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EIGHT NEW ORIENTAL AND AUSTRALASIAN SPECIES OF LEPTOMORPHUS (DIPTERA: MYCETOPHILIDAE)

PAPP, L.[1] and ŠEVČÍK, J.[2]

[1]*Department of Zoology, Hungarian Natural History Museum and Animal Ecology Research Group of the Hungarian Academy of Sciences H-1431 Budapest, PO Box 13, Hungary. E-mail: flyer.papp@gmail.com*
[2]*University of Ostrava, Chittussiho 10, CZ-710 00 Ostrava & Silesian Museum, Tyrsova 1 CZ-746 01 Opava, Czech Republic. E-mail: sevcikjan@hotmail.com*

Eight new species of *Leptomorphus* CURTIS are described from the Oriental and Australasian regions: *L. alienus* (Indonesia: Seram), *L. ascutellatus* (Thailand), *L. baramensis* sp. n. (Malaysia: Sarawak), *L. gunungmuluensis* sp. n. (Malaysia: Sarawak), *L. longipes* sp. n. (Brunei), *L. matilei* sp. n. (Indonesia: Sulawesi), *L. papua* sp. n. (Papua New Guinea), *L. utarensis* sp. n. (Indonesia: Sulawesi). A key is given for their identification and male terminalia are figured. The egg of *L. utarensis* sp. n. is also figured. With 57 + 3 (photo) figures.

Key words: fungus gnats, Sciaroidea, *Leptomorphus*, taxonomy, new species, Australasian Region, Oriental Region

INTRODUCTION

The genus *Leptomorphus* CURTIS, 1831 (type species *L. walkeri* CURTIS, 1831, orig. des.) is a species-rich genus with 27 described species (BECHEV 2000). Species of the present concept of the genus occur in the Palaearctic, the Nearctic, the Oriental and the Afrotropical regions. Two species are listed from the Oriental region by COLLESS and LIEPA (1973). The first one, *L. ornatus* BRUNETTI, 1912, is poorly characterized and the depository of the female type is unknown. The second one, *L. chaseni* EDWARDS, 1933, is also described from one female (deposited in BMNH), so its identity remains unclear as the identification of the Oriental species of *Leptomorphus* is based on the male terminalia (see below).

The Oriental and Australasian fauna of Mycetophilidae s. str. is still insufficiently known (except Manotinae and Metanepsiinae, see e.g. HIPPA & ŠEVČÍK 2010, ŠEVČÍK & HIPPA 2010) and this applies also to *Leptomorphus*. A careful examination of the male terminalia of a rather small number of specimens of this genus surprisingly revealed eight new species.

MATERIALS AND METHODS

All the specimens examined, except the holotype of *L. matilei*, types of *L. ascutellatus* and a male paratype of *L. utarensis*, were pinned from alcohol. Those specimens are rather faded and seem also slightly desclerotised; however this latter process was not severe, as we saw on the types of *L. gunungmuluensis*, which had been kept in alcohol for 30 years.

Detailed description of body characters is given only for *L. ascutellatus*, as almost all diagnostic characters within this group of species are on the male terminalia. The morphological terminology principally follows that by SØLI *et al.* (2000).

The types and other material are deposited in the following collections: Hungarian Natural History Museum, Budapest, Hungary (HNHM), Muséum d'Histoire Naturelle, Paris, France (MNHN), Natural History Museum, London, U.K. (BMNH) and the Silesian Museum (Slezské zemské muzeum), Opava, Czech Republic (SMOC).

TAXONOMY

The *Leptomorphus ascutellatus* group

The torsion of male genitalia may be up to 180° in Mycetophilidae. The torsion may affect differently postabdominal sclerites and the genitalia themselves. In the species below one can find numerous situations in this respect. As for dry specimens, we detected different torsion degrees even within a species (e.g. *L. gunungmuluensis*). This is why one can not say that pregenital tergites and sternites are depicted in dorsal or ventral view. Instead, we positioned those sclerites, where we can make a view perpendicular to the sclerite, so we use "perpendicular view" below.

We hypothesise a close relationship of the new species described here with the Afrotropical subgenus *Gymnoscutum* MATILE of *Leptomorphus*. The fusion of tergite 9 with gonocoxites is partial in the species of *Gymnoscutum* (at least two species studied in the HNHM collection), i.e. only the most caudal part of gonocoxites is fused to tergite 9. However, in normal case tergite 9 bears setae on its outer surface only. Contrarily, the paired caudal processes of the species group have 2 walls, setae emerge on both sides. It was not possible to confirm whether the inner sclerotised plate with setae belongs to tergite 9 or to the gonocoxites (cf. MATILE 1977: figs 1–7, 1996: figures of "tergite IX"). Tergite 9 and gonocoxites are not fused in *L. alienus* sp. n. The fusion is complete in all the other species, but insertion of muscles is separate (separable) and no setae emerge on the hypothesised lines of fusion. So below we name that fused structure as the tergo-gonocoxal complex.

The connection of the aedeagus is stronger to the ejaculatory apodeme (unpaired, in the sagittal plane), than to the paired aedeagal apodeme, which usually remain in the genital vault, when the aedeagus is removed. So below the aedeagus is depicted with the ejaculatory apodeme, rather than with the aedeagal apodeme.

Leptomorphus alienus sp. n.
(Figs 1–6)

Holotype male (BMNH): Indonesia, Seram, Solea, August 1987, Malaise trap, M. C. DAY leg. (Flagellomeres, apical to 7th on the left side and to 9th on the right side, broken off; some tarsomeres also lost, incl. all the 5th tarsomeres with claws.)

Measurements (holotype): wing length: 5.75 mm, head + thorax 1.9 mm, abdomen 5.75 mm.

Diagnostic characters. Prefrons ventrally with 6 strong (black) setae. Wing tip dark. Pleura mostly dark, but light just around anterior spiracle. Terminal section of Cu_1 vein downcurved, vein M_3 more than 1.5 times longer than Cu_1 terminal section.

Male terminalia (Figs 1–6) very distinct, since tergite 9 and gonocoxites are not fused. Sternite 8 (Fig. 1) membranous medially, edges strongly narrowing proximally. Setae of sternite 8 long but emerge only on distal edges. Tergite 8 (Fig. 4) definitely broader than long, caudal part partly separated, basally with short setulae, medially with numerous thin setae. Long and thick setae of tergite 8 emerge only apically (11–12) and laterally (numerous ones). Tergite 9 (Figs 2–3) long, evenly setose, caudal part divided into 2 long lobes. Cerci (Fig. 3) widely separated, setose, broadened subapically. Genital complex (Figs 5–6) of an intricate form. Hypoproct much narrower than cerci. Caudal lobes of gonocoxites with a blunt lateral apex (Fig. 6), with long caudal setae (Fig. 5); medial part of the lobes with numerous, medially directed setae. Medial edges of gonocoxites with a comb of closely set thick black setae. Gonostyli small. Aedeagus robust, aedeagal apodemes with broadened "holes" on cranial apices (they are not sclerotised there).

Etymology. From the Latin "*alienus*" (= alien), referring to its difference from the other Oriental and Australasian species.

Leptomorphus ascutellatus sp. n.
(Figs 7–17, 58–59)

Holotype male (HNHM): Thailand: Trang Prov., Thung Khai Botanic Garden, primary lowland rainforest, along the "Nature Trail", Nov 13, 2004, No. 29, leg. L. PAPP & M. FÖLDVÁRI. (right 10 apical flagellomeres lost, some tarsomeres, incl. tarsomeres 4 and 5 lost, last tarsomere with claws remained on the right hind leg only)

