



## Notes on Afrotropical *Manota* Williston (Diptera: Mycetophilidae), with the description of seven new species

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### Abstract

The following new species are described: *Manota clinochaeta* (Madagascar), *M. cultrigera* (Madagascar), *M. edentula* (Mauritius), *M. ehippiata* (Uganda), *M. macrodon* (Madagascar), *M. phyllochaeta* (Madagascar) and *M. uncinata* (Madagascar). New records and taxonomic notes are given for *M. maboceansis* Matile (Uganda), *M. natalensis* Jaschhof & Mostovski (South Africa) and *M. whiteleyi* Jaschhof and Mostovski (Ivory Coast). Taxonomic notes on *M. flavipes* (Enderlein) (Seychelles) are given and its hypopygium is redescribed.

**Key words:** Diptera, Mycetophilidae, *Manota*, new species, Afrotropical region

### Introduction

*Manota* Williston (type-species *M. defecta* Williston, 1896) is the only Afrotropical genus which has been referred to the subfamily Manotinae of the Mycetophilidae (cf. Hippa *et al.* 2000). For a long time, the species diversity of *Manota* in the Afrotropical region was relatively high when compared with other areas. The first Afrotropical and Old World species was described from the Seychelles (Enderlein 1910b). Matile (1972) discovered the first continental African species, and later added two species from the Comoros (Matile 1978). When Söli (1993) published his study on the East African *Manota*, the number of Afrotropical species was 18 in contrast to the total of 10 species known from all the other biogeographical regions together. Since then, the Afrotropical fauna has been increased by only two species (Jaschhof and Mostovski 2006) while the global number has reached 129.

So far the following species of *Manota* are known from the Afrotropical region: *M. aureonigra* Matile (Comoros), *M. crassiseta* Matile (Comoros), *M. flavipes* (Enderlein) (Seychelles), *M. issongo* Matile (Central African Republic), *M. furcata* Söli (Tanzania), *M. fusca* Matile (Central African Republic), *M. joerni* Söli (Tanzania), *M. mazumbaiensis* Söli (Tanzania), *M. montana* Söli (Tanzania), *M. serrata* Söli (Tanzania), *M. sespinea* Söli (Tanzania), *M. styloides* Söli (Tanzania), *M. lachaisei* Matile (Ivory Coast), *M. maboceansis* Matile (Central African Republic), *M. natalensis* Jaschhof and Mostovski (Republic of South Africa), *M. nigra* Matile (Cameroon), *M. saepium* Matile (Cameroon), *M. teocchi* Matile (Central African Republic), *M. tridactyla* Söli (Tanzania) and *M. whiteleyi* Jaschhof and Mostovski (Republic of South Africa). *M. flavipes* was originally described in *Aphanizophleps* Enderlein (type-species *A. coxata* Enderlein, 1910a, from Brazil), but since Edwards' (1913) comments this genus has been regarded as a synonym of *Manota*.

I have had the opportunity of studying a small collection of *Manota* from Madagascar. Even though it consists of only 11 specimens, there are 5 species represented, all undescribed. I have also studied the unpublished Afrotropical *Manota* material found in the Natural History Museum, London, Muséum National d'histoire Naturelle, Paris, and the Swedish Museum of Natural History, Stockholm. This material includes two additional new species and also new records of some previously known species. The primary aim of this work

is to describe the new taxa and to publish the new records, but I am also taking the opportunity of supplementing the descriptions of those previously known species which I have at hand, including *M. flavipes* of which all the original material has now been located.

## Material and methods

The material from Madagascar and South Africa was preserved in alcohol, but all other specimens were dry and pinned or glued on labels. In all cases, I have detached the abdomen or just the apical part of the abdomen from specimens and macerated the detached part in warm potassium hydroxide (10% KOH). I have further detached the hypopygium beyond segment 8. After washing in water and step-wise dehydration in concentrated alcohol, I have placed the parts of the abdomen for a few seconds in clove oil (eugenol), after which I have mounted them in "Euparal" 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. Other parts of the bodies of the alcohol-preserved specimens have not been treated with potassium hydroxide, but after dehydration I mounted them as such in "Euparal", with or without prior treatment in clove oil. In the case of dry specimens, I have usually detached the wings and mounted them via absolute alcohol and clove oil in "Euparal". The other parts were treated with KOH and mounted as described above, usually on the same piece of cover glass as the parts of the abdomen. With some dry specimens, only the abdominal parts are slide-mounted, the rest of the body remaining as it was (syntype of *Aphanizophleps flavipes*, some of the paratypes of *M. edentula*). The slide is enclosed in a small envelope and is attached to the pin that bears the rest of the specimen.

The morphological terminology follows Hippa and Papp (2007). The terminology of the male hypopygium is explained in Figs 2 and 4, and that of the female terminalia in Fig. 1. The wing venation is practically identical in all the Afrotropical species and is similar to that illustrated earlier (Hippa 2006, fig. 2), and so it is not described in the descriptions here. Characters involving the setosity of the apical part of Sc, the setae marking reduced parts of M and 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 uncertain in most of the specimens.

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

The material studied is deposited in the following institutions: Department of Entomology, California Academy of Sciences, San Francisco (CAS), Swedish Museum of Natural History, Stockholm (SMNH), Muséum National d'Histoire Naturelle, Paris (MNHN), the Natural History Museum, London (BMNH), and Zoological Museum, Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw (MIZ).

The following abbreviations are used in the figures: cr = cercus, cr 1 = basal segment of cercus, cr 2 = distal segment of cercus, dm 1 = lobe at dorsal mesial margin of gonocoxa, gs = gonostylus, gx = gonocoxa, gx a = gonocoxal apodeme, gx d = dorsal mesial margin of gonocoxa, gx v = ventral mesial margin of gonocoxa, hpr = hypoproct, jx b = basal body of juxtagonostylar seta or setae, jx s = juxtagonostylar seta or megaseta, pa 1 = paraapodemal lobe, ps 1 = parastylar lobe, st 7–st 10 = sternite 7–sternite 10, tg 7–tg 9 = tergite 7–tergite 9, tm = tegmen, tm a = apodeme of tegmen.

## Description of new species

### *Manota clinochaeta* sp. n.

(Figs 1 B, 2 A–E)

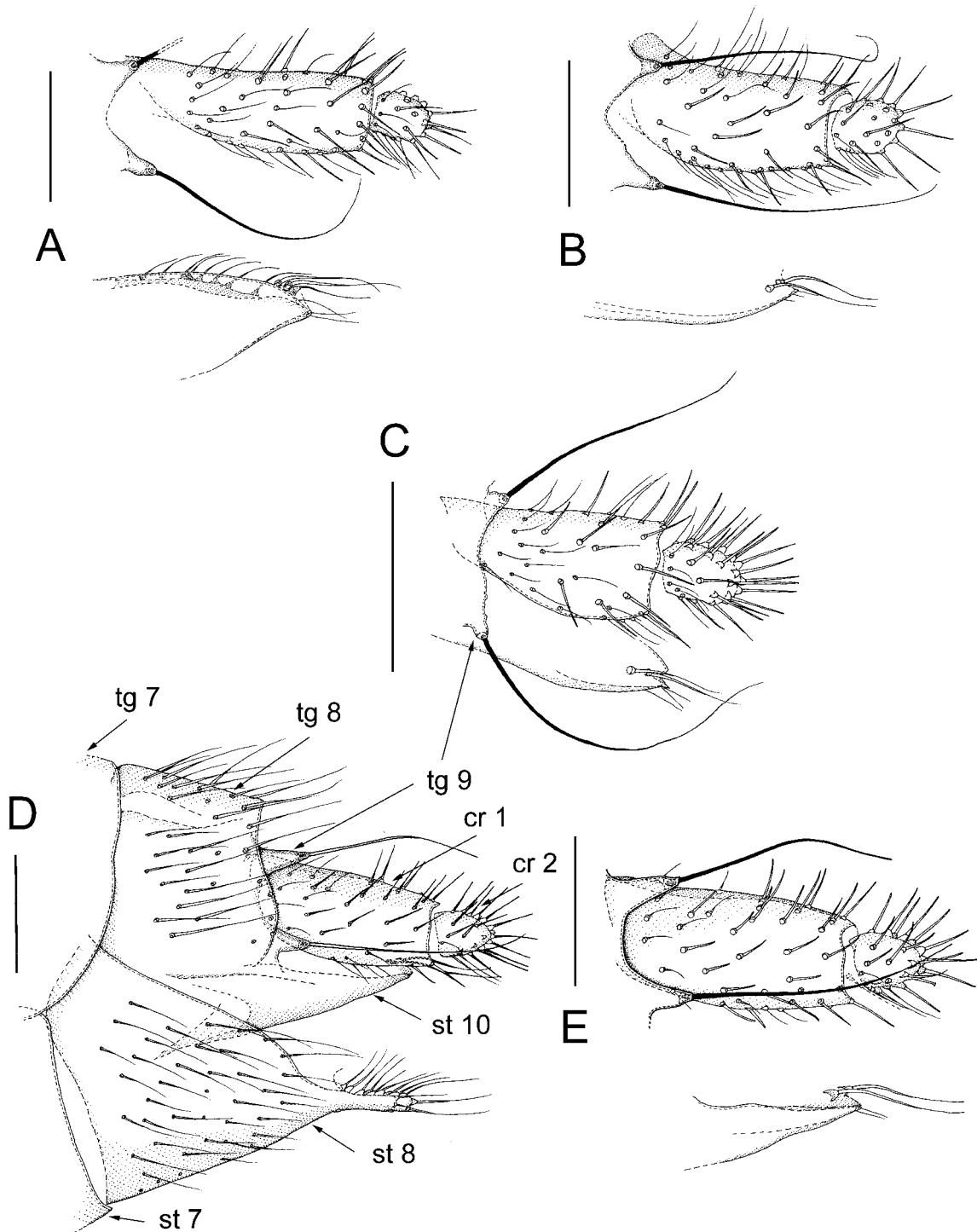
**Male. Colour.** Face pale yellowish-brown, frons vertex and occiput dark brown, antenna pale brown, the basal segments concolorous with face but turning slightly darker brown towards the apex, mouthparts pale

yellowish. Thorax pale brown, ventral part of preepisternum 2 paler yellowish, also prothorax probably much paler than main part of thorax but the character is not well seen in the mount. Legs pale yellowish, femur 3 diffusely infuscated on basal third but the character is difficult to observe and may be misinterpreted. Wing unicolorous pale brown; haltere pale brown with black knob. Abdomen pale brown. All setae brown, the thinner ones seeming pale, the thicker ones darker. **Head.** Antennal flagellomere 4, Fig. 2 A. Palpomere 3 of maxillary palpus with apicomerial extension, with 4 apically expanded curved sensilla; palpomere 4 with parasegment. Number of large postocular setae 9. **Thorax.** Anepisternum setose, with 40 setae; anterior basalare setose, with 11 setae; preepisternum 2 non-setose; laterotergite setose, with 26 setae; episternum 3 setose, with 22 setae. **Wing.** Length 1.8 mm. **Hypopygium,** Figs 2 B–E: Sternite 9 laterally fused with gonocoxa, extending posteriorly to base of gonostylus, posterior margin nearly straight, anterior margin narrowly notched, the setae similar to ventral setae of gonocoxa. Parastylar lobe directed obliquely posteriad, long and narrow, with an apical transverse stout seta. Paraapodemal lobe not observable. Dorsal mesial margin of gonocoxa simple, smoothly curved, with an apical lobe with two setae. Near middle of dorsal mesial margin of gonostylus, on a more ventral level, with a plate-like lobe bearing two obliquely posteriorly directed megasetae. Without distinct apicolateral lobe on gonocoxa. One juxtagonostylar seta present as a flattened flame-shaped megaseta, which arises from a basal body which is about two-thirds of the length of the megaseta. Gonostylus narrow, apically bilobed, the more ventral lobe with rather strong but short setae on ventral side and with three strong and long setae on apical part, the more dorsal lobe non-setose except for two transverse rather short megasetae on the apical part; dorsal side of gonostylus almost non-setose. Tegmen narrowly subtriangular with base, including lateral shoulders and apodemes, rather broad. Hypoproct large, posteriorly extending as far as the apex of gonostylus, with ca. 30 setae on each half, the setae in rather distinct, more anterior and more posterior groups, the former in Fig. 2 D covered by sternite 9. Cerci medially separate.

