum 2, a non-setose anterior basalare and laterotergite, a short vein R1, the tergite 9 laterally free, the parastylar lobe obliquely sickle-shaped or subtriangular, an apically setose apophysis at the dorsal margin of the gonocoxa, two juxtagonostylar megasetae arising from a long common basal body and a

hypoproct with a ventral mesial row of setae. *M. perangulata* is not very similar to the other species in this group and is easily distinguished by the prominent pointed basomesial corner of the gonostylus and the two extremely long apicomeres. *M. dolichothrix* has similar gonostylar setae but they are shorter than the gonostylus, four setae in total and they are not arising from a nose-like lobe.

**Etymology.** The name is derived from the Latin words *per*, very, and *angulata*, having a corner, referring to the sharp baso-mesial corner of the gonostylus.

**Types.** *Holotype.* Male, BRUNEI, 13.iv.1991, without other data (in NHM).

*Other material.* 1 male, MALAYSIA, Sabah, Danum Valley, 14–17.vii.1986, Malaise trap, E. Smith leg. (in NHM).



**FIGURE 9.** *Manota perangulata* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. Scale 0.10 mm.

***Manota radula* sp. n.**

Figs 10 A–D

**Male. Colour.** Head pale brown, frons, vertex and dorsal part of occiput darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish. Thorax pale brown, postero-medial part of scutum and scutellum darker. Leg 1 and coxae 2 and 3 pale yellowish, the more distal parts of legs 2 and 3 lost in both specimens. Wing unicolorous pale yellowish-brown; haltere yellowish-brown with darker brown knob. Abdominal tergites brown, sternites pale brown. All setosity yellowish or brownish, thicker setae apparently darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 10 A. Palpomere 3 of maxillary palpus without apicomeres extension, without apically expanded curved sensilla; palpomeres 4 and 5 broken off on both sides in both specimens. Ten to twelve strong postocular setae. **Thorax.** Anepisternum non-setose; anterior basalare non-setose; preepisternum 2 non-setose; laterotergite non-setose; episternum 3 setose, with 16–18 setae. **Wing.** Similar to Fig. 1 A; wing length 1.6–1.8 mm. **Hypopygium,** Figs 10 B, C, D. Sternite 9 small, about one fourth of ventral length of gonocoxa, with sharply delimited convergent lateral margins, posterior margin indented, anterior margin deeply incised, setae similar to adjacent setae of gonocoxa. Mesial margin of gonocoxa slightly concave, in the mount of the holotype the posterior part is turned laterad (Fig. 10 C), in the paratype it is lobed ventrad. Parastylar lobe in anterior-posterior direction very long, almost as long as ventral

mesial margin of gonocoxa, with several setae anteriorly at mesial margin and 2 setae in more lateral position. Paraapodemal lobe exposed in ventral view. Dorsal mesial margin of gonocoxa simple, slightly sigmoid, slightly ventrally a folded submembranous lobe subapically at dorsal mesial margin, ventrally of this a narrow lobe with two truncate megasetae, even more ventrally a similar lobe with ca. 3 truncate setae. The two latter could also be part of one lobe only. No apical apophysis dorsally on gonocoxa. Two long juxtagonostylar setae, both subequal, rather unmodified megasetae arising from a common short basal body. Gonostylus complex, with a narrow lateral part, a broad mesial part and the intermediate part lobe-like both dorsally and ventrally; lateral part with moderately long setae on ventral side, with fine setae on apical half of dorsal side, intermediate part setose only on ventral side, mesial part non-setose ventrally, dorsally at mesial margin with many rows of short curved setae. Aedeagus elongate subtriangular, without prominent lateral shoulders, apex curved ventrad. Hypoproct posteriorly extending to level of middle of gonostylus, ventral setae small, in a patch of ca. 20 setae on each half. Cerci mesially separate.

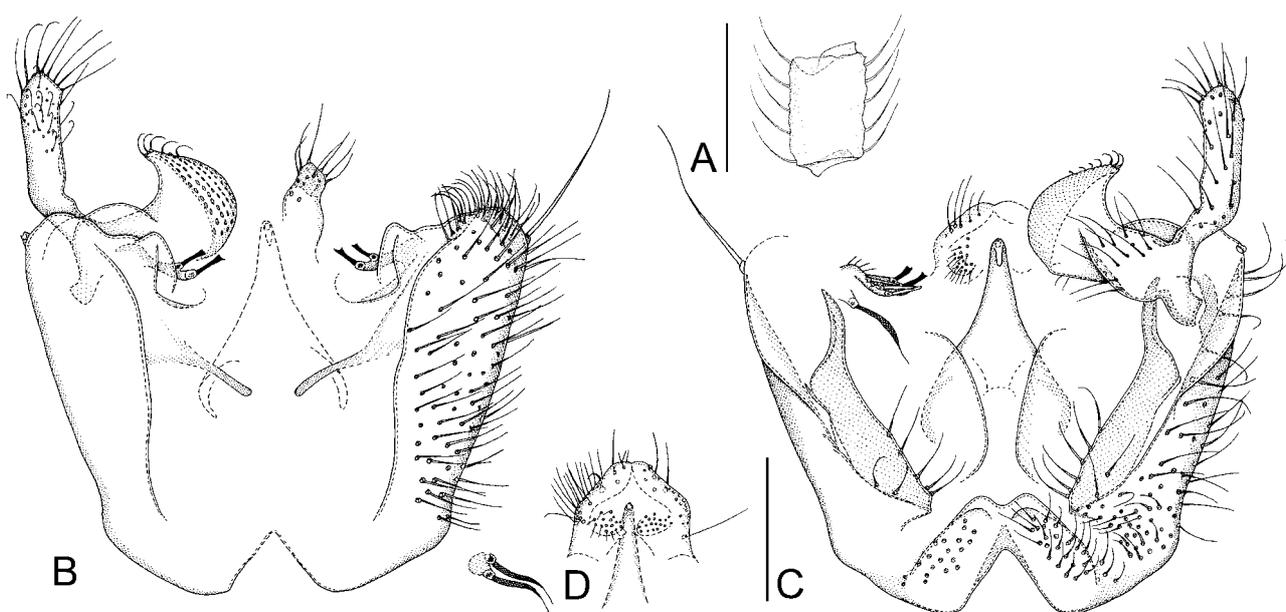
Female unknown.

