

## Two new species of the millipede genus *Trichopeltis* Pocock, 1894 (Diplopoda: Polydesmida: Cryptodesmidae) from Vietnam and China

### Два новых вида диплопод рода *Trichopeltis* Pocock, 1894 (Diplopoda: Polydesmida: Cryptodesmidae) из Вьетнама и Китая

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КЛЮЧЕВЫЕ СЛОВА: Cryptodesmidae, *Trichopeltis*, новый вид, горный лес, пещера, Вьетнам, Китай.

ABSTRACT. Two new species of *Trichopeltis* are described: *T. deharvengi* sp.n. from a montane forest in southern Vietnam, and *T. latellai* sp.n. from two adjacent caves in Guizhou Province, southern China. One of these species, *T. deharvengi* sp.n., not only shows some of the somatic and gonopod characters intermediate between those known to distinguish the tribes Trichopeltini and Otodesmini, but also seems to be especially similar to the type species *T. bicolor* (Pocock, 1894), from Sumatra. This warrants a more conservative approach to be followed in refining the diagnosis and scope of this genus, with the synonymization of Trichopeltini under Otodesmini, syn.n., based upon the reconfirmed synonymy of *Trichopeltis* and *Otodesmus*. A key is compiled to all six currently known species of *Trichopeltis*.

РЕЗЮМЕ. Описаны два новых вида рода *Trichopeltis*: *T. dehavengi* sp.n. из горного леса в Южном Вьетнаме и *T. latellai* sp.n. из двух соседних пещер в провинции Гуйчжоу (Южный Китай). Один из этих видов (*T. deharvengi* sp.n.) демонстрирует некоторые признаки строения тела и гоноподий, промежуточные между таковыми, используемыми при различении триб Trichopeltini и Otodesmini, и, кажется, особенно сходен с типовым видом *T. bicolor* (Pocock, 1894) из Суматры. Все это требует более консервативного подхода для уточнения диагноза и объема этого рода, а также синонимизации Trichopeltini с Otodesmini, syn.n., на основе подтвержденной синонимии родов *Trichopeltis* и *Otodesmus*. Составлен ключ для всех шести ныне известных видов рода *Trichopeltis*.

### Introduction

The rather small, mainly tropical family Cryptodesmidae shows one of its main centres of diversification in Southeast and southern East Asia [Hoffman, 1973, 1980]. The genus *Trichopeltis* Pocock, 1894 has hitherto been treated either as monobasic, with the type, and sole, species *T. bicolor* (Pocock, 1894), endemic to Sumatra [Hoffman, 1973, 1980], or, following a more conservative approach, as comprising also the following three species: *T. doriae* Pocock, 1895, *T. feae* Pocock, 1895 (both from Myanmar) and *T. watsoni* Pocock, 1895 (from Myanmar and Darjeeling District, India) [Pocock, 1894, 1895; Attems, 1899, 1914, 1936, 1940; Jeekel, 1955].

Originally, Pocock [1894] proposed *Trichopeltis* as a monobasic genus to encompass *Cryptodesmus bicolor* Pocock, 1894 alone, telling he had no doubts it would prove well distinguished at the generic level from the then all-embracing genus *Cryptodesmus* Peters, 1864. Shortly after that, Pocock [1895] described his *Trichopeltis doriae*, *T. feae* and *T. watsoni*, and also provided a key to these three species. Cook [1896] designated *T. watsoni* as the type species of his new genus *Otodesmus* Cook, 1896, and even created the new family Otodesmidae to accommodate *Trichopeltis* and *Otodesmus*, both monotypic. Furthermore, he diagnosed this family, based on the location of the ozopores near the front margin at the base of the poriferous paraterga, somehow deducing this feature because Pocock [1894, 1895] had said nothing whatsoever about ozopores in *Trichopeltis*. Attems [1899] pointed this out, returned *T. watsoni* to *Trichopeltis*

(thus indirectly synonymizing *Trichopeltis* and *Otodesmus*, still listing *Otodesmus* as a separate genus just below *Trichopeltis*), and provided both a succinct generic diagnosis and a key to all four species. Somewhat later, he [Attems, 1914] largely repeated his diagnosis of 1899 and simply listed the same four species under *Trichopeltis*.

Two decades later, Attems [1936] added new faunistic records to *T. watsoni* (erroneously referred to as *Trichodesmus watsoni*) and *T. feae*, and definitively listed *Otodesmus* as a synonym of *Trichopeltis*. Apparently based on those new samples, Attems [1940] refined his earlier diagnoses of *Trichopeltis* in stating the ozopore formula was normal, with the ozopores located ventrally behind the front margin near the base of the poriferous paraterga; he also gave a new key to all of its four species. Jeekel [1955], albeit admitting a somewhat isolated position of *T. bicolor* in the genus, generally adhered to Attems [1940], not to Cook [1896], and provided both a few more faunistic records of this species in Sumatra and a very clear illustration of its gonopod. He also stated that the colour pattern of *T. bicolor*, with strikingly alternating yellow and grey-brown paraterga as originally described by Pocock [1894], was probably an artifact.

In contrast, Hoffman [1973, 1980], rather following Cook [1896], sees the differences in gonopod structure between *T. bicolor* and the remaining trio so profound that he placed these two species groups not only in different genera, but also in different tribes, only slightly downgrading the rank of Otodesmidae to Otodesmini. As a result, at present both *Trichopeltis* and *Pseudoniponiella* Verhoeff, 1942 (only with *P. kometis* (Attems, 1938), from Indochina) belong in the tribe Trichopeltini, as opposed to *Otodesmus* Cook, 1896, which encompasses the above *T. watsoni* (the type species), *T. doriae* and *T. feae*, and *Kiusiunum* Verhoeff, 1942, with several species in Japan and Southeast Asia, composing the tribe Otodesmini. The differences between these two tribes are stated to lie in the presence in the Otodesmini of a prominent solenomere and two (*Otodesmus*) or three (*Kiusiunum*) long branches on a modestly slender gonopod telopodite. In contrast, *Trichopeltis bicolor* and *Pseudoniponiella kometis* share a much stouter gonotelopodite which is densely microdentate on its mesal face and shows no prominent, elongated branches [Hoffman, 1973].

Prompted by the discovery of two new species of Cryptodesmidae, one in caves of southern China, the other in a montane forest in Vietnam, we take the opportunity not only to describe them, but also refine the scope of *Trichopeltis*. In fact, one of the new species is kind of intermediate between Trichopeltini and Otodesmini, and seems to be especially similar to *T. bicolor*, thus warranting us to also follow the conservative approach. Furthermore, because the Trichopeltini is now obsolete, it must be synonymized with Otodesmini, while the synonymy of *Trichopeltis* and *Otodesmus* is reconfirmed.

