

A new species of *Xenylla* (Collembola: Poduromorpha: Hypogastruridae) with new records for the state of Espírito Santo, southeastern Brazil

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ABSTRACT. A new species of *Xenylla* Tullberg, 1869, *X. capixaba* sp. nov., is described and illustrated. In addition, we present a list with new records of *Poduromorpha* from the state of Espírito Santo, Brazil. *Xenylla yucatanana* Mills, 1938 and *Brachystomella platensis* Najt & Massoud, 1974 are for the first time recorded in Brazil. Also, the distributions of *B. ceciliae* Fernandes & Mendonça, 2004, *B. contorta* Denis, 1931 and *Arlesia albipes* (Folsom, 1927) are expanded to include Espírito Santo. *Brachystomella agrosa* Wray, 1953, previously recorded in agricultural soils, was also found in a marine environment.

KEY WORDS. Bracystomellidae; collembolan diversity; list of species; Neauridae.

This study is part of a broader project that aims to investigate the composition and distribution of Collembola Poduromorpha communities in sand shores. Despite the rich collembolan diversity in coastal ecosystems, research on this group in Brazil is still limited to the coastal sand plains of the state of Rio de Janeiro (MENDONÇA & FERNANDES 1997, FERNANDES & MENDONÇA 2004, 2007).

In order to expand our knowledge on the Poduromorpha inhabiting other Brazilian shores, we performed preliminary sampling in stretches on the coast of the state of Espírito Santo. Only two species, *Anurida maritima* (Guérin, 1838) and *Fissuraphorura cubanica* Rusek, 1991, had been previously recorded in this region (ARLÉ 1981, THIBAUD & PALACIOS-VARGAS 1999).

The material resulting from samples obtained from the vegetation that covers sandy dunes, rocks and intertidal zone sands of the beaches surveyed revealed a new species of *Xenylla* Tullberg, 1869, which is described and illustrated below. In addition, *X. yucatanana* Mills, 1938 and *Brachystomella platensis* Najt & Massoud, 1974 are recorded for the first time in Brazil, and the distributions of *B. ceciliae* Fernandes & Mendonça, 2004, *B. contorta* Denis, 1931 and *Arlesia albipes* (Folsom, 1927) are expanded to include the state of Espírito Santo. *Brachystomella agrosa* Wray, 1953, previously recorded in agricultural soils by CULIK *et al.* (2006), was also found in a marine environment.

MATERIAL AND METHODS

The study area is located on the coast of the state of Espírito Santo, and consists of a 430 km stretch that borders the state of Bahia (39°30'W, 18°28'S) in the North and the state of Rio de Janeiro (41°00'W, 21°15'S) in the south. The littoral formation by quaternary deposits is present in almost the entire area (FRAGA & PEIXOTO 2004). The local vegetation is part of the physiognomy of the Atlantic Rainforest. The climate, according to Köppen's classification system, is tropical with a hot

and rainy summer and a dry winter (Aw). It has an annual average temperature of 23.3°C, precipitation of 1,307 mm of and relative humidity of 80% (Assis *et al.* 2004).

Sampling was conducted in the municipalities of Guarapari and Vila Velha (Fig. 1), located in the central meso-region, in the following sampling stations: Station 1 – samples #1141, 1142, and 1143 – Parque Estadual Paulo César Vinha, Guarapari, litter over sandy dune, 23/VII/2001; Station 2 – samples # 1144 and 1145 – Praia de Itaparica, Vila Velha, beach sand, 23/VII/2001; Station 3 – samples #1146 and 1147– Enseada Azul, Praia da Bacutia, Guarapari, moss and soil over beach rocks, 24/VII/2001.

The springtails were obtained from random samples of litter and sand with the aid of a cylindrical apparatus. In the laboratory, the specimens were extracted using a Berlese-Tullgren funnel, fixed in boiling alcohol and kept at 96% ethanol. The methodology of ARLÉ & MENDONÇA (1982) was used in the study of the external morphology. The collected material is deposited in the Collembola Collection of the Museu Nacional, Universidade Federal do Rio de Janeiro (CM/MNRJ).