**Discussion.** *M. radula* is one of the few species of *Manota* which have a non-setose episternum 2. The other species are *M. ctenophora* Matile (New Caledonia), *M. forceps* Hippa & Papp (Thailand), *M. maorica* Edwards (New Zealand), *M. serawei* Hippa (New Guinea), *M. sinepollex* sp. n. (Sumatra), *M. subforceps* sp. n. (Sumatra), *M. taedia* Matile (New Caledonia) and *M. unifurcata* Lundström (Europe). The only species that have a non-setose episternum 2 and a non-setose laterotergite are *M. forceps*, *M. subforceps* and *M. unifurcata*. *M. radula* differs from *M. unifurcata* e.g. by lacking the apicomésial extension and the curved sensilla on the maxillary palpomere 3, and from *M. forceps* and *M. subforceps* by having a unicolorous wing and a short wing vein R1. *M. radula* differs from all three species by its branched gonostylus. The unusual branched gonostylus alone is sufficient to easily recognize *M. radula*. The only species which may be similar is *M. perlobata* Hippa (Thailand and Burma) but its gonostylus has a long basal part with one short and two long transversely placed lobes or branches.

**Etymology.** The name is derived from Latin, *radula*, scraper, referring to the scraper-like area on the mesial lobe of the gonostylus.

**Types.** *Holotype.* Male, BRUNEI, Ulu Temburong, 14.ii.–9.iii.1982, Malaise trap, M. C. Day leg. (in NHM).

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



**FIGURE 10.** *Manota radula* sp. n. (A, B, C holotype, D paratype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. **D.** Apex of aedeagus, hypoproct and juxtagonostylar setae, ventral view. Scale 0.10 mm.

***Manota sinepollex* sp. n.**

Figs 1 C, 11 A, B, C

Male. **Colour.** Head pale brown, frons and vertex slightly darker brown. Antenna pale brown, flagellomeres 1–4 ventrally paler than other parts. Mouthparts pale yellowish. Thorax dorsally brown, laterally paler brown. Leg pale yellowish, apices of coxa 2 and 3 darker. Wing pale yellowish-brown with a diffuse darker brown patch at middle of anterior half (Fig. 1 C); haltere yellowish-brown with brown knob. Abdominal tergites brown, sternites pale brown. All setosity yellowish or brownish, thicker setae apparently darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 11 A. Palpomere 3 of maxillary palpus without apicomeresial extension, without apically expanded curved sensilla; palpomere 4 with parasegment, palpomere 5 ca 1.2 times longer than palpomere 4. About 15–18 strong postocular setae. **Thorax.** Anepisternum non-setose; anterior basalare non-setose; preepisternum 2 non-setose; laterotergite setose, with 18–24 setae; episternum 3 non-setose. **Wing.** Fig. 1 C; wing length 2.0 mm. **Hypopygium,** Figs 11 B, C. Sternite 9 about half the ventral length of gonocoxa, with sharply delimited convergent lateral margins, posterior margin with a medial 'knob', anterior margin deeply incised but the sides of the incision posteriorly closely approximate, setae similar to adjacent setae of gonocoxa. Mesial margin of gonocoxa appearing as a large subtriangular lobe. No distinct parastylar lobe visible, but there is a small curved apically setose lobe and a membranous non-setose lobe at ventral mesial margin of gonocoxa (see Fig. 11 C), either or both of which may be the parastylar lobe. Dorsal mesial margin of gonocoxa simple, convex. No apophysis dorsally at posterior margin of gonocoxa. A transverse lobe with 4–5 megasetae and 1–2 short usual setae subapically at dorsal mesial margin of gonocoxa. Juxtagonostylar setae in form of two expanded, complex megasetae arising from large but short basal bodies which may be at least partly united. Gonostylus simple, nearly 3 times longer than broad, elongate oval in outline, ventral side evenly covered by rather short setosity, dorsal side non-setose except for a stripe of few setae in middle. Aedeagus subtriangular, with weak lateral shoulders, apex curved ventrad. Hypoproct short, posterior margin at level of basal part of gonostylus, with rounded posterolateral corners, ca. 15 ventral setae on a medial lobe. Tergite 9 unusually well developed posteriorly, with 1 seta in holotype, non-setose in paratype. Cercus unusually complex, divided into dorsal and ventral lobes, the former further divided into smaller lobes; cerci fused at extreme base.

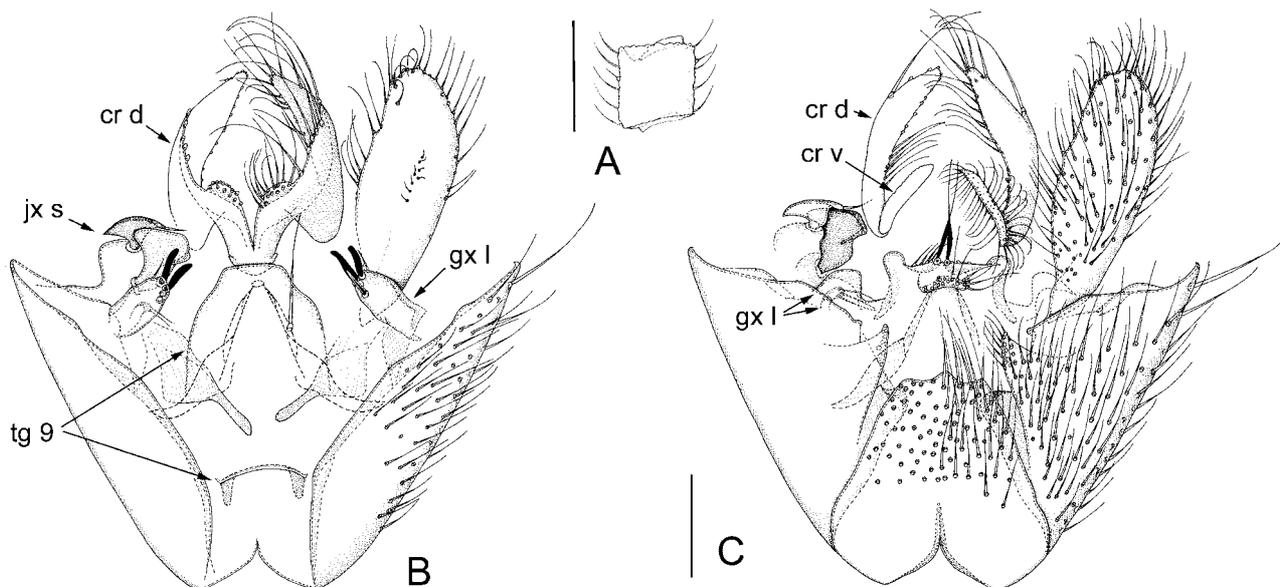
Female unknown.

