

TAXONOMY AND NOMENCLATURE

A new Brazilian species of *Isotomiella* (Collembola: Isotomidae) from the state of Pará, Brazil

Maria Cleide de Mendonça^{1,*} & Gabriel Costa Queiroz¹

¹*Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro. Quinta da Boa Vista, São Cristóvão, 20940-040 Rio de Janeiro, RJ, Brazil.*

^{*}*Corresponding author. E-mail: cleidecollembola@gmail.com*

ABSTRACT. A new species of *Isotomiella* from Pará State is described and illustrated. This new species belongs to the *digitata* group, but differs from other by the number of chaetae on manubrium and dens, teeth on the tenaculum and size of the sensilla on abdominal tergites V-VI.

KEY WORDS. Biodiversity, *digitata* group, taxonomy.

The Brazilian fauna of *Isotomiella* Bagnall, 1939 comprises 22 species (ABRANTES et al. 2012), of which 12 were described for the Northern region (DEHARVENG & OLIVEIRA 1990, OLIVEIRA & DEHARVENG 1990) and 8 for the Southeastern region (MENDONÇA & FERNANDES 2003a, 2003b, MENDONÇA & ABRANTES 2007, MENDONÇA et al. 2012). In other regions of Brazil such as the Central-Western, records about this genus are unknown. Recent samples collected by the second author in the Municipality of Santarém (State of Pará) revealed the new species, *Isotomiella louisi* sp. nov., in the *digitata* group, which is defined here by the presence of a strongly thickened metathoracic tibiotarsus with several digitiform chaetae, and basal chaeta of the outer lobe of maxilla ciliated. The new species differs from other of the *digitata* group by the number of chaetae on manubrium and dens, the number of teeth on the tenaculum and the size of the sensillae, sa, spe, spi, on abdominal tergites V-VI.

MATERIAL AND METHODS

The material studied was obtained in September 2014, from soil samples collected near Tapajós River, in the municipality of Santarém, state of Pará. The fauna was extracted using Berlese Tullgren funnels, sorted under the stereomicroscope, and mounted on slides according to usual methodology. Illustrations and measurements were made using an ocular micrometer on an optic microscope. The type material is deposited in the Collembola Collection at Departamento de Entomologia, Museu Nacional/UFRJ, Rio de Janeiro, Brazil, under the acronym CM/MNRJ. Abbreviations used in the description: (Abd) abdominal, (Ant) antennal, (Sa) anterior sensillum, (Spe) posterior external sensillum, (Spi) posterior internal sensillum, (Spl) dorso-lateral sensillum, (Sv) ventral sensillum, (Th) thorax, (Tita) tibiotarsi.

TAXONOMY

Isotomiella louisi sp. nov.

Figs 1-11

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Body length of holotype 0.71 mm. Habitus slender and cylindrical, typical of the genus. Color white. Body chaetotaxy ciliated; few chaetae slightly ciliated or smooth. Integument without craters. Pseudopores and channels not visible.

Head. All chaetae ciliated and subequal, anterior and posterior chaetae longer (Fig. 1). Ant I (25 µm) with 15 ciliated chaetae, 2 basal microchaetae, one dorsal and one ventral; 2 ventral unequal sensilla, one plump (5 µm) and one (3 µm) very thin. Ant II (30 µm) with 26 ciliated chaetae and one dorso-basal microchaeta (Figs. 2, 3). Ant III and Ant. IV damaged. Labrum with 4 anterior spinules; labral chaetae pattern 4/5,5,4. Maxillary outer lobe bifurcated with basal ciliated chaeta and 3 sublobal hairs. *Linea ventralis* of head with 3+3 chaetae.

