

## Further new taxa of non-biting moth flies (Diptera: Psychodidae: Psychodinae) from Malaysia

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**Abstract.** An account of the tribes Mormiini and Paramormiini (Psychodidae: Psychodinae) from Malaysia is given, including the description of a new paramormiine genus *Perakomyia* gen. nov. and the second record of the genus *Saximormia* Ježek, 1984 in the Oriental Region. The subgenera *Nototelmatoscopus* Satchell, 1953 and *Oscoreopus* Ježek, 1989 (substitute name for *Oreoscopus* Quate & Quate, 1967) of the genus *Telmatoscopus* Eaton, 1904, unjustly synonymized with the genus *Peripsychoda* Enderlein, 1935 in the past, are recognized as valid. *Nototelmatoscopus* is raised to generic rank. It includes the subgenera *Nototelmatoscopus* s. str., *Oscoreopus* and *Jozifekia* subgen. nov. The following new combination for species originally included in *Telmatoscopus* are given: *Nototelmatoscopus* (*Nototelmatoscopus*) *obscurus* (Satchell, 1953) comb. nov., *N. (N.) appendiculatus* (Quate & Quate, 1967) comb. nov., *N. (N.) baitabagensis* (Quate & Quate, 1967) comb. nov., *N. (N.) centriceps* (Quate & Quate, 1967) comb. nov., *N. (N.) confragus* (Quate & Quate, 1967) comb. nov., *N. (N.) cracentus* (Quate & Quate, 1967) comb. nov., *N. (N.) crassepalpis* (Satchell, 1953) comb. nov., *N. (N.) dimorphus* (Tonnoir, 1953) comb. nov., *N. (N.) empheres* (Quate & Quate, 1967) comb. nov., *N. (N.) festivus* (Satchell, 1953) comb. nov., *N. (N.) gregsoni* (Tonnoir, 1953) comb. nov., *N. (N.) nicholsoni* (Satchell, 1953) comb. nov., *N. (N.) obtusalatus* (Quate & Quate, 1967) comb. nov., *N. (N.) reburrus* (Quate & Quate, 1967) comb. nov., *N. (N.) sisyphus* (Quate & Quate, 1967) comb. nov., *N. (N.) tridentatus* (Quate & Quate, 1967) comb. nov., *N. (N.) viduatus* (Tonnoir, 1953) comb. nov., *N. (Oscoreopus)* *wauensis* (Quate & Quate, 1967) comb. nov., *N. (O.) ambalatus* (Quate & Quate, 1967) comb. nov., *N. (O.) globalaris* (Quate & Quate, 1967) comb. nov., and *Perakomyia kalabakensis* (Quate, 1962) comb. nov. Three new species are described: *Saximormia jelineki* sp. nov., *Nototelmatoscopus* (*Jozifekia*) *sasakawai* sp. nov. and *Perakomyia sifneri* sp. nov. Important diagnostic characters and differential diagnoses are given and many characters illustrated for all mentioned taxa.

**Key words.** Diptera, Psychodidae, Psychodinae, Mormiini, Paramormiini, taxonomy, new genus, new subgenus, new status, new species, new combination, Oriental Region, Malaysia

## Introduction

Non-phlebotomine Psychodidae are represented in the Oriental Region by a large number of species, still mostly undescribed. Many of them are by their morphological characters in conflict with the current classification of moth flies. DUCKHOUSE (1973) catalogued 227 species of non-biting moth flies from the region and IPE et al. (1986) added further 33 species. Both catalogues are based mostly on the papers of BRUNETTI (1908, 1912), ENDERLEIN (1936), QUATE (1962a,b,c, 1965b, 1966), SATCHELL (1955, 1958) and TONNOIR (1933). During the last 23 years, 21 new species and three new genera were added to the Oriental fauna (CURLER 2009; CURLER & COURTNEY 2009; CURLER et al. 2006; HUANG & CHEN 1992, 2001; ILANGO 1994; IPE & KISHORE 1986; IPE & SINGH 1994; JEŽEK 1996, 2002, 2004a; KAUL 1984). In this paper, a new genus *Perakomyia* gen. nov. is described, including two species, *P. kalabakensis* (Quate, 1962) comb. nov. (Borneo) and *P. sifneri* sp. nov. *Nototelmatoscopus* Satchell, 1953 stat. nov. is raised to generic rank. *Oscoreopus* Ježek, 1989 (formerly a subgenus of *Telmatoscopus* Eaton, 1904) and *Jozifekia* subgen. nov. are described and classified as subgenera of *Nototelmatoscopus*. *Jozifekia* subgen. nov. includes a single species *Nototelmatoscopus* (*Jozifekia*) *sasakawai* sp. nov. Finally, an additional species of *Saximormia* Ježek, 1984, *Saximormia jelineki* sp. nov., is described. The number of described Oriental species of non-phlebotomine moth flies thus reaches 286.

## Material and methods

This paper builds on JEŽEK (2002) and is based on further specimens collected by the Belum expedition in Malaysia (DAVISON 1995) and found in the collections of the Slovene Museum of Natural History. It is complemented with several specimens from the Malaysian province of Sabah (northern Kalimantan) collected by Prof. Mitsuhiro Sasakawa (Osaka, Japan). The moth flies were preserved in 75% ethanol and mounted on slides in Canada balsam. The slides are deposited in the Department of Entomology of the National Museum, Prague (NMPC) and in the Slovene Natural History Museum, Ljubljana (NMLS). The slides are numbered with two separate series of numbers: Inv. No. = Inventory Slide Number of the family Psychodidae and Cat. No. = Catalogue Number of Slide. The latter series is used for type material included in the NMPC Diptera collection. The microphotographs were made with a digital camera mounted on a Nikon TS-100F trinocular eclipse microscope. Wing indices are based on distances between the following points: A = tip of  $R_5$ , B = radial fork, C = medial fork, D = tip of Cu; the distances are indicated by both extreme points. Maximum wing length is approximately equal to the distance from the line connecting the bases of basal costal node to neala and the tip of  $R_5$ . The ratio of the lengths of femur, tibia and tarsomere 1 of the fore, middle and hind leg is indicated by  $P_1$ ,  $P_2$  and  $P_3$ , respectively.

## Taxonomy

### *Saximormia* Ježek, 1984

*Hemimormia* Krek, 1971 sensu VAILLANT (1974: 142) (partim).

*Saximormia* Ježek, 1984: 160. Type species: *Telmatoscopus saxicolus* Tokunaga & Komyo, 1955, original designation.

*Saximormia*: JEŽEK (1990b: 142, 144); JEŽEK (1994: 64).