**Discussion.** *M. sinepollex* is one of the few *Manota* species in which episternum 2 is non-setose, the others being *M. ctenophora* Matile (New Caledonia), *M. forceps* Hippa & Papp (Thailand), *M. maorica* Edwards (New Zealand), *M. radula* sp. n. (Borneo), *M. serawei* Hippa (New Guinea), *M. subforceps* sp. n. (Sumatra), *M. taedia* Matile (New Caledonia) and *M. unifurcata* Lundström (Europe). It is also one of the few species in which the vein R1 is long, meeting the costa near the middle of the wing instead of well into the basal half; the other species are *M. avita* Hippa (Thailand), *M. forceps*, *M. maorica*, *M. subforceps* and *M. unifurcata*. Further, *M. sinepollex* belongs to a group of a few species which lack the apicomeresial extension and the curved sensilla on the maxillary palpomere 3; other species are *M. avita*, *M. forceps*, *M. natalensis* Jaschhof et Mostovski (South Africa), *M. radula* and *M. subforceps*. Thus, *M. sinepollex* shares all the three above mentioned characters only with *M. forceps* and *M. subforceps*. *M. sinepollex* differs from both by having the laterotergite setose. In the hypopygial characters, *M. sinepollex* is distinguished from any described *Manota* species by the many-lobed cercus. It is rather similar to *M. avita* (cf. Hippa 2009: fig. 2) so that it is possible to homologise nearly all the structures, but in *M. avita* the gonostylus is two-lobed and the cercus is less modified. *M. sinepollex* resembles *M. avita*, *M. forceps* and *M. subforceps* by having a dark patch at the costal margin of the wing.

**Etymology.** The name is derived from the Latin words *sine*, without and *pollex*, thumb, referring to the maxillary palpomere 3, which lacks a thumb-like apicomeresial extension.

**Types.** *Holotype.* Male, INDONESIA, Sumatra, Sumatera Utara, Semangat Gunung, 1300 m, Malaise in jungle, 16.iii.1992, H. Hippa (in SMNH).

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



**FIGURE 11.** *Manota sinepollex* sp. n. (A paratype, B, C holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. Scale 0.10 mm, cr d= dorsal lobe of cercus, cr v = ventral lobe of cercus, gx l = lobe at mesial margin of gonocoxa, jx s = juxtagonostylar megasetae.

