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Koponenius gen. nov., a new genus of the millipede family Haplodesmidae from the Himalayas of India and Nepal (Diplopoda: Polydesmida)

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Abstract

The first, apparently westernmost indigenous representatives of Haplodesmidae are reported, from the Himalayas of Nepal and India. Both new species belong to a new genus, *Koponenius* gen. nov., with *K. unicornis* sp. nov., the type species from Darjeeling District, NE India, and *K. biramus* sp. nov., from Nepal. The new genus is superficially very similar to *Prosopodesmus* Silvestri, 1910, most species of which seem to be native to tropical Australia, partly also to southern Japan. However, *Koponenius* gen. nov. is easily distinguished in showing only 19 body segments, a special ozopore formula (5, 7–18), 4 transverse rows of setigerous isostictic tubercles per postcollum metatergum, and a clearly helicoid, twisted prefemoral portion of the gonopod so that the seminal groove runs mostly laterally, not mesally.

Key words: Diplopoda, Haplodesmidae, taxonomy, new genus, new species, key, Nepal, India

Introduction

The rather small East Asian to Australasian millipede family Haplodesmidae has recently been reviewed and shown to contain 70+ species from 6 accepted genera (Golovatch *et al.* 2009a, 2009b, 2010; Mesibov 2009, 2012, 2013; Liu & Tian 2013). Of them, 40 currently belong to the largest and especially widespread genus *Eutrichodesmus* Silvestri, 2010, which ranges from southern Korea, southern Japan and Taiwan in the northeast, through southern continental China, Indochina, Malay Peninsula and Indonesia, to New Guinea and Melanesia in the southeast. Thus, the indigenous distribution of this genus largely repeats that of the entire family, except for its absence from Australia.

Few haplodesmid species have attained larger distributions and this is through human introductions, e.g. the largely pantropical *Cylindrodesmus hirsutus* Pocock, 1889, *Prosopodesmus jacobsoni* Silvestri, 1910 and *P. panporus* Blower & Rundle, 1980 (Golovatch *et al.* 2001; Mesibov 2012). Most species have localised distributions, including many species that seem to be troglobites (Golovatch *et al.* 2009a, 2009b; Liu & Tian 2013). The westernmost indigenous records of *Eutrichodesmus*, and of Haplodesmidae, were previously in the Yunnan Province, southern China (Golovatch *et al.* 2009a, 2009b). All the more important is the discovery of two new haplodesmids from the Himalayan regions of Nepal and India, both these species being epigean and representing a new genus. A new key is provided to all 7 currently known genera of Haplodesmidae.

Material and methods

Part of the material treated below had been taken in Nepal and long ago sent to us for identification by Jochen Martens (Mainz University, Germany). Additional samples, from India, have recently been provided by Konstantin Tomkovich (Moscow, Russia). The holotype and most of the paratypes of the Nepalese species are housed in the Senckenberg Museum, Frankfurt/M. (SMF), Germany, with only a few duplicates deposited in the collection of the

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Key to the known genera of Haplodesmidae, based mainly on male characters:

1 Body more or less pyrgodesmid-like, not capable of volvation, with rather well developed and strongly declivous paraterga. Head largely invisible from above, being concealed under a large, flabellate, usually clearly lobulated collum. Ozopores usually borne on porosteles 2

– Body either vermiform, subcylindrical, not capable of volvation and devoid of paraterga starting from segment 3 or "doratodesmid", with or without mid-dorsal projections, but always with well-developed and strongly declivous paraterga, typically capable of complete conglobation. Porosteles mostly absent 3

2 Collum's fore margin strongly 12-lobulated. Body with 20 segments. Postcollum metaterga with 3 transverse rows of tuberculations. Entire gonopod telopodites falcate, uniramous, seminal groove mesal, usually terminating in a hairy pulvillus. . . . . *Prosopodesmus* Silvestri, 1910

– Collum's fore margin either regularly rounded and only vaguely lobulated or with a prominent median projection at fore margin. Body with 19 segments. Postcollum metaterga with 4 transverse rows of tuberculations. Only distal halves of gonopod telopodites curved caudad, uni- or biramous, seminal groove running mostly on lateral side, terminating on a simple and slender solenomere devoid of a hairy pulvillus . . . . . *Koponenius* **gen. nov.**

3 Body vermiform, subcylindrical, not capable of volvation, with paraterga 2 rather well developed, but following ones represented mostly by lateral swellings. Gonopods simplified 4

– Body "doratodesmid", with or without mid-dorsal projections; mostly capable of complete conglobation, with paraterga 2 always very strongly enlarged laterally, all following paraterga more or less strongly declivous while collum somewhat reduced. Gonopods usually rather elaborate 6

4 Body with 19 (male) or 20 (female) segments, collum and all following metaterga with abundant setation in part represented by long, bisegmented, tactile setae. Gonopods especially simple; telopodite = solenomere sometimes with a lateral outgrowth at midway; seminal groove terminating subapically and devoid of a hairy pulvillus. . . . . *Cylindrodesmus* Pocock, 1889

– Body with 19 or 20 segments regardless of sex, collum and all following metaterga without abundant irregular setation, usually tuberculate. Paraterga 2 rather well developed, but following ones mostly represented by lateral swellings. Gonopods aberrant. 5

5 Body with 19 segments. Collum still large, covering the head from above, with 4–5 transverse rows of setigerous tubercles or pits. Following paraterga with three rows of similar tubercles or pits. Gonopods with poorly setose gonocoxae and a considerably shortened prefemoral (= setose) part, deeply biramous thereafter, with a very long and flagelliform solenomere devoid of a hairy pulvillus. . . . . *Helodesmus* Cook, 1896

– Body with 19 or 20 segments. Collum small, not covering the head from above; tergal trichome wanting. Metaterga often irregularly multituberculate. Gonopod coxae virtually bare and reduced; telopodites strongly geniculate at about midway, with neither a coxal cannula nor a seminal groove . . . . . *Agathodesmus* Silvestri, 1910

6 Gonopod telopodite typically stout and strongly enlarged laterally towards end of femorite, with or without a short solenomere branch thereafter; acropodite variable, from absent to well-developed . . . . . *Doratodesmus* Cook *in* Cook & Collins, 1895

– Gonopod telopodite usually slender, not enlarged towards end of femorite, but with a more or less distinct process or outgrowth laterally, opposite recurvature point of seminal groove; solenomere thereafter taking up most of telopodite, sometimes elaborate; seminal groove terminating distally to subapically, with or without a hairy pulvillus; acropodite small to nearly absent. . . . . *Eutrichodesmus* Silvestri, 1910

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