**Affinities and differential diagnosis.** The genus *Saximormia* is characterized by the following features: ascoids approximately rectangular, embracing necked parts of antennal flagellomeres (Fig. 10); forks placed in central area of wing (Fig. 13), medial fork a little basad of radial;  $R_5$  extending distally and reaching wing margin below rounded apex; basal apodeme of aedeagal complex very narrow (Figs. 6–7, 17–18); gonostyli long (Figs. 4, 15), tapering to apex, pointed. Moreover, the genus *Bryopharsos* Quate, 1996 with four described species from Costa Rica (type species *Bryopharsos palpiculum* Quate, 1996 by original designation) is also related to *Saximormia*, because it also has very large ascoids, connected eyes in frontal area and general structure of wing (Mormiini: wing basally with prolonged  $R_{2+3}$ , with connection of  $R_4$  – see JEŽEK & VAN HARTEN 2005). The genus *Bryopharsos* differs from *Saximormia* by leaf-shaped ascoids, radial and medial forks placed basad of wing centre and both on the same level,  $R_5$  ending in the acute wing apex, basal apodeme of aedeagal complex conspicuously enlarged from dorsal view and short, club-shaped gonostyli with a rather rounded (not pointed) apex.

**Species included.** *Saximormia saxicola* (Tokunaga & Komyo, 1955) from Japan; *S. nepalensis* (Vaillant, 1965) from Nepal; and *S. jelineki* sp. nov. from Malaysia.

**Comments on the nomenclature.** The two previously known species of the genus *Saximormia* Ježek, 1984 fell into the subgenus *Hemimormia* Krek, 1971 according to the interpretation by VAILLANT (1974). KREK (1971) described *Hemimormia* in a key without explicit establishment of the type species. However, in the same paper he included only one species, *Mormia* (*Hemimormia*) *albicornis* (Tonnoir, 1919), in this subgenus and *Hemimormia* is therefore available under ICZN (1999: Articles 13.3, 68.3). *Perimormia* Vaillant, 1974, with the type species *Pericoma albicornis* Tonnoir, 1919, is an objective junior synonym of *Hemimormia* Krek, 1971. The subsequent designation of *Hemimormia eatoni* (Tonnoir, 1940) as the type species of *Hemimormia* by VAILLANT (1974) is irrelevant (see also WAGNER 1990).

### *Saximormia jelineki* sp. nov.

(Figs. 1–18, 53)

**Type locality.** Malaysia, Perak, Hulu, Belum Camp (5°30'07"N, 101°26'21"E).

**Type material.** HOLOTYPE: ♂ (NMLS), MALAYSIA: PERAK: Hulu, Belum Expedition, Belum Camp, iv.–vi.1994, light trap (Rothamsted). Slide, Canada Balsam, dissected specimen. PARATYPES: 4 ♂♂ (NMPC: Cat No. 34494–34497, Inv. No. 17656–17659), the same locality and data, dissected. The figures are based mainly on the holotype.

**Description.** Male. Head prolonged (Fig. 1), vertex conspicuously enlarged, eyes touching for 3.3 diameters of one facet, eye bridge of four facet rows, however, in the touch of eyes only three facets on both sides (Fig. 53). Frontoclypeus with hexagonal patch of insertions

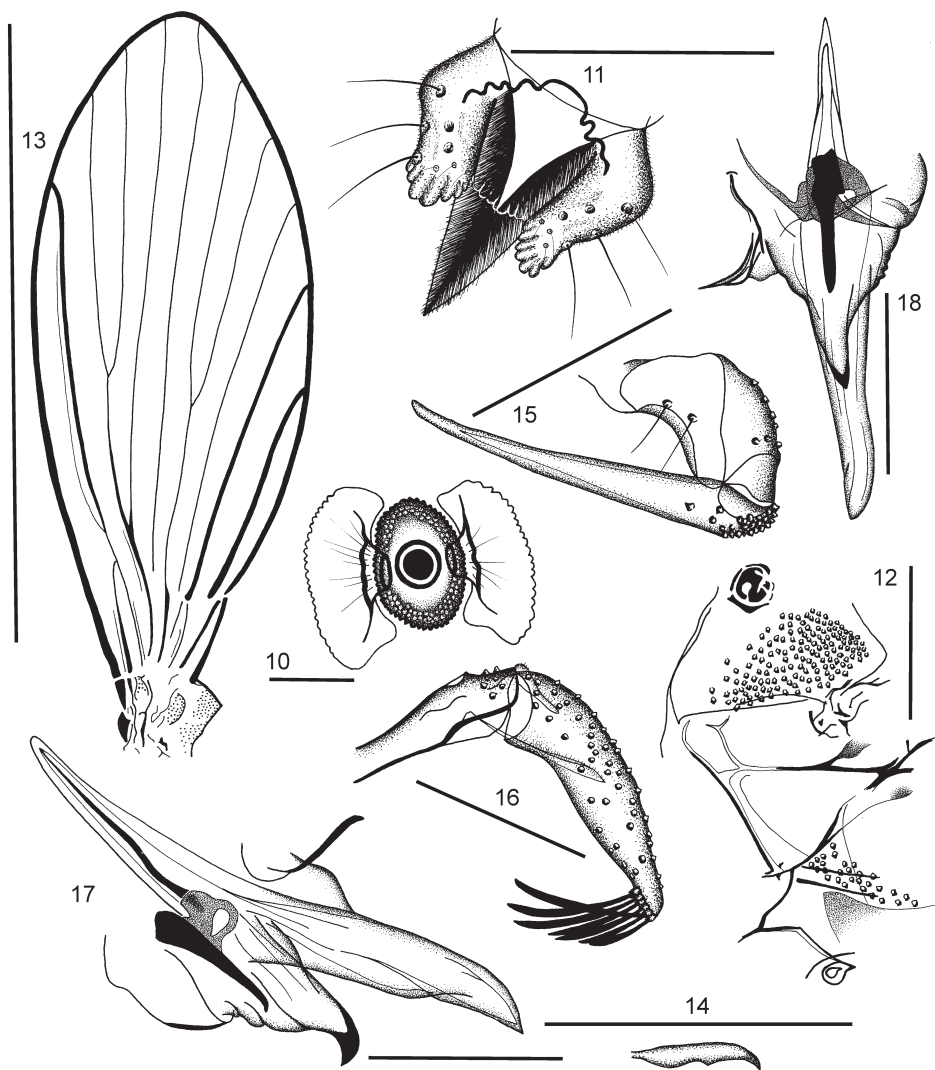
of hairs, upper area of patch with shallow cleft. Antennae probably with 16 antennomeres (terminal flagellomeres missing). Scape very short (Fig. 2), widened distad, 1.2 times as long as pedicel, the latter almost globular. Basal flagellomeres excentrically bulbous with rather short and broad necks. Ascoids of flagellomeres approximately rectangular, embracing their constricted parts (Fig. 10), paired. Upper side of sensory rectangle inconspicuously curled.



Figs. 1–9. *Saximormia jelineki* sp. nov. (♂). 1 – head; 2 – basal antennomeres; 3 – maxilla and maxillary palpus (palpomere 4 deformed); 4 – gonocoxite and gonostylus, dorsal view; 5 – aedeagal complex, dorso-lateral view; 6 – the same, dorso-ventral view; 7 – the same, diagonal view; 8 – epandrium, dorsal view; 9 – surstyli (retinaculi omitted), dorsal view. Scales = 0.05 mm (Figs. 2, 5–7) and 0.1 mm (Figs. 1, 3–4, 8–9).