***Manota stricta* sp. n.**

Figs 12 A, B, C

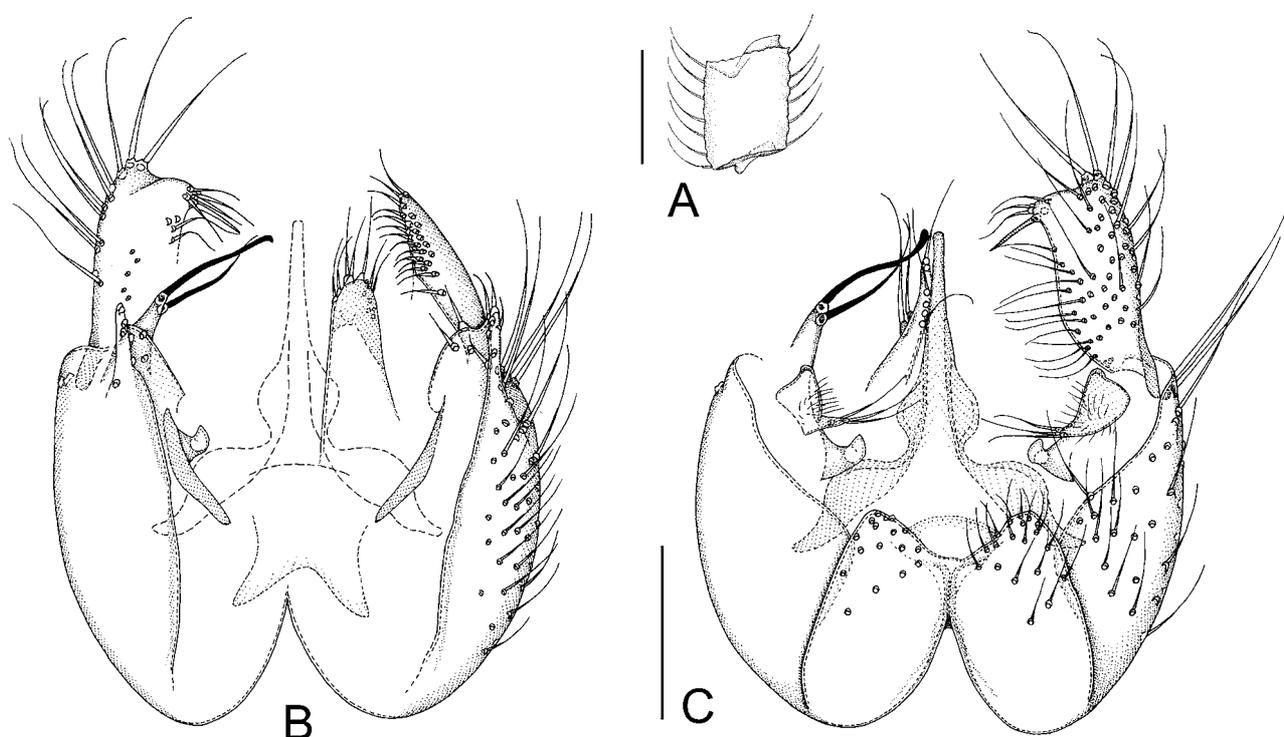
**Male. Colour.** The single specimen appears to be rather faded. Head pale brown, vertex and dorsal part of occiput darker brown. Antenna unicolorous pale brown. Mouthparts pale yellowish. Thorax pale brown, postero-medial part of scutum and almost all of scutellum darker brown. Legs unicolorous pale yellowish. Wing unicolorous pale greyish-brown; haltere yellowish-brown with darker brown knob. Abdominal tergites pale brownish, tergites 5 and 6 darker brown, sternites pale yellowish brown, sternite 6 darker brown, nearly as dark as tergite 6. All setosity yellowish or brownish, thicker setae appearing darker than finer setae and trichia. **Head.** Antennal flagellomere 4, Fig. 12 A. Palpomere 3 of maxillary palpus with apicomesial extension, with 5 apically expanded curved sensilla; palpomere 4 with parasegment; palpomere 5 1.6 times as long as palpomere 4. Nine strong postocular setae. **Thorax.** Anepisternum setose, with 58 setae; anterior basallare non-setose; preepisternum 2 setose, with 17 setae; laterotergite non-setose; episternum 3 setose, with 17 setae. **Wing.** Similar to Fig 1 A; wing length 2.1 mm. **Hypopygium,** Figs 12 B, C. Sternite 9 about half ventral length of gonocoxa, with sharply delimited nearly straight lateral margin, posterior margin with deep indentation, anterior margin deeply incised, setae slightly shorter than adjacent ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, sigmoid. Parastylar lobe oblique, sickle-shaped, with 3 setae anteriorly (at apex). Paraapodemal lobe exposed in ventral view, its mesial angle with a submembranous projection. Dorsal mesial margin of gonocoxa simple, slightly convex. There is a rather small setose apico-dorsal apophysis on the gonocoxa. Two juxtagonostylar setae present, both long, one thin, other thicker and megaseta-like, both arising from a common basal body which is about half length of setae. Gonostylus elongate sub-quadrangular with an apicomesial projection. Setae on ventral side moderately long, unevenly distributed with a non-setose area apicomesially, few setae on dorsal side, apicomesially with a patch of setae with one seta stronger, apicolaterally with few long and strong setae. Aedeagus unusually long, apex extending nearly as far as apex of gonostylus, lateral shoulders strong, relatively basal, the apical part narrow with small wing-like lateral lobes near the base, apex straight, not angularly curved ventrad. Hypoproct unusually narrow and elongated, posteriorly extending as far as apex of aedeagus, ventrally with a mesial row of ca. 6 setae (sternite 10) on each half. Cerci mesially separate.

Female unknown.

**Discussion.** *M. stricta* is similar to *M. calcarata* Hippa (Peninsular Malaysia), *M. hyboloma* sp. n. (Malaysia: Sabah), *M. procera* Hippa (Peninsular Malaysia, Sarawak, Thailand) and *M. transversa* Hippa (Malaysia). It differs from all of these by its unusual aedeagus in which the apical part, posterior to the lateral shoulders, is narrow and elongated with unique wing-like lobes near the base. Even the hypoproct is unusually narrow. *M. stricta* and *M. hyboloma* have the apex of the aedeagus straight, not curved ventrad as in the other species. *M. stricta* and the other species mentioned above differ from *M. hyboloma* by lacking a projecting lobe posteriorly at the dorsal mesial margin of the gonocoxa. There is one other species of *Manota*, *M. spadix* Hippa (Peninsular Malaysia), which has a similar narrow and elongated posterior part on the aedeagus. In this species the aedeagal apex is laterally expanded, the parastylar lobe is lacking, the gonostylus is short obcordate and the laterotergite is setose.

**Etymology.** The name is derived from the Latin *stricta*, straight, referring to the straight apical part of the aedeagus.