**Female.** Similar to male. The infuscation at the base of femur 3 scarcely observable. Antennal flagellomere 4, Fig. 2 B. Number of postocular setae 11. Anepisternum with 74 setae, anterior basalare with 14 setae, laterotergite with 37 setae, episternum 3 with 17 setae. Wing length 2.2 mm. Tergite 9, cercus and sternite 10, Fig. 1 B.

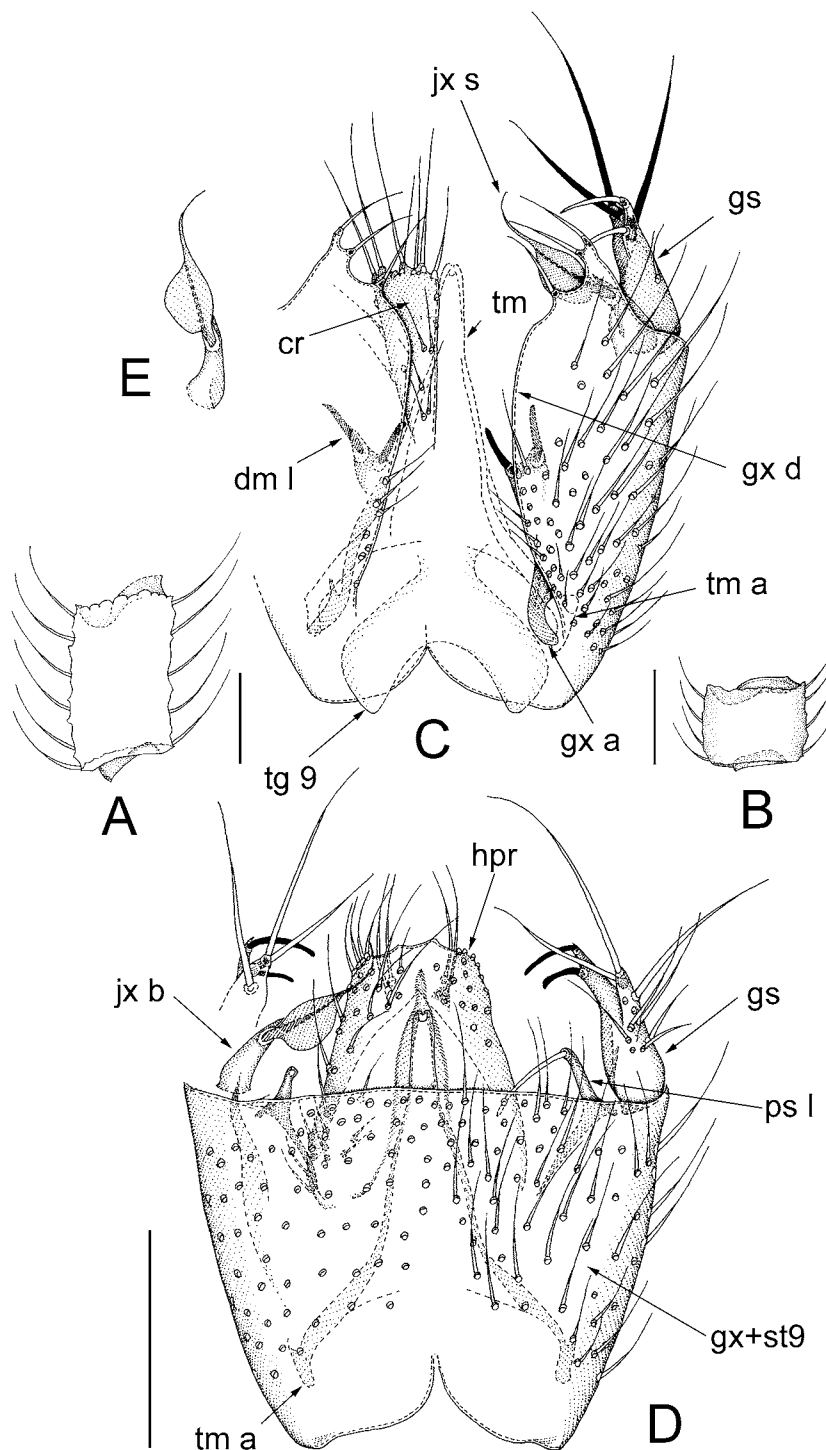
**Discussion.** *Manota clinochaeta* is similar to *M. phyllochaeta* sp.n. but is distinguished e.g. as follows: 1) the seta of the parastylar lobe is at a right angle to, not in line with, the body of the lobe, 2) the ventral lobe of the gonostylus is narrow and lateral in position, not broad and mesial in position, 3) the apicomerial setae of the dorsal lobe of the gonostylus are shorter and stouter, and 4) the narrow apical part of the tegmen is longer, steadily widening from apex towards the base, not almost parallel-sided. In both species the juxtagonostylar megaseta is probably similar, but is only viewed from different angles in Figs 2 and 7. Both these are rather similar to *M. teocchi* Matile, known from the Central African Republic. Matile (1972) gives a rather superficial illustration of the hypopygium from the dorsal side. The gonostylus resembles that of *M. phyllochaeta* in having the ventral lobe broad. In the illustration, the lobe is in a more lateral position than in my Fig. 7 C, probably because the whole gonostylus is rotated into a different position by the pressure of the cover glass. The latter probably also gives the gonostylus a more broadly triangular outline than in Figs 7 B and C. The setae on the ventral lobe of the gonostylus are short in *M. teocchi*, not more than half the length of the gonostylus, but in *M. clinochaeta* and *M. phyllochaeta* there are setae which are as long as the gonostylus itself. In *M. teocchi* the apical part of the dorsal lobe of gonostylus seems to have four setae which are similar to the other shorter gonostylar setae, whereas in *M. clinochaeta* and *M. phyllochaeta* there are only two setae which differ from the other setosity in being blunt-ended and in *M. clinochaeta* also conspicuously stout. Furthermore, the two megasetae at the dorsal mesial margin of the gonocoxa in *M. clinochaeta* and *M. phyllochaeta* seem shorter and broader than in *M. teocchi*. *M. flavipes* (Enderlein) is similar to all three species but is distinguished e.g. by having only one megaseta at the dorsal mesial margin of gonocoxa. For further discussion, see under *M. flavipes*.

The female is associated with the male because it was collected together with it and is reasonably similar. There may be no known method to distinguish it from other species. Of the females which I have described in this paper, it resembles *M. edentula* by having the basal segment of cercus with most of the lateral setae stout and blunt. *M. clinochaeta* differs by having more numerous and much longer fine setae latero-dorsally on the basal segment of the cercus.



**FIGURE 1.** Apical part of female abdomen (D) and female tergite 9, cercus and apical part of sternite 10 (A, B, C and E), lateral view. **A.** *Manota natalensis* Jaschhof and Mostovski (South Africa). **B.** *M. clinochaeta* sp. n. (Madagascar). **C.** *M. cultrigera* sp. n. (Madagascar). **D, E.** *M. edentula* sp. n. (Mauritius). Scale 0.10 mm.

**Types.** *Holotype.* Male, MADAGASCAR, Province Fianarantsoa, Ikongo Ambatombe, Forêt d'Ambalagoavy Nord, 21°49'39"S 47°20'20"E, 625 m a.s.l., Malaise trap, xi.2000, leg. Irwin & Harin'Hala. In CAS. *Other material.* 1 female with same data as holotype. In CAS.



**FIGURE 2.** *Manota clinochaeta* sp. n. (A, C, D and E holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Female antennal flagellomere 4, lateral view. **C.** Hypopygium, dorsal view. **D.** Hypopygium, ventral view. **E.** Right juxtagonostylar megaseta, dorsal view. Scale for A and B 0.05 mm, for C, D and E 0.10 mm.

***Manota cultrigera* sp. n.**

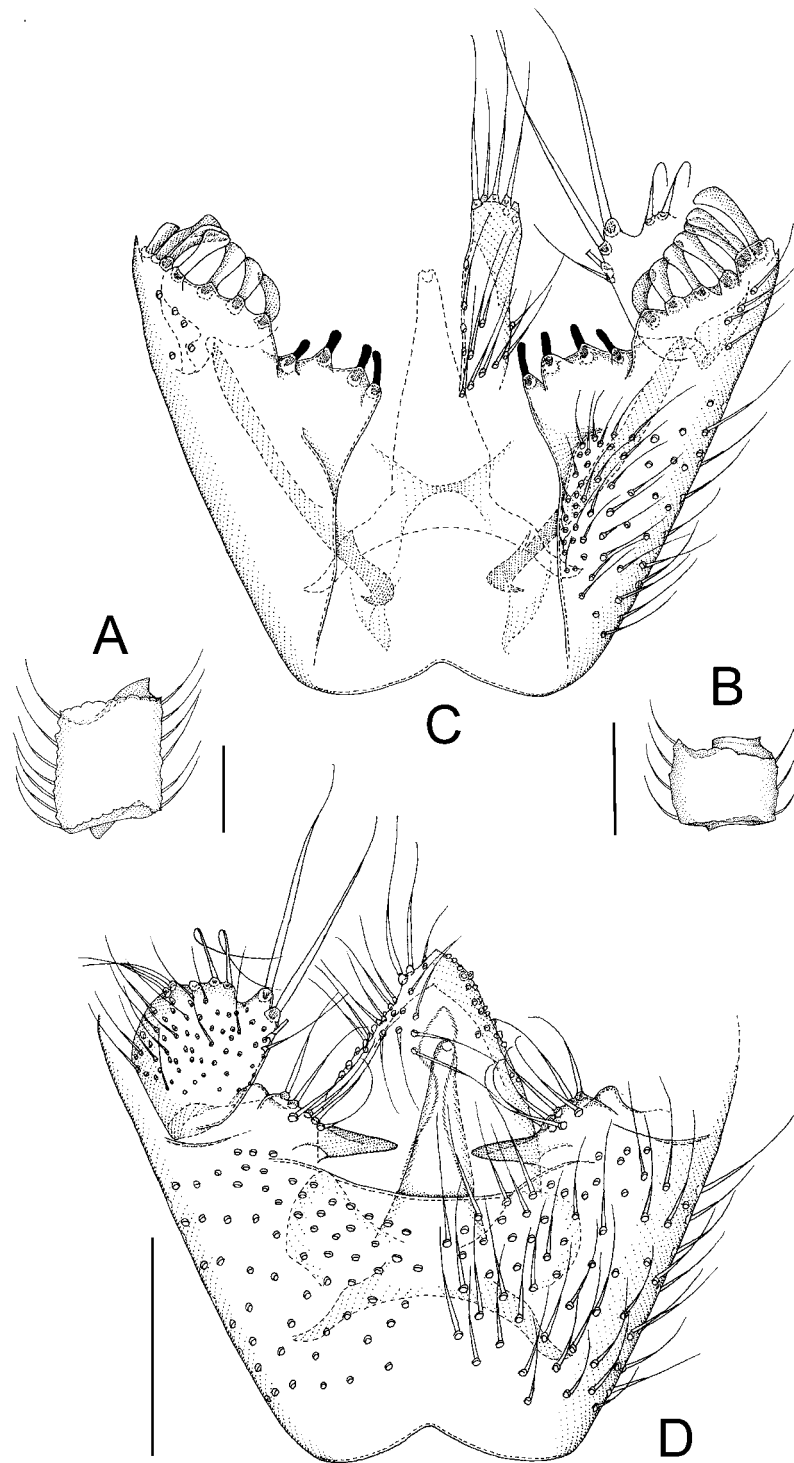
(Figs 1 C, 3 A, B, C)