Length ratios of maxillary palpomeres equal to 1 : 1.3 : 1.3 : 1.4. Palpomere 4 annulate, connected basally with subapical area of palpomere 3 (Fig. 3). Labium and labial lobes with many folds terminally (Fig. 11). Cibarium 2.3 times as long as epipharynx.

Thoracic sclerites as in Fig. 12. Wing (Fig. 13) widely lancet shaped, 0.9–1.2 mm long (1.2 mm in holotype), wing membrane bare, clear, radial and medial forks complete; the following



Figs. 10–18. *Saximormia jelineki* sp. nov. (♂). 10 – middle flagellomere, ascoids, axial view; 11 – terminal lobes of labium and epipharynx; 12 – thoracic sclerites, lateral view; 13 – wing; 14 – claw of  $P_1$ ; 15 – gonocoxite and gonostylus, lateral view; 16 – epandrium and surstylus, lateral view; 17 – aedeagal complex, lateral view; 18 – same, dorsal view. Scales = 0.05 mm (Figs. 10–11, 14, 17–18), 0.1 mm (Figs. 12, 15–16) and 1 mm (Fig. 13).

veins or their parts strengthened: Sc inconspicuously at base,  $R_1$  distally (but not at apex),  $R_{2+3+4}$ , basis of  $M_{1+2}$ , entire  $M_4$  and Cu. Basal costal nodes distinct. Sc uninterrupted. Bases of  $M_3$  and  $M_4$  at large distance to base of Cu.  $R_5$  extending distally to reach wing margin below the rounded apex of the wing. Veins r-r, r-m and m-m not developed. Medial wing angle  $152^\circ$  (BCD). Wing 2.5 times as long as wide. Length ratios of femur, tibia and first tarsomere:  $P_1 = 1.9 : 21.1 : 1$ ,  $P_3 = 2 : 2.8 : 1$  (ratio for  $P_3$  measured in a different specimen),  $P_2$  missing in examined specimens. Fore claws as in Fig. 14.

Basal apodeme of male genitalia rather short and thin, a little bent from lateral view, straight from dorsal one. Aedeagal complex (Figs. 5–7, 17–18) propped upon a sclerite of complicated shape at large distance to basal apodeme (lateral view). Male copulatory organ formed by two jointed phallomeres and one ventral declinated phallomere, with a similar overall morphology to the genitalia of the tribe Psychodini (incorrectly interpreted as asymmetrical copulatory organ by some authors). Gonocoxites (Figs. 4, 15) rather slender, expanded at base, gonostyli long, gradually tapering to apex, sharply pointed and a little bent terminally. Epandrium (Fig. 8) almost bare, several insertions of hairs caudally on both sides of a shallow epandrial notch. Basal paired apertures visible. Remainders of tergite 10 and sternite 10 inside epandrium conspicuous, largely V-shaped. Hypandrium narrow, bare. Hypoproct large, long, triangular, 2.3 times as long as epiproct (Fig. 9); epiproct small, short, almost hemicircular, tongue-shaped, both parts haired. Surstyli cylindrical (Figs. 9, 16), straight (dorsal view), a little bent from lateral view. Seven retinaculi present.

Female unknown.

**Differential diagnosis.** *Saximormia jelineki* sp. nov. is characterized by the following characters: curled upper side of the sensory rectangles (ascoids) (Fig. 10), short and thin basal apodeme of the male genitalia, aedeagal complex formed by two jointed phallomeres and one ventral declinated phallomere and propped upon a sclerite of complicated shape at large distance to basal apodeme (Figs. 5–7, 17–18), gonostyli straight, not corrugate (Figs. 4, 15), and surstyli with seven retinaculi (Fig. 9).

*Saximormia saxicola* (Tokunaga & Komyo, 1955) differs from the new species by having the upper side of sensory rectangles not curled. Unfortunately, the type material of *S. saxicola* is probably lost (M. Sasakawa, pers. comm.) and there is no illustration of the aedeagal complex in the original paper of TOKUNAGA & KOMYO (1955). The gonostyli of *S. saxicola* are little corrugated and the surstyli have six retinaculi.

**Etymology.** The species is dedicated to my dear colleague and friend Josef Jelinek (National Museum, Prague).

**Bionomy.** Unknown. The males were collected by a light trap in a primeval rainforest.

**Distribution.** Peninsular Malaysia: Perak state.

### *Nototelmatoscopus* Satchell, 1953 stat. nov.

*Nototelmatoscopus* Satchell, 1953: 398 (subgenus of *Telmatoscopus* Eaton, 1904). Type species: *Telmatoscopus obscurus* Satchell, 1953, original designation.

*Telmatoscopus* (*Nototelmatoscopus*): TONNOIR (1953: 419); QUATE & QUATE (1967: 51); JEŽEK (1989: 95).

**Note.** DUCKHOUSE (1966: 183), DUCKHOUSE (1973a: 233), VAILLANT (1972: 94), and DUCKHOUSE & LEWIS (1989: 172) considered *Nototelmatoscopus* as a junior synonym of a broadly conceived *Peripsychoda* Enderlein, 1935.



**Diagnosis.** Ascoids of flagellomeres needle-shaped, multiple; insertions of ascoids numerous, arranged in a ring (Fig. 28); flagellar nodes asymmetrical, excentric and bulbous (Figs. 21, 27); area of insertions of retinaculi relatively small (8–30), circular or hardly elliptical (Figs 25, 26).

**Differential diagnosis.** *Peripsychoda* differs from *Nototelmatoscopus* in having ascoids fan-shaped, paired, flagellar nodes symmetrical, not excentric and not bulbous, high number of retinaculi (35–44), area of insertions of retinaculi large, conspicuously prolonged (Table 1).

**Subgenera and species included.** The genus *Nototelmatoscopus* in the present sense includes three subgenera: *Nototelmatoscopus* s. str. (17 valid species from Australia, Tasmania, and New Guinea), *Oscoreopus* Ježek, 1989 (three species from Papua New Guinea) and *Jozifekia*

Table 1. Important morphological characters in the genera *Peripsychoda* Enderlein, 1935 and *Nototelmatoscopus* Satchell, 1953 (including subgenera).

character	<i>Peripsychoda</i>	<i>Nototelmatoscopus</i> Satchell stat. nov.		
		<i>Nototelmatoscopus</i> s. str.	<i>Oscoreopus</i>	<i>Jozifekia</i> subgen. nov.
<b>frons</b>	narrow	narrow	wide	wide
<b>neck of the first flagellomere</b>	long	short	long	long
<b>ascoids of flagellomeres</b>	fan-shaped	needle-shaped	needle-shaped	needle-shaped
<b>insertions of ascoids</b>	paired	multiple, arranged in a ring	multiple, arranged in a ring	multiple, arranged in a ring
<b>flagellar nodes</b>	symmetrical, not excentric and not bulbous	asymmetrical, excentric and bulbous	asymmetrical, excentric and bulbous	asymmetrical, excentric and bulbous
<b>subcostal and cubital area of wing</b>	enlarged, very broad	not enlarged, not unusually broad	enlarged, very broad	not enlarged, not unusually broad
<b>medial fork and the end of Cu</b>	near	near	far	far
<b>wing forks</b>	medial basally of radial, near base of wing	radial basally of medial, near centre of wing	forks on same level, near base of wing	radial basally of medial, near base of wing
<b>distal end of <math>R_5</math></b>	conspicuously below apex of wing	conspicuously below apex of wing	conspicuously below apex of wing	slightly below apex of wing
<b>distal end of <math>R_4</math></b>	slightly below apex of wing	in apex of wing	in apex of wing	conspicuously above apex of wing
<b>number of retinaculi</b>	high (35–44)	not high (8–30)	not high (15–25)	not high (11–13)
<b>area of insertions of retinaculi</b>	large, conspicuously prolonged	small, circular or hardly elliptical	small, circular or hardly elliptical	small, circular or hardly elliptical

subgen. nov. (one species from Kalimantan). The differential characters of all three taxa are summarized in Table 1; the list of species is given below.