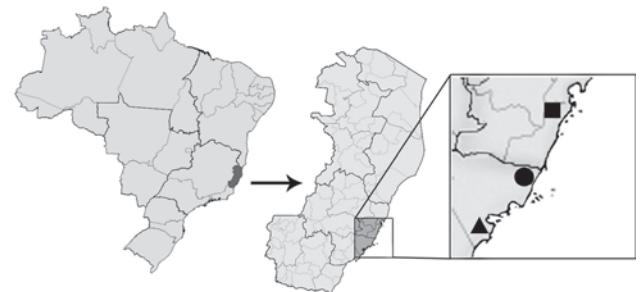


Figure 1. Map of Brazil indicating the location of the state of Espírito Santo and the locations of the sampling stations: (▲) Station 1, (●) Station 2, (■) Station 3.

TAXONOMY

Hypogastruridae

Xenylla capixaba sp. nov.

Figs 2-8

Diagnosis. Body length 630-1200 µm. Coloration dark grey. Body tegument strongly granulated. Body and cephalic dorsal chaetotaxy with ciliated, apically round setae; smooth thin sensillae are twice the length of common setae (Fig. 2); body and cephalic ventral chaetotaxy with smooth thin setae. Antennae shorter than head diagonal. Antennal segment IV apical vesicle bearing one granulated lobe; one subapical organite; one lateral microsensillum; five sensillae with the two dorsal-external sensillae thicker than the others. Sensory organ of antennal segment III formed by two rounded granulated microsensilla inside a fold of the tegument, two small subcylindrical guard sensillae; one ventral microsensillum. Antennal segments I and II with seven and 12 setae, respectively (Fig. 3). Eye patches strongly pigmented with 5+5 eyes; postantennal organ absent. Chewing mouthparts typical of the genus; maxillary outer lobe with one sublobal hair; labral chaetotaxy formula: 4/5/5/4. Tibiotarsi I-III, respectively, with 19, 19, 18 setae, being two of them long spatulate tenent hairs, per leg. Ungues measuring 37 µm, with one small inner tooth near apex; unguiculus absent (Fig. 4).

Ventral tube with 4+4 setae. Retinaculum with 3+3 teeth. Manubrium with about 35 setae on posterior side; dens (40 µm) with two dorsal setae; mucro narrowed and elongate (25 µm), clearly separated from dens, with lobed lamella on basal part (Figs 5 and 6). Presence of two anal spines (5 µm) on weakly developed papillae. Anal valve with 14+14 setae and 2+2 hr setae. Genital plate of female with two eugenital and eight circungenital setae (Fig. 5); genital plate of male with six eugenital setae and 21 circungenital setae (Fig. 7).

Dorsal chaetotaxy (b, h1, h2, i, q): Head with a0, c2, c3 and d1 setae, with L1 as long as L3, and both longer than the others; seta c1 absent (b). Thoracic segment I with 3+3 setae. Thoracic segments II and III with setae la2, m3 and p3; seta a2 displaced apically compared with seta a1 (h1); seta p2 displaced apically compared with seta p1 (h2); seta la1 absent (i). Abdominal segment III with 4+4 setae between the sensillae in posterior row. Abdominal segment IV with p3 and m3; seta p5 = Ss. Abdominal segment V without seta a2 (q).

Ventral chaetotaxy (t, a3): Head with m3 and p1 (Fig. 8). Thoracic segments II and III without pair of medial setae (t). Abdominal segment II with p1, p2 and p6. Abdominal segment III with seta a6; seta p5 absent (a3). Abdominal segment IV with seta m1 (Fig. 5).

Type locality: Parque Nacional Paulo César Vinha, Guarapari, State of Espírito Santo, Brazil. Found on sand dune litter.