**Male. Colour.** Face yellowish-brown, frons, vertex and occiput dark brown, antennal scapus and pedicellus concolorous with face, basal flagellomeres slightly paler than pedicellus, rest of flagellum slightly darker brown, mouthpart pale yellowish. Thorax brown, prothorax and ventral part of preepisternum 2 paler yellowish-brown. Legs pale yellowish, apical part of trochanter 3 diffusely infuscated, femora 2 and 3 diffusely infuscated ventrally on basal third. Wing unicolorous pale brown; haltere pale brown with brown knob. Setae brown, the thinner ones seeming pale, the thicker ones darker. **Head.** Antennal flagellomere 4, Fig. 3 A. Palpomere 3 of maxillary palpus with apicomeresial extension, with 3–4 apically expanded curved sensilla; palpomere 4 with parasegment. Number of postocular setae 8–12. **Thorax.** Anepisternum setose, with 43–56 setae; anterior basalare setose, with 9–13 setae; preepisternum 2 setose, with 3–9 setae; laterotergite setose, with 21–27 setae; episternum 3 setose, with 14–27 setae. **Wing.** Length 1.4–1.7 mm. **Hypopygium,** Figs 3 C, D: Sternite 9 laterally fused with gonocoxa, extending posteriorly nearly to base of gonostylus, posterior margin slightly concave, anterior margin notched, the setae similar to ventral setae of gonocoxa. Parastylar lobe transverse, large with a broad setose basal part and narrow knife-blade-like non-setose apical part. Paraapodemal lobe not observable. Dorsal mesial margin of gonocoxa with two flattened lobes, one near middle, the other extending over all the more apical part, the former with 4, the latter with 7 flattened blunt-ended megasetae at margin, the megasetae on the more apical one of the lobes very broad and partly overlapping. Apicolateral part of gonocoxa forming a non-setose lobe which posteriorly extends as far as apex of gonostylus. Juxtagonostylar seta/e difficult to identify, apparently similar to and among the flattened megasetae at dorsal mesial margin of gonocoxa. Gonostylus almost round, with a lobe-like projection at mesial margin, the setae on the ventral side rather short, on the dorsal side largely absent, mesial lobe with two strong and long setae. Tegmen narrowly subtriangular, but the base unusually broad, the lateral shoulders ill-defined. Hypoproct large, posteriorly extending as far as apex of gonostylus, with ca. 20 setae on each half. Cerci medially separate.

**Female.** Similar to male. Antennal flagellomere 4, Fig. 3 B. Number of postocular setae 9. Palpomere 3 with 3–4 apically expanded curved sensilla. Anepisternum with 33–46 setae, anterior basalare with 8–9 setae, preepisternum 2 with 0–3 setae, laterotergite with 22–23 setae, episternum 3 with 28 setae. Wing length 1.5–1.6 mm. Tergite 9, cercus and sternite 10, Fig. 1 C.

**Discussion.** *M. cultrigera* is similar to *M. crassiseta* Matile. It is distinguished 1) by having the more anterior group of megasetae at the dorsal mesial margin of gonocoxa at the middle, not on the basal half of gonocoxa, 2) by having the number of megasetae in the more posterior group seven instead of four, and 3) by having all the megasetae of the latter group similar, apically strongly expanded, whereas in *M. crassiseta* the three anteriormost lack the expanded apex (see Matile 1978). It is possible that the expanded megasetae is actually a juxtagonostylar megasetae, and that in *M. cultrigera* one of the posteriormost megasetae in the same position is also that. Furthermore, the two long setae on the gonostylus seem to be thinner in *M. cultrigera* than in *M. crassiseta*. The characters on the ventral side of the hypopygium are mostly unknown in *M. crassiseta*, but from Matile's drawing one can deduce that the parastylar lobe is similar to *M. macrodon* sp. n., with only one long seta. *M. cultrigera* and *M. crassiseta* are similar to *M. macrodon* sp. n., *M. serrata* Söli and *M. sespinea* Söli. For distinguishing characters, see under *M. macrodon*. *M. mazumbaiensis* Söli and *M. montana* Söli are not very dissimilar to *M. cultrigera* and *M. crassiseta*. They differ e.g. by the number of megasetae at the dorsal mesial margin of the gonocoxa: only one in the more anterior "group" and two in the more posterior one.

The two females are associated with this species because they were collected together with the holotype and are reasonably similar to it. The basal segment of the cercus in the female which is not illustrated is less distinctly narrowed towards the base than in the female shown in Fig. 1 C. The female of *M. cultrigera* may be



**FIGURE 3.** *Manota cultrigera* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Female antennal flagellomere 4, lateral view. **C.** Hypopygium, dorsal view. **D.** Hypopygium, ventral view. **E.** Right juxtagonostylar megaseta, dorsal view. Scale for A and B 0.05 mm, for C and D 0.10 mm.

impossible to identify on the basis of the characters known today. Among the females which I describe in this paper, the lateral chaetotaxy of the basal segment of the cercus resembles that of *M. natalensis* Jaschhof and Mostovski: in both species the stouter, blunt setae are relatively long and fine setae are intermixed on the apical half. *M. cultrigera* has the basal segment of the cercus broader and shorter than in *M. natalensis*. Apart

from this the two species cannot be confused because *M. cultrigera* has a thumb-like apicolateral extension on palpomere 3, which is completely absent in both sexes of *M. natalensis*. *M. fusca* Matile, which was described only on the basis of the female from the Central African Republic, resembles *M. cultrigera* by the rather short and broad basal segment of the cercus, but it is not possible to see the detailed character of the setae in *M. fusca*. The two species should be distinguishable by the hind femur, which is infuscated basally in *M. cultrigera* but apically in *M. fusca*. Furthermore, *M. fusca* has infuscated wings.

**Types.** *Holotype*. Male, MADAGASCAR, Province Antsiranana, Réserve Spéciale de l'Ankarana, 13.6 km 192° SSW of Anivorano Nord, 12°51'49''S 49°13'33''E, 210 m a.s.l., tropical dry forest, Malaise trap, 16.ii.-20.ii.2001, leg. Fisher, Griswold *et al.* In CAS.

*Paratypes*. 1 male with same data as holotype (in SMNH). 1 male, MADAGASCAR, Mahayanga Prov., Park Nat. Bemaraha, 1.6 km ESE Anzalove, elev. 150 m, 16–20 Nov. 2001, 19°42'34''S, 44°43'5''E, coll. Fisher, Griswold *et al.*, Calif. Acad. of Sciences; Malaise, tropical dry forest on Tsingv.; code BLF 4462. In CAS.

*Other material*. 2 females with same data as holotype. In CAS and SMNH.

### ***Manota edentula* sp. n.**

(Figs 1 D, E, 4 A, B, C)

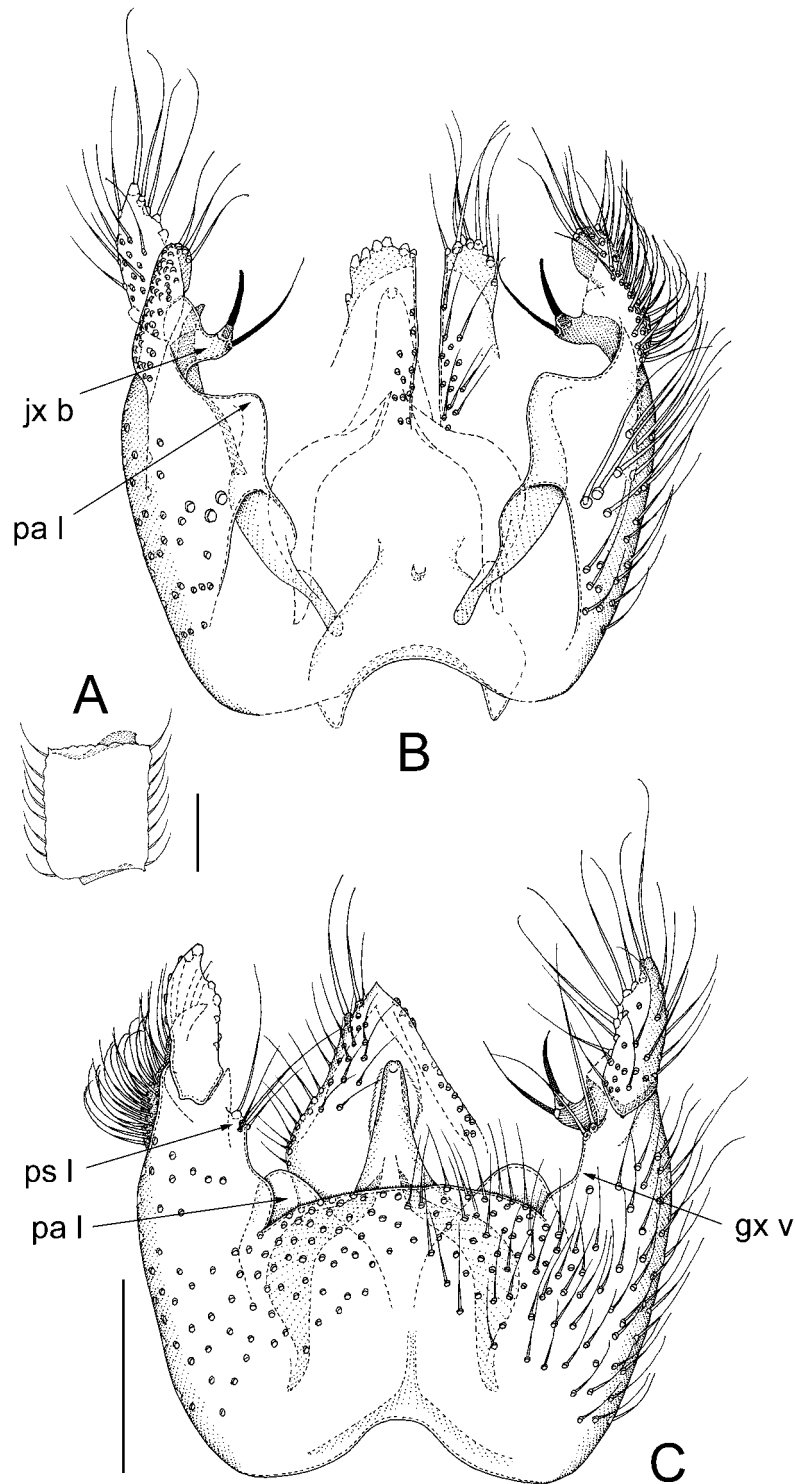
**Male. Colour.** Head brown, vertex and occiput dark brown, mouthparts yellowish-brown, antennal scapus, pedicellus and varying number (2–5) of basal flagellomeres yellowish-brown. Thorax dark brown, prothorax and ventral part of preepisternum 2 orange brown. Legs pale yellowish or yellowish-brown, in some specimens with orange tinge, femur 3 infuscated at basal fourth, femur 2 similar but the infuscation weaker. Wing unicolorous pale brown, haltere pale brown with black knob. Abdomen brown. Setae brown, the thinner ones seeming pale, the thicker ones darker. **Head.** Antennal flagellomere 4, Fig. 4 A. Palpomere 3 of maxillary palpus with apicomeresial extension, with 4–5 apically expanded curved sensilla (counted from 2 slide-mounted paratypes only); palpomere 4 with parasegment. Number of postocular setae 12–15. **Thorax.** Anepisternum setose, with 29–52 setae; anterior basalare setose, with 6–12 setae; preepisternum 2 non-setose; laterotergite setose, with 47–61 setae; episternum 3 setose, with ca. 9 setae (the setae counted from 1 slide-mounted paratype only). **Wing.** Length 2.3 mm. **Hypopygium,** Figs 4 B, C: Sternite 9 laterally fused with gonocoxa, its length about two-thirds of the ventral length of gonocoxa, posterior margin slightly convex, anterior margin with a shallow incision, the setae similar to ventral setae of gonocoxa. Ventral mesial margin of gonocoxa sigmoid. Parastylar lobe fused with gonocoxa, represented by a few long setae at ventral mesial margin. Paraapodemal lobe large, unusually anterior in position, in Fig. 4 C partly exposed between posterior margin of sternite 9 and ventral mesial margin of gonocoxa. Dorsal mesial margin of gonocoxa simple. In the middle of gonocoxa with two or three long setae which differ from its other dorsal setosity. Apicodorsally on gonocoxa with a densely setose lobe which extends to middle of gonostylus: in four of the mounts it is lateral in position (Fig. 4 B, C), in one it is mesial and covers the juxtagonostylar setae. Gonostylus simple, elongate-oval, with rather long setae dorsally and ventrally, the mesial and apical marginal setae longer than other setae. Number of juxtagonostylar setae two, a strong normal seta and a thicker and shorter blunt megaseta, both arising from a broad basal body which is as long as the megaseta. Tegmen with a narrow apical half and, beginning from strong lateral shoulders, with a broad basal half that narrows towards base. Hypoproct large, posteriorly extending near to apex of gonostylus, with ca. 30 setae on each half. Cerci medially separate.