**Comments on the status.** Many species of the Oriental Psychodinae were originally described in the genus *Telmatoscopus* Eaton, 1904, which currently forms a heterogeneous assemblage of more than 220 species distributed worldwide. Ongoing revisions of these species allow to transfer them to other described or newly established genera (see, e.g., CURLER 2009).

The taxonomical position of *Peripsychoda* was discussed and its intergeneric relationships and list of species given by JEŽEK (1983, 1987, 1990a, 2004b).

### subgenus *Nototelmatoscopus* s. str.

**Diagnosis.** Frons narrow, neck of flagellomere 1 short, subcostal and cubital area of wing not enlarged, not unusually broad, medial fork slightly before the end of Cu, radial fork basally of medial fork, near centre of wing,  $R_5$  ending distinctly below apex of wing,  $R_4$  ending in apex of wing, number of retinaculi not high (8–30).

**Species included.** The subgenus currently includes 17 species previously assigned to *Telmatoscopus* (subgenus *Nototelmatoscopus*):

- Nototelmatoscopus* (*Nototelmatoscopus*) *appendiculatus* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *baitabagensis* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *centraceps* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *confragus* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *cracentus* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *crassepalpis* (Satchell, 1953) comb. nov. (Australia)
- Nototelmatoscopus* (*Nototelmatoscopus*) *dimorphus* (Tonnoir, 1953) comb. nov. (Australia)
- Nototelmatoscopus* (*Nototelmatoscopus*) *empheres* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *festivus* (Satchell, 1953) comb. nov. (Australia)
- Nototelmatoscopus* (*Nototelmatoscopus*) *gregsoni* (Tonnoir, 1953) comb. nov. (Australia)
- Nototelmatoscopus* (*Nototelmatoscopus*) *nicholsoni* (Satchell, 1953) comb. nov. (Tasmania)
- Nototelmatoscopus* (*Nototelmatoscopus*) *obscurus* (Satchell, 1953) comb. nov. (Australia)
- Nototelmatoscopus* (*Nototelmatoscopus*) *obtusulatus* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *reburrus* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *sisyphus* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *tridentatus* (Quate & Quate, 1967) comb. nov. (New Guinea)
- Nototelmatoscopus* (*Nototelmatoscopus*) *viduatus* (Tonnoir, 1953) comb. nov. (Tasmania)

The following 10 species described originally in the subgenus *Nototelmatoscopus* are considered here as species *incertae sedis*, because the type series included only females (six species) or the original description of males did not include details (morphology of ascoids) required to resolve their placement in *Nototelmatoscopus* (four species):

- Telmatoscopus* *agrestis* Quate & Quate, 1967 (New Guinea) (female only)
- Telmatoscopus* *bulbulus* Quate & Quate, 1967 (New Guinea) (female only)
- Telmatoscopus* *castaneus* Quate & Quate, 1967 (New Guinea) (insufficient description)
- Telmatoscopus* *fragilis* Quate & Quate, 1967 (New Guinea) (female only)
- Telmatoscopus* *hirsutus* Quate & Quate, 1967 (New Guinea) (insufficient description)
- Telmatoscopus* *lippus* Quate & Quate, 1967 (New Guinea) (female only)
- Telmatoscopus* *lobellus* Quate & Quate, 1967 (New Guinea) (female only)
- Telmatoscopus* *longicerus* Quate & Quate, 1967 (New Guinea) (insufficient description)
- Telmatoscopus* *repandus* Quate & Quate, 1967 (New Guinea) (insufficient description)
- Telmatoscopus* *scarificatus* Quate & Quate, 1967 (New Guinea) (female only)



**subgenus *Oscoreopus* Ježek, 1989**

*Oreoscopus* Quate & Quate, 1967: 51, 98. Type species: *Telmatoscopus wauensis* Quate & Quate, 1967, original designation. Junior homonym of *Oreoscopus* North, 1905 (Aves, Passeriformes, Sylviidae).

*Oscoreopus* Ježek, 1989: 98. New substitute name for *Oreoscopus* Quate & Quate, 1967.

**Diagnosis.** Frons wide, neck of flagellomere 1 long, subcostal and cubital area of wing enlarged, very broad, medial fork placed far before end of Cu, forks on the same level, near base of wing,  $R_5$  ending distinctly below apex of wing,  $R_4$  ending in apex of wing, number of retinaculi not high (15–25).

**Species included.** The subgenus currently includes three species previously assigned to *Telmatoscopus* (subgenus *Oscoreopus*):

*Nototelmatoscopus (Oscoreopus) ambalatus* (Quate & Quate, 1967) comb. nov. (New Guinea)

*Nototelmatoscopus (Oscoreopus) globalaris* (Quate & Quate, 1967) comb. nov. (New Guinea)

*Nototelmatoscopus (Oscoreopus) wauensis* (Quate & Quate, 1967) comb. nov. (New Guinea)

Four species described originally in the subgenus *Oscoreopus* are considered here as species *incertae sedis*, because the type series included only females (one species) or the original description of males did not include details required for a correct placement (three species):

*Telmatoscopus adustus* Quate & Quate, 1967 (New Guinea) (insufficient description)

*Telmatoscopus kratkensis* Quate & Quate, 1967 (New Guinea) (insufficient description)

*Telmatoscopus spurius* Quate & Quate, 1967 (New Guinea) (female only)

*Telmatoscopus zygops* Quate & Quate, 1967 (New Guinea) (insufficient description)

**subgenus *Jozifekia* subgen. nov.**

**Type species.** *Nototelmatoscopus (Jozifekia) sasakawai* sp. nov., present designation.

**Diagnosis.** Frons wide (Fig. 19), neck of flagellomere 1 long (Fig. 21), subcostal and cubital area of wing not enlarged (Fig. 54), not unusually broad, medial fork far before the end of Cu, radial fork basally of medial, near base of wing,  $R_5$  ending slightly below apex of wing,  $R_4$  ending conspicuously above apex of wing, number of retinaculi not high (11–13) (Figs. 25, 26).