## Material and methods

The material serving as the basis for the present contribution derives from the collections made in southern Vietnam by Louis Deharveng and Anne Bedos (both Muséum national d'Histoire naturelle, Paris, MNHN), and in southern China by Leonardo Latella and his collaborators (Verona, Italy). Material has largely been deposited in MNHN (+ entry number), with one paratype housed in the Museo Civico di Storia Naturale di Verona, Italy (MCSNV), as indicated thereafter.

SEM micrographs were taken using a JEOL JSM-6480LV scanning electron microscope. SEM material was coated with gold and, after examination, it was removed from stubs and returned to alcohol.

## Taxonomic part

### *Trichopeltis deharvengi* sp.n.

Figs 1–27.

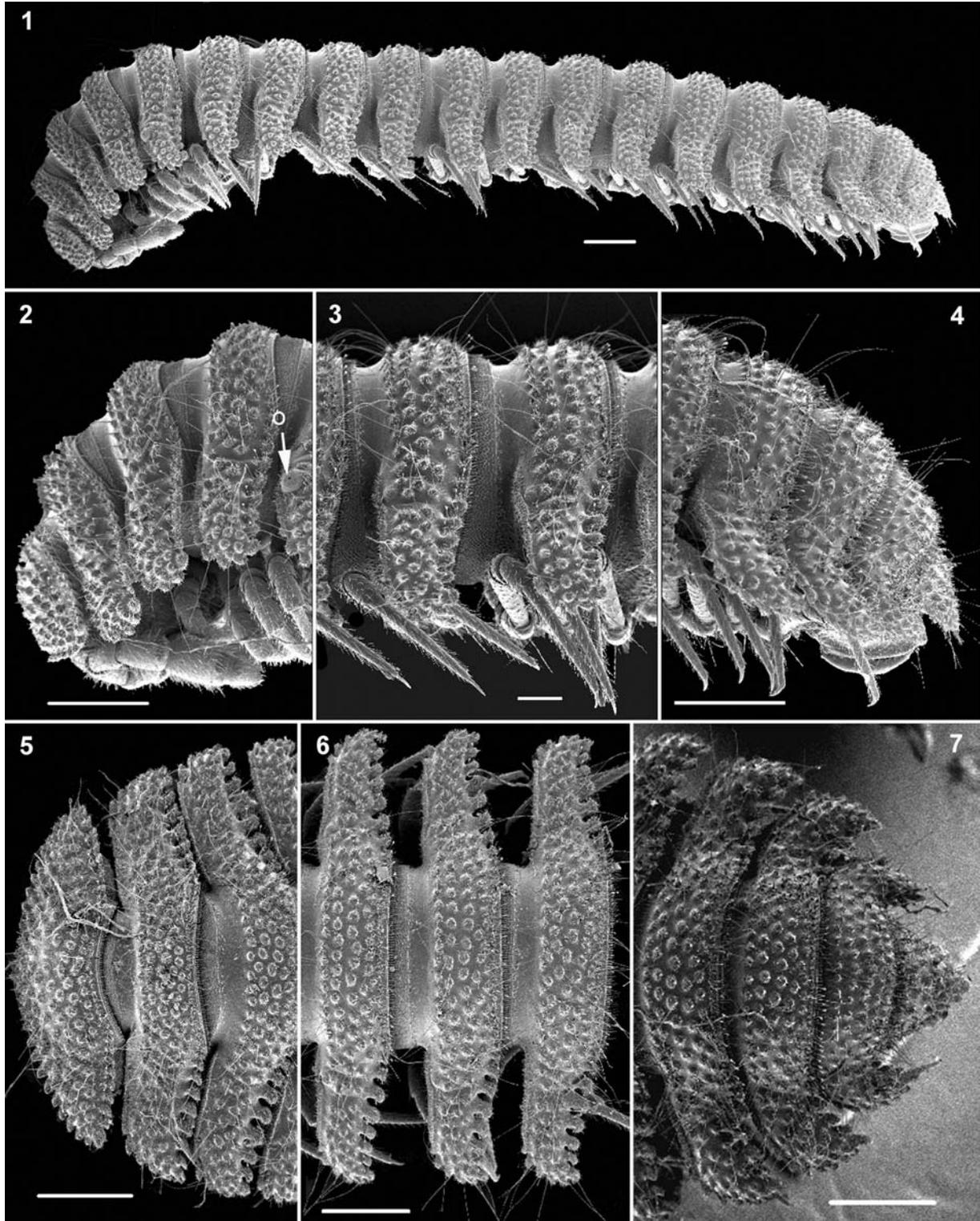
HOLOTYPE ♂ (MNHN JC 326), Vietnam, Lam Dong Province, Dalat, Peak Lang Bian, below summit (about 2030 m), rainforest, in rotten wood, by hand, 9.12.2006, leg. L. Deharveng & A. Bedos (Vn06-176). PARATYPE ♂ (MNHN JC 326, SEM), same locality, together with holotype.

NAME. To honour Louis Deharveng, one of the collectors.

DIAGNOSIS. Differs from congeners in only the ozopore on paraterga 5 being located dorsally, coupled with certain details of somatic and gonopod structure (see also key below).

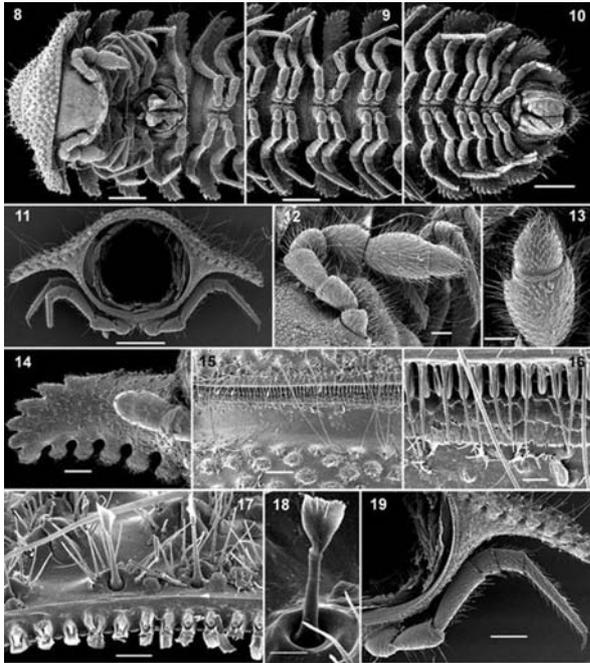
DESCRIPTION. Length ca 12 mm, width 3.0 mm. Coloration in alcohol uniformly light yellow-brown, venter light yellow.

