

Terocelion gen. nov., a new Oriental genus of Keroplatidae (Diptera) with pectinate antennae

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Abstract. A new genus, *Terocelion* gen. nov., is proposed for two new Oriental species of Keroplatidae (Diptera), *T. melanoleucum* sp. nov. (Thailand) and *T. terezae* sp. nov. (Brunei). The new genus is characterized mainly by the following characters: long and pectinate antennae, mediotergite distinctly protruding with a well developed subscutellar membranous area, wings distinctly marked and relatively narrow, vein CuA₂ downcurved towards the tip, tibial trichia in regular rows, gonostylus without teeth, dorsoventrally flattened and apically rounded. A brief discussion on possible relationships to other genera of the tribe Keroplatini is also included.

Key words. Sciaroidea, fungus gnats, taxonomy, new genus, new species, Oriental Region

Introduction

Pectinate antennae are a distinct apomorphic feature of several genera of fungus gnats (Diptera: Sciaroidea) and they are particularly well developed and frequent in the Oriental Region. They are found in several Oriental species of *Symmerus* Walker, 1848 and in the Neotropical *Rhipidita* Edwards, 1940 (Ditomyiidae, cf. MUNROE 1974, VOCKEROTH 2009), in *Ctenoceridion* Matile, 1972, *Platyroptilon* Westwood, 1850 and other genera of the Keroplatidae (cf. MATILE 1990) and in *Chalastonepsia* Søli, 1996, *Dziedzickia* Johannsen, 1909 s. lat., *Metanepsia* Edwards, 1927 and *Pectinepsia* Ševčík & Hippa, 2010 from the family Mycetophilidae (cf. KALLWEIT 1998, ŠEVČÍK & HIPPA 2010, ŠEVČÍK et al. 2011).

Studying extensive samples of fungus gnats collected within the ‘Thailand Inventory Group for Entomological Research (TIGER)’ project in Thailand and unsorted alcohol samples in the Natural History Museum (London), I found two interesting new species of Keroplatidae with pectinate antennae, which could not be satisfactorily assigned to any known genus. These new species are described in this paper and a new genus is proposed for them.

Material and methods

The morphological terminology follows that used by SØLI et al. (2000). The material is preserved in 70% ethanol and deposited in the following collections:

- BMNH Natural History Museum, London, United Kingdom;
JSOC Jan Ševčík private collection, Ostrava, Czech Republic;
QSBG Queen Sirikit Botanic Garden, Chiang Mai, Thailand.

Taxonomy

Terocelion gen. nov.

Type species. *Terocelion terezae* sp. nov., here designated.

Diagnosis. Head relatively narrow in lateral view (the ratio of height to width is 5 : 3). Antenna long (at least 1.5 times as long as the head and thorax together), pectinate, with 14 flagellomeres. Compound eyes distinctly emarginated above the bases of antennae. Three ocelli, the median one much smaller, the lateral one almost touching the eye margin. Face narrow (three times as high as broad) and bare. Mouthparts reduced, palpus with one visible segment.

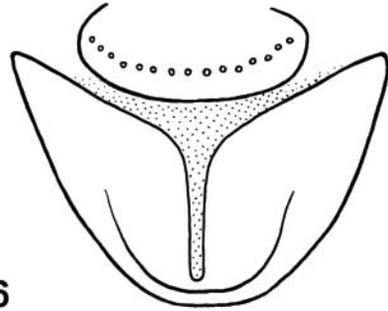
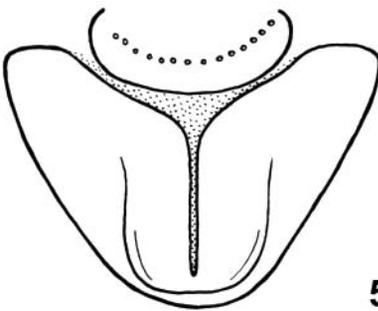
Scutum weakly arched. Mediotergite distinctly protruding. Subscutellar membranous area well developed, in the shape of a narrow sagittal triangle, tapering posteriorly and reaching the posterior edge of mediotergite. Both mediotergite and laterotergite bare. Wing distinctly marked and relatively narrow (ratio of length to width 2.8). Sc short, reaching only to the base of R-M fusion. Vein C produced beyond R_5 to about half the distance between the tips of R_5 and M_1 . R_4 ending on C. CuA_2 distinctly downcurved towards the tip. A_1 strong, ending just before the wing margin. Tibial trichia in regular rows throughout the entire length of all tibiae, only hind tibia ventrally with a longitudinal area of dense trichia not arranged in rows. Tergite 9 subtriangular, about as broad as long. Gonostylus simple, without teeth, dorsoventrally flattened and apically rounded.