**Differential diagnosis.** The subgenus *Jozifekia* subgen. nov. differs from *Nototelmatoscopus* s. str. and *Oscoreopus* mainly by the position of wing veins, with  $R_4$  ending conspicuously above and  $R_5$  slightly below apex of wing (Fig. 54); see Table 1 for a detailed list of characters.

**Etymology.** The subgenus is named in honour of my colleague and friend Josef Jelínek. Jozífek is a diminutive of Josef, which we used during our expeditions to Iran. The gender is feminine.

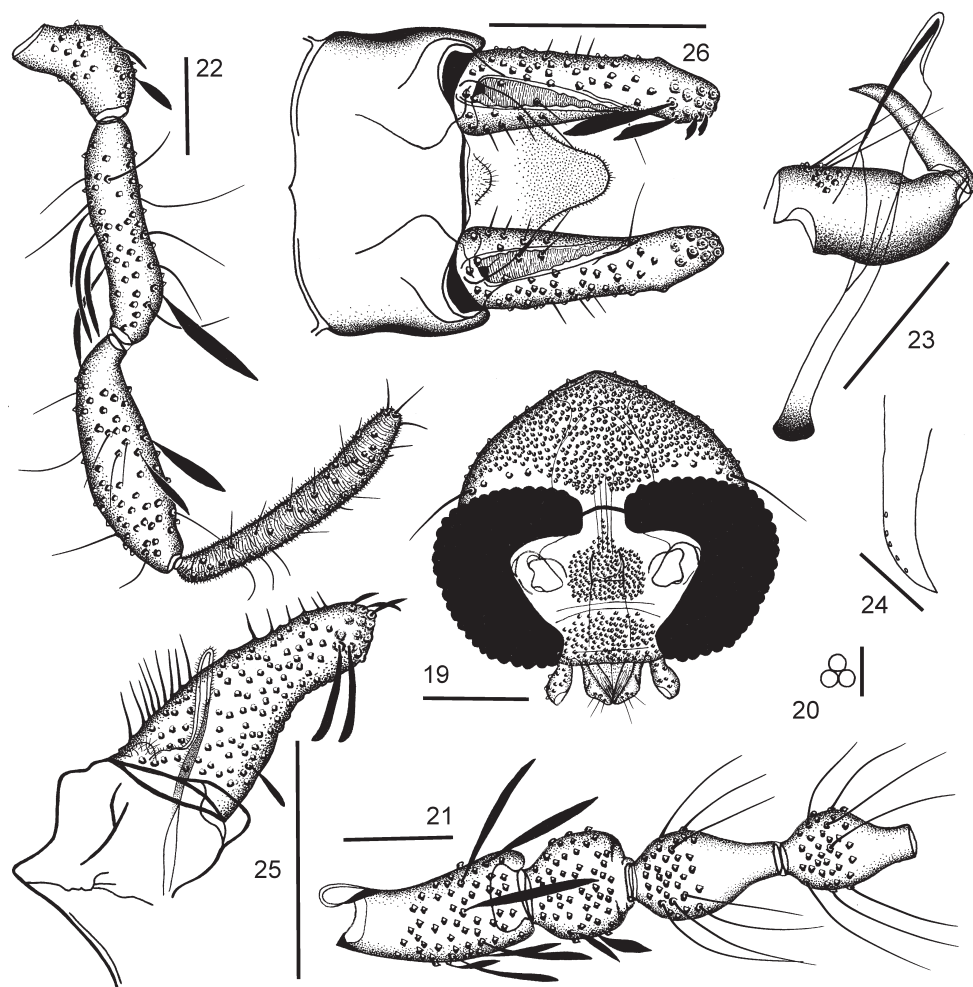
***Nototelmatoscopus (Jozifekia) sasakawai* sp. nov.**

(Figs. 19–36, 54)

**Type locality.** Malaysia, Sabah, Kepong.

**Type material.** HOLOTYPE: ♂ (NMPC: Cat. No. 34498, Inv. No. 17660), MALAYSIA: SABAH: Kepong, 5.–6.viii.1986, M. Sasakawa leg. Slide, Canada Balsam, dissected specimen. PARATYPE: ♂ (NMPC: Cat. No. 34499, Inv. No. 17661), the same locality and data, dissected. The figures are based mainly on the holotype.

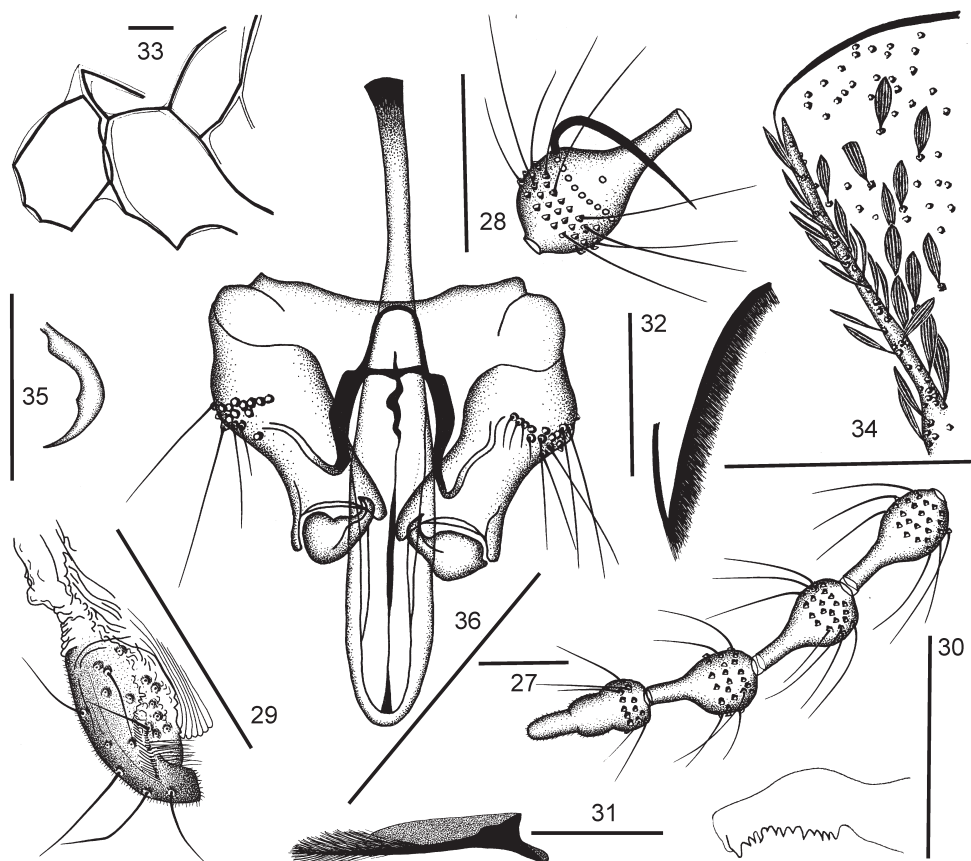
**Description.** Male. Head distinctly broader than high (Fig. 19), eyes separated, vertex largely triangular, on midline approximately three times as wide as frons. Eye bridge of four facet rows, minimum distance between apices of eyes equal to a little more than two diameters of facet (Fig. 20). Frontoclypeus with almost circular patch of insertions of hairs, upper area of patch pointed but not touching convex frontal suture. Antenna (Figs. 21, 27) with 16 antennomeres. Antennomere 16 twice strangulated and tapering, composed of two basal parts and one digitiform terminal part. Scape long, widened distally, 1.8 times as long as pedicel, the