Body with 20 segments (Fig. 1), strongly flattened dorsoventrally. Head (Fig. 8) evidently narrower than collum, densely setose, epicranial suture distinct. Antennae short and clavate (Figs 6, 12 & 13), antennomere 6 longest, yet only 1.2–1.3 times as long as high. Both antennomeres 5 and 6 with a tight distodorsal group of bacilliform sensilla (Figs 12 & 13). Collum and following terga densely tuberculate and setose (Figs 1–8); body parallel-sided on segments 4–16, gradually tapering thereafter. Front and caudolateral margins of collum, as well as anterolateral, lateral and caudal margins of following paraterga evidently crenulate-lobulate, these lobulations being slightly larger at caudal margins of paraterga. Dorsum convex, postcollum paraterga flat, very broad and short, evidently and regularly declivous, tips reaching level of venter, directed increasingly caudolaterad starting from segment 14, surpassing rear tergal contour only on segments 17, 18 and, especially, 19 (Figs 1–10). Surface dull, prozona microalveolate; metatergal tuberculations arranged in 5–6 irregular transverse rows of evident setiferous knobs with abundant micropilosity, gradually turning into 2–3 likewise irregular rows on metaterga; microtuberculations (mostly bare) extending also onto stricture be-



Figs 1–7. *Trichopeltis deharvengi* sp.n., ♂ paratype: 1 — habitus, lateral view; 2 & 5 — anterior body portion, lateral and dorsal views, respectively; 3 & 6 — middle body segments, lateral and dorsal views, respectively; 4 & 7 — posterior body portion, lateral and dorsal views, respectively. Scale bars: 0.5 (1, 2, 4–7) & 0.2 mm (3).

Рис. 1–7. *Trichopeltis deharvengi* sp.n., паратип ♂: 1 — габитус, вид сбоку; 2 и 5 — передняя часть тела, соответственно виды сбоку и сверху; 3 и 6 — средние туловищные сегменты, соответственно виды сбоку и сверху; 4 и 7 — задняя часть тела, соответственно виды сбоку и сверху. Масштаб: 0,5 (1, 2, 4–7) и 0,2 мм (3).



Figs 8–19. *Trichopeltis deharvengi* sp.n., ♂ paratype: 8 — anterior body portion, ventral view; 9 — middle body segments, ventral view; 10 — posterior body portion, ventral view; 11 — midbody segment, cross-section, caudal view; 12 — antenna, dorsal view; 13 — antennomeres 5–8, dorsal view; 14 — midbody paratergum, ventral view; 15 — limbus and adjacent part of pro- and metaterga, subdorsal view; 16 — limbus enlarged, dorsal view; 17 — limbus and adjacent part of metatergum, subcaudal view; 18 — 2-segmented macrochaeta above limbus, subcaudal view; 19 — right midbody paratergite and leg, caudal view. Scale bars: 0.5 (8–11), 0.2 (19), 0.1 (12–15), 0.02 (16 & 17) & 0.01 mm (18).

Рис. 8–19. *Trichopeltis deharvengi* sp.n., паратип ♂: 8 — передняя часть тела, вид снизу; 9 — средние туловищные сегменты, вид снизу; 10 — задняя часть тела, вид снизу; 11 — срединный туловищный сегмент, поперечный срез, вид сзади; 12 — антенна, вид сверху; 13 — членики 6–8 антенны, вид сверху; 14 — паратергит среднего туловищного сегмента, вид снизу; 15 — лимбус с примыкающими районами про- и метатергитов, вид почти сверху; 16 — лимбус увеличенный, вид сверху; 17 — лимбус и прилегающая часть метатергита, вид сзади; 18 — 2-сегментная макрохета над лимбусом, вид почти сзади; 19 — правые паратергит и нога среднего туловищного сегмента, вид сзади. Масштаб: 0,5 (8–11), 0,2 (19), 0,1 (12–15), 0,02 (16 и 17) и 0,01 мм (18).

tween pro- and metazona, onto ventral surface of paraterga and onto sides of metazona (Figs 1–8). Tergal macrochaetae very long, filiform, placed on knobs and interspersed with abundant micropilosity (Figs 15–17, 20 & 21); a row of macrochaetae near limbus particular in being placed in pits, shorter, 2-segmented, with distal part spatuliform (Figs 17 & 18); limbus with a row of simple, relatively short setae, each seta placed exactly above a tongue-shaped protuberance (Figs 16 & 17). Ozopore formula normal; ozopores evident and situated dorsally only on segment 5, placed there on a small bare tubercle/porostele lying anteriorly a little below base of paratergum (Fig. 2, o); following ozo-

pores barely visible, small, lying near midway of paraterga behind medianmost of anterolateral lobulations. Pleurosternal carinae wanting. Epiproct conical, flattened dorsoventrally, mictotuberculate (Figs 4 & 7). Hypoproct roundly subtrapeziform, caudal corners like evident setiferous knobs (Fig. 10).

Sterna usual, without modifications, cross-impressions evident (Figs 8–10). Legs usual, only slightly longer than paraterga (Figs 8–11 & 19), last pair a little shorter than penultimate one (Fig. 10), only coxa 2 with a small distomedian tubercle marking the orifice of vas deferens, while both coxae 6 and 7 distinctly separated to accommodate tips of gonopods (Fig. 8).

Gonopod aperture small, simple, subcardiform (Fig. 22). Gonopods (Figs 22–27) rather complex. Coxae relatively small and short, bare. Telopodite slightly longer than coxa, rather stout, evidently and deeply divided by a notch into a large, rounded, apically abundantly dentate, caudal lobe and a much narrower, front, apically denticulate-setose, bifid piece representing a short solenomere just behind notch and a caudal spine (Figs 23–27). Lateral surface abundantly denticulate (Fig. 27).

REMARKS. Some of the tergal macrochaetae being 2-segmented in this species (Figs 17 & 18) is noteworthy. They look very much like those in several species of *Eutrichodesmus* Silvestri, 1910, a large East to Southeast Asian genus of Haplodesmidae [Golovatch et al., 2009a, b].

#### *Trichopeltis latellai* sp.n.

Figs 28–49.

