Zeitschrift: Archives des sciences et compte rendu des séances de la Société
Herausgeber: Société de Physique et d'Histoire Naturelle de Genève
Band: 35 (1982)
Heft: 1

Artikel: A new genus and species of doratodesmid milliped from Thailand
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DOI: https://doi.org/10.5169/seals-740552

Arch. Sc. Genève	Vol. 35	Fasc. 1	pp. 87-93	1982

A NEW GENUS AND SPECIES OF DORATODESMID MILLIPED FROM THAILAND

BY

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With 8 figures

ABSTRACT

A new genus and species of doratodesmid milliped is described as *Dyomerothrix gremialis* from material taken in a cave at Chiang Dao, northwestern Thailand. Gonopod structure suggests relationship with *Ascetophacus* from the Malay Peninsula, but ornamentation of the metaterga is unique for the Doratodesmidae if not for all Polydesmida. Notes on related forms are provided, including justification for the reference of *Eutrichodesmus* to this family.

The family Doratodesmidae was proposed by O. F. Cook in 1896 to accomodate the monotypic genus *Doratodesmus*. Additional species, thought to be congeneric with *D. vestitus* (Pocock), were named in subsequent years, but the familial status suggested by Cook was opposed by Graf Attems (1899 and many later papers) with the result that *Doratodesmus* itself languished as a sort of nomen inquirendum until Jeekel (1955) redescribed the type species and gave a drawing of its gonopod structure. Generally *Doratodesmus* has been carried on through the literature as a presumptive member of the family Oniscodesmidae.

Owing to the recent availability of diverse fresh material, knowledge of the group has been greatly augmented in the past decade. In three papers (1976*a*, 1976*b*, 1978) I have revived the family as a valid taxon quite different from the Oniscodesmidae, described some new genera and species from Malaya and New Guinea, and established as doratodesmids some inadequately defined taxa of earlier authors. At present, the family is considered to include nine genera and 13 species, distributed from Thailand and Japan south to Java and New Guinea.

Since the soil fauna of Southeast Asia has been so poorly sampled heretofore, it is obvious that a long way remains to go in the discovery of the smaller kinds of millipeds, certainly including doratodesmids. But a step in this journey has been made

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with the collection in northern Thailand of an undescribed genus and species of this family that helps fill in a distributional lacuna and enhances our knowledge of anatomical variation.

Dyomerothrix gen. nov.

(Gk. *dyo*, two + *meros*, part + *thrix*, bristle)

Type species: *D. gremialis*, sp. n., from Thailand.

Diagnosis: A genus of minute doratodesmids in which the metaterga are ornamented with three transverse rows of truncate conical tubercles each with an apical rosette of flat, bacilliform setules and a long, bisegmented median sensory macroseta. Body with 20 segments in both sexes, capable of volvation into a loose coil. Paranota large, narrowed toward the base, directed almost vertically, typically with four lateral lobes. Ozopores not detected. Collum strongly arched, its anterior edge crenulate, parnota of 2nd segment flabellately enlarged, with four large lateral lobes, but not marginally modified to accomodate other paranota during volvation. Gonopods unusually large, appearing longer than adjacent legs; coxae of typical polydesmoid form, with apicoventral projection but apparing to lack ventral concavity for retraction of telopodites; latter long and slender, similar to that of *Ascetophacus*, prostatic groove curving around to lateral side at about midlength and debouching at a subterminal setose lobe, distal end bifurcate.

Distribution: Known so far only from the type locality of the single included species.

Dyomerothrix gremialis sp. n. (figs. 1-8)

Material: Male holotype, two male and two female paratypes (Mus. Genève) from "grottes de Chiang Dao" [19.23 N, 98.59 E], Thailand, Pierre Strinati leg. 15 February 1975.

Holotype: Adult male, exact length indeterminate owing to curvature and breakage but near 6.0 mm., maximum width 1.2 mm. near anterior end, segments

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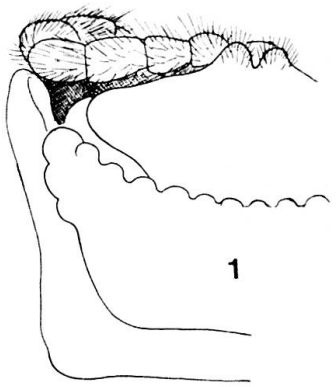
FIGS. 1 to 8. — *Dyomerothrix gremialis*, sp. n.