Figs. 19–26. *Nototelmatoscopus (Jozifekia) sasakawai* sp. nov. (♂). 19 – head; 20 – facets; 21 – basal antennomeres; 22 – maxillary palpus; 23 – aedeagal complex, gonocoxite and gonostylus, lateral view; 24 – detail of apex of gonostylus; 25 – epandrium and surstylus, lateral view; 26 – epandrium and surstyli, dorsal view. Scales = 0.05 mm (Figs. 20–22, 24) and 0.1 mm (Figs. 19, 23, 25–26).

latter almost globular. Flagellomeres excentrically bulbous (not conspicuously) with rather long necks. Ascoids (Fig. 28) of flagellomeres needle shaped, multiple, arranged in a ring, long, bent. Mouthparts small, maxilla and epipharynx as in Figs. 31 and 32. Length ratios of maxillary palpomeres equal to 1 : 1.5 : 1.7 : 1.8. Palpomere 4 annulate (Fig. 22), connected basally with the apical area of palpomere 3. Labium and labial lobes with many minute folds (Figs. 29, 30). Cibarium 2.1 times as long as epipharynx.

Thoracic sclerites as in Fig. 33. Allurement organ conspicuously reduced; only widely spaced insertions of hairs present near spiracle. Haltere spatula-shaped, with many scales (Fig. 34). Wings 1.7 mm long (holotype and paratype), widely lancet shaped, apex rounded (Fig. 54), wing membrane bare, radial and medial forks complete; the following veins or their parts strengthened: Sc conspicuously at base (then gradually tapering to a forked broader



Figs. 27–36. *Nototelmatoscopus (Jozifikia) sasakawai* sp. nov. (♂). 27 – apical antennomeres; 28 – middle flagellomere; 29 – terminal lobe of labium; 30 – labium, lateral view; 31 – maxilla; 32 – epipharynx; 33 – thoracic sclerites, lateral view; 34 – left half of haltere; 35 – claw of P<sub>1</sub>; 36 – aedeagal complex and gonopods, dorsal view. Scales = 0.05 mm (Figs. 27–33, 35) and 0.1 mm (Figs. 34, 36).

small patch), almost whole  $R_1$  distally,  $R_{2+3}$ ,  $R_2$ ,  $R_3$ ,  $R_5$ ,  $M_1$ ,  $M_2$ ,  $M_4$  and Cu (last two conspicuously strengthened at base). R, M and Cu narrow before the junction with wing margin. Basal costal nodes distinct. Sc uninterrupted. Bases of  $M_3$  and  $M_4$  distant from basis of Cu.  $R_5$  extending distally to reach wing margin a little below rounded apex of wing. Veins r-r, r-m and m-m not developed. Medial wing angle  $163^\circ$  (BCD). Wing twice as long as wide. Wing indices  $AB : AC : AD = 5.8 : 5.5 : 4.8$ ;  $BC : CD : BD = 1 : 2.5 : 3.5$ . Length ratios of femur, tibia and first tarsomere equal to:  $P_1 = 2.3 : 2 : 1$ ;  $P_2 = 2.6 : 3.3 : 1.8$ ;  $P_3 = 2.6 : 3.7 : 1.6$ . Fore claws as in Fig. 35.

Basal apodeme of male genitalia long and thin, almost straight in dorsal view, inconspicuously S-shaped in lateral view. Aedeagal complex (Figs. 23, 36) conspicuously long and simple, narrowed caudally in lateral view. Gonocoxites long, expanded at base in dorsal view, provided with numerous very long hairs; gonostyli slender, little shorter than gonocoxites in lateral view, gradually tapering to apex and a little bent before end (Figs. 23, 24). Epandrium rectangular, bare, without apertures (Figs. 25, 26). Remainders of tergite 10 and sternite 10 inside epandrium not visible. Caudal coupling of epandrium and hypandrium developed but hypandrium formed as inconspicuous ligament. Hypoproct large, long, almost triangular, with rounded apex, haired (Figs. 25, 26). Epiproct very small, hemicircular, haired. Surstyli cylindrical, almost straight in dorsal view, a little bent in lateral view, expanded basally. Number of retinaculi 11–13.

Female unknown.

**Differential diagnosis.** Because many species of Paramormiina were inadequately described and I have not seen all type specimens (or the species are known only from females), a direct comparison of the males of *Nototelmatoscopus* (*Jozifekia*) *sasakawai* sp. nov. with them is not possible. The most important morphological characters that characterize the new species are as follows:  $R_4$  ending conspicuously above the apex of wing (Fig. 54);  $R_5$  reaching the wing margin slightly below the apex; haltere spatula-shaped (Fig. 34), with many scales; aedeagal complex with a characteristic shape (Fig. 36); epandrium bare (Fig. 26), with caudal coupling, hypandrium formed only by an inconspicuous ligament without sclerotization.

**Etymology.** The species is dedicated to Prof. Mitsuhiro Sasakawa (Osaka Prefecture, Japan), who collected the type material of this species.

**Bionomy.** Unknown.

**Distribution.** Malaysia: Kalimantan: Sabah state.

### *Perakomyia* gen. nov.

**Type species.** *Perakomyia sifneri* sp. nov., present designation.

**Diagnosis.** *Perakomyia* gen. nov. is characterized by the following characters: radial fork of wing behind medial fork and medial fork a little behind the end of Cu (Fig. 55); end of  $R_4$  in apex of wing;  $R_5$  extending distally and reaching wing margin below apex; costal vein depressed near the end of Sc; aedeagal complex (Figs. 51, 52) distally with paired lateral minute sclerotized protuberances with blunt tips; hypandrium enlarged in middle (Fig. 51); surstyli with conspicuously prolonged area of insertions of retinaculi (Figs. 44, 45).

**Differential diagnosis.** *Perakomyia* gen. nov. is similar to *Iranotelmatoscopus* Ježek, 1987. However, in *Iranotelmatoscopus* the radial fork of the wing is conspicuously behind the medial fork, the latter is at a large distance behind the end of Cu, the end of  $R_5$  is in the apex of wing,

$R_4$  ends before the apex, the costal vein is not depressed near the end of Sc, the aedeagal complex has paired long and pointed protuberances distally, the hypandrium is narrow in the middle and the surstyli have a circular area of insertions of the retinaculi.

**Etymology.** The name is a combination of *Perak* (silver in Malayan language), the second largest state in Peninsular Malaysia, and *myia*, the Greek word for a fly. The gender is feminine.

**Included species.** *Perakomyia sifneri* sp. nov. (Peninsular Malaysia) and *P. kalabakensis* (Quate, 1962) comb. nov. (northern Kalimantan).