**Female.** Similar to male. Antennal flagellomere 4 similar to Fig. 2 B. Palpal sensilla and pleural setae not counted because the single specimen is dry. Wing length 2.4 mm. Apical part of abdomen, Figs 1 D, E.

**Discussion.** *M. edentula* is not especially similar to any described *Manota*. It is easily recognized by the densely setose apical lobe dorsally on the gonocoxa, especially when it is in a lateral position as in Figs 4 B



and C. When the lobes are flipped to a mesial position, the dorsal aspect of hypopygium is reminiscent of two other Afrotropical species: *M. issongo* Matile and *M. mabokeensis* Matile. From the former, *M. edentula* is distinguished e.g. by its short gonostylus, which is scarcely one-third of the length of the gonocoxa instead of being more than half of that length, and from the latter e.g. by the simple, not lobed, gonostylus. The female differs from the other species described in this paper by having the lateral setae of the basal segment of the cercus shorter and by having most of these setae stout and blunt-ended (see Fig. 1).



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

**Types.** *Holotype.* Male, MAURITIUS, Macchabee Forest, 2.vi.1971, A. M. Hutson, B.M.1971-346. In BMNH.

*Paratypes*, 2 males with same data as holotype. 2 males with same data except for date 1.vi. In BMNH.

*Other material.* One female, MAURITIUS, La Pouce, 10.vi.1971, A. M. Hutson, B.M.1971-346. In BMNH.

***Manota ehippiata* sp. n.**

(Figs 5 A, B)

**Male. Colour.** Except for the wing, the single specimen has been treated with KOH and is strongly faded. It is almost unicolorous pale brown, face, mouthparts, ventral part of preepisternum 2 and coxae (of legs, only coxae and femur 1 and 2 remain) seem paler brown/yellowish, the vertex dark brown; wing and haltere pale brown, the knob of haltere seems a little darker brown. All the setosity pale (postocular setae lost), yellowish or brownish, the thicker setae seeming darker than the finer setae and trichia. **Head.** Of the antennae, only scape, pedicellus and flagellomere 1 remain. Palpomeres 3–5 lost. Number of postocular setae (only the sockets remain) 9–11. **Thorax.** Anepisternum setose, with 46 setae; anterior basalare non-setose; preepisternum 2 setose, with 17 setae; laterotergite non-setose; episternum 3 setose, with 24 setae. **Wing.** Length 1.8 mm. **Hypopygium,** Figs 5 A, B: Sternite 9 about one half of ventral length of gonocoxa, lateral margin sharply delimited, posterior margin medially notched, anterior margin deeply incised, the setae similar to ventral setae of gonocoxa. Ventral mesial margin of gonocoxa simple, slightly sigmoid. Parastylar lobe complex, with ca. 20 setae. Paraapodemal lobe not identifiable. Dorsal mesial margin of gonocoxa strongly sigmoid with a broad rounded long-setose lobe-like corner on apical half. From the latter the margin continues to an apically setose apicolateral lobe. At the corner on the mesial margin of gonocoxa with a small sparsely setose lobe lying on a more ventral level, and a larger lobe lying still more ventrally and which is broadly setose at margin. Two juxtagonostylar setae present, both being subequal stout megasetae arising from a common basal body, one from the apex, the other from the side, the basal body about twice length of megasetae. Gonostylus large, almost as long as gonocoxa, elongate subquadrangular with two small lobes at basomesial angle. Setae on ventral side of gonostylus rather fine and short, at apical margin stronger and longer, on dorsal side absent. Tegmen unusually small, broadly subtriangular, with lateral shoulders which are unusually apical in position, the apodeme of tegmen unusual, directed obliquely posteriad. Hypoproct posteriorly reaching middle of gonostylus, with ca. 20 setae on each half, in a row along mesial and anterior margin. Cerci medially separate.

Female unknown.

**Discussion.** *M. ehippiata* is not similar to, and cannot be confused with, any described *Manota*. The very large gonostylus with the two small lobes at the basomesial angle is enough to distinguish the species. The unusually small tegmen with the apodemes turned obliquely posteriad is similar to the Oriental *M. perlobata* Hippa, but otherwise the two species are very dissimilar.

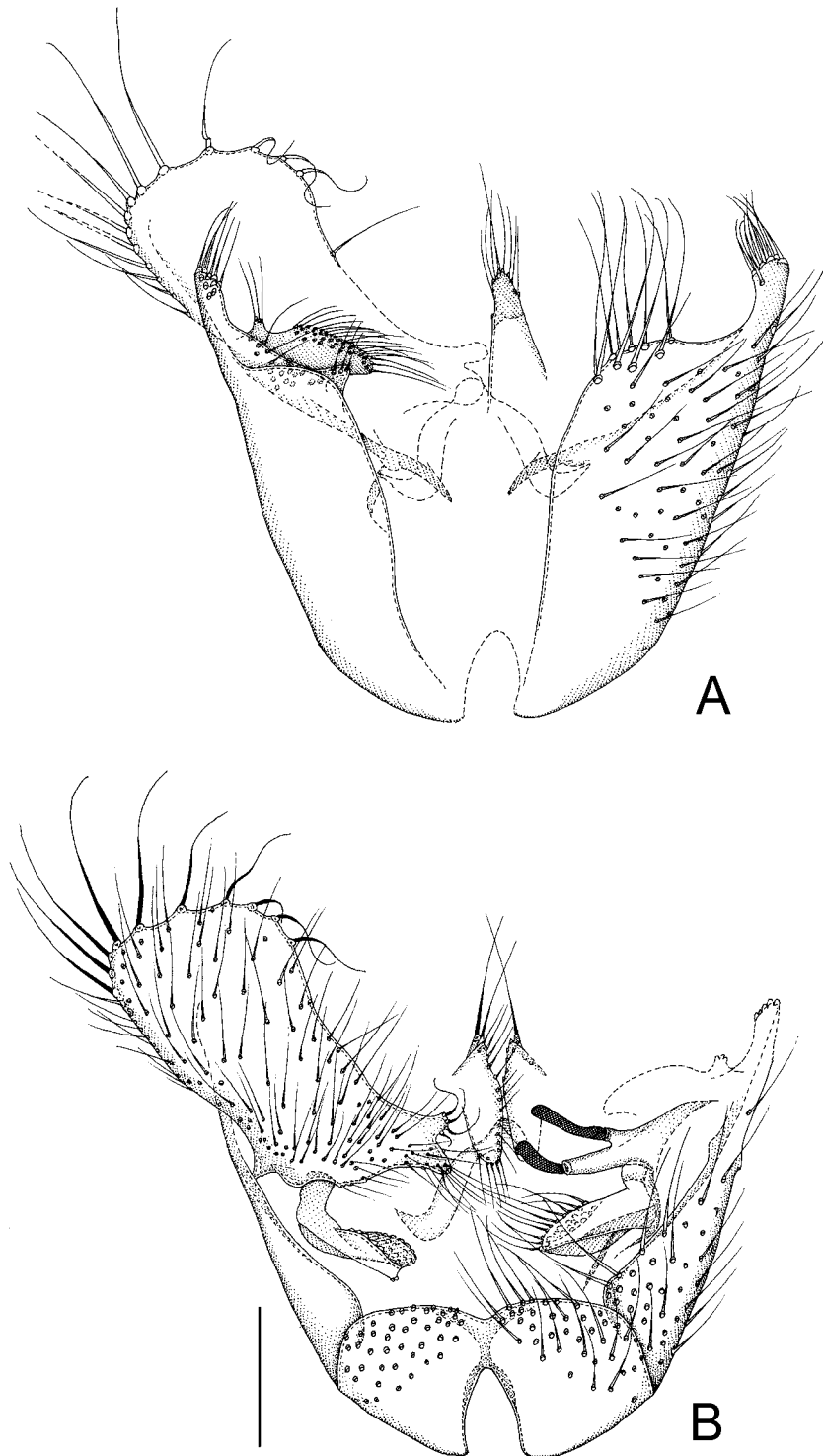
**Types.** *Holotype.* Male, UGANDA, Distr. Masindi, Budongo Forest, n. Sonso, 1°45'N 31°35'E (written as W on the label), 11–20.VII. 1995, Th. Wagner; Fogging sur Teclea nobilis no 17, swamp forest. In MNHN.