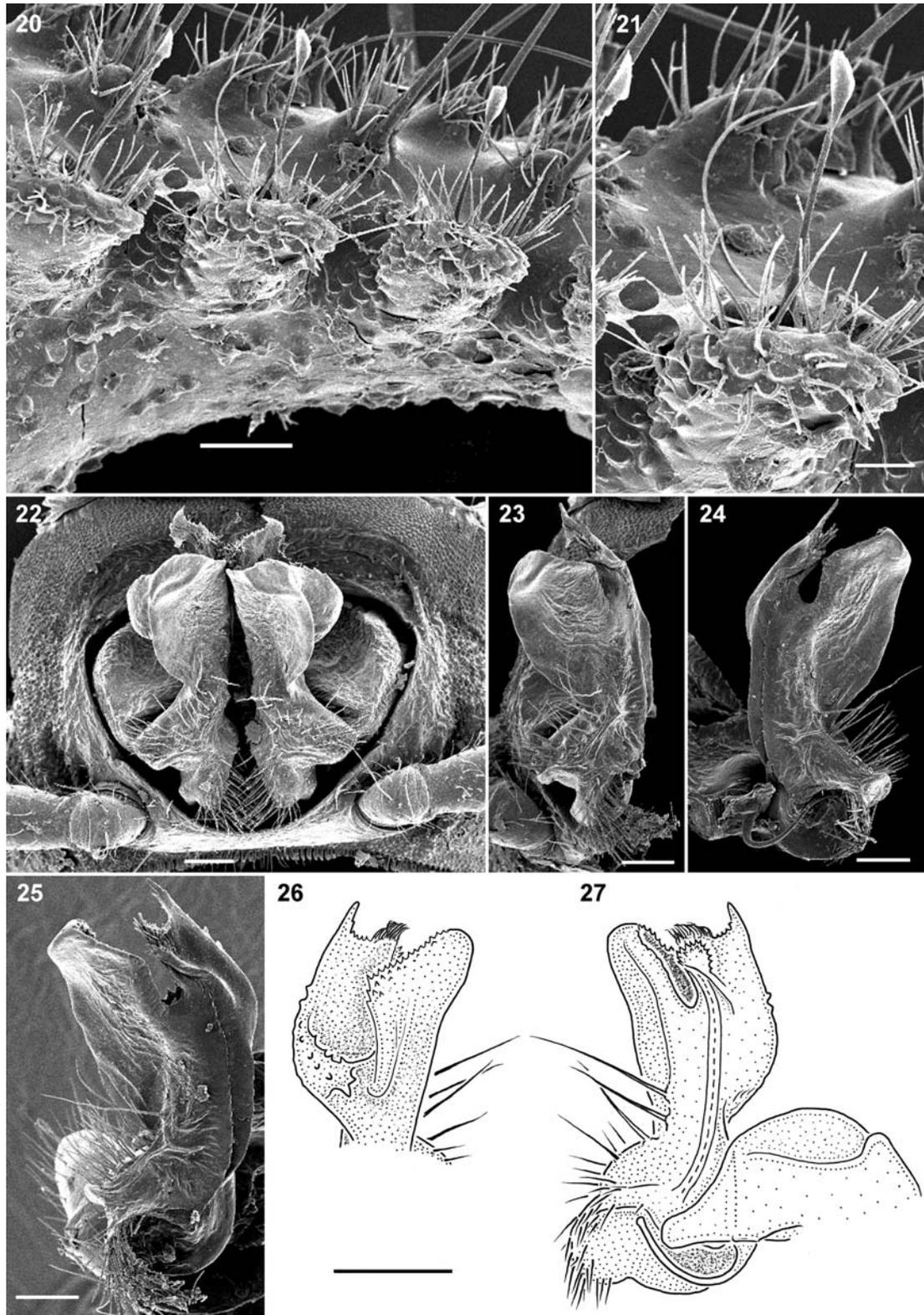
HOLOTYPE ♂ (MNHN JC 327), China, Guizhou Province, Qianxi County, Hong Lin Town, Cave Chang Tu Dong, 20.11.2001, leg. L. Latella. PARATYPES: 1 ♂ (MNHN JC 327, SEM), same locality, together with holotype. 1 ♂, 1 ♀ (MNHN JC 327), 1 ♀ (MCSNV), Hong Lin Town, Cave Tiao Shuz Dong, 18.11.2003, leg. L. Latella, D. Avesani & G. Rossi.

NAME. To honour Leonardo Latella, the principal collector.

DIAGNOSIS. Differs from congeners in all of the ozopores being located anterodorsally near the base of the poriferous paraterga, coupled with certain details of somatic and gonopod structure (see also key below).

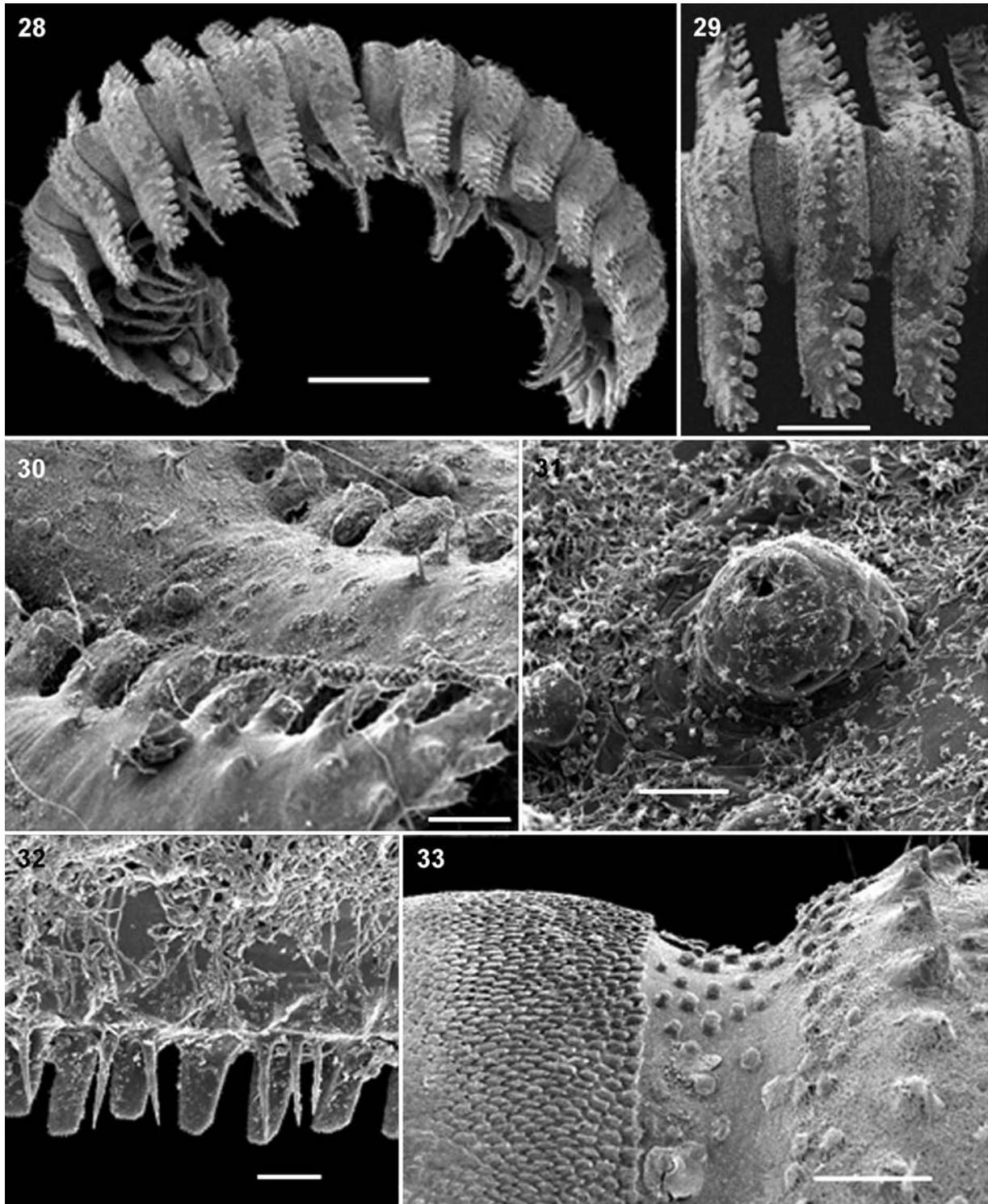
DESCRIPTION. Length ca 8.5 (♂) or 10.0 mm (♀), width 2.8 (♂) or 2.9 mm (♀). Coloration in alcohol uniformly whitish yellow, head yellow.