**Types.** *Holotype*. Male, BRUNEI, 13.iv.1991, without other data (in NHM).



**FIGURE 12.** *Manota stricta* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. Scale 0.10 mm.

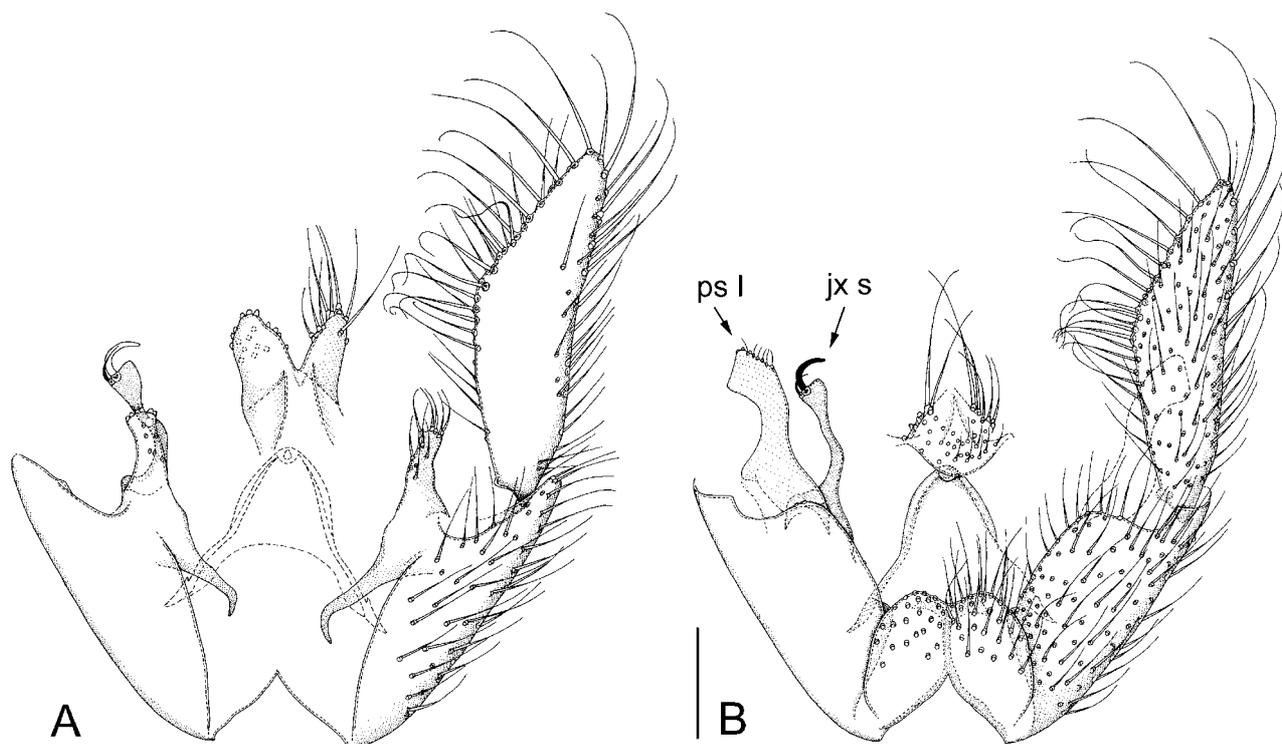
***Manota subforceps* sp. n.**

Figs 1 B, 13 A, B.

**Male. Colour.** Head brown. Antenna unicolorous brown. Mouthparts pale yellowish. Thorax unicolorous brown. Legs pale yellowish, trochanter and femur 2 and 3 brown, tibiae and tarsi appearing rather dark depending on the vestiture. Wing pale yellowish-brown with a darker brownish patch at costal margin (Fig. 1 B); haltere pale brown, with brown knob. Abdominal tergites brown, sternites brown, almost as dark as tergites. All setosity yellowish or brownish, thicker setae seeming darker than finer setae and trichia, thick setae on parts of legs appearing nearly black. **Head.** Antennal flagellomere 4 visible in ventral view in the single specimen and not illustrated (probably ca. 1.5 times longer than broad). Palpomere 3 of maxillary

palpus without apicomerial extension, without apically expanded curved sensilla; palpomere 4 without parasegment; palpomere 5 1.7 times longer than palpomere 4. Twelve strong postocular setae. **Thorax.** Anepisternum non-setose, anterior basalare non-setose, preepisternum 2 non-setose, laterotergite non-setose, episternum 3 non-setose. **Wing.** Fig. 1 B: sclerotized part of M2 unusually long, basally extending nearly to level of r-s; wing length 2.8 mm. **Hypopygium,** Figs 13 A, B. Sternite 9 about one third of ventral length of gonocoxa, lateral margin sharply demarcated, slightly convex, posterior margin notched, anterior margin with deep acute incision, setae similar to ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, with shoulder-like curvature laterad at parastylar lobe. Parastylar lobe almost as long as gonocoxa and directed posteriad, with a row of short setae apicomerially. Paraapodemal lobe indistinct. Dorsal mesial margin of gonocoxa simple, at middle united with a broad setose posteriorly directed lobe. No apical apophysis dorsally at apical margin of gonocoxa. Two juxtagonostylar setae present: a curved megaseta and a thinner seta arising from an apically flattened, unusually long basal body, which is ca. four times as long as megaseta. Gonostylus long, longer than gonocoxa, broadest at middle, ventrally rather short-setose, dorsally almost non-setose, setae on mesial margin forming a fringe, setae becoming stronger towards apex. Aedeagus subtriangular, without distinct lateral shoulders, apex curved ventrad. Hypoproct rather small, posteriorly not reaching middle of gonostylus, medially not distinctly divided into two halves, with ca. 20 ventral setae. Cerci medially united except for apical parts.

Female unknown.



**FIGURE 13.** *Manota subforceps* sp. n. (holotype). **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. Scale 0.10 mm. ps l = parastylar lobe, jx s = juxtagonostylar setae.

**Discussion.** *M. subforceps* is very similar to *M. forceps*, but can be distinguished as follows: the parastylar lobe is apically broad and flat, simple and with a row of small setae, while in *M. forceps* the apex is narrow and has a narrow falcate process and a group of strong setae; the gonostylus is broadest at the middle, but in *M. forceps* the sub-basal part is broadest. *M. forceps* and *M. subforceps* differ from all other *Manota* for which the wing is described by having the sclerotized part of M2 basally extending nearly to the level of r-s instead of being very much shorter. *M. subforceps* and *M. forceps* belong to the few species of *Manota* in which all the mesopleural sclerites are non-setose. The other similar species are *M. radula* sp. n. (Borneo) and *M.*

*unifurcata* Lundström (Europe). *M. subforceps* and *M. forceps* are distinguished from both of these by the dark mark on the wing, from *M. radula* by the simple, not deeply lobed gonostylus, and from *M. unifurcata* by lacking the apicomerial thumb-like extension with curved sensilla on the maxillary palpomere 3, and by the very long parastylar lobe and basal body of the juxtagonostylar setae, both of which are quite inconspicuous in *M. unifurcata*. For other unusual characters of *M. forceps* and *M. subforceps*, see under *M. radula* and *M. sinepollex* above.

**Etymology.** The name is Latin and formed from the specific epithet of *M. forceps* by the prefix *sub-*, somewhat, referring to the similarity of the two species.

**Types.** *Holotype.* Male, INDONESIA, Sumatra, Sumatera Utara, Semangat Gunung, 1300 m, Malaise in jungle, 16.iii.1992, H. Hippa (in SMNH).

