

Brief Communication / Comunicación Breve

First record of *Trachypauropus cordatus* (Scheller, 1974) (Tetramerocerata: Eurypauropodidae) in South America, with a summary of Pauropoda in Colombia

Primer registro de *Trachypauropus cordatus* (Scheller, 1974) (Tetramerocerata: Eurypauropodidae) en Sur América, con un resumen de Pauropoda en Colombia

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Abstract. Pauropods are small myriapods that inhabit the soil matrix and are possibly one of the least known groups of arthropods in Colombia. Information about this group in the country is practically nonexistent, with only two species recorded and no ecological work mentioning them. In this paper, I report for the first time in South America and Colombia the family Eurypauropodidae with the species *Trachypauropus cordatus* (Scheller, 1974), an endemic species from the Euro-Asian region possibly introduced to the country.

Key words: Eurypauropodidae; soil fauna; urban fauna; Andes; Bogota D.C.

Resumen. Los paurópodos son pequeños miriápodos que habitan la matriz edáfica y son posiblemente uno de los grupos de artrópodos menos conocidos en Colombia, ya que la información sobre este grupo en el país es prácticamente inexistente con solo dos especies registradas y ningún trabajo de ecología en el territorio que los mencione. En esta publicación se registra por primera vez en Sur América y Colombia a la familia Eurypauropodidae con la especie *Trachypauropus cordatus* (Scheller, 1974), especie endémica de la región euro-asiática posiblemente introducida al país.

Palabras clave: Eurypauropodidae; fauna del suelo; fauna urbana; Andes; Bogota D.C.

Pauropoda is the smallest class (with regards to body size) among the Myriapoda (0.2-2.0 mm). They differ from other myriapods by having a unique set of antennae composed by a shaft of 4 or 6 segments, which distally project into the tergal and sternal branches. Over 860 species (Scheller 2011; Gao & Bu 2023) of Pauropoda are known worldwide, and they are considered a cosmopolitan group closely tied to the soil system. Pauropods typically have free heads with whitish and poorly sclerotized cuticles. However, members of the family Eurypauropodidae are an exception to this rule, as they have broad tergites that cover the head. These tergites are highly sclerotized, giving them a reddish-brown tone. They can also be ornamented with various protuberances, making them one of the most visually appealing groups of pauropods (Gao & Bu 2023). This family is found on

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all continents except Antarctica and South America (Scheller 2002, 2008, 2011). This study reports, for the first time, the presence of the family Eurypauropodidae in South America, specifically in Bogota D.C, Colombia, with the record of an individual of *Trachypauropus cordatus* (Scheller, 1974). Additionally, a checklist of currently registered species in the territory, as well as a list of expected taxonomic groups, is presented.

The specimen was collected from the live cloud forest collection at the Botanical Garden of Bogotá "Jose Celestino Mutis" (JBB). This collection includes samples of living specimens of plant species characteristic of typical cloud forests in the Colombian Andes, such as the genera *Bomarea* Mirb., 1804, *Delostoma* D. Don, *Quercus* L., 1753, *Vallea mutis* ex L.f., among others (see Orejuela & Celis 2019). The individual was collected from a 5 cm³ soil sample after being processed for seven days in a Berlese-Tullgren funnel. The specimen was fixed with Hoyers solution on a slide and observed in a Nikon Eclipse Ni-u microscope and was identified using Scheller (1974, 1977) and Scheller & Dallai (1980). The specimen is deposited in the "Museo Javeriano de Historia Natural, Lorenzo Uribe", MPUJ_ENT., Bogota, Colombia.

