

***Pseudochetoneura* gen. nov., a peculiar new genus
from Ecuador, with notes on *Chetoneura*
(Diptera: Keroplatidae)**

Jan ŠEVČÍK

University of Ostrava, Department of Biology and Ecology, Chittussiho 10, CZ-710 00 Ostrava
& Silesian Museum, Tyršova 1, CZ-746 01 Opava, Czech Republic; e-mail: sevcikjan@hotmail.com

Abstract. A new genus, *Pseudochetoneura* gen. nov., is proposed for a single new species, *P. otongensis* sp. nov. (Diptera: Keroplatidae), collected in the Otonga Reserve in Ecuador. Its possible relationships with other genera of Keroplatidae are briefly discussed. The recently described genus *Bisubcosta* Papp, 2006 is considered a junior synonym of *Chetoneura* Colless, 1962, which now includes three species, *Ch. cavernae* Colless, 1962, *Ch. oligoradiata* (Papp, 2006) comb. nov., and *Ch. shennonggongensis* Amorim & Niu, 2008.

Key words. Diptera, Sciaroidea, fungus gnats, taxonomy, new taxa, new synonym, Ecuador, Neotropical Region, Oriental Region

Introduction

Several interesting new genera of Keroplatidae (Diptera: Sciaroidea) have been discovered during the last 10 years in the Oriental and Afrotropical Regions (PAPP & ŠEVČÍK 2005, PAPP 2008, ŠEVČÍK 2009, ŠEVČÍK & PAPP 2009) but the Neotropical Region is still rather neglected since MATILE (1990) published his comprehensive monograph of the family.

Studying unsorted samples of fungus gnats and other Diptera recently collected in Ecuador, I found several specimens of an undescribed species with unique combination of characters. In this paper, a new genus is proposed for this new species and it is tentatively placed in the tribe Keroplatini of the family Keroplatidae, pending a new phylogenetic analysis of the tribe that will be published elsewhere. The opportunity is taken here also to clarify the status and diagnostic characters of species hitherto included in the Oriental genera *Chetoneura* Colless, 1962 and *Bisubcosta* Papp, 2006.

Material and methods

The morphological terminology follows that by SØLI et al. (2000) and MATILE (1990). The type specimens of the new species were collected with a Malaise trap by Giovanni Onore and

his collaborators in the Otonga Nature Reserve on the western slope of the Ecuadorian Andes. This private reserve consists of about 300 ha of mainly primary premontane and montane (1600–2200 m) wet tropical forest (FREIBERG 1998).

The material is preserved in the following collections:

BMNH	Natural History Museum, London, United Kingdom;
HNHM	Hungarian Natural History Museum, Budapest, Hungary;
JSOC	Jan Ševčík collection, Ostrava, Czech Republic;
NHRM	Swedish Museum of Natural History, Stockholm, Sweden;
QSBG	Queen Sirikit Botanic Garden, Chiang Mai, Thailand;
SMOC	Silesian Museum, Opava, Czech Republic.

Taxonomy

Pseudochetoneura gen. nov.

Type species. *Pseudochetoneura otongensis* sp. nov., here designated.

Diagnosis. Two ocelli. Antennae with 14 flagellomeres. Flagellomeres short, cylindrical, at most as long as wide. Mouthparts strongly reduced, palpus with only one segment. Compound eyes relatively narrow in lateral view. Both mediotergite and laterotergite bare. Mediotergite without distinct membranous subscutellar area. Wing unmarked, slightly darkened, membrane covered with microtrichia. Radial veins and CuA_2 dark and strong, the other veins lighter. C produced beyond R_5 to about half the distance between the tips of R_5 and M_1 . Vein Sc ending free, apically obsolete, reaching to the level of Rs. R-M fusion short but distinct. Crossvein Rs relatively short and almost vertical. M-Cu connection and basal part of M indistinct. The stem of M-fork long. Cu-fork with point of furcation at the base of wing. CuA_1 weaker, CuA_2 strong, distinctly downcurved towards the tip. CuP relatively long and strong, A_1 short, distally weak. Legs without special tibial organs. Tibial setae irregularly arranged. Abdomen distinctly bent downwards. Male terminalia with gonocoxites fused only basally. Gonostylus relatively large, about as long as wide, with rounded apical projection. Aedeagal complex large, its laterally compressed plate extending into segment 7. Tergite 9 short, transverse, three times as broad as long.