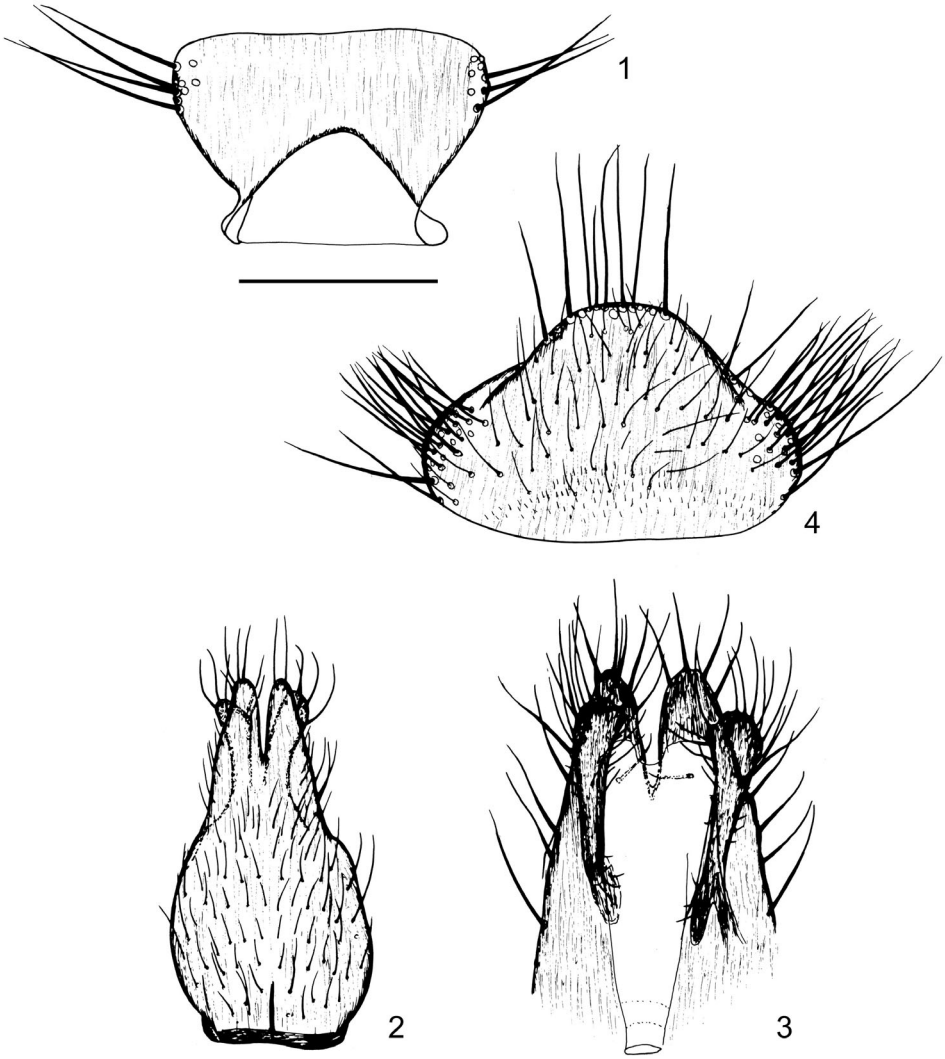
Paratype female (HNHM): same data.

Measurements: Body length 5.20 mm, head + thorax 1.23 mm, abdomen 3.97 mm (holotype), c. 5.8 mm, 1.48 mm, c. 4.3 mm (abdomen strongly downcurved) (paratype female), respectively.

Male. Body mostly metallic dark bluish grey.

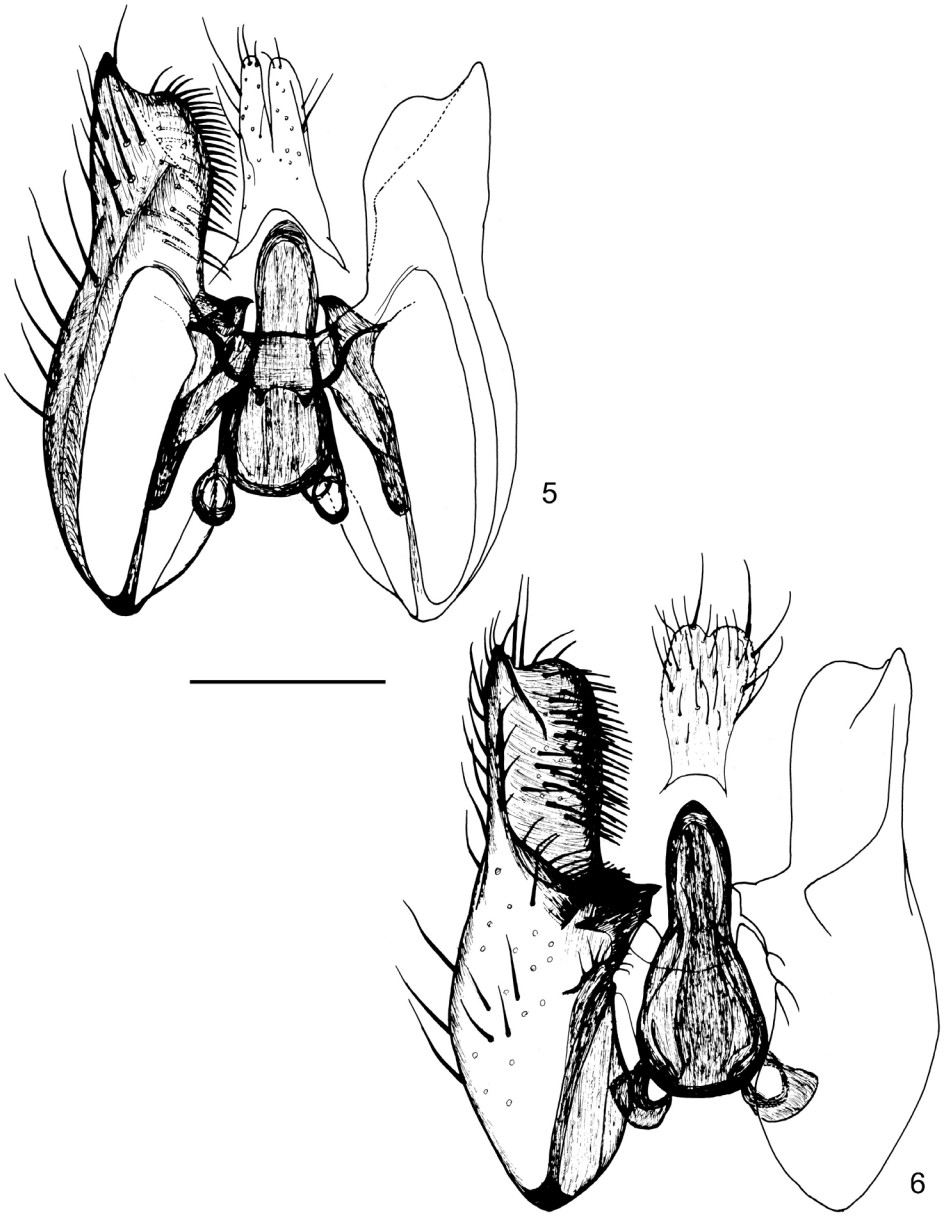
Head yellow, incl. palpi, scape and pedicel. Ocellar triangle black, ocelli comparatively large. Anterior ocellus only slightly anterior to lateral ocelli. Distance of lateral ocelli only 0.08 m, head 0.55 and 0.60 mm broad, i.e. lateral ocelli far from eye margins. Postfrons shiny. Prefrons ventrally

with 2 strong setae only. Eyes bare, dark grey, subshiny. Terminal palpomere 0.13 mm, ca. 6 times longer than broad and 1 1/3 times as long as penultimate one. Antennae dark grey. First flagellomere 0.115 × 0.093 mm, 2nd 0.21 × 0.01 mm, 7th 0.10 × 0.093 mm 14th (terminal) 0.125 × 0.07 mm. Terminal flagellomere not sharp apically but with a distinct central apex. Flagellomeres slightly flattened (strongly so in some related spp.).