Family Eurypauropodidae Ryder, 1879

Genus *Trachypauropus* Tömösváry, 1882

Diagnosis. Fourth antennal segment with at least 4 well-developed setae (3 well-developed setae in *Samarangopus* Verhoeff, 1934) (Fig. 1B); globulus *g* of sternal antennal branch long-stalked (short stalked in *Samarangopus* Verhoeff, 1934) (Fig. 1C); setae of tergites inserted in the posterior part of longish crater-shaped structures (inserted anteriorly and posteriorly in *Eurypauropus* Ryder, 1879); 1st and last pairs of legs 5-segmented, interposed pairs 6-segmented (all 5 jointed in *Samarangopus* Verhoeff, 1934 and *Acopauropus* (Cook, 1896)); empodium of legs 3-8 with one mid accessory claw (2 accessory claws in *Eurypauropus* Ryder, 1879 and *Acopauropus* (Cook, 1896), 1 anterior claw only in *Samarangopus* Verhoeff, 1934); interdistance of pygidial setae *a*₁ shorter than distance setae *a*₂-*a*₃; *st* very short, cylindrical-clavate (Fig. 1G, *st*), glabrous or with very short pubescence (for more details on diagnosis see Scheller 2008, 2011).

Trachypauropus cordatus (Scheller, 1974) (Figs. 1A-1I)

Gravieripus cordatus Scheller, 1974.

Diagnosis. *Trachypauropus cordatus* (Scheller, 1974) can be differentiated from closer species *T. atticus* (Remy, 1951) and *T. latzeli* (Cook, 1896), by the globulus of the fourth antennal segment (Fig. 1C) being as long as broad compared to longer than broad in *T. cordatus* (Scheller, 1974), also the pygidium setae and shape of the annal plate are different. *T. cordatus* (Scheller, 1974) can be differentiated from *T. hispanicus* (Scheller, 1974) and *T. asper* (Scheller, 1974) by the annal plate (Fig. 1G, *ap*) lacking the stalks and related pubescent appendages (for more details see Scheller 1974).

New record. *Trachypauropus cordatus* (Scheller, 1974). 1 female. **COLOMBIA.** Bogota D.C, Engativá, Jardín Botánico de Bogota José Celestino Mutis, Cloud Forest live collection, 4°40'1.956" N - 74°6'1.26" W, 2600 m, 25-May-2022, leg. E. Tulande-M [MPUJ_ENT_0088334].

Description. A fourth instar larvae with 8 pairs of legs, 5 tergites and 4 bothriotrichia, colour light brown (Fig. 1A). *Antennae:* globulus *g*₂ of tergal side 1.5 times as long as
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broad, bracts open and cuticle pubescent (Fig. 1C), 4th antennal joint with four pair of setae, relative lengths $p = 100$, $p' = 100$, $p'' = 95$, $r' = 90$; (Figs. 1B-C). *Trunk*: tergite I completely covering the head, much narrower than other tergites; all tergites with many short conical protuberances, the ones located anteriorly very small, posterior protuberances larger, sides of tergites with many thick spines, four pairs of sensorial setae T; T1 (Fig. 1D) and T2 (Fig. 1E), thin and glabrous with delicate sparse pubescence at distal end, T3 with a thick axis and apical end-swelling, bearing a strong pubescence of simple hairs (Fig. 1F), T4 similar to T3 but without the distal end-swelling, distal pubescence also longer than T3, all legs 5 segmented. *Pygidial tergum*: with 5 pairs of setae, stylus (st) very short, a1 inserted near the posterior margin of the tergum with a “winged” shape forming a heart-shaped shield, a2 winged and curved inwardly, a3 and d2 glabrous and spinous (Figs. 1G-H). *Anal plate*: lyrate with two diverging lateral appendages, and two submedian ones long and straight, distal end oblique with an inner pubescence, two leaf-like pubescent appendages with thin and glabrous stalks arise from it, relative length of setae: a1 = 10, a2 = 20, a3 = 30, d2 = 30. *Pygidial sternum*: with three pairs of setae b1 = 30, b2 = 15, b3 = 12, all three setae with small pubescence (Fig. 1I).