Differential diagnosis. The new genus is most similar to the Oriental genera *Chetoneura* and *Microkeroplatus* Ševčík & Papp, 2009, from which it differs mainly in the length of male antennae (only 3 times as long as head), shape of flagellomeres (these are not S-shaped or anteriorly prolonged), stronger reduction of mouthparts (reduced labella, one palpomere without palpifer), shorter wings (ratio of length to width only 2.2), wing venation (Sc ending free, R_1 reaching well beyond the point of furcation of M), distinctly bent abdomen, and peculiar male terminalia (remarkable aedeagal complex, short tergite 9). The habitus photograph of *Chetoneura cavernae* Colless, 1962 is presented here for comparison (Fig. 6) to supplement the description by COLLESS (1962).

Etymology. The name is modified from *Chetoneura*, a related genus, by the Greek prefix *pseudo-*, referring to their similarity. Gender is feminine.

Pseudochetoneura otongensis sp. nov.

(Figs. 1–5)

Type material. HOLOTYPE: ♂, **ECUADOR: COTOPAXI:** San Francisco de Las Pampas, Otonga Reserve, 17.v.1997, Malaise trap, G. Onore leg. (SMOC). PARATYPES: 11 ♂♂ 2 ♀♀, the same data as holotype (BMNH, JSOC, SMOC).

Description. Coloration. The entire body is dark brown, except antennae and legs, which are slightly lighter.

Male. Body length 3.2 mm. Wing length 3.1 mm. Ratio of wing length to width 2.2.

Head. Two ocelli, the distance between them about their diameter. Compound eyes relatively narrow, twice as high as broad in lateral view. Vertex covered with setae, frons bare. Frons anteriorly narrowing, apically blunt, with a sagittal furrow reaching behind ocelli. Face and clypeus small and narrow, rhomboid, covered with dark setae. Mouthparts strongly reduced. Labellum and labrum rudimentary, in the form of only one small setose oval sclerite, which may represent either labrum or fused labella. Maxillary palpus with a single palpomere of about the same size as the proximal sclerite. Lacinia absent. Palpus with a circular sensilla at the anterodorsal side.

Antenna about 3 times as long as the width of head, with 14 flagellomeres. Flagellomeres relatively short (Fig. 1), cylindrical, laterally only slightly flattened, all covered by fine setae at most as long as the diameter of flagellum. F1 and F14 about as long as wide, F2–F5 and F8–F13 slightly wider than long, F6 and F7 almost twice as wide as long. Flagellomere 14 simple, without any apical process. Scape and pedicel slightly shorter than wide.

Thorax. Scutum with two rows of dorsocentral setae, one row of acrostichals and laterally with numerous prealar and postalar setae. Scutellum rather small, almost as long as wide, dorsally covered with short setae, without long apical bristles. Mediotergite bare, posteriorly slightly protruding, with a narrow indistinct subscutellar membranous area. Laterotergite bare. Antepronotum and proepisternum setose. Anterior spiracle and membranous area around it brownish yellowish, without setae. Anepisternum and the other lateral sclerites bare. Haltere yellowish brown, slightly longer than the first abdominal tergite.

Wing (Fig. 3) hyaline, unmarked but slightly darkened, membrane covered only with microtrichia, without macrotrichia. Radial veins and CuA_2 dark and strong, the other veins lighter. Costa, R_1 and R_5 covered with setae. C produced beyond R_5 to about half the distance between the tips of R_5 and M_1 . Vein Sc ending free, apically obsolete, reaching to the level of Rs. R-M fusion short but distinct. Crossvein Rs relatively short and almost vertical. M-Cu connection and basal part of M indistinct. The stem of M-fork long, $4/5$ as long as M_1 . Cu-fork distinct, with point of furcation at the base of wing, CuA_1 weaker, CuA_2 strong, distinctly downcurved towards the tip. CuP relatively long and strong, A1 shorter, distally weak.

Legs mostly yellowish brown, covered with dark trichia. Coxae dark brown. Femora laterally flattened, evenly clothed with fine trichia, not longer than maximum width of femur. All tibiae with trichia about as long as tibial diameter, not forming distinct rows, without strong bristles. The apex of fore tibia without distinct tibial organ. Fore tibia with one apical spur, as long as maximum tibial diameter. Two spurs present on both mid and hind tibia, the posteroventral spurs twice as long as anteroventral ones. Relative lengths of femur, tibia and tarsus for particular legs: fore leg – 1 : 1.1 : 1.7; mid leg – 1.3 : 1.6 : 2; hind leg – 1.4 : 1.8 : 2. Tarsal claws simple, almost straight. Empodium filiform.