### ***Eumanota vilkamaai* sp. n.**

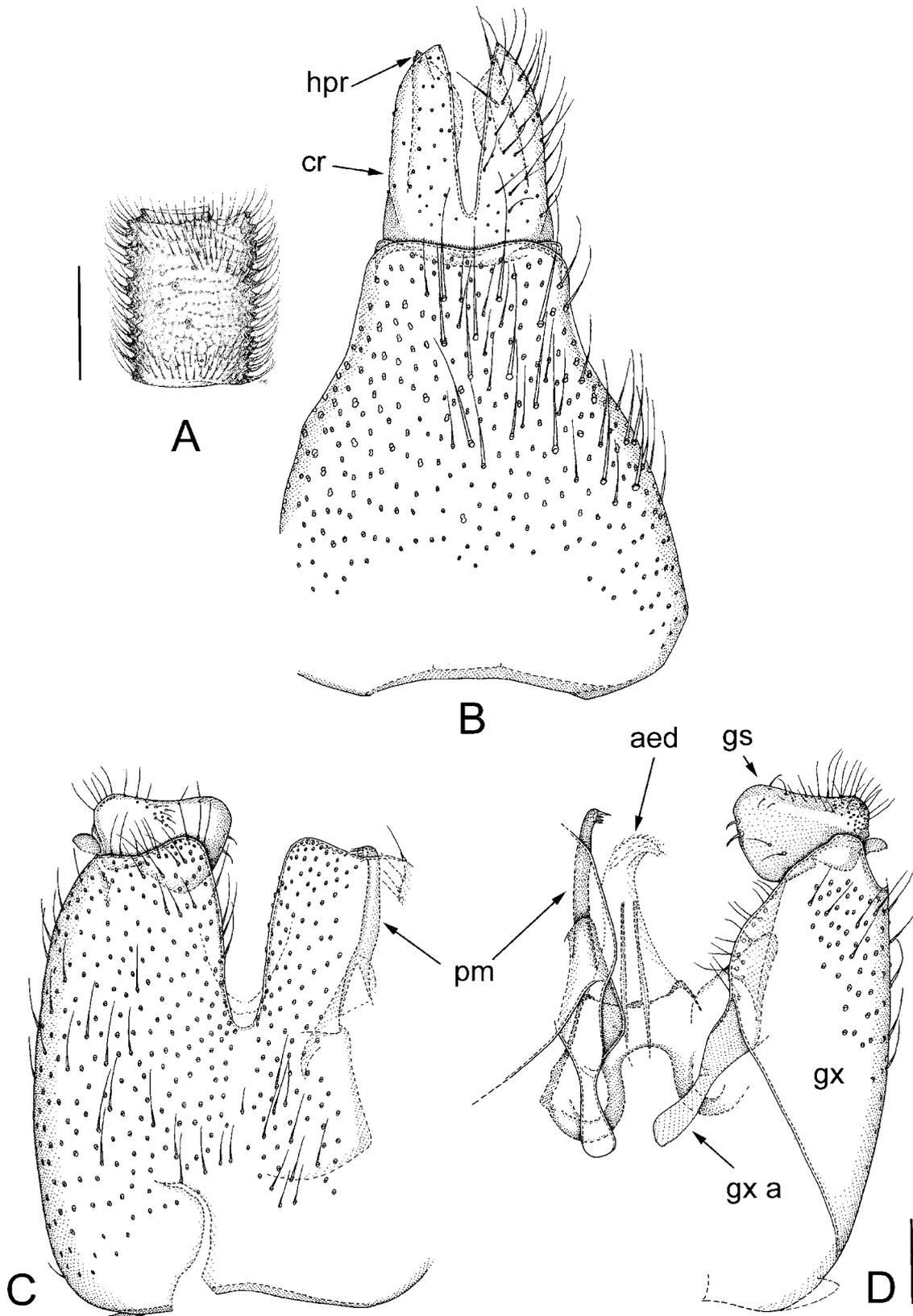
Figs 1 D, E, 14 A, B, C

Male. **Colour.** Head pale brown. Antenna unicolorous pale brown. Mouthparts unicolorous yellowish. Thorax brown, lateral parts slightly paler than scutum and scutellum. Wing with basal half nearly colourless yellowish, apical half infuscated (Fig. 1 E). Legs pale yellowish, apices of coxae, trochanters, extreme base and apical third of femur 3 infuscated; in the mount also femur 1 and 2 appear brownish, but we assume it due to their contents. Abdomen unicolorous pale brown (after treatment with KOH), hypoproct and cerci whitish. Setae and other vestiture vary from pale yellowish to dark brown or blackish, largely depending on their thickness. **Head.** Similar to *E. hilleviae* (Hippa *et al.* 2004: fig 3a). Ultimate palpomere of maxillary palpus 7.3 times longer than penultimate. Antennal flagellomere 4, Fig. A. **Thorax.** Similar to *E. hilleviae* (Hippa *et al.* 2004: fig 4a). Anepisternum with ca 130 weak setae and 1 strong setae on posterior part; anterior basalare with ca. 10 weak and 2 very strong setae; preepisternum 2 non-setose; laterotergite with ca 70 weak setae intermixed with 10 strong ones; episternum 3 non-setose. Legs as usual, basal part of hind tibia similar to *E. leucura* (Hippa *et al.* 2004: fig 3e). **Wing,** Figs 1 D, E. **Hypopygium,** Figs 14 B, C, D. No sternite 9 identifiable. Gonocoxae fused, postero-medially separated by a cleft which is almost half length of gonocoxa. Ventral mesial and apical margin of gonocoxa simple, apicomerial corner rounded, not lobe-like. Dorsal mesial margin of gonocoxa simple, convex; at middle of mesial margin, on more ventral level, there is a sclerite with setae. Paramere long and narrow, extending to level of posterior margin of gonocoxa, apically with short setae directed mesiad. Aedeagus with a membranous trichose apical part extending posteriorly as far as apex of paramere, aedeagal apodeme looped, a pair of longitudinal rod-like structures medio-dorsally on the aedeagus. Ventral part of hypoproct (sternite 10) with nearly 100 setae, lobe-like posterolateral parts with ca 10 setae each, posteriormost stronger than remainder. Tergite 9 as usual. Cerci as usual, baso-medially fused.

Female. Similar to male. Baso-ventral part of tibia 3 simple. Apical part of abdomen similar to fig. 4a in Hippa *et al.* 2004.