Remarks. This is the first recorded occurrence of the family Eurypauropodidae in South America and Colombia. However, this record is likely the result of accidental introduction, as the Botanical Garden of Bogotá receives thousands of visitors annually from Europe and Asia and harbors nonnative species from these continents, where *T. cordatus* is quite common. Nevertheless, it is remarkable that the species may have adapted to the conditions of the botanical garden, particularly in the cloud forest collection. In Germany, it has been found associated with suburban areas, natural protected areas, as well as grasslands with shrubs of the genus *Rubus* sp. (which is a common genus in the Colombian Andes) (Voigtländer *et al.* 2016). Additionally, it is worth noting that anthropogenic factors may play an important role in the dispersal of pauropods, which often go unnoticed due to the difficulty of finding them and the limited interest in the group as a whole. In Central and South America, five families have been recorded: Pauropodidae (cosmopolitan), Polypauropodidae (Argentina, Brazil), Diplopauropodidae (Brazil), Millotauropodidae (Brazil), and Hansenauropodidae (Panama). By contrast, the study of pauropods in Colombia has been somewhat overlooked. Only one work (Remy 1950) describes the two recorded species in the country, both of which were found in the Antioquia department of the Andean region (Tab. 1). This lack of research extends to neighboring countries like Peru, Ecuador, and Venezuela, where no species are currently recorded in their territories, underscoring the need for further exploration of Pauropoda in northern South America.

Table 1. Checklist of the Pauropoda of Colombia. / Lista de los Pauropoda de Colombia.

Family	Species	Locality	Altitude	Reference
Pauropodidae	<i>Hemipauropus rosascostai</i> Remy, 1950	Antioquia, La Ceja.	2200 m	Remy 1950
	<i>Decapauropus bulbifer</i> (Remy, 1950)	Antioquia, La Ceja.	2200 m	Remy 1950
Eurypauropodidae	<i>Trachypauropus cordatus</i> (Scheller, 1974)	Bogota D.C.	2600 m	New record