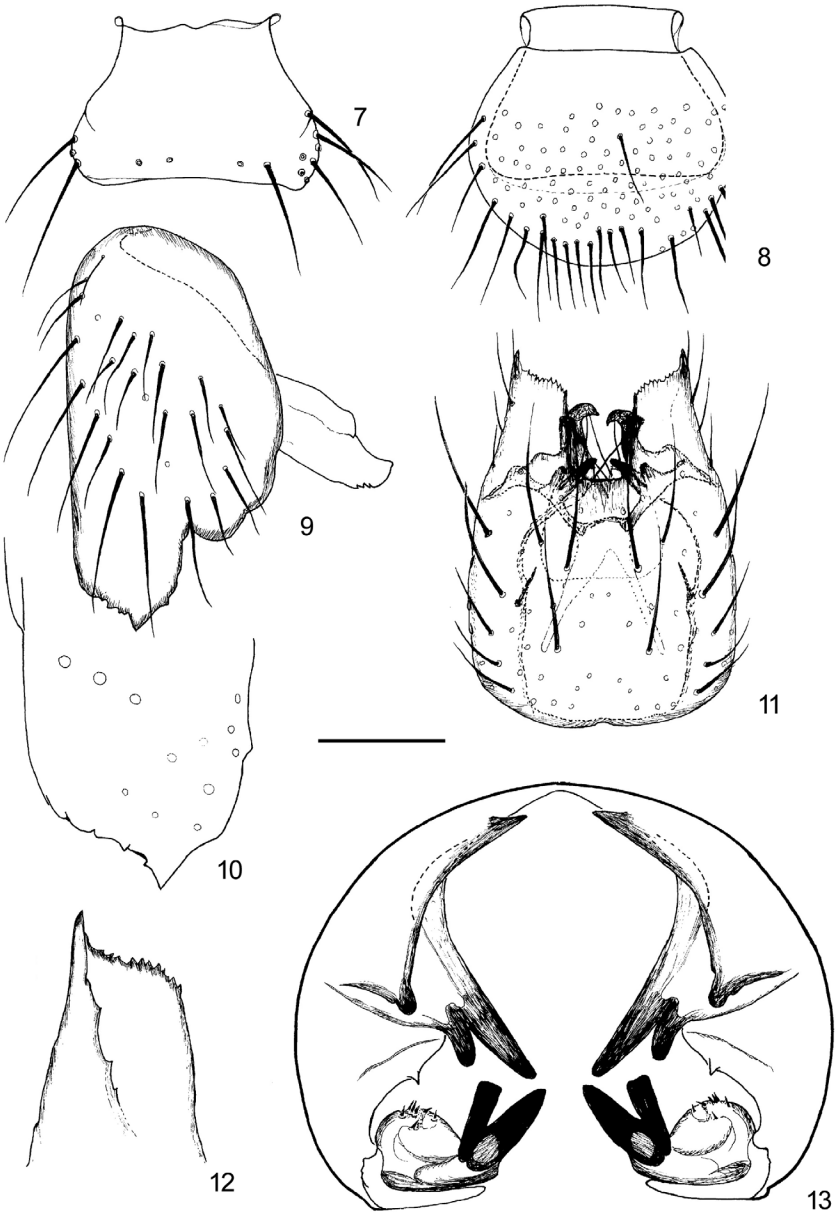


Figs 1–4. *Leptomorphus alienus* sp. n., holotype, male genitalia: 1 = pregenital (8th) sternite, perpendicular view, 2 = tergite 9 and cerci, ventral view, 3 = apical part of tergite 9 and cerci, dorsal view, 4 = pregenital (8th) tergite, perpendicular view. Scale bar: 0.4 mm for Fig. 2, 0.2 mm for Figs 1, 3–4

Whole thorax dark, but scutellum yellow. Pleura around anterior spiracle dark. Scutellum very small (Fig. 58) and so thinly sclerotised, that it may turn in to become slightly concave (as it is the case with the paratype female, Fig. 59). Scutellum entirely bare, not even microsetae present.



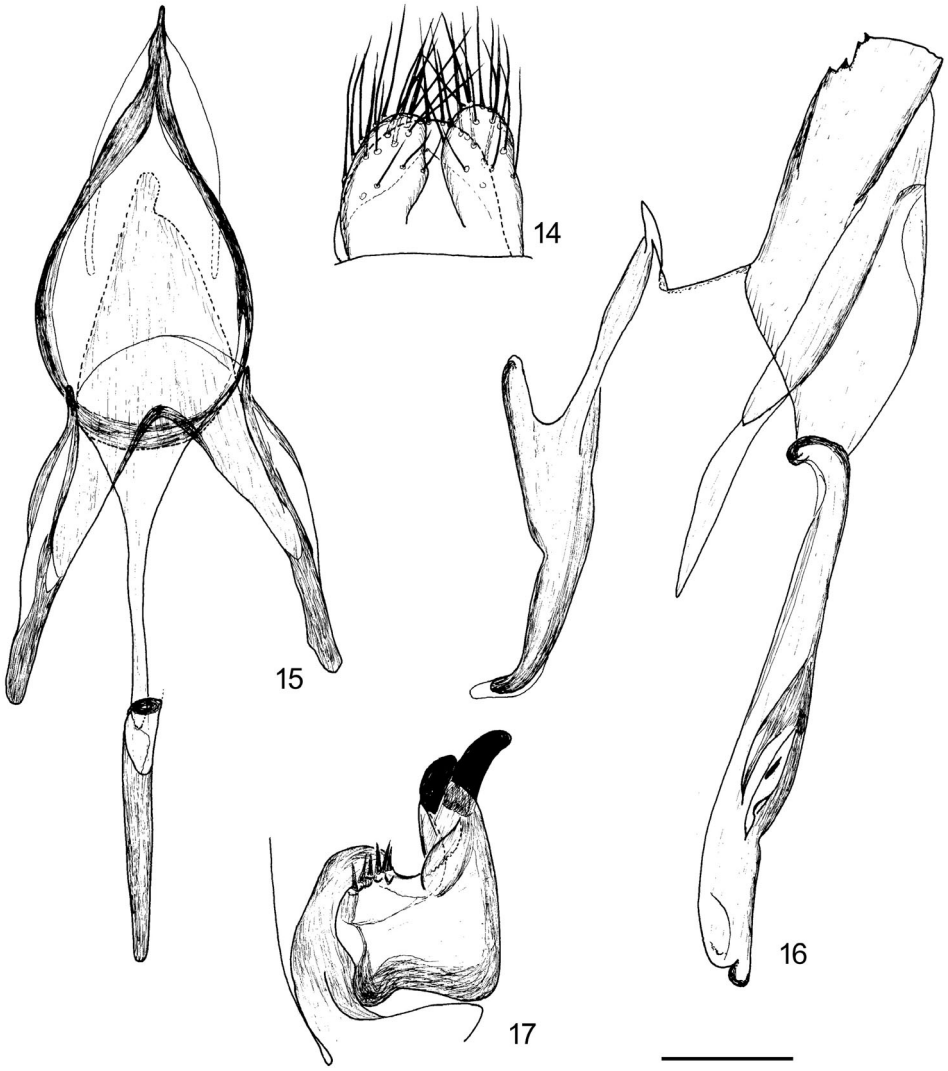
Figs 5–6. *Leptomorphus alienus* sp. n., holotype, male genital complex: 5 = dorsal view, 6 = ventral view. Scale bar: 0.2 mm



Figs 7–13. *Leptomorphus ascutellatus* sp. n., holotype, male genitalia: 7 = pregenital sternite, ventral view, 8 = pregenital tergite and sternite *in situ* (overlapping), dorsal view (sternal setae omitted), 9 = tergo-gonocoxal complex with apex of aedeagus, lateral view, 10 = caudal lobe in higher magnification, 11 = genitalia in ventral view (cercal complex mostly covered), 12 = caudal lobe of tergo-gonocoxal complex in higher magnification, ventral view, 13 = tergo-gonocoxal complex with gonostyli, caudal view. Scale bar: 0.2 mm for Figs 7–9, 11, 0.1 mm for Figs 10, 12–13

Legs yellow but base and apex of hind femur as well as base of hind tibia infuscated. Fore tibia 1.48 mm, fore basitarsus 2.11 mm long. Hind coxa 0.77 mm long (holotype). Microsetae on tibiae unaligned, rather short macrosetae present on all tibiae. Empodia not developed, claws minute (c. 0.03 mm).

Wing greyish with macrotrichia, veins ochre. All veins, incl. Sc, Rs and R-M setose. Sc ending in costa. Crossvein Sc-R present, close to apex of Sc. Length of R-M 0.20 mm, stem of medial fork 0.69 mm, M_1 1.38 mm, i.e. twice longer than M_1. Cu_2 close to, and only slightly divergent from Cu_1. Apex



Figs 14–17. *Leptomorphus ascutellatus* sp. n., holotype, male genitalia: 14 = cerci with hypoproct, dorsal view, 15 = phallic organ, ventral view, 16 = same, lateral view, 17 = gonostylus in broadest (a subdorsal) view. Scale bar: 0.2 mm for Fig. 14, 0.1 mm for Figs 15–17

of Cu_2 overruns distinctly the level of Rs. M_3 c. 1.13 mm on holotype (wing broken there, so not precisely measurable), Cu_1 0.77 mm, M_3 of paratype female 1.54 mm, terminal section of Cu_1 0.80 mm, distance of their apices 0.86 mm. A_1 only slightly shorter than Cu_2, apex blunt. Halteres black.

Abdominal tergites 3 to 5 dark, each only with a short light band cranially.

Male terminalia: Setae asymmetrically placed on sternite 8 (Fig. 7). Tergite 8 larger, subspherical (Fig. 13). Genitalia very small, yellow. Cercal setae somewhat shorter than setae on hypoproct (Fig. 13). Gonocoxites higher than long or broad (Figs 9, 11), apical lobe of gonocoxite broad, slightly serrate caudally, more strongly apically (Figs 10, 12). Gonocoxites mostly fused with several long setae (Fig. 11), gonostyli mostly covered by gonocoxal lobes in caudal view.

Gonocoxites with an additional dark bilobed process at base of apical lobe, and those processes are perpendicular to the outer wall (Fig. 12). Gonostyli comparatively small but of an intricate structure (Figs 12, 17) with two extremely large black apical processes (we call them processes rather than thorns). Phallic organ (Figs 15–16) comparatively large. If we follow SØLI's (1997) interpretation (see SØLI 1997: fig. 30C), the paired, cranially directed structures (Fig. 15) must be named as parameral apodemes. Aedeagus largely triangular in dorsal (ventral) view. Aedeagal apodeme (a paired structure, too), better seen in lateral view, small (Fig. 16), ejaculatory apodeme large.

