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The first troglobitic *Glomeridesmus* from Brazil, and a template for a modern taxonomic description of Glomeridesmida (Diplopoda)

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Abstract

Glomeridesmus spelaeus **n. sp.**, the first Glomeridesmida described from Brazil and only the second known troglobiont of the order, is described from iron caves of the Amazonian. This description is the first in the order Glomeridesmida since 1975, and also the first utilizing modern techniques like SEM. Numerous taxonomic characters, some employed in recent studies of other millipedes, are described, illustrated, and compared for the first time in the Glomeridesmida, building a foundation for future phylogenetic studies, as well as future descriptions of new members of this basal, enigmatic, and still little-known millipede order. The first photographs of a living Glomeridesmida, as well as anecdotal live observations, are presented. The description of *G. spelaeus* is also important from a conservation point of view, since the cave system it inhabits is under anthropogenic pressure due to planned mining activities.

Key words: Glomeridesmida, caves, iron ore, conservation, Neotropics, Brazil

Introduction

The basal most order (Sierwald & Bond 2007) of chilognath millipedes are the Glomeridesmida, sole members of the superorder Limacomorpha (Hoffman 1980). Glomeridesmida are ill-explored and little known, but possess several plesiomorphic traits. Their appearance might come very close to the hypothetical ground-pattern representative of chilognath Diplopoda (Enghoff 1990). Glomeridesmida are intermediate between pill millipedes (subclass Pentazonia) and the remaining millipedes (subclass Helminthomorpha) and are viewed by some authorities as being ancestral to both groups (Hoffman 1982), while they are resolved in most phylogenies as sister taxon to either Glomerida or Sphaerotheriida (Sierwald et al 2003, Sierwald & Bond 2007).

Glomeridesmida are, after the Siphoniulida (two species, Sierwald *et al.* 2003) and Siphonocryptida (six species, Enghoff 2010), the millipedes with the lowest number of described species. The order contained until now only 31 species (26 Glomeridesmidae, 5 Termitodesmidae, Jeekel 2003). In fact, so little is known about this order that the history of its discovery can be reviewed in a few sentences. The first member of the order was described by Gervais in 1844 from Colombia, and no additional species were described until 1894, from Sumatra of all places, as well as the Lesser Antilles (Pocock 1894a, 1894b). Pocock remarked in the first sentence (1894a, p. 36): "Undoubtedly the most interesting and important feature in the Antillean Diplopod fauna brought to light ....is the discovery, or rather rediscovery, of *Glomeridesmus*. This genus has been a puzzle to systematists for upwards of half a century.... " This rediscovery of the order was followed by the description of a few species from Ecuador (Silvestri 1903), Java (Attems 1907) and the Caribbean (Chamberlin 1918, 1922, 1923), as well as the discovery of the enigmatic family Termitodesmidae as obligate commensals of termites in Sri Lanka (Silvestri 1911a, 1911b), India (Hirst 1911, 1913) and Vietnam (Attems 1938). The first male representative of the order Glomeridesmida was not discovered until much later (Loomis 1936), and not formally recognized for another five years (Carl 1941). Before, the extraordinary long ovipositors of the female (see Fig. 3B) were viewed as male penes. Males are still unknown for the family Termitodesmidae, while within the Glomeridesmidae, males are known only for six of the

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