Differential diagnosis. The new genus is probably related to the Holarctic *Rocetelion* Matile, 1988 and the Afrotropical *Paracerotelion* Matile, 1974, especially if we consider the structure of the male terminalia. The dorsoventrally flattened gonostylus without teeth is a distinct synapomorphy of these genera, which form a monophyletic branch in the phylogenetic tree by MATILE (1990: 532). *Terocelion* gen. nov. differs from these genera mainly in the following characters: male antennae long, 1.5 times as long as the head and thorax together, and pectinate (as long as the head and thorax together, flagellomeres only flattened in both *Rocetelion* and *Paracerotelion*), subscutellar membranous area well developed (absent or small), wing distinctly marked on most of surface (darkened mainly in the distal third), vein C produced beyond R_5 to about half the distance between the tips of R_5 and M_1 (only to about a quarter), A_1 not reaching wing margin (reaching), vein Cu_2 distinctly bent downwards (almost straight), tibial trichia in regular rows throughout the entire length of all tibiae (only on apical half).

Terocelion gen. nov. also resembles the Oriental and Australasian genus *Euceroptatus* Edwards, 1929, from which it can be distinguished by the long and pectinate antennae, strongly protruding mediotergite with a distinct triangular membranous area and mainly by the dorsoventrally flattened and rounded gonostylus. The genera with pectinate antennae, like



Figs. 1–2. Habitus. 1 – *Terozelion melanoleucum* gen. & sp. nov.; 2 – *T. terezae* gen. & sp. nov.



Figs. 3–6. Diagnostic characters of *Terocelion* species. 3–4. wing (3 – *Terocelion melanoleucum* gen. & sp. nov.; 4 – *T. terezae* gen. & sp. nov.). 5–6 – mediotergite with subcutellar membranous area in posterior view (5 – *Terocelion melanoleucum* gen. & sp. nov.; 6 – *T. terezae* gen. & sp. nov.).

Ctenoceridion and *Platyroptilon*, differ in the broader head in lateral view, shorter antennae, relatively broad and short wings, longer Sc (reaching above or behind the distal end of R-M fusion) and in gonostylus either bifid or with apical tooth.

Etymology. The name is an anagram of *Cerotelion* and *Rocetelion*. Gender is neuter.

***Terozelion melanoleucum* sp. nov.**

(Figs. 1, 3, 5, 7)

Type material. HOLOTYPE: ♂, **THAILAND: PETCHABURI:** 'Kaeng Krachan NP, Panernthung/km27/water pump, 12°49.151'N 99°22.483'E, 950 m, 4.-11.vii.2008, Malaise trap, Chusak & Sirichai & Arkom leg., T4337' (QSBG). PARATYPE: ♂, **THAILAND: PETCHABURI:** 'Kaeng Krachan NP, Panernthung/km27/water pump, 12°49.151'N 99°22.483'E, 970 m, 12.-19.ix.2008, Malaise trap, Sirichai & Chusak leg., T4371' (JSOC).

Description. Male. Body length (without antennae) 6.5 mm. Wing length 4.2 mm (holotype). Ratio of wing length to width 2.86.

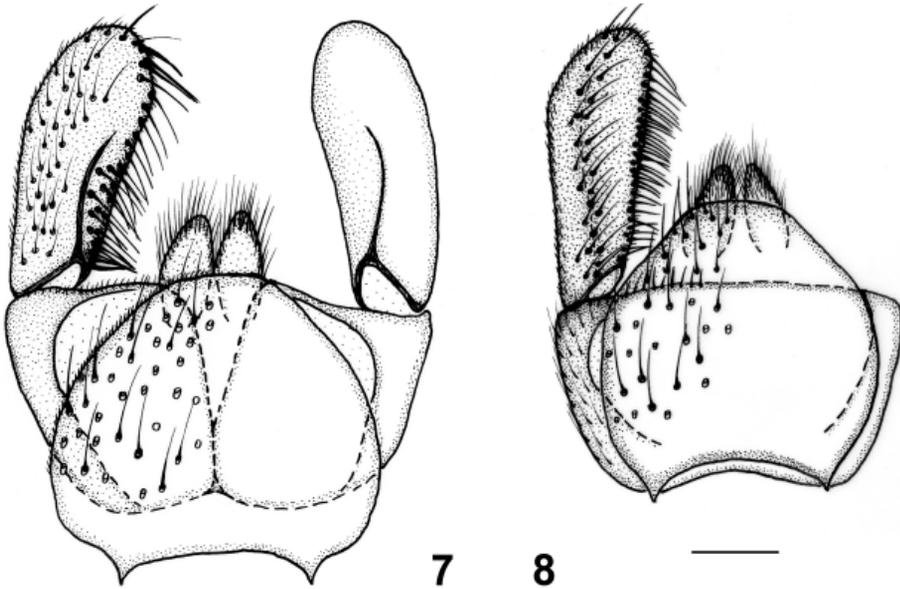
Head. Compound eyes relatively narrow, 1.6 times as high as broad in lateral view, distinctly emarginated above the bases of antennae. Three ocelli, the median one smaller, the lateral one almost touching the eye margin (distance between the eye margin and lateral ocellus is about half the diameter of the latter). Ocelli placed on a dark tubercle, medially divided by a distinct frontal furrow. Face narrow (three times as high as broad), light brown, bare, weakly sclerotised and in its upper half medially divided by a dark sagittal furrow. Clypeus small and indistinct. Mouthparts reduced. Maxillary palpus consists of a small palpifer and a larger oval yellowish palpomere.