Female as male but postabdomen beginning with 8th segment yellow, 8th sternite with a patch of stiff black setae of c. 0.09 mm. Apical cercomere 0.23 × 0.165 mm.

Etymology. The specific epithet refers to the remarkably reduced scutellum.

Leptomorphus baramensis sp. n.
(Figs 18–23)

Type. Holotype male (BMNH): Malaysia: Sarawak: Baram District, 4th Division, Gunung Mulu Nat. Park, Kerangas rain forest nr. RGS camp 5, N4°03' E114°56', Malaise trap, 27.6–19.7. 1978, V. H. VALLACK coll.

Measurements: wings missing, head + thorax 1.5 mm, abdomen 4.75 mm.

Male terminalia. Positioning of the setae not strongly asymmetrical on sternite 8 (Fig. 18), sternite 8 submedially with a darker transverse thickening. Tergite 8 distinctly shorter than broad, only moderately large, setae on its medial 1/3 dark, lateral setae light (Fig. 19). Tergo-gonocoxal complex longer than broad, caudal lobes (Fig. 20) serrate ventrally with a definite apical prolongation, inner medial process very long in caudal view, digitiform in dorsal view (Figs 20–21), the other process blunt; there is an additional darker thickening at base of processes (Fig. 20). Gonostyli medium large (Fig. 22), the more medial process is almost in the longitudinal axis of gonostylus, lateral process thick. Phallic organ comparatively small, aedeagus rather long, proximal 2/3 ovoid in dorsal view, ejaculatory apodeme distinct but thin, without lateral (horizontal) lobes (Fig. 23).

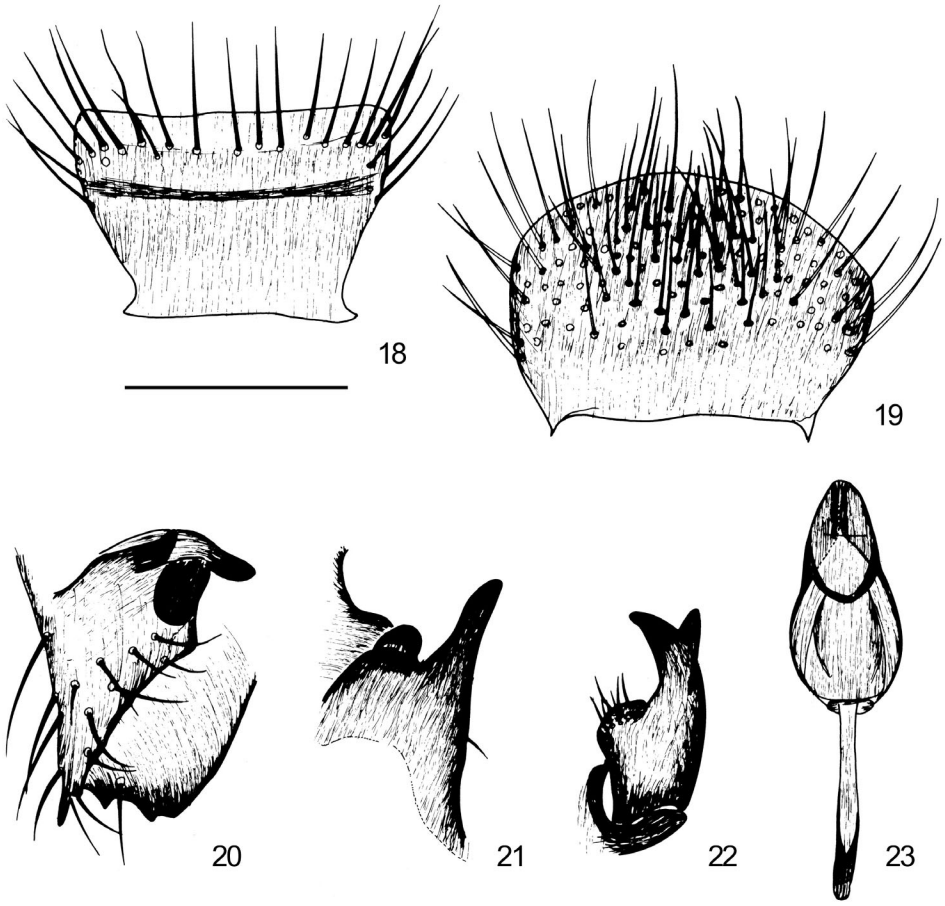
Etymology. The specific epithet of the new species refers to its type locality in the Baram District.

Leptomorphus gunungmuluensis sp. n.
(Figs 24–30)

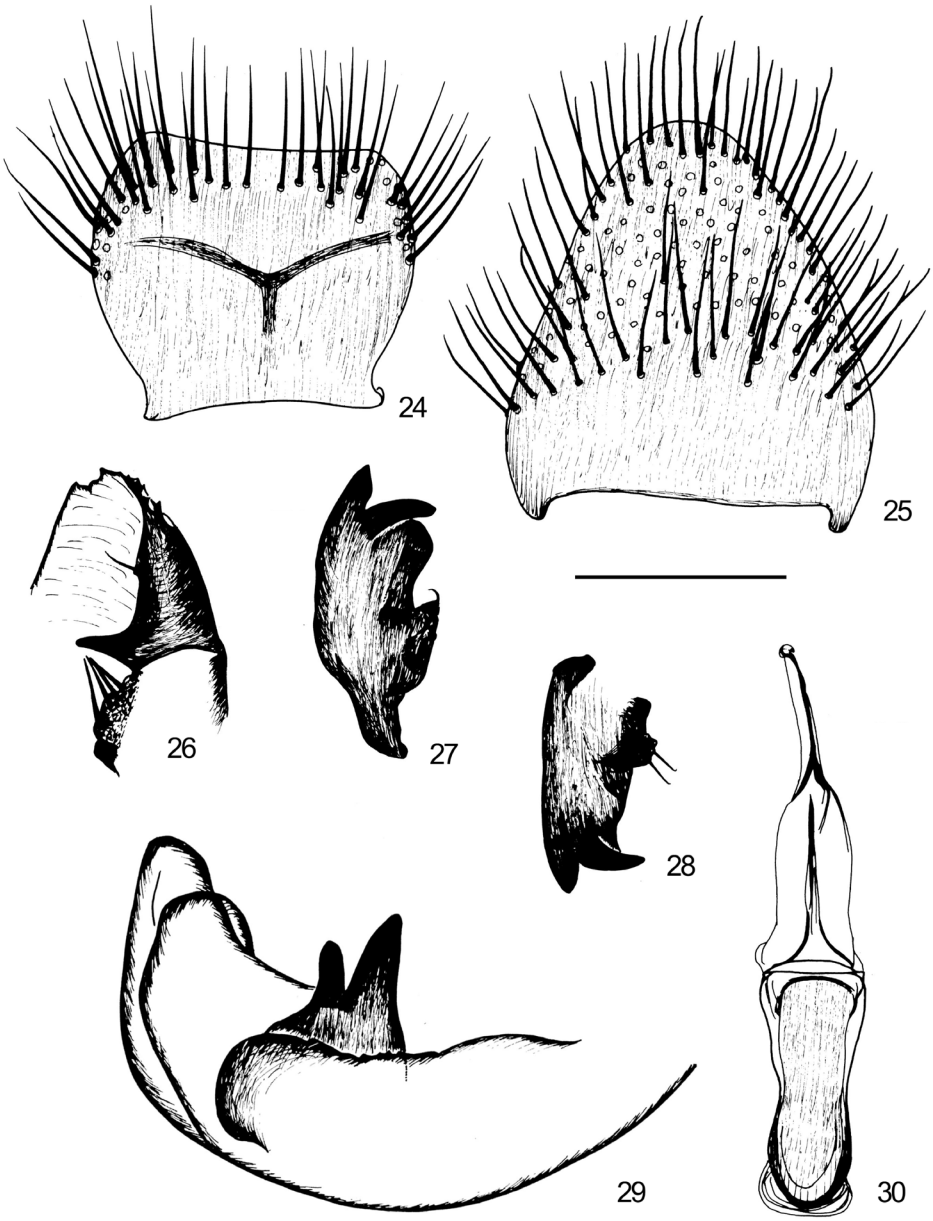
Holotype male (BMNH): Malaysia: Sarawak: Baram Distr., Gunung Mulu National Park, Alluvial forest near Base Camp, 23–29.10.1977, Malaise trap, N. M. Collins coll.