Fig. 1. Right side of head, collum, and 2nd segment, dorsal aspect. — Fig. 2. Right side of head, collum, and 2nd and 3rd segments, lateral aspect. — Fig. 3. Segment 3, posterior aspect, to show pronounced flattening of dorsal surface. — Fig. 4. Segment 8, right side in dorso-lateral aspect. — Fig. 5. Highly magnified optical section through a dorsal tubercle showing dispersal of setae and connection of sensory macroseta to sensory nerve (stippled). — Fig. 6. Posterior end of body (segments 18-20), left side, lateral aspect. — Fig. 7. Right gonopod, lateral aspect, slightly oblique. — Fig. 8. Left gonopod, greatly magnified, mesal aspect. Letters correspond to those in my 1977 paper, Fig. 7, except *g* which represents a pointed flange unique to *Dyomerothrix*. Figures drawn ×90 except Fig. 7 (×150) and Figs. 5 and 8 (×300). Drawings from holotype.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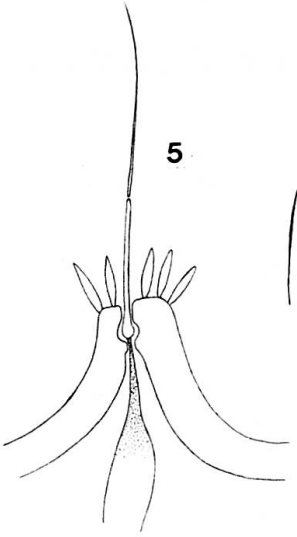
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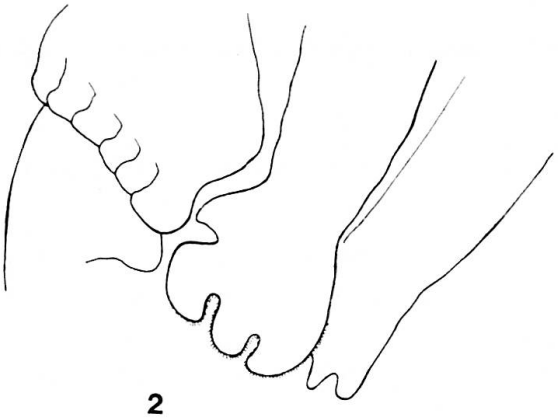
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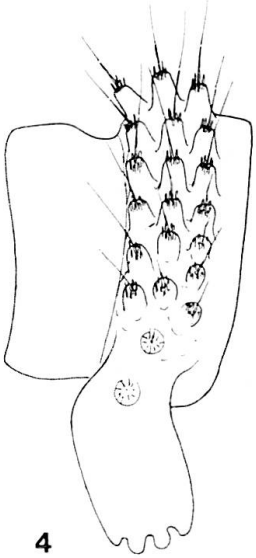
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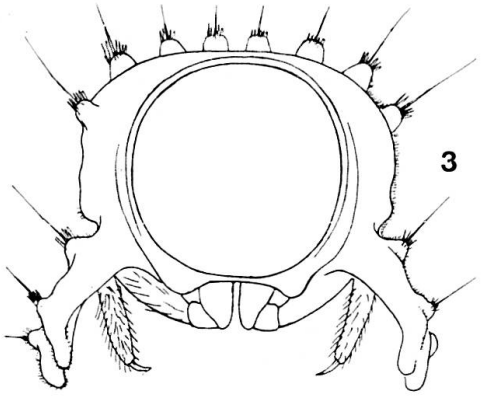
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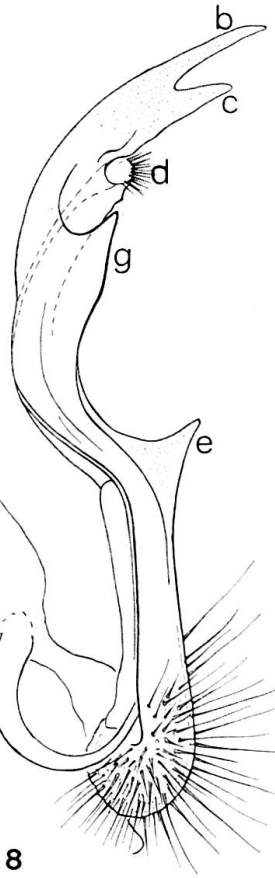
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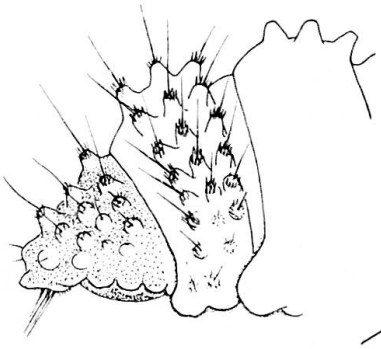
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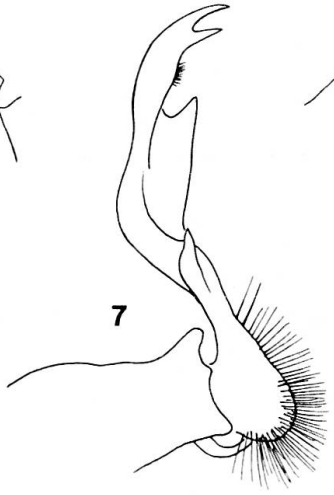
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gradually narrowed posteriad. Body slender, capable of rolling into a loose spiral; integument soft and poorly calcified, virtually colorless when surface layer of soil is removed.