Antenna long, about 1.7 times as long as the head and thorax together, pectinate, with 14 flagellomeres (Fig. 1). Flagellum laterally flattened, flagellomeres 2 to 13 anteriorly slightly prolonged and narrowing. F1 to F11 plus F14 dark brown, F12 and F13 white. Scape and pedicel dark brown, slightly shorter than wide.

Thorax. Scutum weakly arched, evenly covered with short setae, yellowish brown with lateral margins and two submedian longitudinal stripes (V-shaped, connecting posteriorly) dark. Scutellum dark brown, with subapical transverse row of short black setae. Mediotergite brown, proximally lighter, bare, posteriorly distinctly protruding. Subscutellar membranous area subtriangular, proximally wide but tapering posteriorly into a narrow sagittal groove (Fig. 5). Lateral sclerites dark brown. Laterotergite bare. Antepronotum and proepisternum setose. Anterior spiracle and membranous area around it without setae. Anepisternum and the other lateral sclerites bare. Prosternum without setae. Haltere dark brown, basally lighter, slightly longer than the first abdominal tergite.

Wing (Fig. 3) hyaline, distinctly marked (Figs. 1, 3), its membrane covered only with microtrichia, without macrotrichia. Sc short, reaching to the base of R-M fusion. Vein C produced beyond R_5 to about half the distance between the tips of R_5 and M_1 . R_4 ending in C. M_2 shortened, not reaching wing margin. CuA_2 downcurved towards the tip. A_1 strong, ending just before the wing margin. Costa, R_1 and R_5 covered with setae.

Legs mostly dark brown, tibiae and tarsi lighter. Coxae and femora all dark brown. Tibiae light brown, darkened at proximal and apical ends. All tibiae with trichia arranged in dense longitudinal rows, without strong bristles. The apex of fore tibia without any tibial organ. Fore tibia with one apical spur, slightly longer than maximum tibial diameter. Two spurs present



Figs. 7–8. Male terminalia in dorsal view. 7 – *Terocelion melanoleucum* gen. & sp. nov.; 8 – *T. terezae* gen. & sp. nov.

on both mid and hind tibia, the posteroventral spurs twice as long as the anteroventral ones. Hind tibia ventrally (except proximal and distal ends) with a longitudinal area of dense trichia not arranged in rows. A distinct transverse comb of closely set posterior setulae apically on mid and hind tibia.

Abdomen relatively long, mostly dark brown, tergites 2–5 with light dorsal triangular markings (Fig. 1). Sternites 2–5 yellowish with dark apical margins. *Terminalia* (Fig. 7) dark brown. Tergite 9 subtriangular, about as broad as long. Gonocoxites ventrobasally fused, posteriorly forming a V-shaped excavation reaching to about the proximal third of the gonocoxites. Gonostylus 1.2 times as long as gonocoxite, 2.6 times as long as wide, dorsoventrally flattened, apically rounded, without teeth, in basal half with a longitudinal submedial furrow.

Female. Unknown.

Differential diagnosis. The dark male antenna with white flagellomeres 12 and 13 is a diagnostic feature of this species. Similar pattern of coloration is found within the Keroplatidae only in several species of *Heteropterna* Skuse, 1888, which differ in many other characters, mainly in the shape of eyes, shorter wings and irregularly arranged tibial trichia.

Etymology. The specific epithet is an adjective derived from the Greek *μέλαινω*, meaning “blackened” and *λευκός*, meaning “white” and refers to the almost black and white coloration of the new species.

Distribution. Thailand (Petchaburi).

***Terocelion terezae* sp. nov.**

(Figs. 2, 4, 6, 8)

Type material. HOLOTYPE: ♂, **BRUNEI:** Seria, swamp forest, 14.ii.–5.iii.1982, M. C. Day leg., Malaise trap (BMNH).