***Manota macrodon* sp. n.**

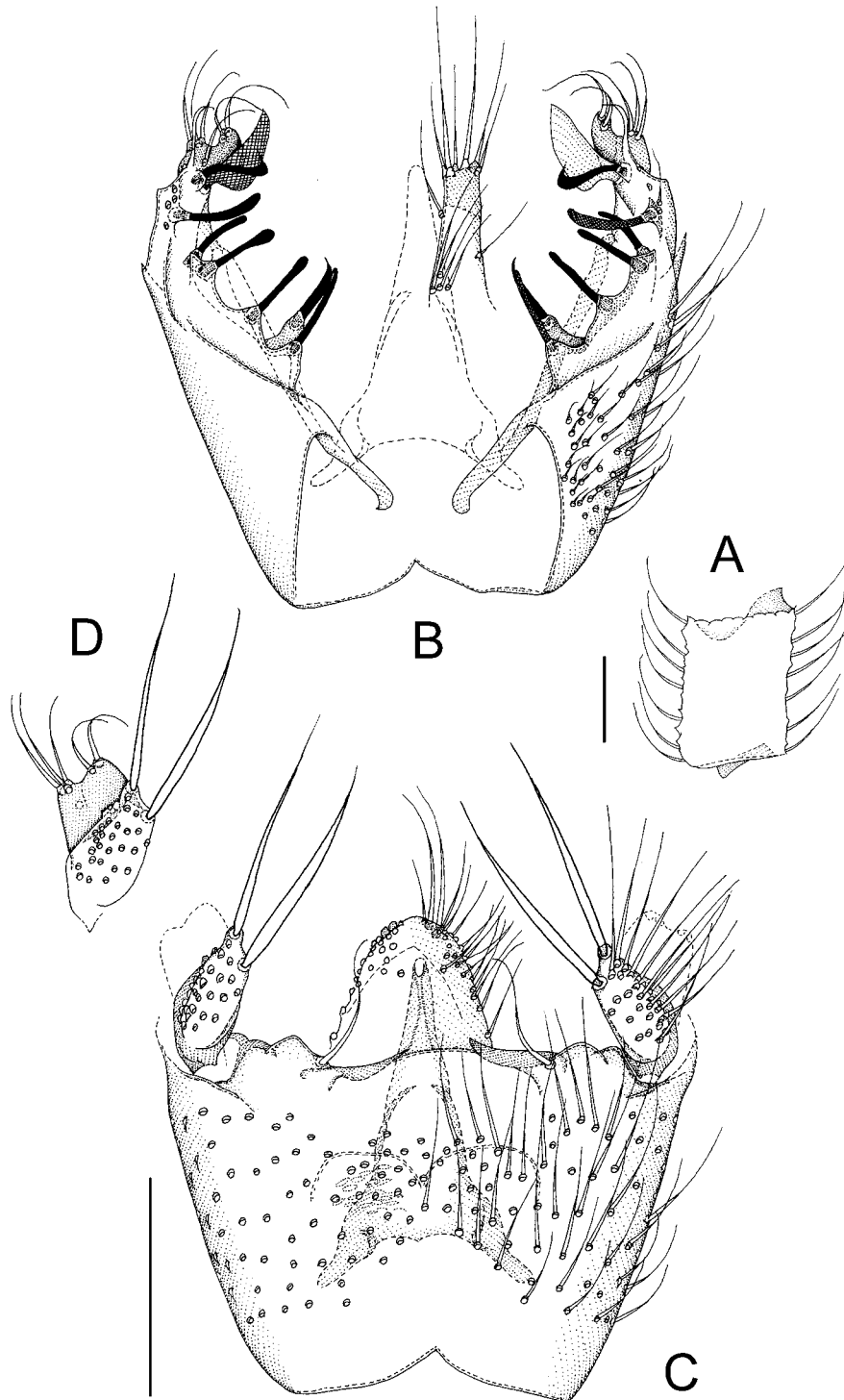
(Figs 6 A–D)

**Male. Colour.** Head dark brown, antenna paler brown, in holotype the basal segments paler than the apical ones, mouthparts pale yellowish, in the holotype the face seeming as dark as occiput, in the other specimen slightly paler. Thorax brown, preepisternum slightly paler ventrally. Legs (in holotype, tarsus 1 and femur,

tibia and tarsus on legs 2 and 3 lost) pale yellowish-brown, coxa 3 basally and coxae 2 and 3 apically diffusely infuscated, femur 2 diffusely infuscated at base, femur 3 diffusely infuscated on both basal and apical third. Wing unicolorous pale brown; haltere pale yellowish with black knob. Abdomen (only remaining in holotype) brown. Setae brown, the thinner ones seeming pale, the thicker ones darker. **Head.** Antennal flagellomere 4, Fig. 6 A. Palpomere 3 of maxillary palpus with apicomeresial extension, with 4 apically expanded curved sensilla; palpomere 4 with parasegment. Number of postocular setae 9–10. **Thorax.** Anepisternum setose, with



**FIGURE 5.** *Manota ehippiata* sp. n. (holotype). **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. Scale 0.10 mm.



**FIGURE 6.** *Manota macrodon* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. **D.** Gonostylus, ventral view. Scale for A 0.05 mm, for B, C and D 0.10 mm.

43–54 setae; anterior basalare setose, with 7–9 setae; preepisternum 2 setose, with 10–15 setae; laterotergite setose, with 34–40 setae; episternum 3 setose, with 19–22 setae. **Wing.** Length 1.9 mm. **Hypopygium,** Figs 6 B, C, D: Sternite 9 laterally fused with gonocoxa, extending posteriorly to base of gonostylus, posterior margin slightly convex, anterior margin notched, the setae similar to ventral setae of gonocoxa. Parastylar lobe transverse, large with broad basal part bearing one seta, and narrow knife-blade-like non-setose apical part.

Paraapodemal lobe not observable. Dorsal mesial margin of gonocoxa with a rather ill-defined flattened plate-like lobe on apical half and with 5 blunt-ended megasetae at margin, the megasetae slightly flattened; at anteriormost megasetae with an acute-ended megasetae arising from a separate small lobe which lies on a more ventral level. The non-setose apicolateral part of gonocoxa extending posteriorly to middle of gonocoxa. Two juxtagonostylar setae present: the more dorsal one a rather unmodified megasetae, similar to the megasetae at dorsal mesial margin of gonocoxa, the more ventral one very broad and flat; the juxtagonostylar megasetae without a distinct basal body. Gonostylus bilobed, ventral lobe long-setose and with two very long and strong setae at apex, dorsal lobe also slightly bilobed, non-setose except for a few setae at margin. Tegmen narrowly subtriangular, with rather weak lateral shoulders. Hypoproct large, posteriorly extending as far as apex of gonostylus, with ca. 20 setae on each half. Cerci medially separate.

**Female.** Unknown.

**Discussion.** *M. macrodon* is similar to *M. crassiseta* Matile and *M. cultrigera* sp. n. It differs from both by having the megasetae at the mesial margin of gonocoxa in a rather contiguous row, not divided into distinct, more anterior and more posterior groups. The megasetae are also markedly longer than in the two other species. *M. macrodon* is similar to *M. crassiseta* and differs from *M. cultrigera* by having one sharp megasetae at the anteriormost of these megasetae, which are apically flattened and blunt. The parastylar lobe differs from that of *M. cultrigera* by having only one seta. The nature of the parastylar lobe in *M. crassiseta* is not clear, but to judge from Matile's (1978) drawing it is similar to that of *M. macrodon*. *M. macrodon* is also similar to *M. serrata* Söli and *M. sespinea* Söli. The latter two differ e.g. by having the megasetae at the dorsal mesial margin of gonocoxa much weaker, about half as thick and long as in *M. macrodon*, and by having a large posteriorly directed conical parastylar lobe; in *M. serrata* the number of dorsal gonocoxal megasetae (ca. 10) seems distinctly higher.

**Types.** *Holotype.* Male, MADAGASCAR, Province Fianarantsoa, Ikongo Ambatombe, Forêt d'Ambalagoavy Nord, 21°49'39''S 47°20'20''E, 625 m a.s.l., Malaise trap, xi.2000, leg. Irwin & Harin'Hala. In CAS.

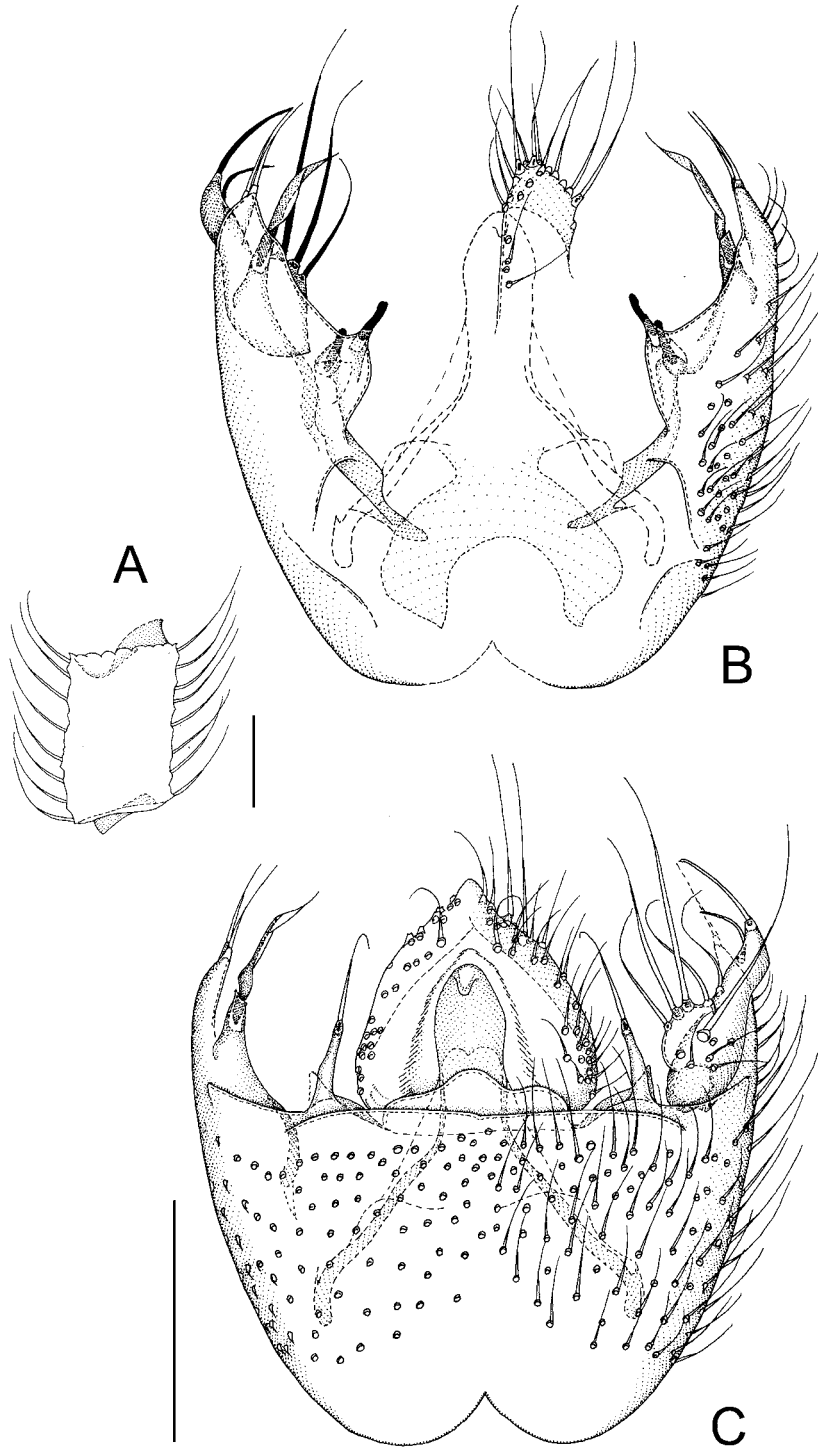
### ***Manota phyllochaeta* sp. n.**

(Figs 7 A, B, C)

**Male. Colour.** Face yellowish-brown, frons, vertex and occiput darker brown, antennal scapus and pedicellus concolorous with face, antennal flagellum brown, flagellomere 1 basally paler, mouthparts pale yellowish. Thorax pale brown, prothorax and ventral part of preepisternum paler than the other parts. Legs pale yellowish, trochanter 2, apparently also trochanter 3, and basal third of femur 3 infuscated, femur, tibia and tarsus of legs 1 and 2 lost from the single specimen. Abdomen brown. Postocular setae dark brown, nearly black, all other setosity pale yellowish or brownish, the thicker setae seeming darker than the finer setae and trichia.