Body segments varying somewhat in shape: 2nd to 5th metaterga distinctly flattened dorsally, sides nearly perpendicular (Fig. 3), from 6th to about midbody metaterga become nearly semicircular in cross-section, with paranota continuing dorsal curvature, posterior to midbody segments are less highly arched and paranota somewhat more divergent from the vertical. Body width greatest near anterior end, presumably an adaptation for volvation.

Head rather small, of typical polydesmoid form with labral area narrow and prolonged ventrad, surface finely granular with numerous scattered setae; lower part of epicranium produced into two paramedian lobes adjacent to upper edge of antennal sockets. Antennae moderately long, articles increasing in size up to 6th, 7th abruptly smaller. Outer distal surface of 6th article with distinct circular sensory pit.

Segments notably constricted medially, stricture deep but poorly defined. Metaterga of most segments with three transverse rows of truncate conical projections (Figs. 3, 4, 6), usually from 8 to 12 in each series, members of the three rows essentially congruent or the median series slightly offset from the 1st and 3rd. Projections structurally unique in the family in having an apical circle of short bacilliform setules surrounding a large, median, sensory hair which is jointed near its midlength (Fig. 5); smaller but similar tubercles occur also on dorsal surface of paranota. Projection rows occupy anterior two-thirds of metaterga, beginning at edge of stricture, leaving posterior third smooth and polished.

Paranota relatively wide, on anterior segments extending out from lower half of body cylinder at about a 45° angle, thence abruptly bent directly ventrad (Fig. 3); on midbody and posterior segments more evenly continuing curvature of dorsum. Anterior and posterior edges smooth except for dense fine marginal pubescence; lateral ends somewhat variable in form but typically with three marginal notches producing four lobes, the median two rounded, the others subangular. No trace of ozopores visible (magnification of X 90). Paranota smaller posteriorly, by segment 19 reduced to vestigial, bilobed flanges hardly projecting free of body, with low bluntly rounded posterior corner (Fig. 6).

Segment 20 of normal size and form, its dorsal surface set with more or less three irregular rows of conic projections; lateral edge crenulately lobed; apex of epiproct bent ventrad, the apical setae invisible in dorsal aspect. Paraprocts and hypoproct small, finely granular, conjointly forming a nearly plane horizontal surface; hypoproct more or less trapezoidal in outline; paraprocts without evident mesal rims.

Sterna extremely narrow, coxae virtually in contact mesially. Legs long and slender, of typical polydesmoid form, none of the anterior legs with enlarged podomeres or other modification.

Gonopod aperture large, transversely ovoid; coxae large, distal half projecting free beyond rim of aperture, with small but distinct apico-ventral projection on lateral side. No distinct concavity on ventral surface, as telopodites are far too long to be readily accomodated. Telopodites long and slender, the distal half curved posteriad, basal half nearly straight, the two halves separated by a slight flexure and marked by a triangular lamella apparently homologous to process "e" in *Ascetophacus macclurei* (cf. Hoffman, 1977*a*, fig. 7). Prostatic groove terminating in a marginal opening fringed with fine setae (d), beyond which telopodite terminates in two subequal elongate points. Groove opening subtended on mesal side by acute projecting lamella (g) not present in *Ascetophacus*.

Remarks: Judged from the lack of pigmentation in freshly preserved specimens and reduced calcification of the body wall, this species may perhaps be justly considered as a troglobite (unless by chance all of the five specimens were taken in a teneral condition). A similar softness of the integument was noted for *Cerastelachys cavernicola* (Sinclair) from the Malay Peninsula (Hoffman, 1977*b*: 709) but attributed to the effect of long preservation. By contrast the equally small species *Scolopopyge pholeter* and *Selminarchus hispidus* (Hoffman, 1998) from New Guinea appear to be normally calcified although also depigmented.