Abdomen mostly dark brown, distinctly bent downwards. Tergite 1 with a small posterior medial projection. Segment 2 slightly longer than the others. **Terminalia** (Figs. 4–5). Tergite 9 short, transverse, three times as broad as long (Fig. 5). Cercus 5/6 as long as tergite 9, placed caudally to tergite 9 and partly hidden behind it. Gonocoxites fused only basally by a membranous connection, forming a deep posteroventral excavation (Fig. 4). Gonostylus relatively large (almost as long as gonocoxite), about as long as wide, with rounded apical projection, which is rather broad in lateral view. Aedeagal complex very large and distinct, with long associated apodemes laterally and with a small medial incision at its posterior margin. Its proximal, laterally compressed plate with anterior part circular in lateral view, extending into segment VII.

Female. Similar to male in most respects. Antenna distinctly shorter, only about twice as long as the width of head (Fig. 2). Terminalia with one-segmented cercus, which is circular in lateral view. Sternite VIII divided medially, forming two subtriangular parts in ventral view. Two globular and well sclerotized spermathecae. Spermathecal ducts distinct.

Etymology. The species name refers to the type locality.

Distribution. Neotropical Region (Ecuador).

Chetoneura Colless, 1962

Chetoneura Colless, 1962: 437.

= *Bisubcosta* Papp, 2006 in PAPP et al. (2006: 129), **syn. nov.**

An emended diagnosis of *Chetoneura* was provided by AMORIM et al. (2008) who also briefly discussed its phylogenetic position and described the larva. At least four important diagnostic characters should be added: subcosta apically forked; mediotergite strongly convex; tibial setae arranged in regular longitudinal rows; and male terminalia with gonocoxites ventrobasally fused, forming U-shaped medioventral excavation, covered with distinct setae on its sides.

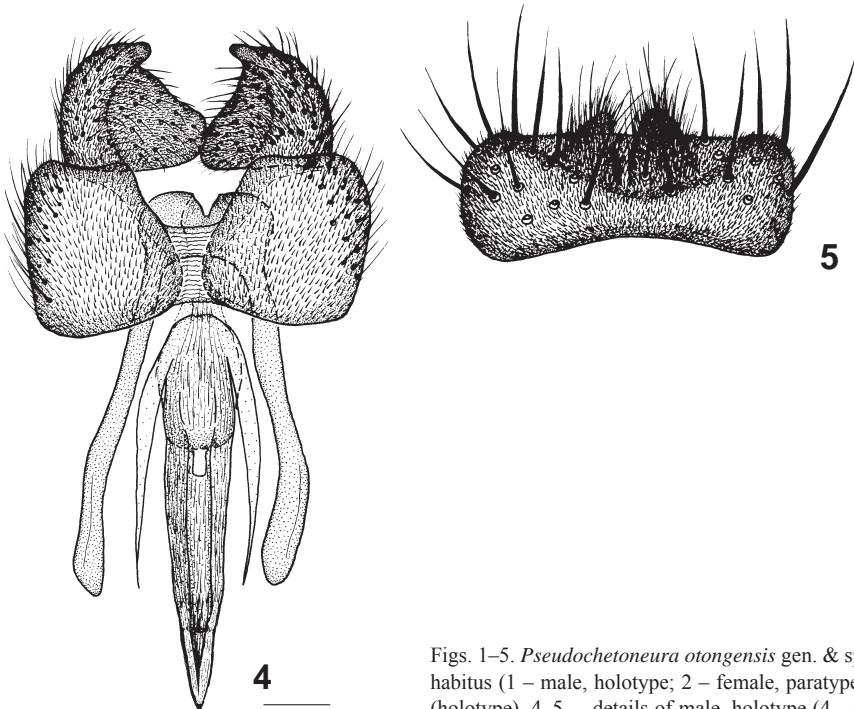
The recently described genus *Bisubcosta* Papp, 2006 is considered here to be a junior synonym of *Chetoneura*, which thus now includes three species, *Ch. cavernae* Colless, 1962 (Thailand, Malaysia and Brunei), *Ch. oligoradiata* (Papp, 2006) comb. nov. (Thailand) and *Ch. shennonggongensis* Amorim & Niu, 2008 (China). Comparison is given below of the former two species, of which material is available to the author. Apparently, *Ch. oligoradiata* and *Ch. shennonggongensis* are more similar to each other than to *Ch. cavernae*, sharing the same wing venation, whitish mediotergite, and short, triangular tergite 9. All the three species are, however, so similar in many characters, including the male terminalia, that further division into separate genera is considered unjustified.