**Head.** Antennal flagellomere 4, Fig. 7 A. Palpomere 3 of maxillary palpus with apicomerial extension, with 4 unusually narrow apically expanded curved sensilla; palpomere 4 with parasegment. Number of postocular setae 10. **Thorax.** Anepisternum setose, with 40 setae; anterior basalare non-setose; preepisternum 2 non-setose; laterotergite setose, with 19 setae; episternum 3 setose, with 6 setae. **Wing.** Length 1.8 mm. **Hypopygium,** Figs 7 B, C: Sternite 9 laterally fused with gonocoxa, extending posteriorly to base of gonostylus, posterior margin nearly straight, anterior margin notched, the setae similar to ventral setae of gonocoxa. Parastylar lobe directed posteriad, long and narrow, with an apical seta in line with lobe. Paraapodemal lobe not observable. Original course of dorsal mesial margin of gonocoxa not seen because the mesial side is inflated on both sides in the single specimen; near middle between gonocoxal apodeme and apicolateral lobe with an angulate plate-like lobe on the ventral side of which are two blunt-ended stout megasetae, each of them arising from a small basal body. Gonocoxa with distinct apicolateral lobe extending posteriorly nearly as far as apex of gonostylus. It is laterally setose and has a couple of apical setae. One juxtagonostylar seta present: it is apparently similar to Fig. 2 E, but in Figs. 7 B and C it is seen in the narrow aspect; the basal body of the seta

is about two-thirds of its length. Gonostylus narrow, tapering towards apex, with a lobe-like mesial widening on basal half; ventrally with a few short setae and one long outstanding seta on basal half; mesial margin with a few setae, three of which at the lobe are long and outstanding; two truncate setae at apex, one apical, the other subapical; dorsal side non-setose. Tegmen with a narrow apical half and subtriangular basal half, without distinct lateral shoulders. Hypoproct large, posteriorly extending as far as apex of gonostylus, with ca. 30 setae on each half, the setae in rather distinct, more anterior and more posterior groups. Cerci medially separate.



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

**Female.** Unknown.

**Discussion.** *M. phyllochaeta* is similar to *M. flavipes* (Enderlein), *M. clinochaeta* sp. n. and *M. teocchi* Matile. For distinguishing characters, see under *M. flavipes* and *M. clinochaeta*.

**Types.** *Holotype.* Male, MADAGASCAR, Province Diego-Suarez, Parc National Montagne d'Ambre, 12°30'52''S 49°10'53''E, 960 m a.s.l., Malaise trap, 26.i.–29.i.2001, leg. Irwin, Schlinger & Harin'Hala. In CAS.

***Manota uncinata* sp. n.**

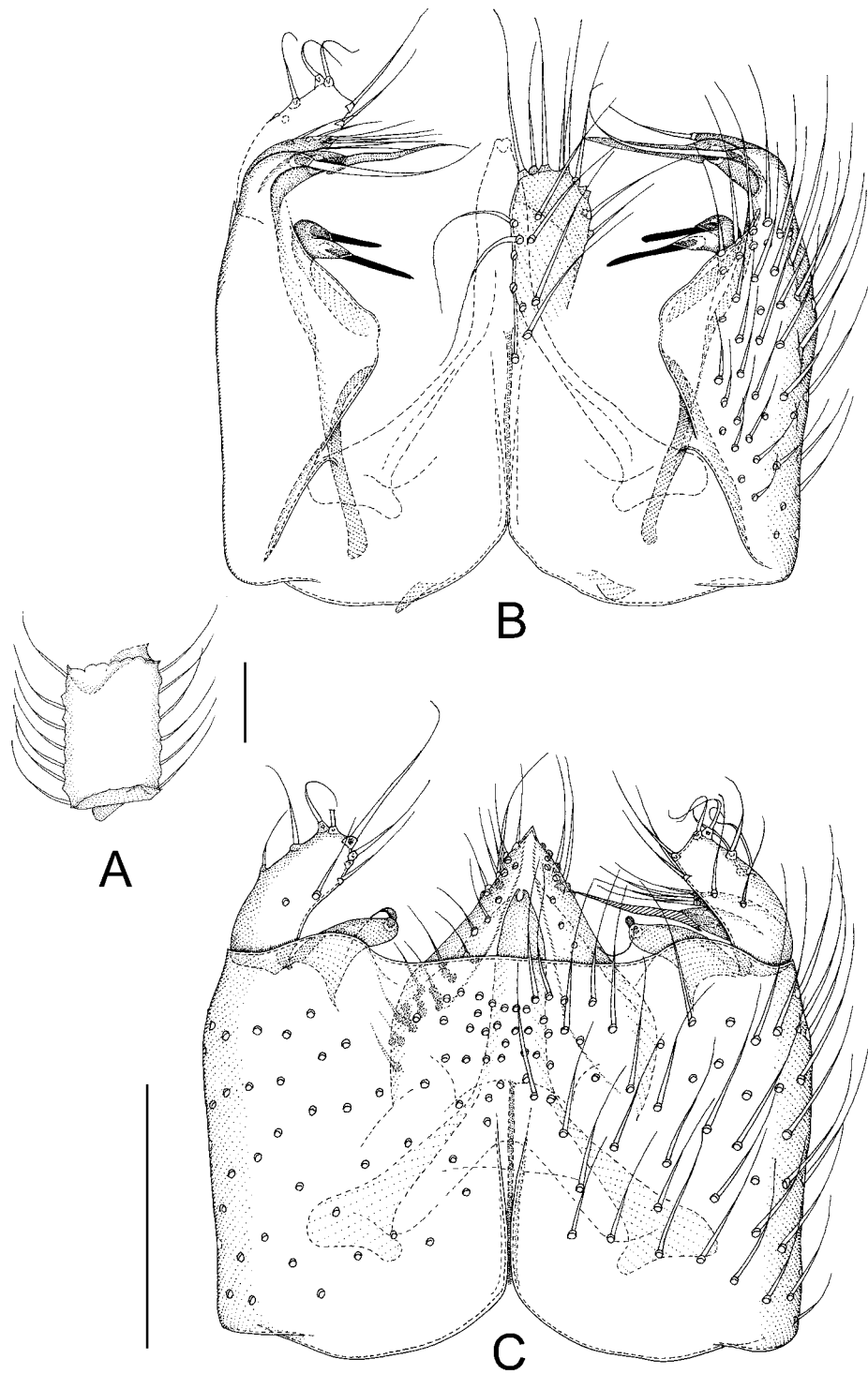
(Figs 8 A, B, C)

**Male. Colour.** Face yellowish-brown, frons, vertex and occiput dark brown, antennal scapus and pedicellus concolorous with face, flagellum slightly darker brown, mouthpart pale yellowish. Thorax pale brown, prothorax and ventral part of preepisternum 2 paler yellowish-brown, this character is not very well seen in the single specimen. Legs pale yellowish, about basal third of femur 3 indistinctly infuscated. Wing unicolorous pale brown; haltere pale brown with brown knob. Setae brown, the thinner ones seeming pale, the thicker ones darker. **Head.** Antennal flagellomere 4, Fig. 8 A. Palpomere 3 of maxillary palpus with apicomeresial extension, with 4 apically expanded curved sensilla, palpomere 4 with parasegment. Number of postocular setae 9. **Thorax.** Anepisternum setose, with 39 setae; anterior basalare setose, with 8 setae; preepisternum 2 non-setose; laterotergite setose, with 23 setae; episternum 3 setose, with 7 setae. **Wing.** Length 1.8 mm. **Hypopygium,** Figs 8 B, C: Sternite 9 laterally fused with gonocoxa, extending posteriorly to base of gonostylus, posterior margin nearly straight, anterior margin with a narrow deep cleft, the setae similar to ventral setae of gonocoxa. Parastylar lobe directed obliquely posteriad, long and rather broad, with one apical seta. Paraapodemal lobe not observable. Dorsal mesial margin of gonocoxa with an angular bulge mesiad near middle, the more apical part of margin continuing to apicolateral lobe of gonocoxa. Between the bulging part of the dorsal mesial margin and apicolateral lobe, on a more ventral level, with a lobe bearing two megasetae pointing anteromesiad. Apicolateral lobe curved and non-setose except for a few apical setae and extending posteriorly to middle of gonostylus. One juxtagonostylar seta present: it is a knife-blade-like megaseta arising from a basal body which is about two-thirds of its length. Gonostylus elongate subquadrangular, the setae moderately long, mostly on the marginal areas, on one side in the single specimen with an outstanding stronger and longer seta at apical margin. Tegmen with a narrow apical half, and basal half widening towards base, without distinct lateral shoulders, the apodeme unusually expanded. Hypoproct large, posteriorly extending as far as apex of gonostylus, with ca. 30 setae on each half, the setae in distinct, more anterior and more posterior groups, the former in Fig. 8 C covered by sternite 9. Cerci medially separate.

Female unknown.

**Discussion.** *M. uncinata* is similar to *M. clinochaeta* and *M. phyllochaeta* but is distinguished from both e.g. as follows: 1) the parastylar lobe is twice as broad, 2) the megasetae at the dorsal mesial margin of the gonocoxa are twice as long and are directed obliquely anteriad, not posteriad, 3) the apodemes of the tegmen are unusually expanded and 4) the gonostylus is simple, without a trace of being bilobed, and its apex is as broad as the base, i.e. it is not attenuated towards the apex (or the apex of the dorsal lobe). *M. uncinata* is also similar to *M. teocchi* from which it differs by the characters mentioned under 2) and 4). Characters 1) and 3) are not known in *M. teocchi*.

**Types.** *Holotype.* Male, MADAGASCAR, Province Toliara, Parc National d'Andohahela, Col du Sedro, 3.8 km 113° ESE of Mahamavo, 37.6 km 341° NNW of Tolagnaro, 24°45'50''S 46°45'06''E, 900 m a.s.l., montane rainforest, Malaise trap, 21.i.–25.i.2002, leg. Fisher, Griswold *et al.* In CAS.