**Discussion.** *E. vilkamaai* is similar to *E. malukuensis* Søli (Indonesia, Maluku Utara) and *E. jani* Papp (Papua New Guinea, Madang province), but is distinguished from them by the different shape of the gonostylus. In *E. vilkamaai* the gonostylus is short, only slightly longer than broad, and it widens from base towards the apex, in *M. malukuensis* the gonostylus is about three times longer than broad while in *E. jani* it is about twice as long as broad and in both species it narrows towards the apex. All the three species are characterized by two short, rather strong setae at the apical margin of the gonostylus and slender and long parameres, unlike the other described *Eumanota*.

**Etymology.** The species is named after the Finnish sciaroidologist Dr. Pekka Vilkkamaa, one of the few students of the Manotinae.



**FIGURE 14.** *Eumanota vilkamaai* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Male tergite 9, cerci and hypoproct, dorsal view. **C.** Hypopygium, ventral view. **D.** Hypopygium with tergite 9 removed, dorsal view. Scale 0.10 mm. aed = aedeagus, cr = cercus, gs = gonostylus, gx = gonocoxa, gx a = gonocoxal apodeme, hpr = hypoproct, pm = paramere.

**Types.** *Holotype.* Male. PAPUA NEW GUINEA, Morobe Province, Lakekamu basin, Tekadu, 470 m, Malaise trap close to Yenina river, 17–20.xi.1999, leg. H. Hippha, R. Norberg, D. Borisch (in SMNH).

*Additional material.* 1 female with same data as holotype (in SMNH).

### New records of *Manota*, *Eumanota* and *Promanota*

#### *Manota bifida* Hippha & Papp, 2007

*Material studied.* 3 males, BRUNEI, 13.vi.1991, without other data (in NHM).

**Remarks.** This species was only known from the holotype from Khao Pu-Khao Ya National Park, Thailand (Hippha & Papp 2007).

#### *Manota clausa* Hippha, 2006

*Material studied.* 1 male, BRUNEI, Ulu Temburong, 14.ii–9.iii.1982, Malaise trap, M.C. Day leg. (in NHM).

**Remarks.** This species was only known from the type material from Peninsular Malaysia (Hippha 2006).

#### *Manota curvata* Hippha, 2006

*Material studied.* 1 male, INDONESIA, Sumatra, Aceh, Gunung Leuser National Park, Ketambe res., st., 3°41'N 97°39'E, young forest, closed canopy, 350 m, 9–21.ix.1989, Malaise trap, C.D. Darling, ROM 893087 (in ROM), 1 male with the same data except for lacking coordinates and for 1–28.ii.1990, ROM 900009 (in ROM). 1 male, MALAYSIA, Sabah, Danum Valley, 14–17.vii.1986, Malaise trap, E. Smith leg. (in NHM).

**Remarks.** The species was only known from Peninsular Malaysia (Hippha 2006, 2008).

#### *Manota ferrata* Hippha, 2006

*Material studied.* 4 males, BRUNEI, Ulu Temburong, 14.ii–9.iii.1982, Malaise trap, M.C. Day leg. (in NHM).

**Remarks.** Only the type material from Selangor, Malaysia was known (Hippha 2006).

#### *Manota forceps* Hippha & Papp, 2007

*Material studied.* 1 male, N.W. THAILAND, Chiang Mai Prov., Queen Sirikit Botanic Gardens, 300–700 m, N 18 53.306 E 51.432, Malaise trap, vii.2006, leg. M.V.L. Barclay & H. Mendel, BMNH (E) 2006-128 (in NHM).

**Remarks.** The species was only known from the holotype from near Doi Anh Kang, Thailand (Hippha & Papp 2007). It seems peculiar that the species was not discovered in the rich material of *Manota* species collected by the TIGER project in the national parks of Thailand (Hippha 2008, 2009).

In *M. forceps*, the maxillary palpus lacks the apicomeres extension or apophysis as well as the curved sensilla on palpomere 3, the preepisternum 2 is non-setose and episternum 3 has a few setae, characters which could not be observed in the dry and pinned holotype. See also *M. subforceps* above.

***Manota horrida* Hippa, 2006**

*Material studied.* 1 male, MALAYSIA, Sabah, Danum Valley, 14–17.vii.1986, Malaise trap, E. Smith leg. (NHM).

**Remarks.** The species was only known from the type material from the Peninsular Malaysia. The specimen from Sabah differs from the types by having the dorsomesial corner of the gonocoxa more angular.

***Manota pectinata* Hippa, 2006**

*Material studied.* 1 male, INDONESIA, Sulawesi, Dumoga, 20.vi.1985 (in NHM). 1 male, MALAYSIA, Sabah, Danum Valley, 14–17. vii.1986, Malaise trap, E. Smith leg. (NHM).

