



Detailed iconography of the widespread Neotropical millipede, *Myrmecodesmus hastatus* (Schubart, 1945), and the first record of the species from the Caribbean area (Diplopoda, Polydesmida, Pyrgodesmidae)

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Abstract: The small-bodied millipede, *Myrmecodesmus hastatus* (Schubart, 1945), which seems to be strongly associated with ant and termite nests, and currently populates much of South America, is recorded from Martinique for the first time. Abundant, mostly SEM illustrations are provided to facilitate its recognition. This record strongly extends its distribution to also cover the Antilles.

Key words: Diplopoda, *Myrmecodesmus*, myrmecophily, termitophily, synthropization, Neotropics

INTRODUCTION

The small-bodied, cryptic millipede *Myrmecodesmus hastatus* was first described as the type and only species of the genus *Gonographis* Schubart, 1945: *G. hastata* Schubart, 1945, from Distrito Federal, Brazil (1945). A little later, the same species was again described as new: *Lophodesmus inquilinus* Silvestri, 1947, from one locality in Argentina and two in Brazil (Silvestri 1947). Their formal synonymy was advanced by Schubart (1954).

Golovatch (2000) synonymized *Gonographis* with *Myrmecodesmus* Silvestri, 1910, and the latter genus has become one of the largest within the family Pyrgodesmidae. At the moment, *Myrmecodesmus* has as many as 11 generic synonyms and more than 30 valid species, all American (Hoffman 1999). The distribution pattern is pan-Neotropical, ranging from Florida, Alabama, Mississippi, Louisiana and Texas in the USA in the north (Shelley 2004) to Argentina in the south. The bulk of *Myrmecodesmus* species diversity is confined to Central America together with the Caribbean, whereas only a few species inhabit southern North America and entire South America (Golovatch & Adis 2004). However, in South America at least, in contrast to any congener, one of the four currently described species, viz., *M. hastatus*, has attained a particularly vast distribution, a fact presumably accounted for by its special ecological traits.

Known records of *M. hastatus* have been summarized and mapped (Golovatch & Adis 2004). This species is remarkably widespread over much of South America, being associated with human settlements, plantations, gardens, as well as termitaria and ant nests in Brazil, Peru and Argentina. The records show clear-cut inclinations of *M. hastatus* to dwelling in open habitats, often if not always in association with ants and/or termites. In *Myrmecodesmus*, as

implied by the generic name, there are several species that can be termed as formi- and/or termiticoles. Some of these, like numerous other myrmeco- or termitophiles, are indeed relatively widespread, especially when the host species of ant or termite occupies a wide geographical area (cf. Schubart 1947). This concerns at least *M. formicarius* Silvestri, 1910, known from Vera Cruz, Mexico north and east through the Texas coastal plain as far as Louisiana, U.S.A. (Hoffman 1999, Shelley 2004). However, *M. hastatus* appears to be especially widely distributed, ranging over much of South America from Amazonia in the north to northern Argentina in the south.

The present note puts on record the occurrence of *M. hastatus* as far north as the Antilles. In addition, the species is abundantly illustrated, including SEM micrographs, to facilitate its recognition.

MATERIAL AND METHODS

The underlying material comes from various places on Martinique, Lesser Antilles. As it was mostly represented by juveniles and females, it had remained unidentified until the quite recent collection of males.

All material treated here belongs to the collection of the Muséum national d'Histoire naturelle, Paris, France. The samples are stored in 70% ethanol. Specimens for scanning electron microscopy (SEM) were air-dried, mounted on aluminium stubs, coated with gold and studied using a JEOL JSM-6480LV scanning electron microscope.

FAUNISTIC AND TAXONOMIC PART

The following *M. hastatus* samples from Martinique are kept in the Paris Museum collection:

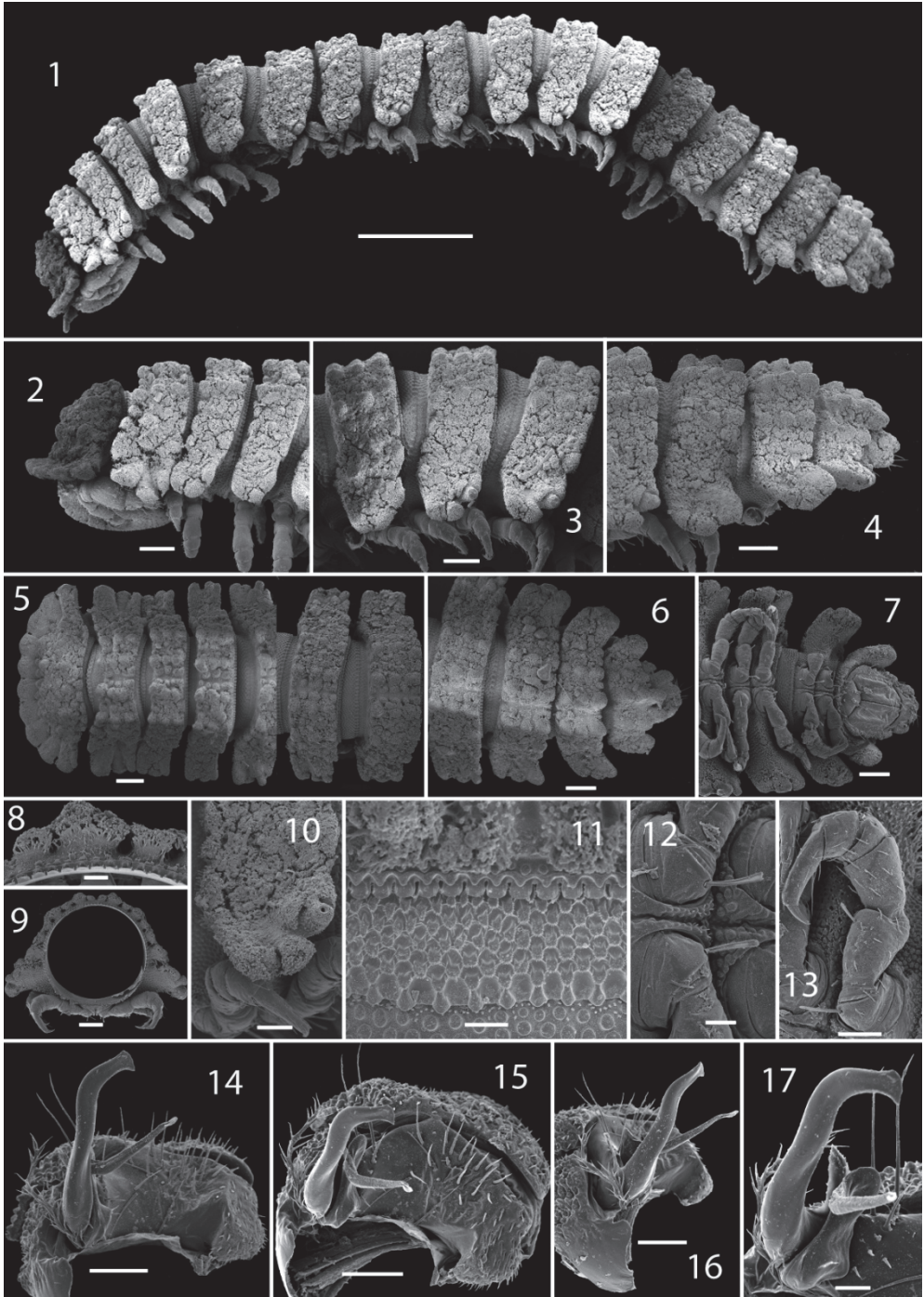
Material examined. 1 juv.: Les Anses d'Arlet, under stones 0.5 km N of Anses d'Arlet, 11 Nov 1978; 3 juv.: Grand'Rivière, near beach, Anse Morne Rouge, dead tree, 20 Feb 1981, all leg. J.-M. Thibaud; 3 females, 7 juv.: Gros-Morne, 6 km NE of Gros-Morne, forest between Morne Bellevue and Morne de l'Étang, 600–690 m a.s.l., dead leaves and wood, 11 Feb 1981; 1 juv.: Trinité, near île Caravelle, under dry log between l'Oratoire and meteo station, 80–115 m a.s.l., 12 Feb 1981; 29 juv.: Morne Rouge, Trace des Jésuites, right bank of Lorrain River, 400–500 m a.s.l., dead wood and bamboo, 13 Feb 1981; 8 juv.: Rivière-Pilote, Anse Figuier, under bark of Cocos palm lying on sand, 24 Feb 1981; 1 juv.: Grand'Rivière, path to Morne Macouba (massif Montagne Pelée), S of savanna Anatole, forest, 550–600 m a.s.l., dead wood and leaves, 26 Feb 1981; 4 females, 2 juv.: Grand'Rivière, Morne aux Gueules (path to Montagne Pelée), cultivated land, 26.II.1981; 3 females: Fonds-Saint-Denis, Pitons du Carbet, between sides at 1100 and 1120 m a.s.l., SSE of Piton Boucher, bush savanna, mosses and dead wood, 27 Feb 1981, all leg. J.-P. Mauriès; 2 males, 9 juv.: Saint-Pierre, rocks, sugar cane, 80 m a.s.l., 02 Mar 2015, leg. M. Coulis.