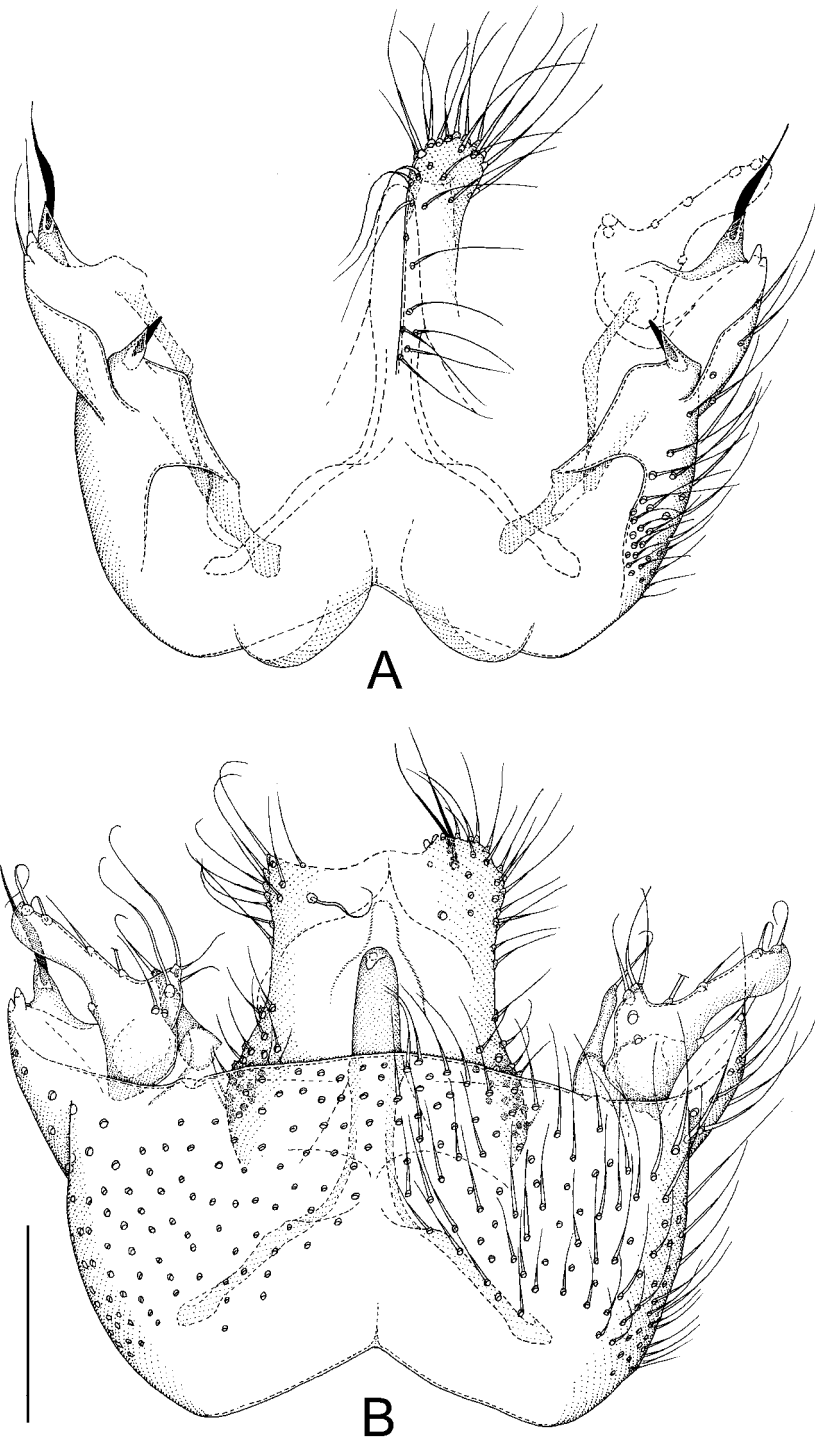


**FIGURE 8.** *Manota uncinata* sp. n. (holotype). **A.** Antennal flagellomere 4, lateral view. **B.** Hypopygium, dorsal view. **C.** Hypopygium, ventral view. Scale for A 0.05 mm, for B and C 0.10 mm.

**Notes on *Manota flavipes* (Enderlein)**  
(Figs 9 A, B)

*Aphanizophleps flavipes* Enderlein, 1910b: 68.





**FIGURE 9.** *Manota flavipes* (Enderlein) (syntype). **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. Scale 0.10 mm.

The species was described from the Seychelles and was based on four specimens: one male from Silhouette, one male and one female from Cascade Estate, Mahé, and one male from near Morne Blanc, Mahé. The two specimens from Cascade Estate are nowadays in BMNH, and the one from Silhouette is in MIZ. In MIZ there is a wing mounted on a slide and labelled “*Aphanizophleps flavipes* Enderl., Seychellen, Mahé. H. Scott, Type”. This must be the remains of the fourth syntype. Matile (1972) designated the male in BMNH as lecto-

type and the female as paralectotype. I have studied the lectotype and also the male in MIZ and consider them to be conspecific. Edwards (1928) gave a drawing of the hypopygium of the lectotype in both dorsal and in ventral aspects. Matile (1972) redescribed *M. flavipes*, including a drawing of the hypopygium of the lectotype in dorsal aspect. Because both Edwards' (1928) and Matile's (1972) drawings are rather superficial, and because the mount of the hypopygium of the lectotype is in poor condition (for details, see Matile 1972), I have illustrated the hypopygium of the male from Silhouette (Figs 9 A, B) to serve as a better comparison with other *Manota*. The female terminalia are still undescribed. The pleural chaetotaxy has not been described. I have tried to study it in the male from Silhouette, but, except for the slide-mounted hypopygium, the specimen is dry and pinned through the pleura. All that I can see with certainty is that the laterotergite is setose.

*M. flavipes* is similar to *M. phyllochaeta* sp. n., *M. clinochaeta* sp. n. and *M. teocchi* Matile. It is distinguished from all these by having one, not two, megasetae at the dorsal mesial margin of the gonocoxa. The gonostylus is very similar to that of *M. phyllochaeta*, but the setae are weaker (Figs 7 C, 9 B). The hypoproct resembles that of *M. clinochaeta*, *M. phyllochaeta* and *M. uncinata* sp. n. in having its setae separated into more anterior and a more posterior groups. In the latter respect, *M. teocchi* may be similar but the character cannot be clearly seen in the original description (Matile 1972).

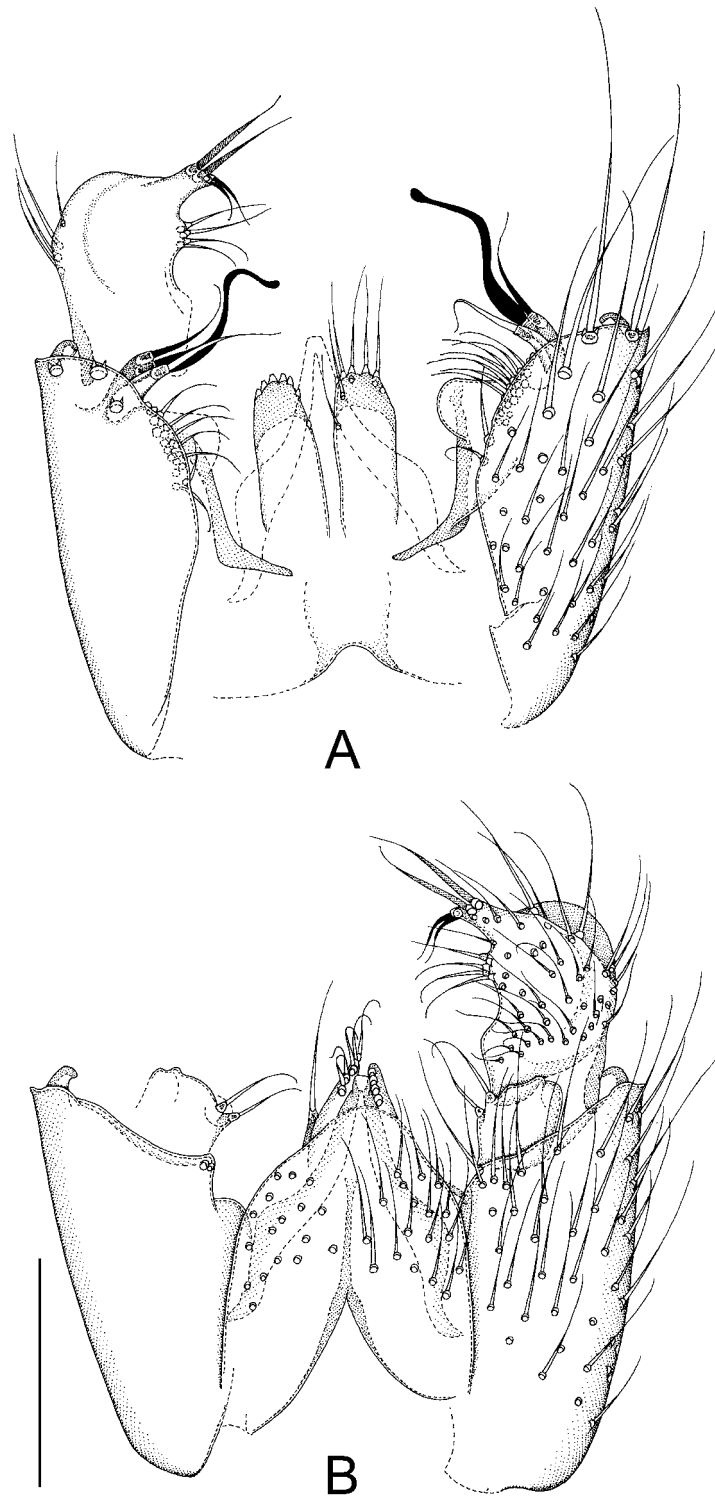
## New records

### *Manota mabokeensis* Matile, 1972

(Figs 10 A, B)

**New record.** 3 males, UGANDA, Distr. Masindi, Budongo Forest, n. Sonso, 1°45'N 31°35'E (written as W on the label). 11–20.VII. 1995, Th. Wagner; Fogging sur *Teclea nobilis* no 17, swamp forest. In MNHN.

**Remarks.** *M. mabokeensis* was previously known only from the holotype from the Central African Republic. Matile (1972) did not study the characters of palp and the pleural chaetotaxy, and the hypopygium was described by means of a drawing in dorsal aspect. Based on the new Uganda material, I can give the following additional notes on the characters of *M. mabokeensis*: Palpomere 3 has an apicomerial thumb-like extension with 4–5 curved apically expanded sensilla and palpomere 4 has a parasegment. Anepisternum is setose, with 44–57 setae; anterior basalare is non-setose; preepisternum 2 is setose, with 15–20 setae; laterotergite is non-setose; and episternum 3 is setose, with 16–20 setae. The wing length is 1.6–2.1 mm. In the hypopygium (Figs 10 A, B), sternite 9 is laterally separated from the gonocoxa and has the anterior margin deeply incised; the parastylar lobe is large, subquadrangular; the paraapodemal lobe is developed but concealed under the parastylar lobe in ventral view; the dorsal mesial margin of the gonocoxa is simple, evenly curving, with an aggregation of setae just on apical half, the setae being placed on the ventral side of the sclerite; there are two juxtagonostylar setae one of which is a rather unmodified normal seta, the other a flattened, long, S-shaped megaseta, both the setae arising from a rather long common basal body; on the dorsal side of the juxtagonostylar setae there is a seta arising from a conspicuous basal body; the gonostylus is rather complicated, with the apex formed by a narrow lobe-like projection bearing two stronger more ventral and two weaker more dorsal setae which differ from the other gonostylar setosity; subapically at the mesial margin of gonostylus there is a tuberculate aggregation of setae, and laterodorsally on the gonostylus there is a large semicircular lobe with conspicuous microtrichia; the tegmen is of the usual rather subtriangular type with distinct lateral shoulders; the hypoproct is rather small and has a mesial row of ca. 6 setae; the cerci are medially separate. In Matile's (1972) drawing, the gonostylus appears rather different from Figs 10 A and B, so that what is the apex in my drawing is a lobe in the middle of the gonostylus in Matile's drawing.