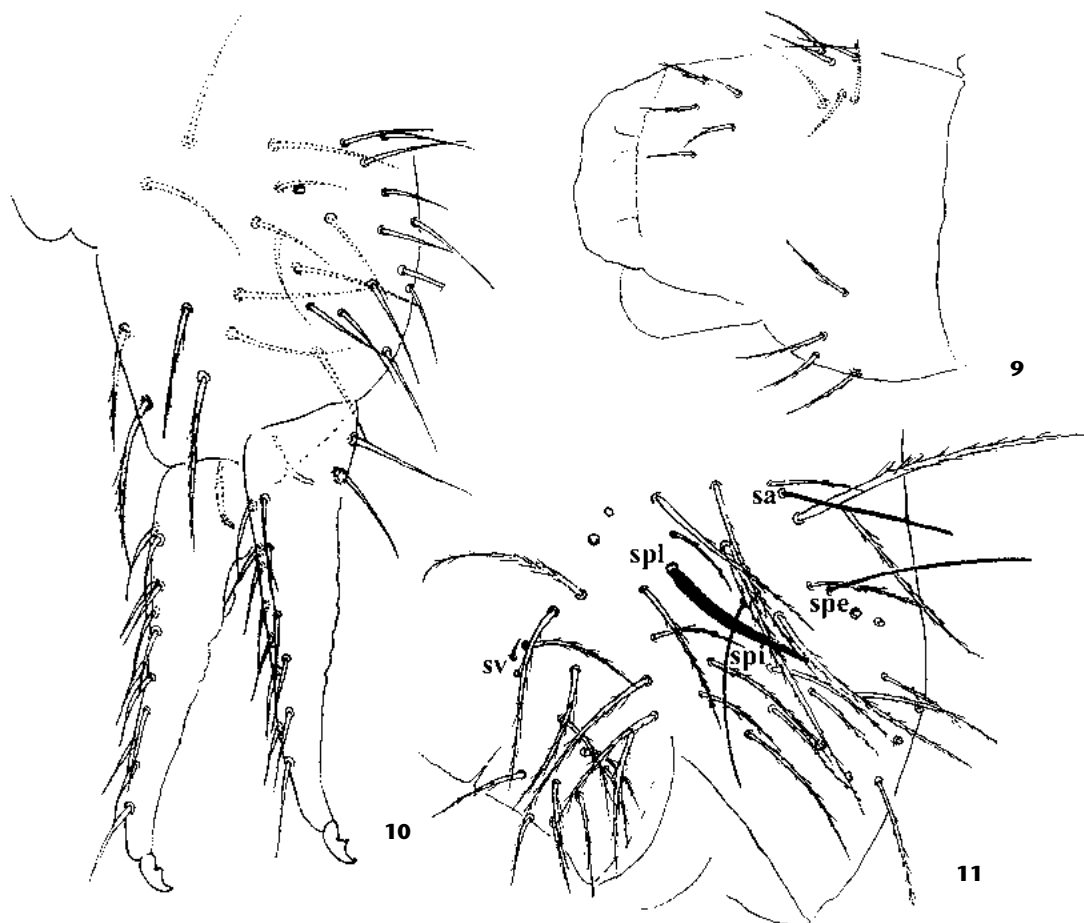
Tergites. Th II with 9+9 axial chaetae, 3+3 lateral sensilla (5 µm, 7 µm, 5 µm), 1+1 lateral macrochaetae (45 µm) (Fig. 4). Th III with 6+6 axial chaetae, 2+2 lateral sensilla (5 µm), 1+1 lateral macrochaetae (55 µm) (Fig. 5). Abd I with 3+3 axial chaetae, 1+1 lateral sensilla, 1+1 lateral macrochaetae (56 µm). Abd II with 3+3 axial chaetae, 1+1 lateral sensilla (4µm), 3+3 macrochaetae (60 µm) Abd III without defined pattern of axial chaetae, 1+1 ventral sensilla (4 µm) and 1+1 lateral sensilla (7µm), 3+3 macrochaetae (62 µm). Abd IV without defined pattern of axial chaetae, 1+1 lateral sensilla, 3+3 anterior macrochaetae (62 µm) and 2+2 posterior macrochaetae (62 µm). Abd V-VI with several macrochaetae (65 µm) among mesochaetae of different sizes (20-45 µm), 1+1 spl



Figures 1-8. *Isotomiella lousi* sp. nov.: (1) dorsal chaetotaxy of head; (2) antennal I-II, dorsal view; (3) antennal I-II, ventral view; (4) lateral sensillar pattern of Th II; (5) lateral sensillar pattern of Th. III; (6) leg III, external view; (7) leg III, internal view; (8) leg I, external view.

long, thick and slightly curved dorso-lateral sensilla (35 μ m), 1+1 ventral sensilla sv with (4 μ m) and 3+3 dorso-lateral sensilla sa, spe, spi very long and thin each with 38 μ m, 45 μ m and 40 μ m respectively (Fig. 11). Sensillary formula by half tergite 3,2/1,1,2,1,5. Unpaired chaetae a0, m0, p0 not visualized.