***Perakomyia sifneri* sp. nov.**

(Figs. 37–52, 55)

**Type locality.** Malaysia, Perak, Hulu, Belum Camp (5°30'07"N, 101°26'21"E).

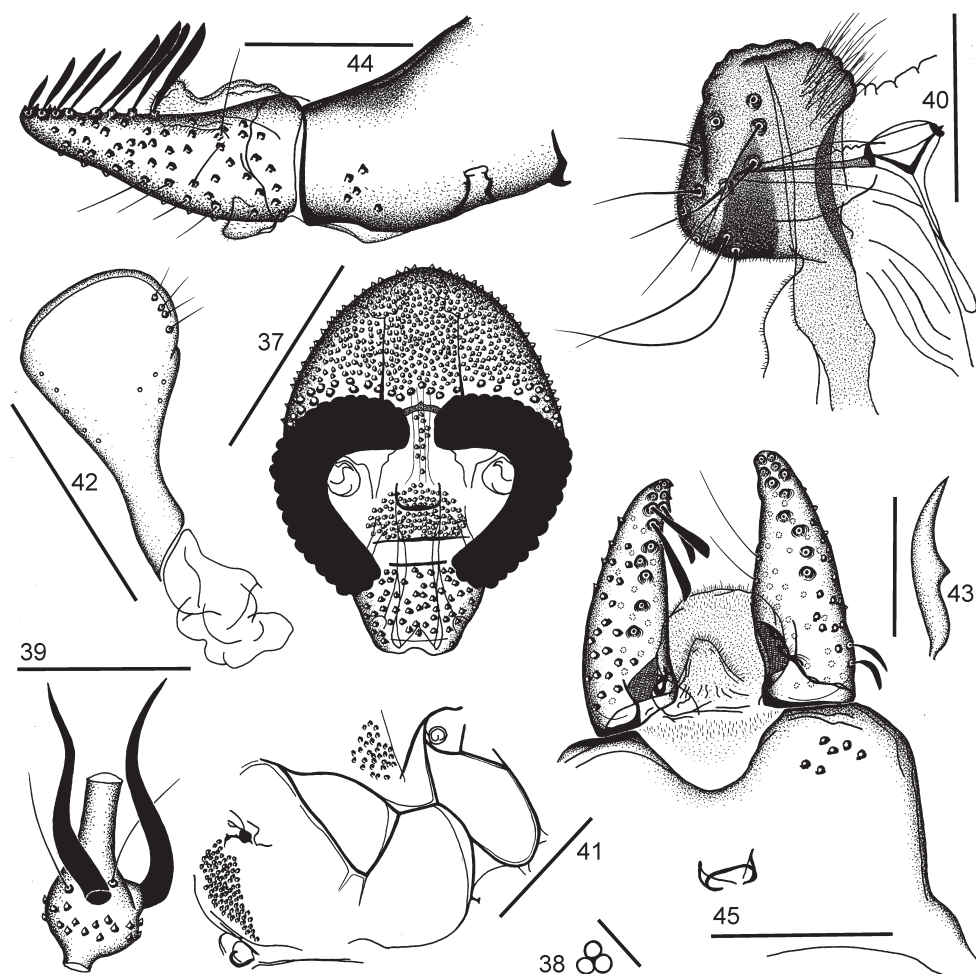
**Type material.** HOLOTYPE: ♂ (NMLS), **MALAYSIA: PERAK:** Hulu, Belum Expedition, Belum Camp, iv.–vi.1994, light trap (Rothamsted). Slide, Canada Balsam. PARATYPES: 4 ♂♂ (NMPC: Cat No. 34500–34503, Inv. No. 17662–17665), the same locality and data, dissected. The figures are based mainly on the holotype.

**Description.** Male. Head prolonged (Fig. 37), vertex conspicuously enlarged, almost hemispherical, hairy. Eyes separated by 1.6 diameters of one facet (Fig. 38), margins of median eye extensions parallel in ventral part, divergent dorsally, eye bridge consisting of four facet rows, near frontal suture only three facets in dorso-ventral line on both sides. Interocular suture moderately convex, with very small triangular patch dorsally. Sockets of side setae in two rows above dorsal margins of eyes. Frontoclypeus with oval patch of hair insertions, upper area of patch with narrow stripe of hairs touching frontal suture. Antennae (Figs. 39, 46, 47) with 16 antennomeres. Scape rather short, widened distally, 2.3 times as long as pedicel, the latter almost globular. Flagellomeres excentrically bulbous with rather long and broad necks, antennomere 16 with slender, digitiform part. Ascoids of flagellomeres needle-shaped, long, bent, paired. Length ratios of maxillary palpomeres equal to 1 : 1.7 : 1.5 : 1.3. Palpomere 4 annulate (Fig. 49), connected basally with apical area of palpomere 3. Labium and labial lobes as in Fig. 40. Labrum enlarged (Fig. 37), hairs widely spaced. Cibarium with simple margins, 2.4 times as long as epipharynx (Fig. 48).

Thoracic sclerites as in Fig. 41. Haltere almost bare (Fig. 42), only several setae developed. Wing narrowly lancet shaped (Fig. 55), 2.1–2.3 mm long (2.2 mm in the holotype), wing membrane bare, clear, radial and medial forks complete. Basal costal nodes distinct. Costal vein depressed near end of Sc, the latter hardly approximated to  $R_1$  before end, long linear streak running parallel to  $R_1$  developed. Bases of  $M_3$ ,  $M_4$  and Cu not connected. Radial fork of wing placed behind medial fork, the latter a little behind end of Cu. End of  $R_4$  in acute apex of wing,  $R_5$  extending distally and reaching wing margin below apex. Insertions of hairs in place of veins r-r, r-m and m-m not developed. The following veins or their parts strengthened: Sc proximally and distally, middle part of  $R_{2+3}$ , whole  $R_5$ ,  $M_4$  and Cu. Medial wing angle 162° (BCD). Wing 2.5 times as long as wide. Length ratios of femur, tibia and first tarsomere:  $P_1 = 2.4 : 2.3 : 1$ ,  $P_2$  and  $P_3$  completely missing. Fore claws as in Figure 43.