Description. Male. Body length (without antennae) 5.9 mm. Wing length 3.5 mm (holotype). Ratio of wing length to width 2.8.

Head. Compound eyes narrow, 2.2 times as high as broad in lateral view, deeply emarginated above antennae. Antenna long, about 1.6 times as long as the head and thorax together, strongly pectinate, mostly brown, with 14 flagellomeres (Fig. 2). Flagellomeres 1 to 13 with a long anterior process, the longest about as long as the height of head.

For the other characters see the previous species.

Thorax. Mostly yellowish brown, the chaetotaxy and coloration similar to the previous species. Mediotergite yellowish, posteriorly protruding, with a distinct triangular subscutellar membranous area sagittally.

Wing (Fig. 4) hyaline, distinctly marked (Figs. 2, 4). Wing venation as in the previous species, except R-M fusion shorter than the stem of M-fork and CuA_2 even more downcurved towards the tip which does not reach the wing margin.

Legs. Coxae dark brown. Femora yellow, basally and apically darkened. Tibiae light brown, darkened at apical ends. All tibiae with trichia arranged in dense longitudinal rows. Hind tibia ventrally (except proximal and distal ends) slightly swollen and densely covered with trichia not arranged in rows. Tibial spurs: 1, 2, 2. Mid and hind tibia with posteroventral spurs about twice as long as the anteroventral ones and apically with a transverse comb of closely set short setulae.

Abdomen relatively long, mostly dark brown, tergites 3–6 with light anterior markings (Fig. 2). Sternites 1–5 yellowish with dark apical margins. **Terminalia** (Fig. 6) brown. Tergite 9 rounded, subtriangular, about as broad as long. Gonocoxites almost completely fused, with dark setae on the posterior margin. Gonostylus 1.4 times as long as gonocoxite, 3.5 times as long as wide, dorsoventrally flattened, apically rounded, without teeth. Longitudinal furrow on gonostylus less distinct than in the previous species.

Female. Unknown.

Differential diagnosis. The strongly pectinate male antennae are diagnostic for this species, in combination with the characters stated above under the diagnosis of the genus.

Etymology. This beautiful species is named after my beautiful wife, Tereza.

Distribution. Brunei.

Comments. The completely fused gonocoxites and the more developed subscutellar membranous area are noteworthy and may be considered as apomorphic features in relation to *T. melanoleucum* sp. nov. Both the new species of *Terocelion* gen. nov. also have relatively the longest pectinate antennae (in relation to body length) among all keroplatids. Within Sciaroidea, the record holder in this respect is probably the Oriental *Pectinepsia pulcherrima* Ševčík & Hippa, 2010 with pectinate antennae almost as long as the entire body (ŠEVČÍK & HIPPA 2010). Interestingly, this species like *T. terezae* sp. nov. also occurs in northern Borneo, which poses a question about the purpose of such strongly modified antennae in this area.

Discussion

In the key to the world species of Keroplatini by MATILE (1990), both species of *Terocelion* gen. nov. would run to *Platyroptilon* due to pectinate antennae, bare laterotergites and tibial trichia arranged in regular rows. However, if we omit the first character (pectinate antennae), *Terocelion* would run to couplet 15 containing the genera *Nauarchia* Matile, 1990 (Afrotropical), *Euceroplatus* (Oriental and Australasian), *Rocetelion* (Holarctic), *Setostylus* Matile, 1990 (Neotropical and Oriental) and *Tergostylus* Matile, 1988 (Afrotropical). If we focus on the male terminalia, its structure (mainly the shape of gonostylus) strongly suggests the relationship of *Terocelion* gen. nov. with *Rocetelion*.

Pectinate antenna is often used as a key character to separate genera within the tribe Keroplatini and this may sometimes be misleading. Interestingly, if we omit this character in some genera, they would merge in one genus, although they are in quite different position in the key; for example *Ctenoceridion* and *Heteropterna*, especially if we consider their similar terminalia. Furthermore, if we omit the arrangement of tibial setae, we can also include *Platyroptilon* in the same genus. We could even continue and also include *Setostylus* because of the same wing venation and very similar terminalia to *Platyroptilon*.

Apparently, the delimitation of some genera in the tribe Keroplatini is still not satisfactory and the differences among them, as currently understood, are rather vague. This is why, together with a growing number of recently described genera, studies towards a new phylogenetic analysis of the tribe Keroplatini have already been started, based on both morphology (ŠEVČÍK & BLAGODEROV, in prep.) and molecular markers (ŠEVČÍK et al., in prep.).

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