Remarks. As seen from the above records, *M. hastatus* is remarkably widespread on Martinique, ranging from nearly sea-level to mountain tops above 1100 m in elevation. Although there are no direct observations on the labels of its association with ants or termites, dead wood in the tropics is known to be widely populated and destroyed by termites.

Both available males were studied in detail to reveal the species identity. The results are presented in Figs 1–20. There can be no doubt now that the Martinique samples belong to *M. hastatus*. The spinulate flagellum (**fl**) arising at the base of a simple, more or less sigmoid solenomere (**sl**) is especially characteristic (Figs 14–17 & 20). SEM iconography demonstrates all features typical of a small cryptic pyrgodesmid, including a flabellate collum that fully covers the head from above, the differentiated tuberculations and lobulations on the

metaterga, the porosteles, the well-developed ceratagument on the metazonae, etc. However, only gonopod characters are decisive for a proper species determination.

This provides the first evidence of the presence of *M. hastatus* in the Caribbean.



Figs 1–17. SEM micrographs of a male of *Myrmecodesmus hastatus* (SCHUBART, 1945), from Saint-Pierre, Martinique: habitus, lateral view (1); anterior part of body, lateral and dorsal views, respectively (2 & 5); midbody segments, lateral view (3); caudal part of body, lateral, dorsal and ventral views, respectively (4, 6 & 7); metatergal microsculpture, caudal view (8); cross-section of a midbody segment, caudal view (9); midbody paratergite, lateral view (10); tergal microsculpture with limbus, dorsal view (11); midbody sternite, ventral view (12); midbody leg, lateral view (13); left gonopod, submesal, subventral, subcaudal and mesal views, respectively (14–17). Scale bars: 0.5 mm (1), 0.1 mm (2–7 & 9), 0.05 mm (10 & 13–13), 0.02 mm (8, 11 & 12).