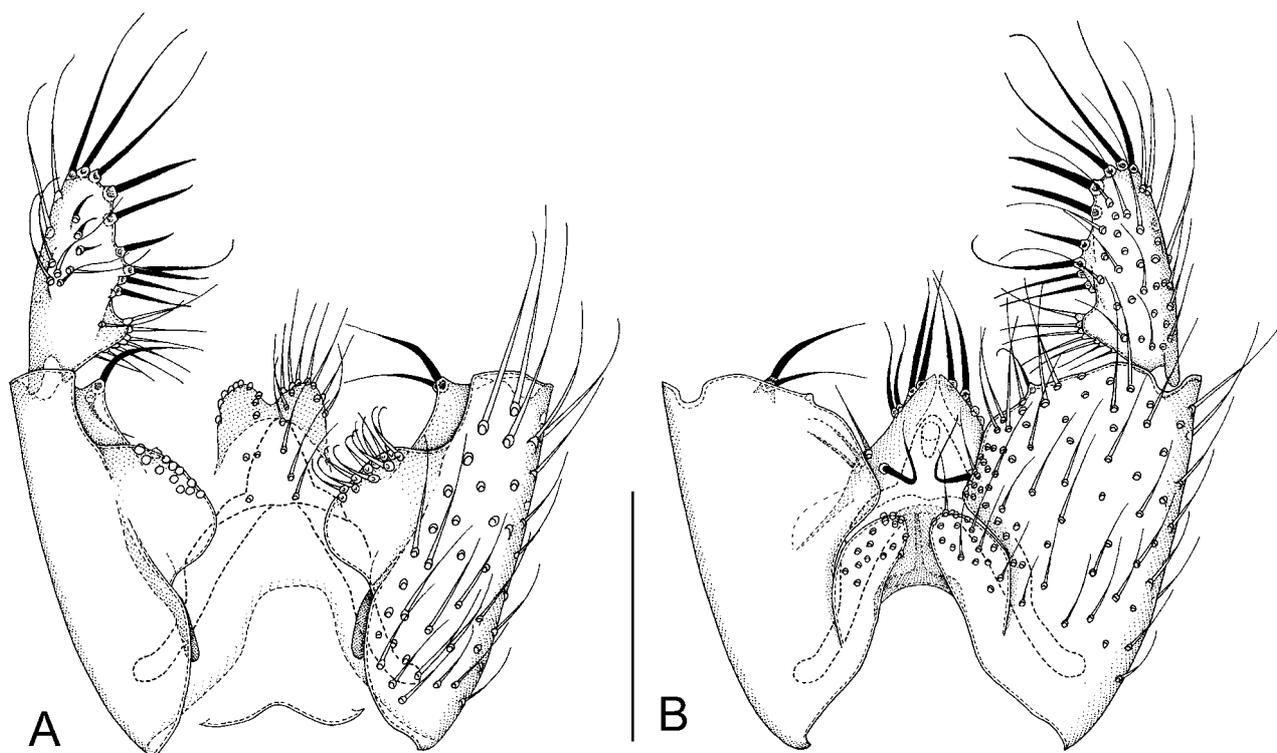
**Remarks.** The species was only known from Peninsular Malaysia (Hippa 2006) and Thailand (Hippa & Papp 2007, Hippa 2008, 2009).

***Manota pappi* Hippa, 2006**

Figs 15 A, B

*Material studied.* 1 male, BRUNEI, Ulu Temburong, 14.ii.–9.iii.1982, Malaise trap, M. C. Day leg. (in NHM); 1 male with the same data except 16–22.ii. (in NHM); 1 male, labelled only Brunei 13.iv.1991 (in NHM). 2 males, MALAYSIA, Sabah, Danum Valley, 14–17.vii.1986, Malaise trap, E. Smith leg. (in NHM).

**Remarks.** The species was only known from the type material from Peninsular Malaysia (Hippa 2006). We include new drawings of the hypopygium (Fig. 15) because those in the original description may be difficult to interpret, in particular the gonostylus.



**FIGURE 15.** *Manota pappi* Hippa (Brunei). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. Scale 0.10 mm.

### ***Manota perpusilla* Hippa, 2006**

*Material studied.* 1 male, INDONESIA, Sumatra, Aceh, Gunung Leuser National Park, Ketambe res. st., 3°41'N 97°39'E, young forest, closed canopy, 350 m, 9–21.ix.1989, Malaise trap, D.C. Darling, ROM 893087 (in ROM).

**Remarks.** The species was described from Peninsular Malaysia (Hippa 2006) and later reported from Thailand (Hippa & Papp 2007, Hippa 2009). The specimen from Sumatra has the juxtagonostylar megasetae similar to the holotype, but it is large with long flagellomeres as in the specimens from Thailand (Hippa 2009).

### ***Manota simplex* Hippa, 2006**

*Material studied.* 1 male, MALAYSIA, Sabah, Danum Valley, 8.vii.–12.viii.1986 (in NHM).

**Remarks.** The species was known from Peninsular Malaysia (Hippa 2006) and Thailand (Hippa 2008).

### ***Manota ulu* Hippa, 2006**

*Material studied.* 1 male, INDONESIA, Sumatra, Aceh, Gunung Leuser National Park, Ketambe res. st., 3°41'N, 97°39'E, young forest, light gap, 350 m, 1–31.i.1990, Malaise trap, D.C. Darling, IIS 900001 (in ROM).

**Remarks.** The species was known from Peninsular Malaysia (Hippa 2006) and Thailand (Hippa & Papp 2007).

### ***Eumanota malukuensis* Søli, 2002**

*Material studied.* 2 males, INDONESIA, Seram, Gunung Kopiboto, 1000 m, September 1987, Malaise trap, M.C. Day leg. (in NHM).

**Remarks.** Only the holotype was known, from Indonesia, Maluku Utara, Bacan, Makian (Søli 2002).

### ***Eumanota humeralis* Edwards, 1933**

*Material studied.* 1 male, MALAYSIA, Sabah, Danum Valley CA, secondary forest, forest edge, SI LAM RD, km 57, xi.1986, P. Eagleton (in NHM).

**Remarks.** Only the holotype from Mt. Kinabalu, Sabah, was known (Edwards 1933).

### ***Eumanota suthepensis* Søli, 2002**

*Material studied.* 1 male, THAILAND, Phetchabun, Nam Nao NP, hill evergreen forest, 1644.371'N 10134.549'E, 834m, Malaise trap 20–27.xi.2006, Leng Jantiep leg., T1324 (in QSBG).

**Remarks.** The species was described from Doi Suthep, Chiang Mai, Thailand (holotype) and from Ban Song, Cha, Louang, Phrabang province, Laos (paratype) (Søli 2002). Papp *et al.* (2004) published further records from Doi Suthep and Doi Inthanon NP in Thailand.

## *Promanota malaisei* Tuomikoski, 1966

*Material studied.* 1 male, N.W. THAILAND, Chiang Mai Prov., Doi Pha Hom Pok, 2000 m, N 20° 7.644' E 99° 8.89', Malaise trap, 24–30.vii.2006, leg. M.V.L. Barclay & H. Mendel, BMNH (E) 2006-128 (in NHM); 3 males, THAILAND, Chiang Mai, Doi Inthanon NP, checkpoint 2, 1700 m, 18°31.559'N 98°29.941'E, Malaise trap, 29.vi.–8.vii.2006, Y. Areeluk leg. (in QSBG).

**Remarks.** This species was only known from Burma (Tuomikoski 1966, Hippa *et al.* 2004) although a very similar (if not identical) species, *P. formosana*, was described from Taiwan by Papp (2004).

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