Basal apodeme of male genitalia spatula-shaped and straight in dorsal view, narrowed and rounded proximally, very narrow and slightly S-shaped in lateral view. Aedeagal complex (Figs. 51, 52) in comparison with gonocoxites longer, caudal part of aedeagal complex narrowed in dorsal view and widened and rounded in lateral view, paired lateral minute

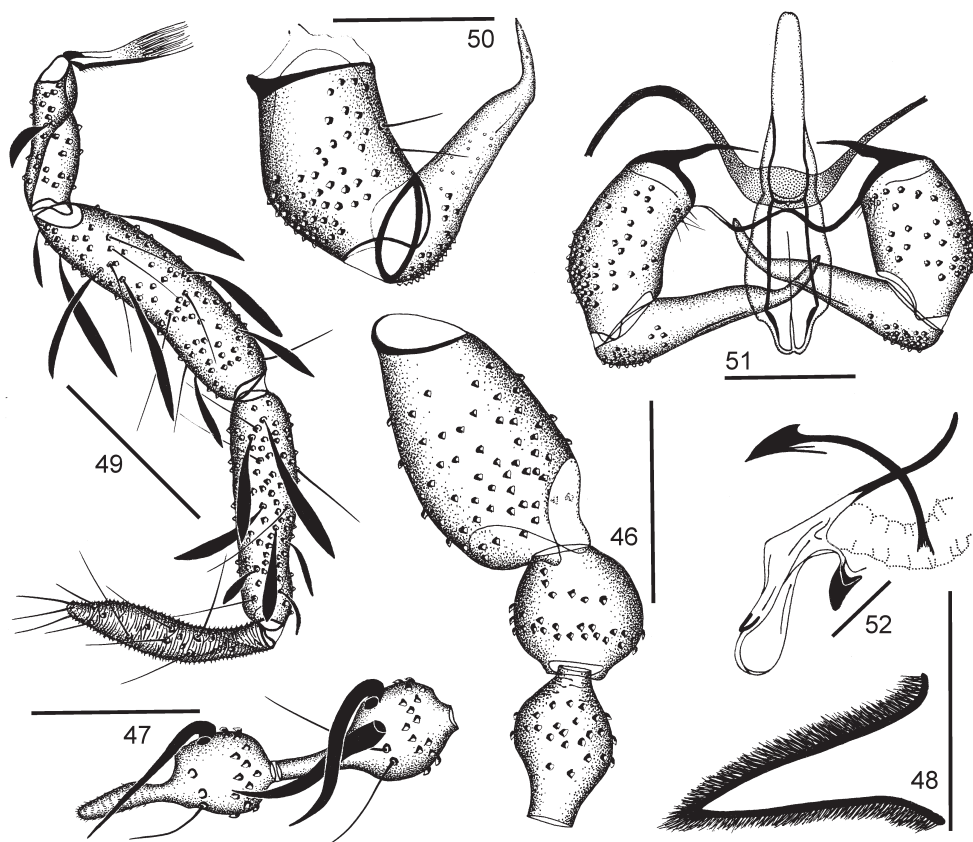




Figs. 37–45. *Perakomyia sifneri* sp. nov. (♂). 37 – head; 38 – facets; 39 – middle flagellomere; 40 – terminal lobe of labium; 41 – thoracic sclerites, lateral view; 42 – haltere; 43 – claw of P; 44 – epandrium and surstylus, lateral view; 45 – epandrium and surstyli, dorsal view. Scales = 0.05 mm (Figs. 38–40, 43), 0.1 mm (Fig. 44) and 0.2 mm (Figs. 37, 41–42, 45).

protuberances of aedeagal complex developed. Gonocoxites cylindrical (Figs. 50, 51), a little bent, gonostyli longer, gradually tapering but before apex narrowed, abruptly curved and apically pointed. Epandrium almost bare (Figs. 44, 45), several insertions of hairs caudally on both sides of a deep epandrial notch. Central aperture developed. Remainders of tergite 10 and sternite 10 inside epandrium not visible. Hypandrium largely expanded in middle, bare (Figs. 51, 52). Hypoproct large, almost circular, twice as long as epiproct (Figs. 44, 45), the latter small, short, almost triangular, tongue-shaped, both parts hairy. Surstyli before tip rapidly narrowed and a little bent; number of retinaculi 11–12, area of insertions of retinaculi large, conspicuously prolonged.

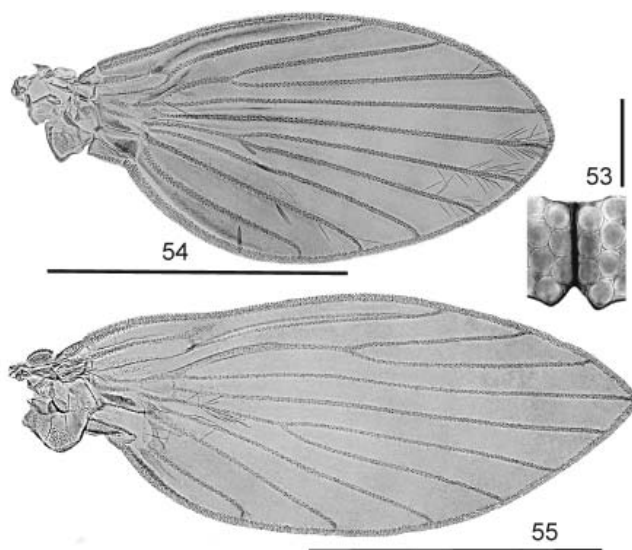




Figs. 46–52. *Perakomyia sifneri* sp. nov. (♂). 46 – basal antennomeres; 47 – apical antennomeres; 48 – epipharynx; 49 – maxilla and maxillary palpus; 50 – gonocoxite and gonostylus, lateral view; 51 – aedeagal complex and gonopods, dorsal view; 52 – aedeagal complex, lateral view. Scales = 0.05 mm (Figs. 46–47, 52) and 0.1 mm (Figs. 48–51).

Female unknown.

**Differential diagnosis.** *Perakomyia sifneri* sp. nov. is characterized by two rows of insertions of sensory setae above the upper margins of eyes (Fig. 37), scape 2.3 times as long as pedicel (Fig. 46), simple margins of cibarium (Fig. 37), longer aedeagal complex in comparison with the gonocoxites, narrowed caudal part of the aedeagal complex in dorsal view, developed paired lateral minute protuberances of the aedeagal complex (Figs. 51, 52), rapidly narrowed and a little bent surstyli before the apex (Figs. 44, 45) and the presence of 11–12 retinaculi. *Perakomyia kalabakensis* (Quate, 1962) comb. nov. differs from the new species by only one row of insertions of sensory setae above the eyes, scape 3.7 times as long as pedicel, conspicuously strengthened margins of cibarium, aedeagal complex as long as or shorter than the gonocoxites, caudal part of the aedeagal complex not narrowed, absent paired lateral minute protuberances of the aedeagal complex, gradually tapering, almost straight surstyli and only eight retinaculi.



Figs. 53–55. 53 – *Saximormia jelineki* sp. nov. (♂), eye bridge; 54 – *Nototelmatoscopus* (*Jozifekia*) *sasakawai* sp. nov. (♂), wing (phase contrast observation); 55 – *Perakomyia sifneri* sp. nov. (♂) – wing (phase contrast observation). Scales = 0.05 mm (Fig. 53) and 1 mm (Figs. 54–55).

**Etymology.** The species is dedicated to my friend František Šifner (Praha, Czech Republic), a specialist in Diptera, Scathophagidae.

**Bionomy.** Unknown. The males were collected at light in a primeval rainforest.

**Distribution.** Peninsular Malaysia: Perak state.

***Perakomyia kalabakensis* (Quate, 1962) comb. nov.**

*Telmatoscopus kalabakensis* Quate, 1962: 13. Type locality. Malaysia, north Kalimantan, 50 km W of Tawan, Kalabakan.

**Comments.** *Telmatoscopus kalabakensis* shares all diagnostic characters of *Perakomyia* gen. nov. and is transferred to this genus here.

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