Chetoneura cavernae Colless, 1962

(Fig. 6)

Chetoneura cavernae Colless, 1962: 439.

Material examined. THAILAND: PETCHABURI: Kaeng Krachan NP, Pa La-U/Waterfall/Ficus tree, 12°32.154'N 99°28.098'E, 11.–18.xii.2008, Malaise trap, Thongbai leg., T4548 (QSBG). **MALAYSIA: PAHANG:** Cameron Highlands, Tanah Rata, Robinson Falls env., 26.–29.i.2009, 1 ♂, Malaise trap, J. Ševčík leg. (JSOC). **SABAH:** Tawau, Maliau Basin, Nepenthes Camp, 994 m a.s.l., 9.–14.vii.2007, 1 ♂, Mega Malaise trap, B. Viklund & N. Jönsson leg. (NHRM). **BRUNEI:** Ulu Temburong, 16.–22.ii.1982, 1 ♂, 14.ii.–9.iii.1982, 1 ♂, Malaise trap, M. C. Day leg. (BMNH).



Figs. 1–5. *Pseudochetoneura otongensis* gen. & sp. nov. 1–2 – habitus (1 – male, holotype; 2 – female, paratype); 3 – wing (holotype). 4–5 – details of male, holotype (4 – terminalia in ventral view; 5 – tergite 9 and cerci in dorsal view). Scale bar 0.05 mm.

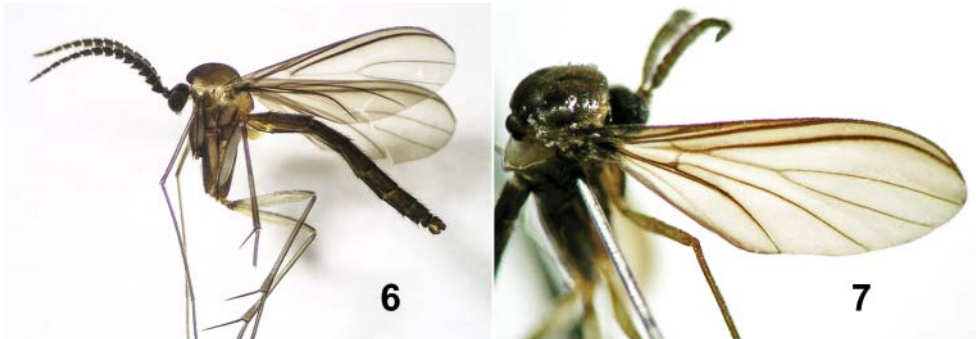


Fig. 6–7. *Chetoneura* species. 6 – *Chetoneura cavernae* Colless, 1962, male habitus (Cameron Highlands, Malaysia); 7 – *Chetoneura oligoradiata* (Papp, 2006), wing venation (holotype, Thailand).

Differential diagnosis. This is the type species of the genus and differs from the other two species of *Chetoneura* in having R-M fusion short, C produced beyond R_5 to about two thirds of the distance between the tips of R_5 and M_1 , mediotergite setose and medially dark, and details on the male terminalia (tergite 9 longitudinal, about 4/3 as long as broad, gonocoxites medioventrally with relatively short setae).

Variation. The relative length of antennae in male seems to vary with the size of specimen. One smaller male from Brunei (wing length 2.8 mm) has relatively long antennae, almost as long as the wing, in comparison with the larger specimen from Cameron Highlands (Fig. 6; wing length 4.1 mm).

Chetoneura oligoradiata (Papp, 2006) comb. nov.

(Fig. 7)

Bisubcosta oligoradiata Papp, 2006: 129.

Type material examined. HOLOTYPE: ♂, THAILAND: CHANGWAT NAN: Ban Na Lae, nr. Pua, over a rocky forest brook, 5.xi.2004, L. Papp & M. Foldvári leg. (HNHM).