Paratypes: 8 males and 1 female (BMNH, except 1 male in SMOC and 3 males in HNHM): the same data as for the holotype.

Measurements (holotype): wing length: 5.9 mm, head + thorax 1.9 mm, abdomen 5.5 mm.



Figs 18–23. *Leptomorphus baramensis* sp. n., holotype, male genitalia: 18 = pregenital (8th) sternite, perpendicular view, 19 = pregenital (8th) tergite, perpendicular view, 20 = caudal end of tergo-gonocoxal complex, dorsal view, 21 = medial processes of gonocoxite, caudal view, 22 = gonostylus, in broadest extension (sublateral view), 23 = aedeagus and ejaculatory apodeme, dorsal view. Scale bar: 0.2 mm for Figs 18–19, 23, 0.1 mm for Figs 20–22



Figs 24–30. *Leptomorphus gunungmuluensis* sp. n., paratype, male genitalia: 24 = pregenital (8th) sternite, perpendicular view, 25 = pregenital (8th) tergite, perpendicular view, 26 = caudal end of tergo-gonocoxal complex, dorsal view, 27 = gonostylus in broadest extension, dorsal-sublateral view, 28 = gonostylus, dorsal view, 29 = tergo-gonocoxal complex without gonostylus, caudal view, 30 = aedeagus and ejaculatory apodeme, dorsal view. Scale bar: 0.2 mm for Figs 24–25, 30, 0.1 mm for Figs 26–29

Male terminalia. Sternite 8 (Fig. 24) rather broad proximally, positioning of the setae almost symmetrical, in more than one row; sternite 8 submedially with a darker, broad Y-shaped transverse thickening. Tergite 8 large, long, shield-shaped, with numerous rather long setae (Fig. 25). Tergo-gonocoxal complex broader than high (Fig. 29). Caudal lobes of tergo-gonocoxal complex blunt but serrate (Fig. 26), medial processes overlapping in dorsal view (the more lateral one is much smaller), both are blunt and better seen in caudal view (Figs 29). Setae situated cranially to processes extremely strong (Fig. 26). Gonostylus medium large (Figs 27–28), rather thick (Fig. 27), its more medial process blunt slightly curved, lateral process thick, almost perpendicular to the longitudinal axis of gonostylus. Aedeagus (Fig. 30) peculiar, rather long with broad blunt apex, ejaculatory apodeme even longer, with lateral (horizontal) lobes (Fig. 30).

Etymology. It was named after Gunung Mulu [= Mount Mulu] National Park in Sarawak.

Leptomorphus longipes sp. n.
(Figs 31–37)

Type. Holotype male (BMNH): BRUNEI, 13. 4. 1991 [no more data]

Measurements: wing length: 4.75 mm, head + thorax 1.5 mm, abdomen 4.25 mm.

Male terminalia. Sternite 8 (Fig. 31) narrowing proximally, positioning of the setae almost symmetrical, largely in one not well-arranged row; sternite 8 without a darker transverse thickening. Tergite 8 large, almost as long as wide, with numerous setae (Fig. 32). Tergo-gonocoxal complex rather high (Fig. 33), caudal lobes high but comparatively not long. Medial processes more separated from gonocoxites than in the related species, appear side-by-side in dorsal view (Fig. 34), the more medial one much longer and strongly narrowing apically in caudal view (Figs 35). Gonostyli rather thick (Fig. 36), both their processes directed medially. Aedeagus (Fig. 37) comparatively short, narrowing apically but apex not sharp, ejaculatory apodeme longer, with weakly sclerotised lateral (horizontal) lobes (Fig. 37).

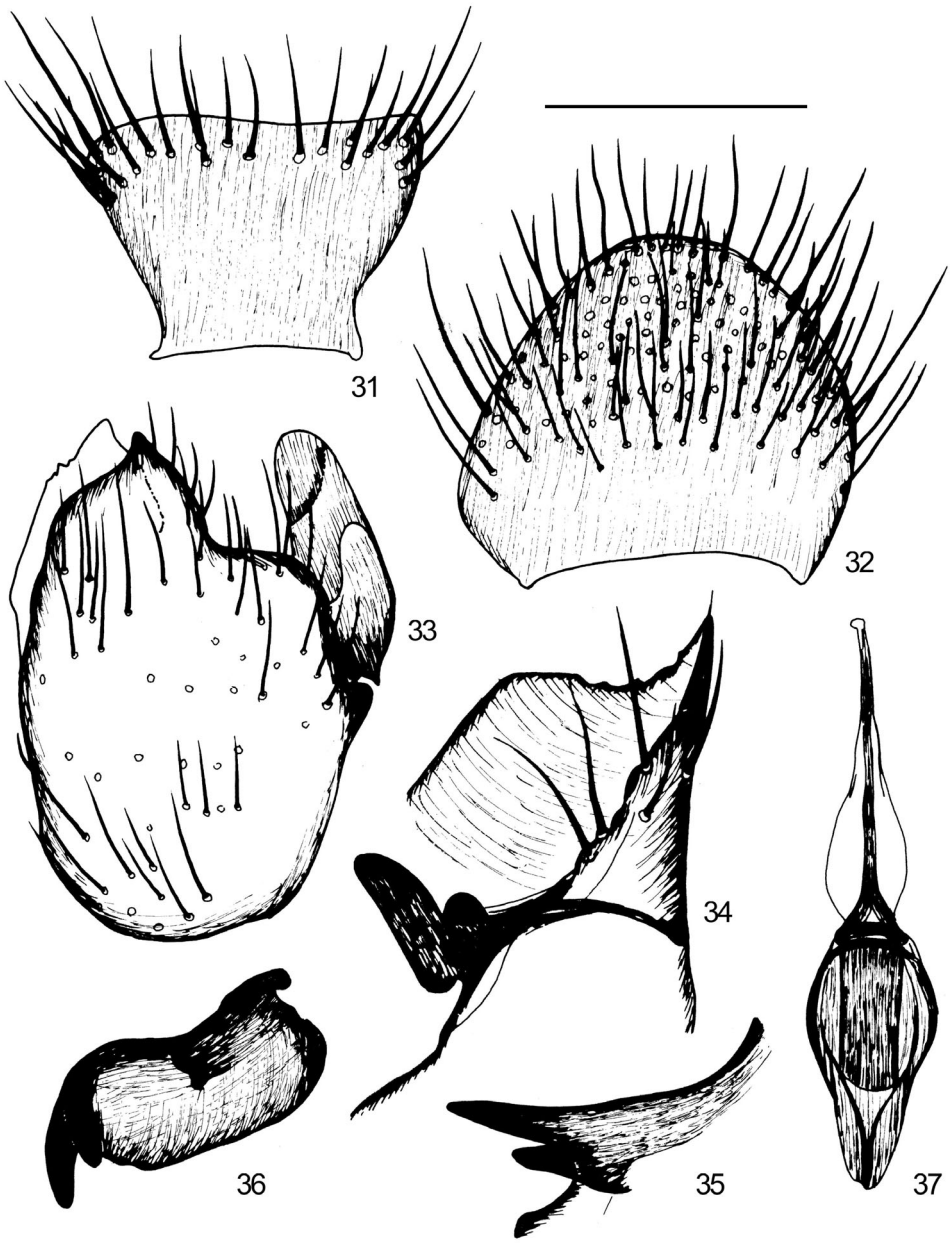
Etymology. The specific epithet refers to the relatively long legs.

Leptomorphus matilei sp. n.
(Figs 38–42)