Other characters like in the preceding species (Figs 28, 29, 35, 37–45), except as follows. Collum and following terga evidently less densely tuberculate and setose (Figs 28, 29, 42–44). Surface dull, metatergal tuberculations less abundant, arranged in 2–3 rather regular transverse rows of small setiferous knobs with relatively sparse micropilosity; tuberculations on paraterga fewer, arranged in 2–3 irregular rows; micro-tuberculations (mostly bare) extending also onto ventral surface of paraterga and onto sides of metazona (Figs 28, 29, 33, 42–44). Tergal macrochaetae very long, filiform, placed on knobs and interspersed with



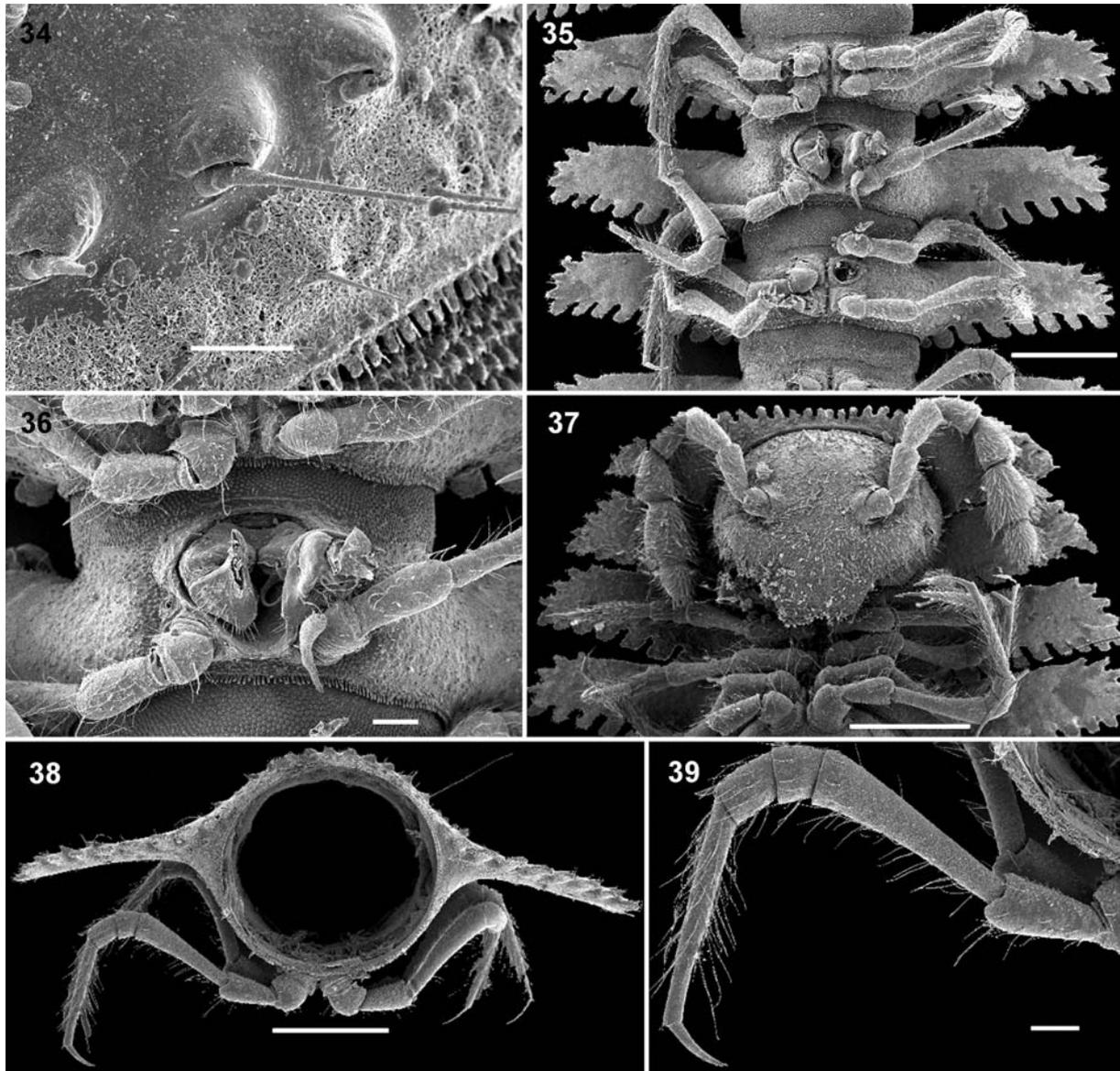
Figs 20–27. *Trichopeltis deharvengi* sp.n., ♂ paratype: 20 & 21 — enlarged tubercles on paratergum, caudal view; 22 — both gonopods in situ, ventral view; 23–27 — gonopod, ventral, mesal, mesal, lateral and mesal views, respectively. Scale bars: 0.2 (26 & 27), 0.1 (22–25), 0.05 (20) & 0.02 mm (21).

Рис. 20–27. *Trichopeltis deharvengi* sp.n., паратип ♂: 20 и 21 — увеличенные бугорки на паратергите, вид сзади; 22 — оба гонопода in situ, вид сзади; 23–27 — гонопод, соответственно виды снизу, изнутри, изнутри, сбоку и изнутри. Масштаб: 0,2 (26 и 27), 0,1 (22–25), 0,05 (20) и 0,02 мм (21).