The specific name "*gremialis*" is a Latin adjective meaning "growing in a cluster from a stump" and precisely describes the appearance of the blunt metatergal projections with their crown of short setules.

TAXONOMIC NOTES ON RELATED MILLIPEDS

Discovery of the remarkable tergal projections surmounted by two kinds of setae led to a search through the literature for mention of any sort of comparable structures. This search led eventually not to another doratodesmid but to the small synanthrope *Cylindrodesmus hirsutus* (Pocock), figured by Attems in 1900. As shown by that author (1900: fig. 8) many of the longer setae that are dispersed through the profuse tergal pubescence of this species are distinctly bisegmented, although not arising from evident tubercles. Presumably such structures are sensory receptors in *Cylindrodesmus* likewise. Despite the lack of obvious similarity in body form, this genus — the type of the small family Haplodesmidae — is reasonably close to doratodesmids in terms of gonopod structure and the two groups are now placed side-by-side in the superfamily Polydesmoidea. Possibly future investigations will discover additional specializations shared by various haplodesmid and doratodesmid species. Maybe even some shifting of genera from one to the other will be mandated.

Examination of the figures in Attems' 1900 paper yielded an unexpected dividend, in that the same plate illustrating *Cylindrodesmus* also has some drawings of *Hyper-*

othrix orophura, a small polydesmid endemic to the Seychelles. This genus has experienced a somewhat vagrant taxonomic history, starting with its proposal in Attems' originally ordinal-sized family Polydesmidae. By 1914 Attems decided to refer *Hyperothrix* to the Oniscodesmidae, and did not alter this opinion in any of his later works. On the other hand, Brolemann (1916) though that *H. orophura* looked more like a cryptodesmoid, and placed it, with *Aporodesmus* and several other African genera, in the subfamily Aporodesminae. Mauriès, the only worker since Attems to see actual material, followed Attems' placement in his report (1980) on millipeds from the Seychelles. In working up the small polydesmoids for my recent classification (1980) I felt that *Hyperothrix* wasn't really an oniscodesmoid, but having no better solution I evaded the problem by referring the genus to the limbo of "Polydesmidea of uncertain status and family position."

Now, having seen the original drawings and description of *Hyperothrix* in the light of *Dymerothrix*, I think that I (and perhaps also Brolemann) erred by paying too much attention to Attems' drawing of a somewhat expanded specimen with widely separated segments, and not enough to the verbal account with its numerous solid facts ("Halsschild... sehr gewölbt; Rucken stark gewölbt, mit herab gebogenen Kiele; Ventralplatten sehr schmal" and so on). Now that fresh material of *orophura* is available, an evaluation of the generic position is possible and imperative, and may in fact show that *Hyperothrix* is not distantly related to the doratodesmids, if in actuality not confamilial with them.

It may be of interest to note the coincidence, that the name *Dyomerothrix* had been invented for several days before *Hyperothrix* entered the picture; the latter thus in no way influenced the origin of the former.

My 1978 paper on New Guinea cave millipeds added *Eutrichodesmus* (Silvestri, 1910) to the roster of known doratodesmid genera but without a word of comment or justification. This taxon, and its single species *E. demangei* Silvestri, was proposed in no family at all, and opinion by subsequent specialists has varied. Attems (1914) placed it in his new family Vanhoeffenidae near *Trichopolydesmus* and *Nearctodesmus ;* Brolemann (1916) thought a better fit could be found in the family Polydesmidae, tribe Peridontodesmini, along with mostly Nearctic genera. Attems continued his original usage in all subsequent papers; Brolemann apparently never returned to the subject of *Eutrichodesmus*. I have seen no specimens of the genus, yet Silvestri's brief verbal account and single gonopod drawing suggest no option beyond the Doratodesmidae: he stated that the body can roll into a spiral, that the paranota of the second segment are enlarged, that the metaterga are ornamented with rows of setigerous tubercles, and that the sterna are very narrow. The gonopod, drawn very clearly in mesal aspect, settles any doubts by its striking similarity to that of *Ascetophacus* and *Dyomerothrix*. It is indeed possible that a close proximity, structural as well as geographic, will be recognized between *Dyomerothrix* and *Eutrichodesmus* when material of the latter genus has been studied.

The number of confirmed doratodesmid genera thus stands now at ten, only four years after the family was ressurrected from obscurity and neglect. Doubtless we have only just crossed the threshhold in the discovery of the extent and diversity of the Doratodesmidae.

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