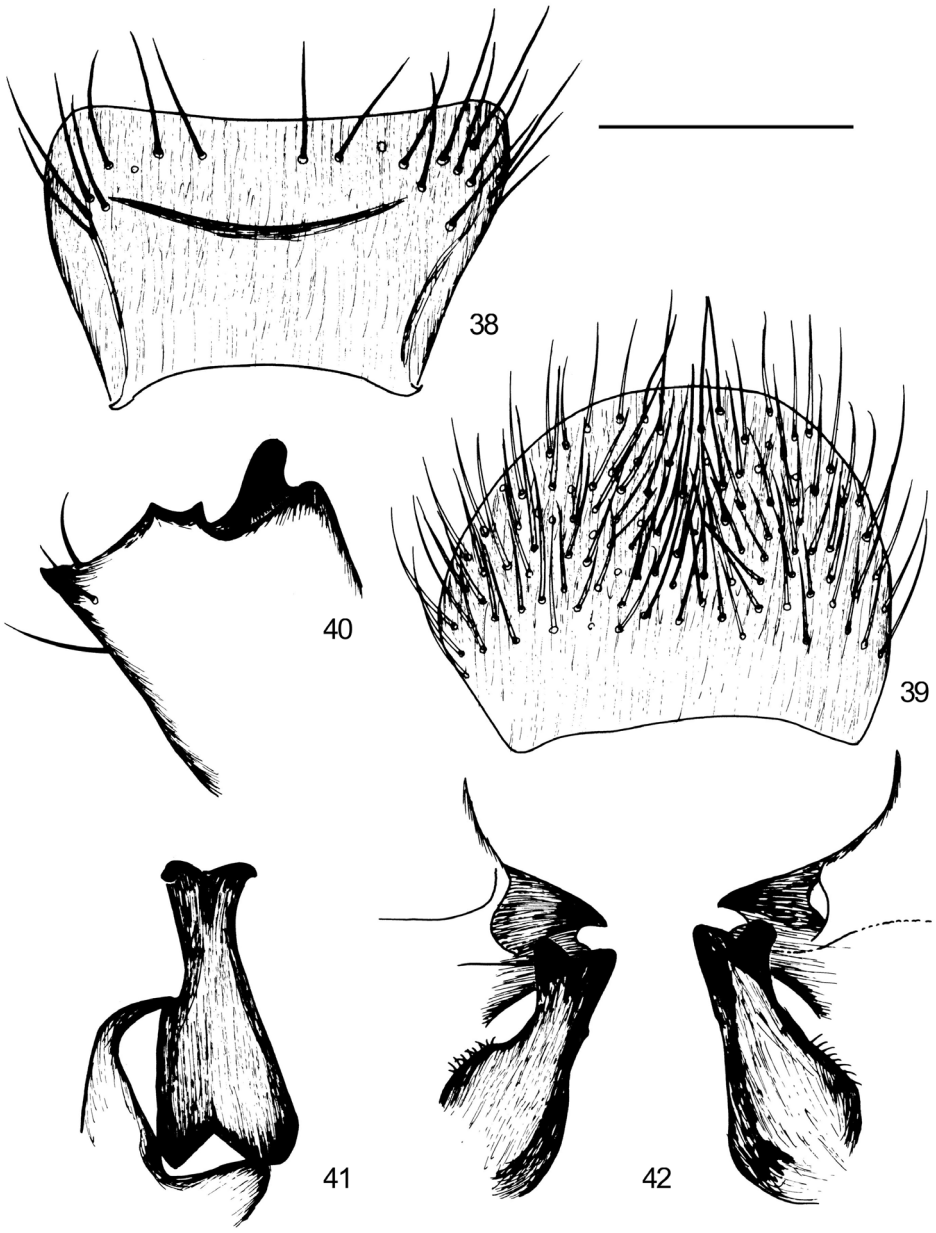
Holotype male (MNHN): NMW Indonesia Expedition 1985 (Project Wallace), NMW. Z. 1985. 078 – SULAWESI UTARA: Dumoga Irrigation Project, Toraut, 10. –19. viii. 1985, A. H. Kirk-Spriggs. – Malaise trap, irrigated rice vars. Aceh & Citandui.

Measurements: wing length: 5.25 mm, head + thorax 1.75 mm, abdomen 4.75 mm.

Male terminalia. Sternite 8 (Fig. 38) only slightly narrowing proximally, positioning of the setae asymmetrical, no setae medially, sternite 8 with a distinct though thin, darker transverse thickening. Tergite 8 broader than long, with numerous rather long setae (Fig. 39), setae in medial 1/5 dark, others lighter. Tergo-gonocoxal complex with very short caudal lobes (Fig. 40). Medial processes short, blunt in dorsal view (Fig. 40), not much separated from each other (Fig. 42). Gonostyli



Figs 31–37. *Leptomorphus longipes* sp. n., holotype, male genitalia: 31 = pregenital (8th) sternite, perpendicular view, 32 = pregenital (8th) tergite, perpendicular view, 33 = tergo-gonocoxal complex with apex of phallus, lateral view, 34 = caudal end of tergo-gonocoxal complex, dorsal view, 35 = medial processes of gonocoxite, caudal view, 36 = gonostylus, broadest (subdorsal) view, 37 = aedeagus and ejaculatory apodeme, dorsal view. Scale bar: 0.2 mm for Figs 31–33, 37, 0.1 mm for Figs 34–36



Figs 38–42. *Leptomorphus matilei* sp. n., holotype, male genitalia: 38 = pregenital (8th) sternite, perpendicular view; 39 = pregenital (8th) tergite, perpendicular view; 40 = caudal end of tergo-gonocoxal complex, dorsal view, 41 = gonostylus, broadest (subdorsal) view, 42 = medial part tergo-gonocoxal complex with gonostyli, caudal view. Scale bar: 0.2 mm for Figs 38–39, 0.1 mm for Figs 40–42

very long (Fig. 41), both their processes short and blunt. Aedeagus comparatively short, ejaculatory apodeme longer, with weakly sclerotised lateral (horizontal) lobes.

Etymology. This new species was named after the late LOÏC MATILE to acknowledge his achievements with the Afrotropical *Leptomorphus*.

Leptomorphus papua sp. n.
(Figs 43–49)

Holotype male (BMNH): Papua New Guinea: Madang Prov., rain forest near Biteta Village, iv. 1987, Malaise trap (C. J. H. Godfray). Antennae and most of its legs lost, only right mid and hind tibiae and femora, as well as left hind tibia and femur present; wings torn, apices lost. *Paratype* male (HNHM, genitalia prepared and kept in a plastic microvial with glycerol): same data. Antennae, wings and all legs lost, only left fore femur and right hind femur remained.

Measurements (holotype): wing length: 5.1 mm, head + thorax 1.75 mm, abdomen 3.8 mm.

Diagnostic characters. Prefrons ventrally with 2 (3) strong setae only. Metanotum partly yellow. Terminal section of Cu_1 less downcurved, M_3 about 1.2 times as long as terminal section of Cu_1.

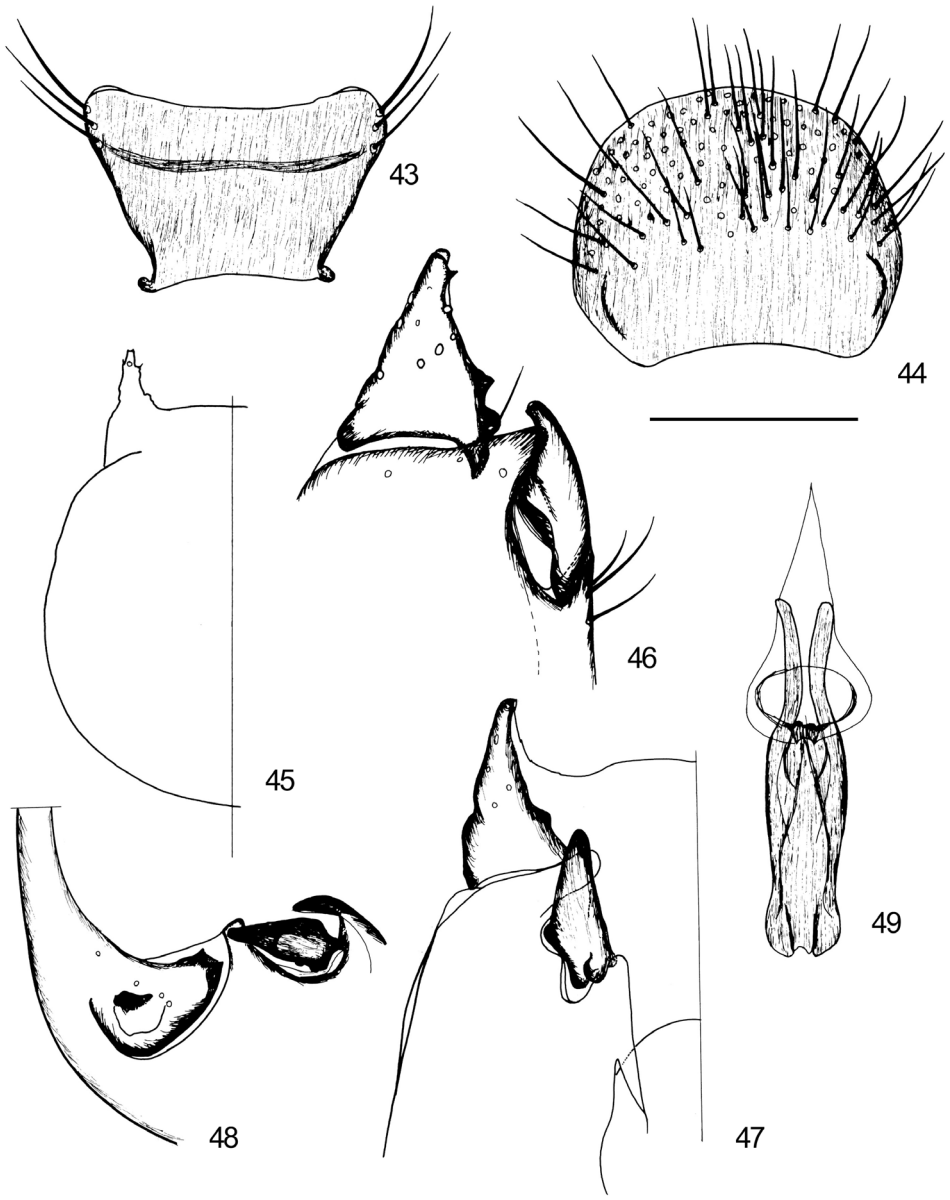
Male terminalia. Pregenital (8th) sternite (Fig. 43) strongly narrowing proximally, with 3 pairs of lateral setae only. Sternite 8 at about its basal 1/3 with a darker transverse thickening. Tergite 8 (Fig. 44) broader than long, cranial 2/5 bare, setae are not on extreme edge. Male genitalia with tergite 9 and gonocoxites fused into a tergo-gonocoxal complex, which is about as high as broad (see ratio on Fig. 45). Caudal process of the complex separated from the other parts but on a small section ventrally (Figs 45, 48). Caudal processes serrate, both apically and basally (Figs 46, 48). Medial process of gonocoxite simple, not double, dark processes observable. Gonostyli very small (Fig. 45), embraced deeply into the medial part of gonocoxites; gonostylus with one – rather blunt – apical process only. Gonostyli rather different in dorsal view and in the view of their broadest extension (Fig. 47, vs Fig. 46). Aedeagus (Fig. 49) long, apex blunt. Ejaculatory apodeme not sclerotised, membranous (Fig. 49). Base of aedeagus continued into a pair of blunt processes (? to replace ejaculatory apodeme).