Figs 28–33. *Trichopeltis latellai* sp.n., ♂ paratype from Cave Chang Tu Dong: 28 — habitus, lateral view; 29 — midbody segments, dorsal view; 30 — two midbody paraterga, one with ozopore, frontodorsal view; 31 — ozopore on tubercle enlarged, frontodorsal view; 32 — limbus, dorsal view; 33 — texture of pro- and metaterga, lateral view. Scale bars: 1.0 (28), 0.5 (29), 0.1 (30 & 33), 0.02 (31) & 0.01 mm (32).

Рис. 28–33. *Trichopeltis latellai* sp.n., паратип ♂ из пещеры Чанг-Ту Донг: 28 — габитус, вид сбоку; 29 — средние туловищные сегменты, вид сверху; 30 — два средние туловищные сегменты, один из которых с озопорой, вид спереди и сверху; 31 — увеличенная озопора на бугорке, вид спереди и сверху; 32 — лимбус, вид сверху; 33 — текстура про- и метатергитов, вид сбоку. Масштаб: 1,0 (28), 0,5 (29), 0,1 (30 и 33), 0,02 (31) и 0,01 мм (32).



Figs 34–39. *Trichopeltis latellai* sp.n., ♂ paratype from Cave Chang Tu Dong: 34 — tubercles and macrochaetae on metatergum, subdorsal view; 35 — segments 6–8, ventral view; 36 — segment 7 with gonopods, ventral view; 37 — anterior body portion, ventral view; 38 — midbody segment, cross-section, caudal view; 39 — midbody leg, caudal view. Scale bars: 0.5 (35, 37 & 38), 0.1 (36 & 39) & 0.05 mm (34).

Рис. 34–39. *Trichopeltis latellai* sp.n., паратип ♂ из пещеры Чанг-Ту Донг: 34 — бугорки и макрохеты на метатергите, вид почти сверху; 35 — сегменты 6–8, вид снизу; 36 — сегмент 7, вид снизу; 37 — передняя часть тела, вид снизу; 38 — средний туловищный сегмент, поперечный срез, вид сзади; 39 — нога среднего туловищного сегмента, вид сзади. Масштаб: 0,5 (35, 37 и 38), 0,1 (36 и 39) и 0,05 мм (34).

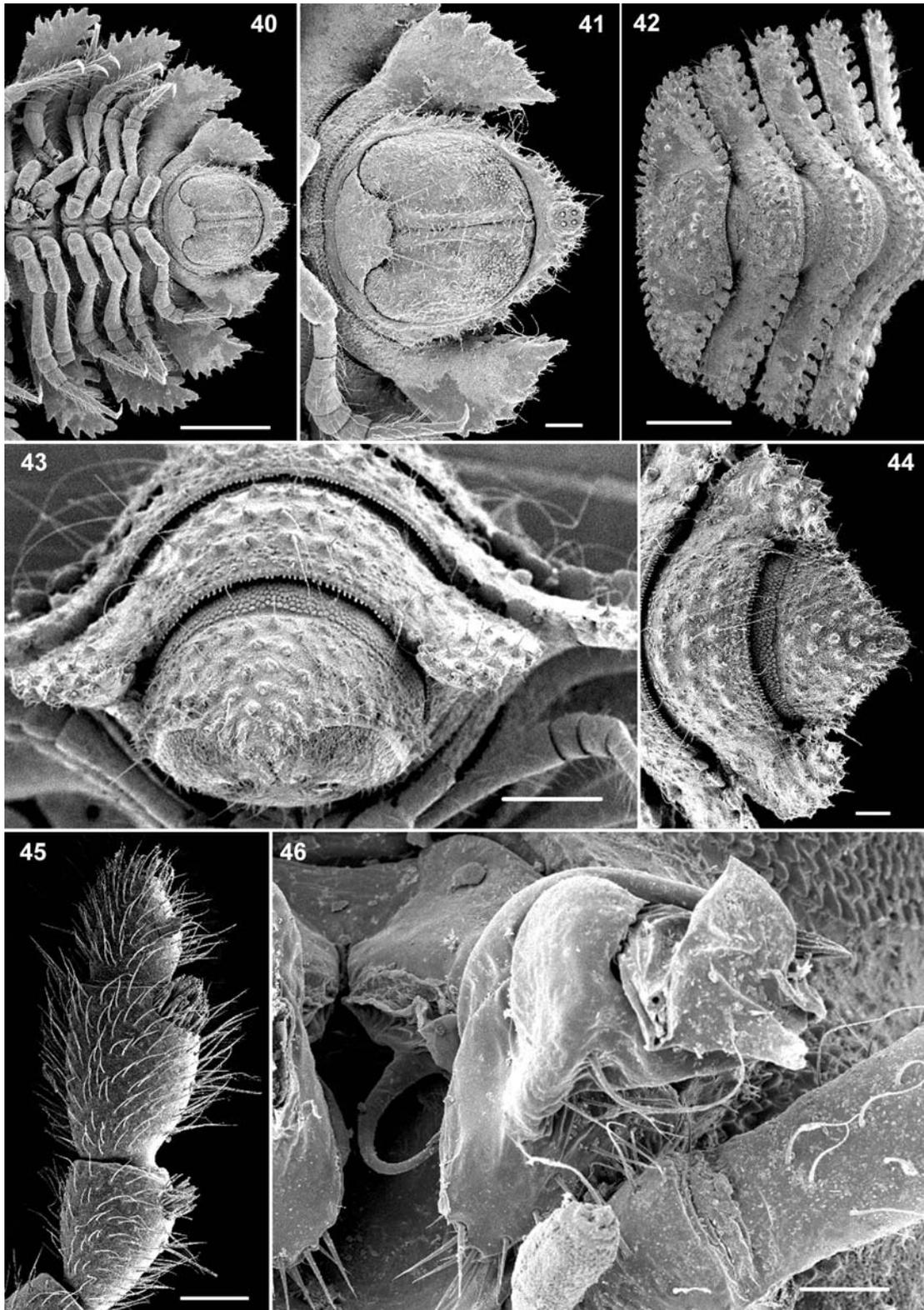
less abundant micropilosity (Figs 34 & 38); no row of special macrochaetae near limbus (Figs 32); limbus with a row of simple and shorter setae less regularly placed above tongue-shaped protuberances (Figs 32). Ozopore formula normal, ozopores small but evident, each placed only dorsally on a small bare tubercle/porostele lying anteriorly near base of paratergum (Figs 30 & 31).

Only ♂ coxae 7 distinctly separated to accommodate tips of gonopods (Fig. 35).

Epigynal ridge in ♂ low and narrow.