Additional material examined. THAILAND: CHIANG MAI: Doi Chiang Dao NP, Nature trail, 19°24.278'N 98°55.311'E, 491 m a.s.l., 21.–28.x.2007, 1 ♂, Malaise trap, Songkran & Apichart leg., T3176 (JSOC); Doi Phahompok NP, Doi Phaluang, 20°1.06'N 99°9.581'E, 1449 m a.s.l., 20.–27.vii.2007, 1 ♂, Malaise trap, Wongchai P. leg., T2928 (QSBG).

Differential diagnosis. This species differs from *Ch. cavernae* mainly in the following characters: R-M fusion long (Fig. 7), C produced beyond R_5 to only about a third of the distance between the tips of R_5 and M_1 , mediotergite bare, strongly protruding and whitish yellow, tergite 9 rather short, triangular, about 3/5 as long as broad, and gonocoxites medioventrally with relatively long setae, almost as long as the width of the medioventral excavation of gonocoxites.

Discussion

The genera *Chetoneura*, *Microkeroplatus* and *Pseudochetoneura* form a distinct group within the family Keroplastidae. In the key to the world species of Keroplastini by MATILE (1990), all the

genera would run to *Xenokeroptatus* Matile, 1990 due to a reduced vein A_1 . This is, however, a distinct genus differing from the above mentioned genera in many characters (e.g. fore tarsus remarkably long, anteroventral spurs absent, R_4 present) and with rather different and specific male terminalia. If we continue and follow couplet 8, we cannot go on due to the absence of vein R_4 . Only if we omit this character we can proceed and reach couplet 9 (if the tibial setae are irregularly arranged as in *Microkeroptatus* and *Pseudochetoneura*), or 13 (if these are arranged in rows as in *Chetoneura*). Anyway, all the genera included in that key (except *Xenokeroptatus*) have rather different wing venation from the three genera in question.

The wing venation of *Pseudochetoneura* (and to some extent also of *Chetoneura* and *Microkeroptatus*) deviates considerably from the typical outline found within the family. It is remarkably similar to that of several taxa of the incertae sedis *Heterotricha* group (see CHANDLER 2002, HIPPA & VILKAMAA 2006, AMORIM & RINDAL 2007), mainly in the short basal cell, long stem of M-fork and poorly developed radio-median fusion, giving the wing the sciarid-like appearance. The recently described genera *Rangomarama* Jaschhof & Didham, 2002 from New Zealand and *Madagotricha* Jaschhof & Jaschhof, 2007 from Madagascar particularly deserve attention in this respect, because of the absence of R_4 , vein Sc ending free, and similar connection of the nearly vertical Rs to R_5 , but the habitus, antennae and terminalia of the two latter genera are clearly different from *Pseudochetoneura* (cf. JASCHHOF & DIDHAM 2002, JASCHHOF & JASCHHOF 2007). The wing venation of the new genus also shows some similarities with several fossil taxa currently placed in the family Lygistorrhinidae, especially the supposedly primitive genus *Palaeognoriste* Meunier, 1904 (see MEUNIER 1904, BLAGODEROV et al. 2010).

The reduction of the number of palpomeres is a typical synapomorphy of the tribe Keroplatini but in case of *Pseudochetoneura* only one palpomere is present and also the labella are strongly reduced. One short palpomere (without any palpifer) is reported within the Keroplatidae e.g. for *Platyroptilon* Westwood, 1850. Such a strong reduction of mouth-parts is typical for some tropical groups of Mycetophilidae – mainly the subfamily Metanepsiinae (e.g. ŠEVČÍK & HIPPA 2010) but it is present also in several Neotropical species of Gnoristinae questionably referred to as *Dziedzickia* Johannsen, 1910 (see ŠEVČÍK et al. 2011), e.g. *D. intermedia* Lane, 1954. SØLI (1996) interprets that single palpomere as the third palpomere.

The male terminalia of *Pseudochetoneura* resemble those of *Urytalpa* Edwards, 1929 and several related genera of the Orfeliini in the presence of the remarkably long aedeagal complex reaching to previous abdominal segments. The long anterior projection is considered by SØLI et al. (2000) to be a sperm pump. Short tergite 9 is another distinct feature, although not so uncommon within the Keroplatidae. Apart from other characters, the ‘Orfeliini-like’ structure of the male terminalia of *Pseudochetoneura* raises some doubts about the traditional division of the Keroplatinae into the tribes Keroplatini and Orfeliini, suggesting that the exact phylogeny and classification of the family still remains a puzzle.

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