Appendages. Subcoxa III with about six ciliated chaetae, longer; Femur III with about 19 ciliated chaetae; Tita III strongly thickened, with about 31 ciliated chaetae and 5 digitiform chaetae (Figs. 6, 7). Femur I with about 19 ciliated chaetae; Tita I (Fig. 8) and II of normal shape, with 24-26 and 26-27 chaetae



Figures 9-11. *Isotomiella louisi* sp. nov.: (9) ventral tube, ventro-lateral view; (10) furcula; (11) abdominal V-VI, lateral sensillar pattern.

respectively. Tita I, II and III with 7 chaetae on distal whorls; tibiotarsal tenent chaetae pointed. Unguis of normal shape (18 μ m), without teeth; unguiculus lanceolate (8 μ m). Ventral tube with 3+3 anterior, 2+2 posterior and 5+5 distal chaetae (Fig. 9). Tenaculum (20 μ m) with 4+4 teeth and one chaeta. Furcal anterior subcoxae with 6 chaetae, three of them longer. Furcal posterior subcoxae with 6 chaetae, one longer. Manubrium (40 μ m) with 2+2 anterior, 20 posterior and no lateral chaetae. Dens slightly crenulated (56 μ m) with 13 anterior and 2 posterior chaetae. Mucro small, (5 μ m) bidentate (Fig. 10).

Material examined. Holotype female, BRAZIL, Pará: Santarém municipality (Alter do Chão, litter near Tapajós River margin, secondary Amazon Forest, local coordinates 2°33'1.67"S, 54°57'15.28"W), 27.IX.2014, Queiroz, C.G. leg., 2489 CM/MNRJ.

Etymology. The species epithet is to honor Dr. Louis Deharveng for his great contribution to the knowledge of *Isotomiella*.

Remarks. The new species, *Isotomiella louisi* sp. nov., belongs to a group of species proposed here as the *I. digitata* group.

The group includes three Brazilian species (*I. digitata* Deharveng & Oliveira, 1990, *I. distincta* Mendonça & Fernandes, 2003 and *I. falcata* Mendonça & Fernandes, 2003) that share two remarkable apomorphies: metathoracic tibiotarsus strongly thickened with several digitiform chaetae, and basal chaeta of maxillary outer lobe ciliated. The new species, *I. louisi* sp. nov. also shares with them the following characteristics: chaetae of body ciliated; unguis toothless; and reduced furcula with few chaetae (1+1-2+2) on anterior side of manubrium. The species *I. macedoi* Mendonça et al. 2012 has tibiotarsus III of male similar to the condition found in *I. digitata* group, but differs from it by the presence of a set of characteristics: sensillary pattern (3,2/0,0,1,3,5), 3+3 to 5+5 ventral chaetae of manubrium, mucro tridentate and 4 sublobal chaetae found in *minor* and *nummulifer* group *sensu* KÓVÁČ & PALÁCIOS-VARGAS (2008). Furthermore, in *I. macedoi* the basal chaeta of the maxillary outer lobe is smooth, the digitiform chaetae are thinner on metathoracic tibiotarsus and are only present in the male. The *digitata* group can be separated from other groups of *Isotomiella* defined so far by the table in KÓVÁČ & PALÁCIOS-VARGAS (2008).

Table 1. Comparison among species of *digitata* group.