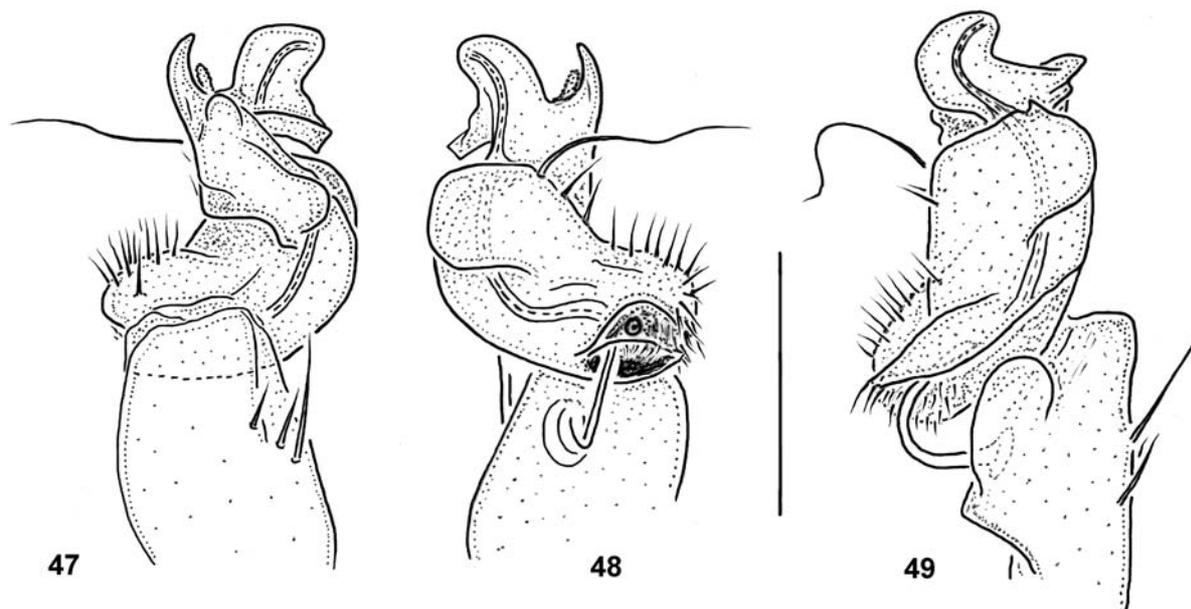
Gonopods (Figs 36, 46–49) rather complex. Coxae with a few long setae laterally. Telopodite slightly longer than coxa, rather stout, not so deeply divided by a notch into a smaller rounded, apically poorly dentate, caudal lobe and a higher, front, twisted, bifid piece carrying a short lobiform solenomere (Figs 47–49). Neither lateral nor median face denticulate (Figs 47–49).

REMARKS. Unlike the distinctly pigmented congeners, the unpigmented *T. latellai* sp.n. might well prove to be a troglobite.



Figs 40–46. *Trichopeltis latellai* sp.n., ♂ paratype from Cave Chang Tu Dong: 40, 43 & 44 — posterior body portion, ventral, caudal and dorsal views, respectively; 41 — telson, ventral view; 42 — collum and segments 2–4, dorsal view; 45 — antennomeres 5–8, lateral view; 46 — left gonopod, ventral view. Scale bars: 0.5 (40 & 42), 0.2 (43), 0.1 (41, 44 & 45) & 0.05 mm (46).

Рис. 40–46. *Trichopeltis latellai* sp.n., паратип ♂ из пещеры Чанг-Ту Донг: 40, 43 и 44 — задняя часть тела, соответственно виды снизу, сзади и сверху; 41 — тельсон, вид снизу; 42 — коллум и сегменты 2–4, вид сверху; 45 — членики 5–8 антенны, вид сбоку; 46 — левый гонопод, вид снизу. Масштаб: 0,5 (40 и 42), 0,2 (43), 0,1 (41, 44 и 45) и 0,05 мм (46).



Figs 47–49. *Trichopeltis latellai* sp.n., ♂ paratype from Cave Chang Tu Dong, gonopods, sublateral, submesal and mesal views, respectively. Scale bar: 0.2 mm.

Рис. 47–49. *Trichopeltis latellai* sp.n., паратип ♂ из пещеры Чанг-Ту Донг, гоноподы, соответственно виды почти сбоку, почти изнутри и изнутри. Масштаб: 0,2 мм.

## Discussion

Neither of the above new species fully fits the diagnosis of *Trichopeltis* as given by Attems [1940] in that their ozopores lie dorsally, either partly or fully. The dorsal location of the ozopores as described by Cook [1896] for *T. watsoni* (which served him as the grounds for creating both *Otodesmus* and *Otodesmidae*) seems to be erroneous, since Attems [1936, 1940] was able to subsequently verify this character, based on new conspecific material deriving both from Myanmar and Darjeeling District, the Himalaya of India. Surprisingly, however, the fully dorsal position of the ozopores near the front margin at the base of the poriferous paraterga is indeed observed within *Trichopeltis*=*Otodesmus*, namely, in *T. latellai* sp.n. In general, the distribution of the ozopores in *Trichopeltis* appears to vary between species: they seem to lie ventrally in *T. bicolor*, *T. doriae*, *T. feae* and *T. watsoni*, entirely dorsally in *T. latellai* sp.n., or partly dorsally (only ozopore 5), but mostly ventrally in *T. deharvengi* sp.n.

It is *T. deharvengi* sp.n. that shows a remarkable, intermediate condition not only in ozopore location, but also as regards gonopod structure. Thus, since the gonotelopodite in this species is quite deeply notched, divided into a prominent anterior lobe and a higher posterior part, albeit neither bearing prominent processes, they can well be treated as two distinct branches by themselves. This notch is especially clear in Figs 24 & 25, somewhat marring the distinction between *T. bicolor* and *T. latellai* sp.n., on the one hand, and *T. doriae*, *T. feae* and *T. watsoni*, on the other

hand. It is also noteworthy that the gonopod telopodite in *T. deharvengi* sp.n. is abundantly denticulate on its lateral face, not on its medial face as observed in *T. bicolor*, whereas the remaining congeners are (nearly) devoid of such denticulations. In addition, *T. deharvengi* sp.n. stems from a high mountain in southern Vietnam, thus kind of bridging the distribution area of *T. bicolor* (Sumatra) with the ranges of the other, mainland congeners. So even the zoogeographic distinction emphasized earlier [Hoffman, 1973] is eroded.

In contrast, *T. latellai* sp.n. demonstrates a highly inconspicuous notch/step between the anterior, low, lobiform and the posterior, elevated part of the gonopod telopodite. So even if one adheres to the more radical viewpoint of Hoffman [1973, 1980], both *T. deharvengi* sp.n. and *T. latellai* sp.n. appear to be far more similar to the type species *T. bicolor* than to any other congener. So their assignment to *Trichopeltis* is anyway justified.

As a result, the following new diagnosis of *Trichopeltis* is proposed here, followed by a key to all of its six constituent species.