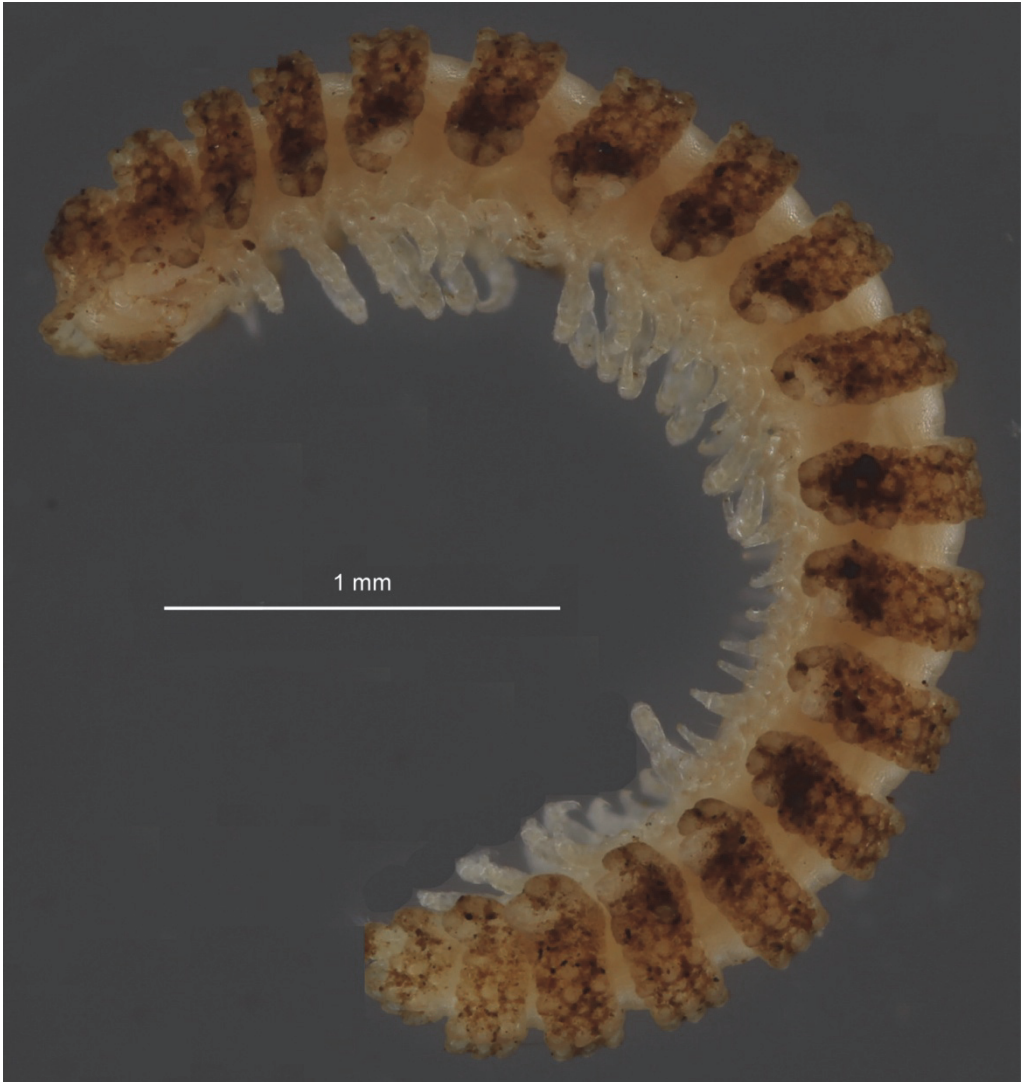
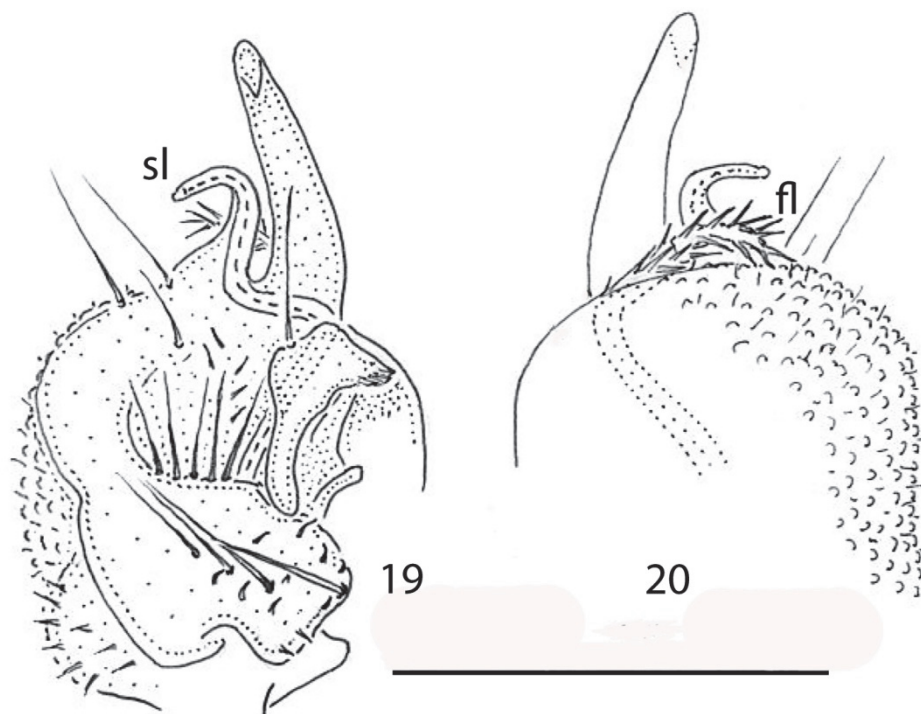


Fig. 18. Habitus of a male of *Myrmecodesmus hastatus* (Schubart, 1945), from Saint-Pierre, Martinique, lateral view. Picture by D. VandenSpiegel.



Figs 19 & 20. Right gonopod of a male of *Myrmecodesmus hastatus* (Schubart, 1945), from Saint-Pierre, Martinique, subventral and subdorsal views, respectively. Scale bar: 0.2 mm. Del. S. Golovatch. Designations: fl – flagellum; sl – solenomere.

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STRESZCZENIE

[Szczegółowa ikonografia krocionoga *Myrmecodesmus hastatus* (Schubart, 1945) szerokorozprzestrzenionego w Neotropiku i pierwsze stwierdzenie tego gatunku w obszarze Karaibów (Diplopoda, Polydesmida, Pyrgodesmidae)]

Niepozorny krocionóg *Myrmecodesmus hastatus* (Schubart, 1945), który wydaje się być silnie związany z gniazdami mrówek oraz termitów, występuje na większości obszarów Ameryki Południowej, a obecnie został stwierdzony na Martynice. W artykule zaprezentowano szczegółową ikonografię gatunku z licznymi ilustracjami spod mikroskopu skaningowego, umożliwiające identyfikację krocionoga. Stwierdzenie *M. hastatus* na Martynice znacznie rozszerza zasięg jego występowania, obejmujący także Antyle.

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