	<i>I. digitata</i>	<i>I. distincta</i>	<i>I. falcata</i>	<i>I. louisii</i> sp.nov.
Body size (mm)	0.40-0.45	0.43	0.70	0.71
Labral chaetae	?	?	?	4/5,5,4
Sublobal hairs	3	?	3	3
Tergal macrosensilla	3,2/1,1,2,1,5	?	?	3,2/1,1,2,1,5
Digitiform tibiotarsal chaetae	4	2	5	5
Ventral tube chaetae	5+5distal 3+3 anterior 2+2 posterior	3+3 distal 1+1 anterior 1+1 posterior	3+3distal 1+1 anterior 1+1 posterior	5+5 distal 3+3 anterior 2+2 posterior
Ratio length sensillum spl/claw	1.4-1.5	2.5-3	2.5-3	1.9
Tenaculum teeth/chaetae	3+3/1	3+3/1	3+3/1	4+4/1
Manubrium anterior chaetae	1+1	1+1	1+1	2+2
Manubrium posterior chaetae	6+6	?	?	10+10
Dens anterior chaetae	6	6	6	13
Dens posterior chaetae	1	1	1	2
Type of mucro	bidentate	bidentate	falcate	bidentate

The new species is similar to *I. digitata*, both share the same sensillar formula (3,2/1,1,2,1,5) and the same number of chaetae on ventral tube. However, *I. louisii* sp. nov. differs by having 5 digitiform chaetae on tibiotarsus III (versus 4), manubrium with 2+2 anterior chaetae (versus 1+1), dens with 13 anterior and 2 posterior chaetae (versus 6 and 1) and 4+4 teeth on tenaculum (versus 3+3) (Table 1).

Isotomiella louisii sp. nov. can be readily distinguished from *I. distincta* by the presence, in this last species, of 2 digitiform chaetae on tibiotarsus III, number of chaetae on ventral tube (3+3 distal, 1+1 anterior, 1+1 posterior) and 3+3 teeth on tenaculum. The new species also resembles *I. falcata*, especially in the presence of five digitiform chaetae on tibiotarsus III, but it can be easily separated from it by its bidentate versus falciform mucro. *Isotomiella louisii* sp. nov. also deviates from species of the *digitata* group by having on Abd V-VI the sensillae, sa, spe, spi very thin and long, about twice as long as lateral macrochaetae on Th II.

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LITERATURE CITED

- ABRANTES EA, BELLINI BC, BERNARDO AN, FERNANDES LH, MENDONÇA MC, OLIVEIRA EP, QUEIROZ GC, SAUTTER KD, SILVEIRA TC, ZEPPELINI D (2012) Errata Corrigenda and update for the "Synthesis of Brazilian Collembola: an update to the species list." Abrantes et al. (2010), *Zootaxa* 2388: 1-22. *Zootaxa* 3168: 1-21.
- DEHARVENG L, OLIVEIRA E (1990) *Isotomiella* (Collembola: Isotomidae) d'Amazonie: les espèces du groupe *delamarei*. *Annales de la Société Entomologique de France* (NS) 26: 185-201.

KOVÁČ L, PALACIOS-VARGAS JG (2008) Redescription of *Isotomiella alulu* and *I. delamarei* (Collembola: Isotomidae) with notes on systematics of the genus and new records from the Neotropics. *Zootaxa* 1825:1-17.

MENDONÇA MC, FERNANDES LH (2003a) New species of *Isotomiella* Bagnall, 1939 and Records of new occurrences of *Isotomiella nummulifer* and *I. quadriseta* from Brazil (Collembola, Isotomidae). *Boletim do Museu Nacional* 502: 1-12.

MENDONÇA MC, FERNANDES LH (2003b) Três novas espécies de *Isotomiella* Bagnall, 1939 do sudeste do Brasil (Collembola: Isotomidae). *Lundiana* 4: 111-116.

MENDONÇA MC, ABRANTES EA (2007) A new species of *Isotomiella* (Collembola: *Isotomiella*), with notes on *I. bidentata* Delamare Deboutteville, 1950 and *I. amazonica* Oliveira & Deharveng, 1990. *Zootaxa* 1652: 41-48.

MENDONÇA MC, ABRANTES EA, NEVES ACR (2012) New species of *Isotomiella* Bagnall, 1939 from Southeast of Brazil (Collembola: Isotomidae). *Zookeys* 232: 21-30. doi: 10.3897/zookeys.233.3553

OLIVEIRA E, DEHARVENG L (1990) *Isotomiella* (Collembola, Isotomidae) d'Amazonie: les espèces du groupe *minor*. *Bulletin du Muséum national d'Histoire naturelle* 12: 75-93.

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