### *Trichopeltis* Pocock, 1894

= *Otodesmus* Cook, 1896, definitively synonymized by Attems [1936: 244].

Cryptodesmidae-Otodesminae with a rather small body (8–18 mm long, 2.8–5.5 mm wide) and 20 segments. Collum lobulated at front, lateral and caudolateral margins, densely tuberculate-setose, much broader than head. Metaterga evidently tuberculate-setose, with at least two irregular transverse rows of tubercula-

tions extending even onto paraterga. Latter very short and wide, strongly declivous, multilobulate at least at caudal and lateral margins. Ozopore formula normal, ozopores located near base of paraterga either entirely dorsally or partly dorsally and mainly ventrally, or entirely ventrally. Only ♂ coxae 7 (Fig. 35) or both ♂ coxae 6 and 7 distinctly separated to accommodate tips of gonopods (Fig. 8).

Gonopod aperture subcordiform, edges not elevated. Gonopods small, telopodites short to rather short, only slightly longer than coxae; latter either bare or poorly setose. Cannula usual, long, slender and falcate, usually not subtended by a median projection of coxa. Prefemoral (setose) part of telopodite taking up 1/3–1/2 extent, acropodite either distinctly branched (usually with three branches, including a conspicuous solenomere) or more or less deeply notched apically, seminal groove running entirely on mesal face to end on a more or less distinct caudo-apical solenomere.

Type species: *Cryptodesmus bicolor* Pocock, 1894

The genus currently encompasses six species, ranging from southern China in the north to Sumatra in the south, and from the Himalaya of India in the west to Vietnam in the east.

#### KEY TO *TRICHOPELTIS* SPECIES

1. Central parts of metaterga with 5–6 irregular transverse rows of setiferous tuberculations ..... 2
- Central parts of metaterga with 2–3 irregular transverse rows of setiferous tuberculations ..... 4
2. Gonopod telopodite 3-branched, solenomere slender. Myanmar ..... *T. doriae*
- Gonopod telopodite without long branches, only more or less deeply notched apically ..... 3
3. Body ca 12 mm long and 3.0 mm wide. Ozopores on paraterga 5 located dorsally, following ones only ventrally. Gonopod telopodite deeply notched, abundantly denticulate on lateral face (Fig. 27). Vietnam ..... *T. deharvengi* sp.n.
- Body ca 16 mm long and 4.8 mm wide. All ozopores located ventrally. Gonopod telopodite less deeply notched, abundantly denticulate on mesal face. Sumatra ..... *T. bicolor*
4. Coloration entirely pallid. Body ≤ 10 mm long and 2.8–2.9 mm wide. All ozopores located dorsally. Gonopods very poorly notched apically (Figs 46–49). Caves in Guizhou Province, China ..... *T. latellai* sp.n.
- Coloration brown. Body ≥ 15 mm long and ≥ 5.0 mm wide. All ozopores located ventrally. Gonopods 3-branched ..... 5
5. Front margin of paraterga abundantly lobulated. Solenomere lobe-shaped, tip nearly pointed ..... *T. feae*
- Front margin of paraterga entire, not lobulated. Solenomere axe-shaped, tip pointed ..... *T. watsoni*

#### Conclusion

As a result, even though *Trichopeltini* must be sunk under *Otodesmini*, while the discovery of *Trichopeltis deharvengi* sp.n. in Vietnam somewhat erodes the dis-

inction, both morphological and zoogeographic, drawn between these tribes, in general the classification of the *Otodesminae* as proposed by Hoffman [1973, 1980] remains solid and only slightly modified. With only a few genera (now even fewer, following the confirmed synonymy of *Trichopeltis* and *Otodesmus*) and just a handful of species involved, we strongly advocate the use of scanning electron microscopy in further studies on the *Cryptodesmidae* in Southeast Asia, as well as worldwide. It is the only modern technique capable of unequivocally demonstrating the location or even presence of numerous obscure structures, such as ozopores, tergal macrochaetae, micropilosity, limbus etc., which are otherwise too easy to overlook, but which often prove to be species-characteristic.

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#### References

- Attems C. 1899. System der Polydesmiden. II. Theil // Denkschriften der mathematisch-naturwissenschaftlichen Classe der Kaiserlichen Akademie der Wissenschaften. Bd.68. S.251–436.
- Attems C. 1914. Die indo-australischen Myriopoden // Arch. Naturgesch. Jg.80A. S.1–396.
- Attems C. 1936. Diplopoda of India // Mem. Ind. Mus. Vol.11. No.4. P.133–323.
- Attems C. 1940. Myriopoda 3. Polydesmoidea III. Fam. Polydesmidae, Vanhoeffeniidae, Cryptodesmidae, Oniscodesmidae, Sphaeritrichopidae, Peridontodesmidae, Rhachidesmidae, Macellophidae, Pandirodesmidae // Das Tierreich. Lfg.70. S.i–xxxii+1–577.
- Cook O.F. 1896. *Cryptodesmus* and its allies // Brandtia. No.5. P.19–28.
- Golovatch S.I., Geoffroy J.-J., Mauriès J.-P., VandenSpiegel D. 2009a. Review of the millipede family Haplodesmidae (Diplopoda: Polydesmida), with descriptions of some new or poorly-known species // ZooKeys. Vol.7. P.1–53.
- Golovatch S.I., Geoffroy J.-J., Mauriès J.-P., VandenSpiegel D. 2009b. Review of the millipede genus *Eutrichodesmus* Silvestri, 1910 (Diplopoda: Polydesmida: Haplodesmidae), with descriptions of new species // Ibid. Vol.12. P.1–46.
- Hoffman R.L. 1973. A new millipede of the genus *Chonodesmus*, with a proposed reclassification of the family *Cryptodesmidae* (Diplopoda, Polydesmida) // Studies Neotrop. Fauna. Vol.8. P.179–193.
- Hoffman R.L. 1980. Classification of the Diplopoda. Mus. Hist. nat. Genève. 237 pp.
- Jeekel C.A.W. 1955. Milliped miscellany II // Entom. Berichten. Deel 15. P.412–417.
- Pocock R.I. 1894. Chilopoda, Symphyla and Diplopoda from the Malay Archipelago // Weber M. (Hrsg.). Zoologische Ergebnisse einer Reise in Niederländisch Ost-Indien. Bd.3. S.307–404.
- Pocock R.I. 1895. Viaggio di Leonardo Fea in Birmania e regioni vicine LXVII. The Myriopoda of Burma, Pt. IV. Report upon the Polydesmoidea collected by Sig. L. Fea, Mr. E.W. Oates and others // Ann. Mus. Civ. Stor. Nat. Genova. Ser.2. Vol.14(34). P.787–834.