Etymology. Named after Papua New Guinea. The specific name is used as a noun in the nominative singular, standing in apposition to generic name.

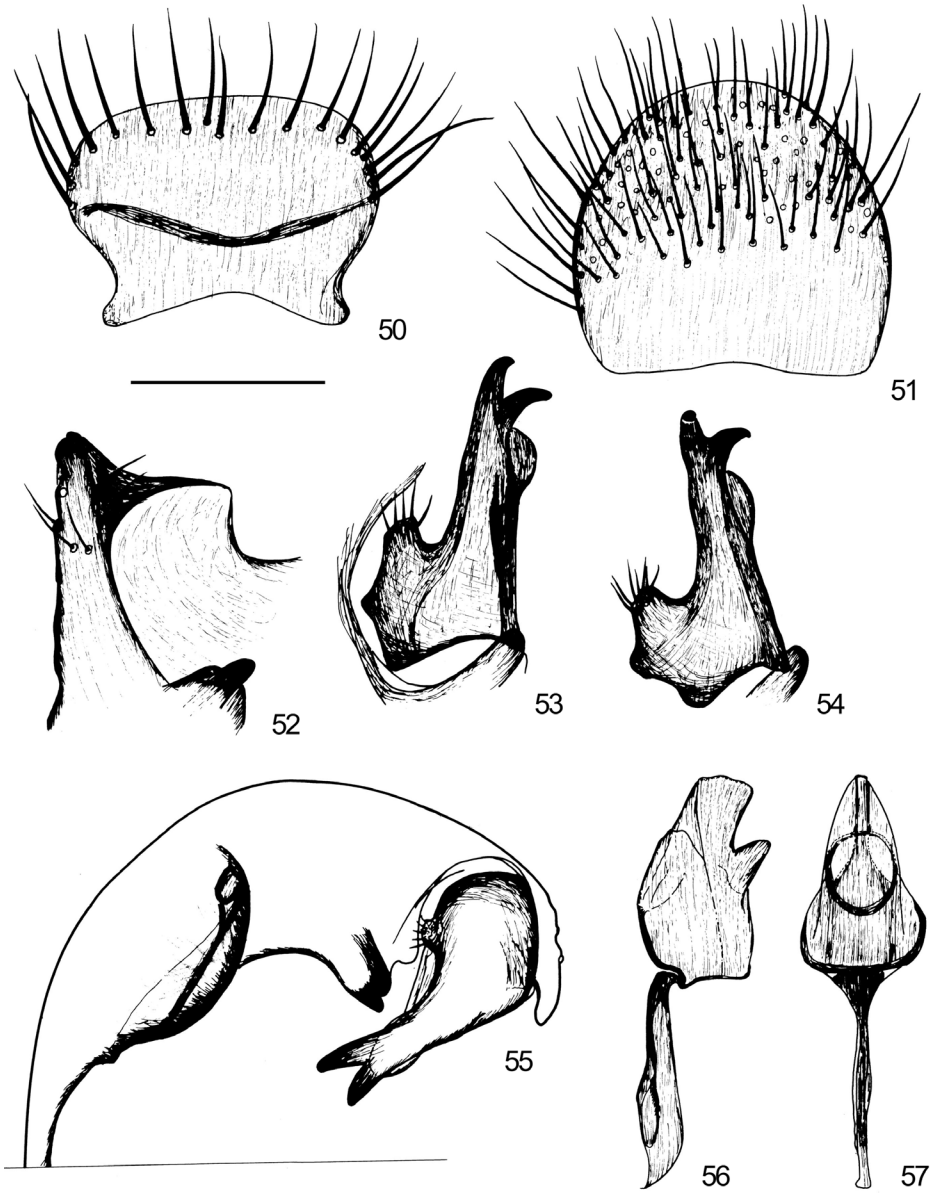
Leptomorphus utarensis sp. n.
(Figs 50–57, 60)

Holotype male (BMNH): Indonesia: Sulawesi: Utara, Dumoga–Bone N. P., "1440 camp", 30.6.–25.7.1985, Malaise trap. (left apical 4 flagellomeres lost, some tarsomeres, incl. all right hind tarsus, as well as all but fore left 5th tarsomeres with claws, lost).

Paratypes. 1 male (HNMH): data same as for the holotype (postabdomen from segment 7 with genitalia are prepared and kept in a plastic microvial with glycerol). 1 female (BMNH): ibid., Toraut, forest edge, 15.6.–20.6.1985, Malaise trap. 1 male (MNHN): NMW Indonesia Expedition 1985 (Project Wallace), NMW. Z. 1985. 078 – Sulawesi Utara: Dumoga Irrigation Project, Toraut, 10–19.viii.1985, A. H. Kirk-Spriggs. – Malaise trap, irrigated rice vars. Aceh & Citandui.



Figs 43–49. *Leptomorphus papua* sp. n., holotype, male genitalia: 43 = pregenital (8th) sternite, perpendicular view, 44 = pregenital (8th) tergite, perpendicular view, 45 = contours of tergo-gonocoxal complex, ventral view, 46 = caudal end of tergo-gonocoxal complex with gonostylus in view of the broadest extension of gonostylus (dorsal-sublateral view), 47 = tergo-gonocoxal complex with gonostyli, dorsal view, 48 = same, caudal view, 49 = aedeagus and ejaculatory apodeme, dorsal view. Scale bar: 0.2 mm for Figs 43–45, 49, 0.1 mm for Figs 46–48



Figs 50–57. *Leptomorphus utarensis* sp. n., paratype, male genitalia: 50 = pregenital (8th) sternite, perpendicular view, 51 = pregenital (8th) tergite, perpendicular view, 52 = caudal end of tergo-gonocoxal complex without gonostylus, dorsal view, 53 = gonostylus, broadest (subdorsal) view, 54 = gonostylus, dorsal view, 55 = tergo-gonocoxal complex with gonostylus, caudal view, 56 = aedeagus and ejaculatory apodeme, lateral view, 57 = same, dorsal view. Scale bar: 0.2 mm for Figs 50–51, 56–57, 0.1 mm for Figs 52–55

Fig. 58. *Leptomorphus ascutellatus* sp. n., male habitus

Fig. 59. *Leptomorphus ascutellatus* sp. n., detail of female scutellum

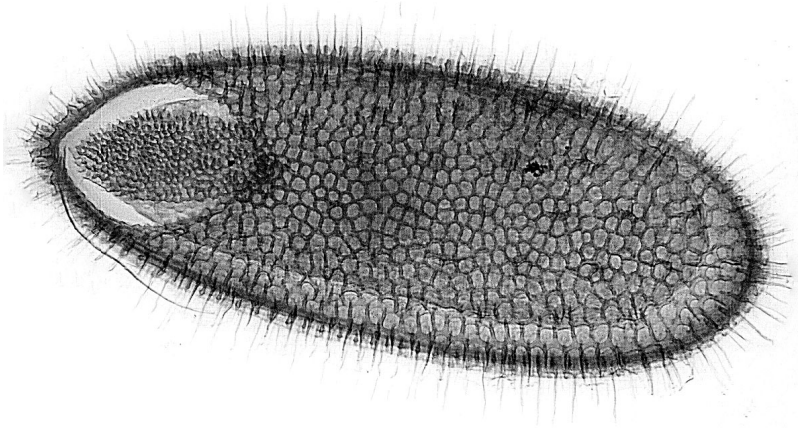


Fig. 60. *Leptomorphus utarensis* sp. n., egg

Measurements (holotype): wing length: 5.75 mm, head + thorax 1.75 mm, abdomen 5.1 mm.