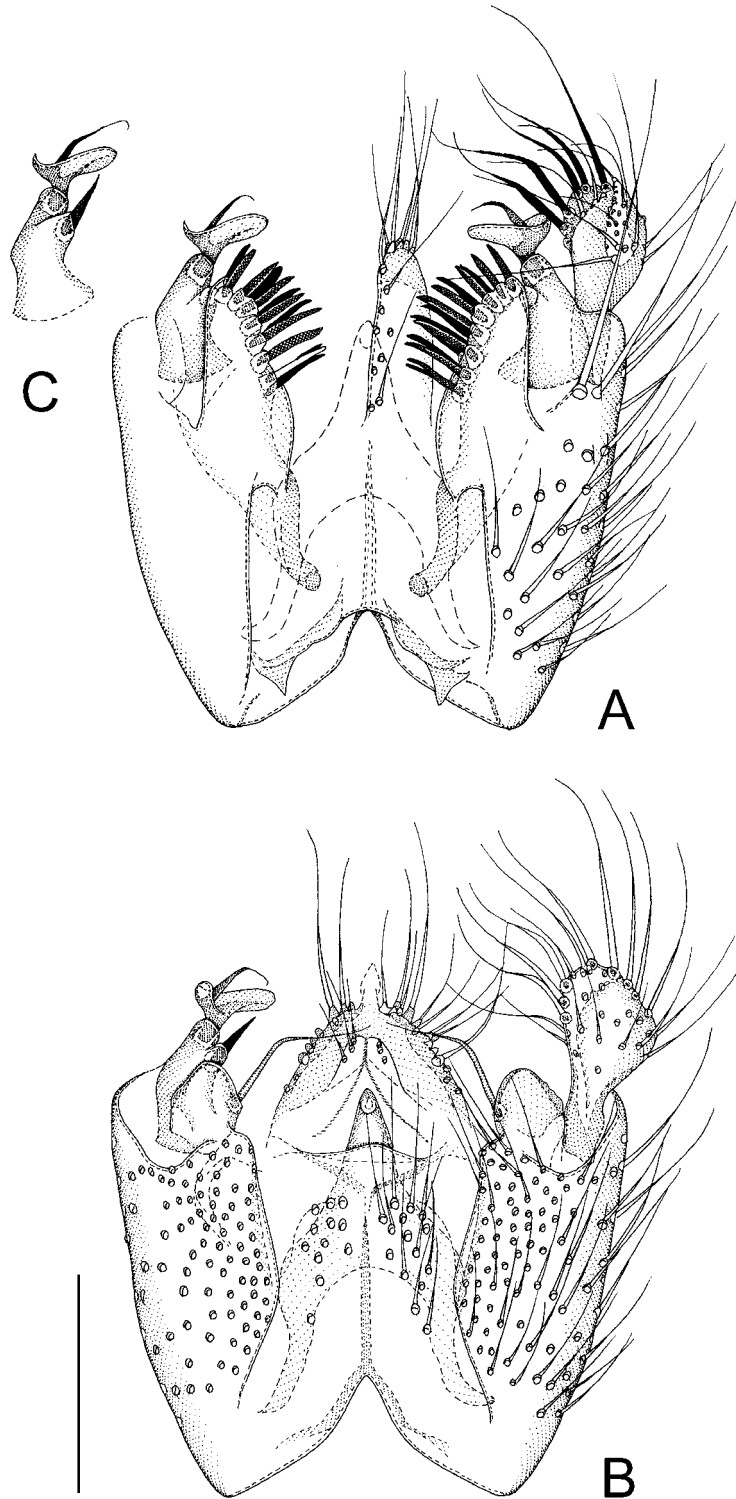


**FIGURE 10.** *Manota maboakensis* Matile (Uganda). ). **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. Scale 0.10 mm.

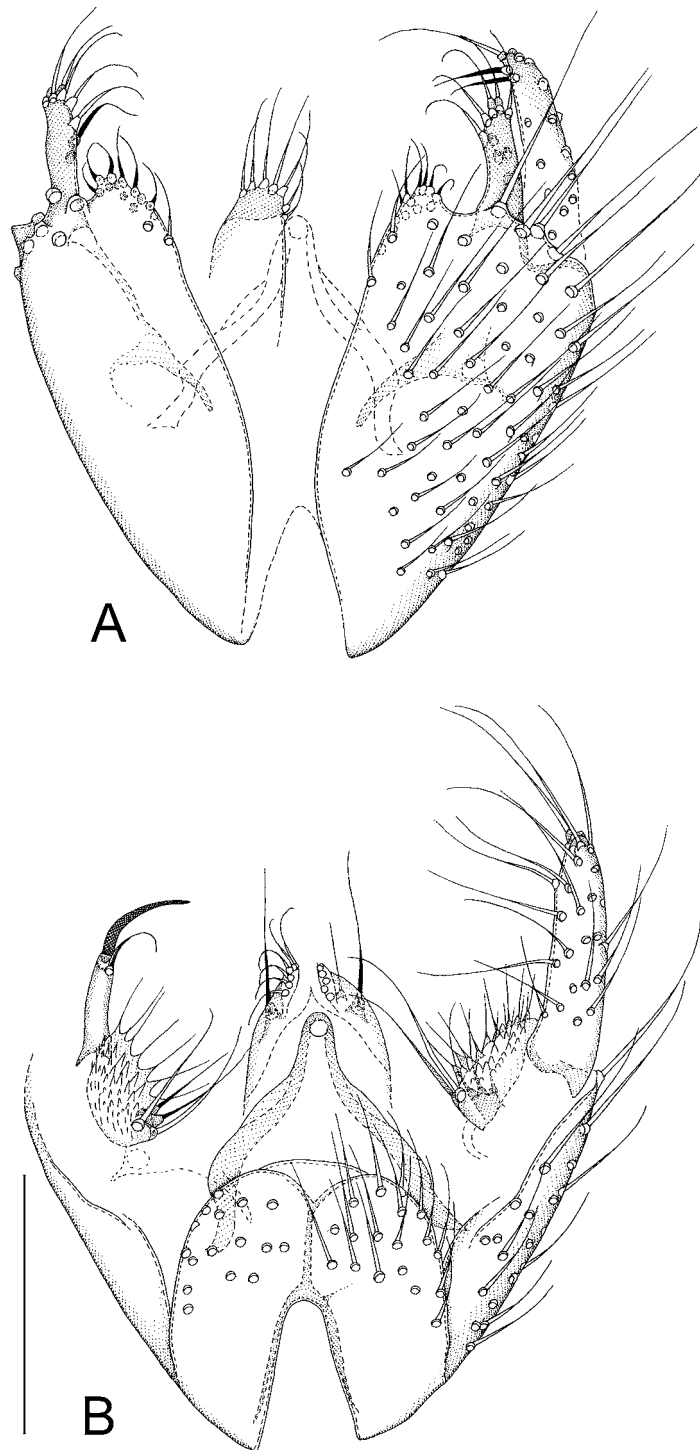
***Manota natalensis* Jaschhof and Mostovski, 2006**  
(Figs 1 A, 11 A, B, C)

**New records:** 4 males and 1 female, REPUBLIC OF SOUTH AFRICA, Cape Province, Tsikama Nat. Park, 29. IV.–17. V. 1995, Malaise trap in moist coastal forest with *Podocarpus*, leg. John Allen (in SMNH). 3

males, REPUBLIC OF SOUTH AFRICA, Cape Province, Bloukrans Pas, at Varkrivier, (S33°57' E23°38').  
Malaise trap 14–19.X.1994. Coastal rainforest in ravine. Leg. Michael Söderlund (in SMNH).



**FIGURE 11.** *Manota natalensis* Jaschhof and Mostovski (South Africa). **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. **C.** Juxtagonostylar megasetae, dorsal view. Scale 0.10 mm.



**FIGURE 12.** *Manota whiteleyi* Jaschhof and Mostovski (Ivory Coast). **A.** Hypopygium, dorsal view. **B.** Hypopygium, ventral view. Scale 0.10 mm.

**Remarks.** The species has previously been found at several localities in KwaZulu-Natal (Jaschhof and Mostovski 2006). Jaschhof and Mostovski (2006) noted that *M. natalensis* differs from other *Manota* by lacking the curved sensilla on palpomere 3. So far as I can see, the thumb-like apicomeres lobe bearing these sensilla is lacking on the palpomere in all my material. Unfortunately, the detailed palpal structure is known for only some of the described Afrotropical species. I have recently seen an undescribed species from Sumatra

which has the palp similar to that in *M. natalensis*, but otherwise the species are very dissimilar. In its hypopygium, *M. natalensis* is similar to *M. furcata* Söli, known from the Usambara Mountains, Tanzania. In both species, the megasetae at the dorsal mesial margin of the gonocoxa arise from a large posteriorly-directed lobe, one of the juxtagonostylar megasetae is branched, and the gonostylus is basally narrowed, clavulate. In *M. natalensis* the branched juxtagonostylar megaseta has a bowl-like basal part with the narrower branch seemingly arising from inside it, whilst in *M. furcata* the megaseta is more simple in having a long flattened axis with the branch arising from its side. In *M. natalensis* the gonostylus is slightly shorter than in *M. furcata*. I would not be surprised if *M. furcata* has a palp similar to that of *M. natalensis*, even though it was not mentioned in the original description (Söli 1993).

### ***Manota whiteleyi* Jaschhof and Mostovski, 2006**

(Figs 12 A, B)

**New record.** 1 male, CÔTE-d'IVOIRE, Taï, 5.V.1980, G. Gouturier leg.; Muséum Paris, Bio 7., Sous Forêt primaire, piège lumineux. In MNHN.

**Remarks.** *M. whiteleyi* was previously known only from KwaZulu-Natal, South Africa. The new specimen from Ivory Coast (Figs 12 A, B) differs in some details in the hypopygium, especially in the apical structures on the dorsal side of the gonocoxa. In the Ivory Coast specimen the apicomeral corner is only slightly produced lobe-like, while in the drawing by Jaschhof and Mostovski (2006) it is a more prominent lobe, and the large apical lobe in my drawing is in a more mesial position than in the drawing by Jaschhof and Mostovski. These differences may only be the result of different methods of slide-mounting.

### **Acknowledgements**

My special thanks are due to Dr Brian Fischer, San Francisco, and Dr Frank Menzel, Müncheberg, for the privilege of studying the material from Madagascar. I thank Ms Erica McAlister and Mr Nigel Wyatt, London, for the loan of the lectotype of *Manota flavipes* (Enderlein) and for the material from Mauritius, Dr Michel Baylac, Paris, for the loan of material from continental Africa, and Prof Dr M. Wolsan and Dr Dominika Mierzwa, Warsaw, for the loan of syntypes of *M. flavipes*. Mr Jarmo Pelli, Stockholm, made the analyses of the chaetotaxy, the wing measurements, and the drawings of the antennal flagellomeres of the females. Dr Adrian Pont, Oxford, UK, kindly checked the English language of this paper.

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