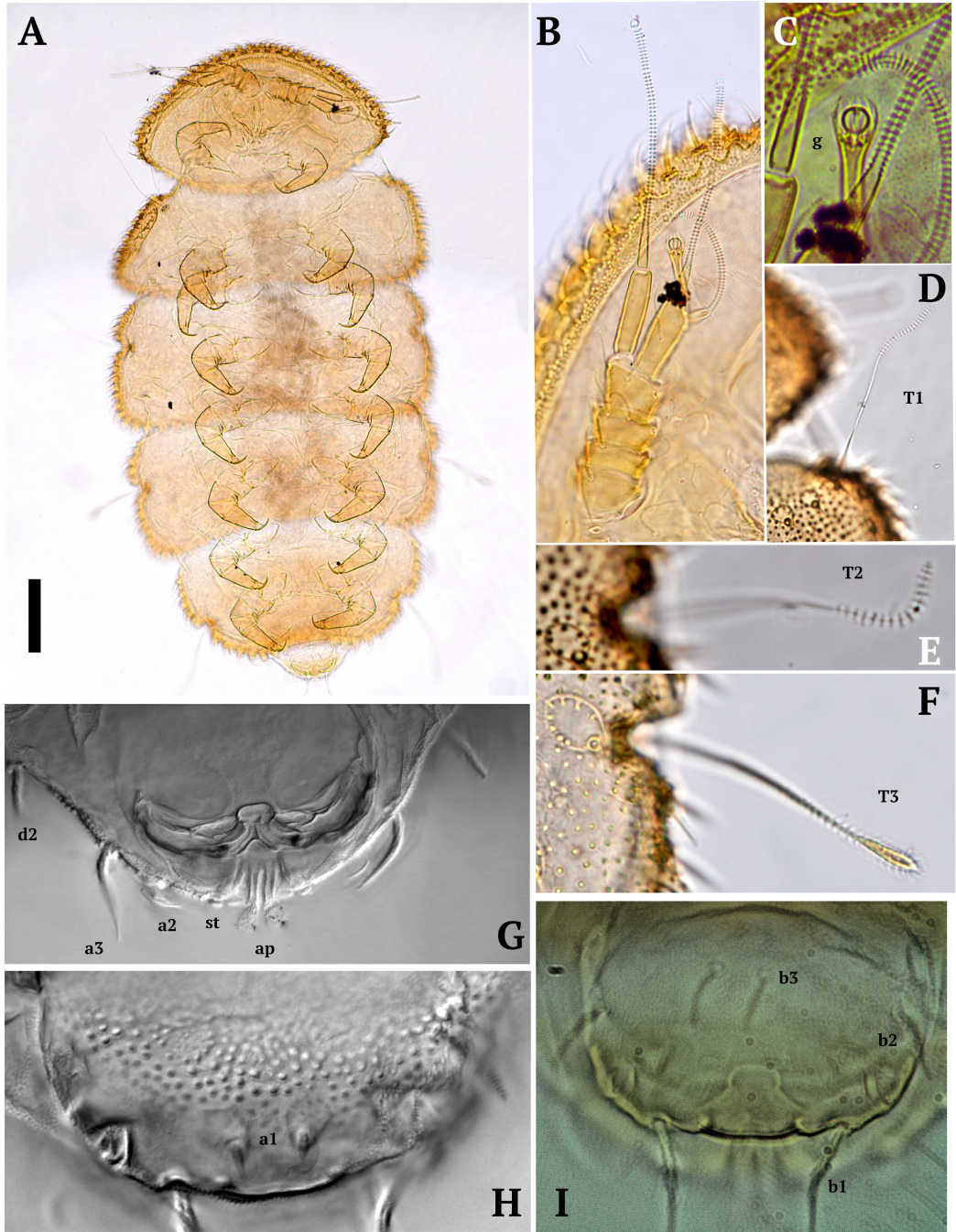


Figure 1. *Trachypauropus cordatus*. **A.** Habitus, ventral view. **B.** Antennae. **C.** Globulus, g. **D.** Botriotrichia T1, **E.** T2, **F.** T3. **G.** Pygidial tergum, st = stylus, ap= anal plate (dorsal). **H.** end of pygidial tergum (dorsal). **I.** Pygidial sternum (ventral). Scale bar: 100 µm. / **A.** Hábito, vista ventral. **B.** Antena. **C.** Globulus, g. **D.** Botriotrichia T1, **E.** T2, **F.** T3. **G.** Tergo del pigidio (dorsal), st = stylo, ap= placa anal, **H.** parte final del tergo pigidal (dorsal). **I.** Esterno pigidial. Escala: 100 µm.

Based on the pauropod fauna observed in countries within the region, including Argentina (Scheller 1968), Brazil, and Chile (Vega-Roman *et al.* 2011), and considering the insights provided by Scheller (1999) regarding the South American fauna, it is plausible to anticipate that certain genera found in these countries, may also be discovered in Colombian territory in the future (Tab. 2).

Finally, it is important to note the presence of an incongruity between the diagnostic characters of the genus *Trachypauropus* Tömösváry, 1882 and *T. cordatus* (Scheller, 1974) (similarly observed in *T. asper* (Scheller, 1974)). According to the established diagnosis, the genus *Trachypauropus* is characterized by having the first and last pair of legs with 5 segments, whereas the remaining legs have 6 segments. However, the original description by Scheller (1974) mentions that *T. cordatus* possesses all legs with 5 segments, a character that would align it more closely with the genera *Samarangopus* Verhoeff, 1934, or *Acopauropus* (Cook, 1896). Additionally, Scheller (1974) notes that *T. cordatus* is virtually identical to *T. glomeroides* Tömösváry, 1882, with the sole difference being the segmentation of the legs.

Table 2. Expected families and genera of Pauropoda likely for Colombia. / Familias y géneros de Pauropoda posibles para Colombia.

Order	Family	Genus	Distribution	
Tetramerocerata	Pauropodidae	<i>Allopauropus</i> Silvestri, 1902	Cosmopolitan	
		<i>Perissopauropus</i> Scheller, 1997	Brazil, Chile	
		<i>Juxtapauropus</i> Scheller, 2007	Argentina, Brazil, Chile	
		<i>Stylopauropoides</i> Remy, 1956	Argentina, Brazil	
		<i>Cauvetauropus</i> Remy, 1952	Brazil	
			<i>Scleropauropus</i> Silvestri, 1902	Mexico, Brazil, Chile
	Polypauropodidae		<i>Polypauropus</i> Remy, 1932	Argentina, Brazil
			<i>Polypauropoides</i> Remy, 1952	Argentina, Brazil
		Diplopauropodidae	<i>Diplopauropus</i> Scheller, 1988	Brazil
		Hansenauropodidae	<i>Hansenauropus</i> Remy, 1954	Panama, Jamaica
Hexamerocerata	Millotauropodidae	<i>Millotauropus</i> Remy, 1950	Brazil (Amazonia)	

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