Male terminalia. Setae on sternite 8 almost symmetrical (Fig. 50), setae long thick and arranged in one row; sternite 8 submedially with a darker transverse thickening. Tergite 8 about as long as broad, dark setae evenly emerge on its apical 2/3 (Fig. 51). Tergo-gonocoxal complex longer than broad, caudal lobes (Fig. 52) comparatively short, broadly bifid, i.e. the complex with deep medial emargination (Fig. 52). Medial processes partly overlapping in dorsal view, short and blunt, better seen in caudal view (Figs 52, 55). Gonostyli broad basally (Fig. 22), but apical 2/3 rather narrow. Gonostylus not much different in dorsal view and in its broadest extension (Fig. 54, vs Fig. 53). Caudal view (Fig. 55) reveals the large, widely rounded extension of the complex subventrally. Phallic organ medium large, aedeagus short but high (Figs 56–57); ejaculatory apodeme comparatively short, rather high (Fig. 56), but rather narrow in dorsal view, without lateral (horizontal) lobes (Fig. 57).

Egg (Fig. 60). This is a formerly unknown morphological type of egg (see PLACHTER 1981).

Etymology. The specific epithet of the new species refers to its type locality Sulawesi Utara (= North Sulawesi).

DISCUSSION

The identification characters for the Oriental and Australasian *Leptomorphus* spp. are mainly in the male and female terminalia, as given above.

MATILE (1976) summarised the characters of *Leptomorphus* subgenus *Gymnoscutum* as follows:

Scutum bare back to the scutellum, except for the dorsocentral setae. Wings hyaline, at most fumose. Pleurotergite with scarce setosity ("villosité").

We think we can characterise this group of species (all new), which we name as *L. ascutellatus* group, by a set of characters:

Body, at least partly, dark bluish metallic. Scutellum white and very small, weakly sclerotised. Female sternite 8 medially with several (8) long black spines.

As for *Leptomorphus* as a genus, MATILE listed the following characters in opposition to *Diomonus* WALKER, 1838 (some authors regard it as a subgenus of *Leptomorphus*): vein R_4 absent, frons setose at base of antennae, mid femur without strong preapical seta. We have to note that the species of *L. ascutellatus* group have no setae at base of antennae.

A KEY FOR THE *LEPTOMORPHUS ASCUTELLATUS* GROUP (aff. *Gymnoscutum* MATILE, 1976)

1 Prefrons ventrally with 6 strong (black) setae. Wing tip distinctly dark. Apical part of vein M_3 strongly S-shaped, bent wavily, M_3-Cu_1 fork in the level of apex of Rs. Terminal section of vein Cu_1 downcurved. Pleura mostly dark, but light just around anterior spiracle. Male genitalia (Figs 1–6) very distinct, since tergite 9 and gonocoxites are not fused. Indonesia: Seram Is. **L. alienus** sp. n.

– Prefrons ventrally with 2 (3) strong setae only. Wing tip clear. Apical part of vein M_3 almost straight, M_3-Cu_1 fork well proximal (basal) to the apex of Rs.Terminal section of Cu_1 less downcurved, M_3 about 1.2 times as long as terminal section of Cu_1. Male genitalia with tergite 9 and gonocoxites fused. 2

2 Metanotum partly yellow. Pregenital sternite with 3 pairs of (lateral) setae only (Fig. 43). In male genitalia (Figs 45–49) caudal process of the tergogonocoxal complex almost completely separated, gonostyli very small, with one apical process only. Papua New Guinea. **L. papua** sp. n.

– Metanotum entirely dark. Male genitalia different, gonostyli larger with 2 apical processes. 3

3 Abdominal tergites 3 to 5 dark, only a short light band anteriorly. Pleura around anterior spiracle dark. Scutellum very small and so thinly sclerotised that it may turn in to become concave. Male terminalia (Figs 7–17). Thailand. **L. ascutellatus** sp. n.

– At least anterior 1/3 of tergites 3 to 5 light. Sarawak (Malaysia), Brunei and islands of Indonesia. 4

4 Pleura around anterior spiracle dark. Legs relatively long (fore leg twice as long as wing). Male terminalia (Figs 31–37). Ejaculatory apodeme with lateral (horizontal) lobes (Fig. 37). Brunei. **L. longipes** sp. n.

– Pleura light around anterior spiracles. Terminalia different. 5

5 The rim and marginal cilia of anterior spiracle dark. Ejaculatory apodeme without lateral (horizontal) lobes (Figs 23, 57). 6

– The rim and marginal cilia of anterior spiracle whitish. Ejaculatory apodeme with lateral (horizontal) lobes (Fig. 30). 7

6 Male terminalia (Figs 18–23). Tergite 8 shorter than broad, setae on each lateral third light (Fig. 19). Inner medial process of gonocoxites very long in caudal view (Fig. 21), but gonostyli short (Fig. 22). Sarawak. **L. baramensis** sp. n.

– Male terminalia (Figs 50–57). Tergite 8 as long as broad, all setae dark (Fig. 51). Both medial processes of gonocoxites very short (Fig. 55), but gonostyli rather long (Figs 53–54). Sulawesi. **L. utarensis** sp. n.

7 Male terminalia (Figs 24–30). Setae on sternite 8 in more than one row (Fig. 24), tergite 8 much longer than broad (Fig. 25). Gonostylus robust, with longer apical processes (Figs 27–28). Sarawak. **L. gunungmuluensis** sp. n.

– Male terminalia (Figs 38–42). Setae on sternite 8 in one row (Fig. 38), tergite 8 about as long as broad (Fig. 25). Tergo-gonocoxal complex with very short caudal lobes (Fig. 40). Gonostylus rather long with short apical processes (Figs 41–44). Sulawesi. **L. matilei** sp. n.

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REFERENCES

BECHEV, D. (2000) World distribution of the genera of fungus gnats (Diptera: Sciaroidea, excluding Sciaridae). *Studia dipterologica* **7**: 543–552.

COLLESS, D. H. & LIEPA, Z. (1973) Superfamily Mycetophiloidea. Family Mycetophilidae (Fungivoridae). Pp. 444–463. *In:* DELFINADO, M. D. & HARDY, D. E. (eds): *A Catalogue of the Diptera of the Oriental Region*. Vol. 1, Honolulu, 618 pp.

HIPPA, H. & ŠEVČÍK, J. (2010) Notes on Oriental and Australasian Manotinae (Diptera, Mycetophilidae), with the description of thirteen new species. *Zootaxa* **2333**: 1–25.

MATILE, L. (1977) Notes sur le genre Leptomorphus et description de taxa nouveaux de la région éthiopienne. *Bulletin de l'Institut fondamental d'Afrique noire* **38** (1976): 141–155.

MATILE, L. (1996) Nouvelles données sur les Leptomorphus afrotropicaux [Diptera, Mycetophilidae]. *Revue française d'Entomologie (N. S.)* **18**(4): 143–150.

PLACHTER, H. (1981) Chorionic structures of the eggshells of 15 fungus-and root-gnat species (Diptera: Mycetophiliodea). *International Journal of Insect Morphology & Embryology* **10**(1): 43–63.

SØLI, G. E. E. (1997) The adult morphology of Mycetophilidae (s. str.), with a tentative phylogeny of the family (Diptera, Sciaroidea). *Entomologica scandinavica Supplement* **50**: 5–55.

SØLI, G. E. E., VOCKEROTH, J. R. & MATILE, L. (2000) A.4. Families of Sciaroidea. Pp. 49–92. *In:* PAPP, L. & DARVAS, B. (eds): *Contributions to a Manual of the Palaearctic Diptera*. *Appendix*, Science Herald, Budapest, 604 pp.

ŠEVČÍK, J. & HIPPA, H. (2010) New species of Chalastonepsia and Pectinepsia gen. nov. (Diptera: Mycetophilidae) from the Oriental and Australasian Regions. *Acta Entomologica Musei Nationalis Pragae* **50**: 595–608.

ZAITZEV, A. I. & ŠEVČÍK, J. (2003) A review of the Palaearctic species of the Leptomorphus quadrimaculatus (Matsumura) group (Diptera: Mycetophilidae). *Acta Zoologica Academiae Scientiarum Hungaricae* **48** (2002), 203–211.

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