Type material. BRAZIL, *Espírito Santo*: Guarapari (Parque Estadual Paulo César Vinha), female holotype on slide N°1142

CM/MNRJ, 23/VII/2001, L.H. Fernandes leg. Paratypes, same data as holotype: 7 specimens on slide N°1141; 5 specimens on slide N°1142, 23/VII/2001, L.H. Fernandes leg.

Etymology. The new species is named after the common name ("capixaba") of the people from the State of Espírito Santo.

Remarks. *Xenylla* Tullberg, 1869, which has a cosmopolitan distribution, includes 123 currently recognized species (BELLINGER *et al.* 1996-2008). In Brazil, this genus is poorly known and only five species have been recorded. Two of them, *X. brasiliensis* Gama, 1978 and *X. nirae* Gama & Oliveira, 1994, were described from the states of Minas Gerais and Amazonas, respectively. *Xenylla welchi* Folsom, 1916 was recorded for the states of Espírito Santo and Rio de Janeiro (CULIK *et al.* 2002, FERNANDES & MENDONÇA 2007), and *X. maritima* Tullberg, 1869 was recorded from the state of Rio de Janeiro (FERNANDES & MENDONÇA 2004).

Xenylla capixaba sp. nov. resembles *X. welchi* Folsom, 1916 and *X. marina* Lee, Park & Park, 2005. These three species share the 5+5 eyes, head with seta L1 as long as L3, tibiotarsus with two tenent hairs, ungues with small inner tooth near the apex, ventral tube with 4+4 setae, retinaculum bearing 3+3 teeth and dens separated from the mucro with two dorsal setae. The new species differs from *X. welchi* and *X. marina* due in characters of the chaetotaxy, granulation on the apical organ and the number of sensilla on the antennal segment IV, and the shape of the mucro. *Xenylla capixaba* sp. nov. and *X. marina* also share the presence of spatulate tenent hairs on the tibiotarsi, which are different from those shown by *X. welchi*. The new species is easily distinguished from *X. welchi*, *X. marina* and the other species of the genus by the dorsal chaetotaxy formed by ciliated setae.

Xenylla yucatana Mills, 1938

Material examined. Station 2, Sample # 1144, 463 specimens.

Remarks. Species of Neotropical, Afrotropical, Oriental and Australasian distribution (BARRA 2006), recorded on beach sand in Brazil for the first time.

Brachystomellidae

Brachystomella agrosa Wray, 1953

Material examined. Station 1, Sample # 1141, four specimens, Sample # 1142, 23 specimens; Station 2, Sample # 1144, two specimens, Sample # 1145, 15 specimens; Station 3, Sample # 1146, one specimen, Sample # 1147, six specimens.

Remarks. Neotropical species with broad distribution in Brazil, already recorded from the states of Rio de Janeiro, Espírito Santo, Pernambuco, Paraíba, Bahia and São Paulo (MENDONÇA & ARLÉ 1992, BELLINI & ZEPPELINI 2004, FERNANDES & MENDONÇA 2004, CULIK *et al.* 2006). *Brachystomella agrosa* was recorded in the state of Espírito Santo in agricultural soil. The present record increases its distribution to the littoral environment.



Figures 2-8. *Xenylla capixaba* sp. nov.: (2) dorsal chaetotaxy; (3) antenna; (4) unguis and tibiotarsus I; (5) abdominal ventral chaetotaxy; (6) retinaculum, dens and mucro; (7) genital plate of male; (8) cephalic ventral chaetotaxy.

Brachystomella ceciliae Fernandes & Mendonça, 2004

Material examined. Station 1, Sample # 1142, one specimen.

Remarks. Species described from the littoral of Rio de Janeiro, where it was collected on Maricá coastal sand plain. It is recorded for the first time from Espírito Santo, confirming its preference in littoral environments.

Brachystomella contorta Denis, 1931

Material examined. Station 2, Sample #1145, four specimens; Station 3, Sample # 1146, one specimen.

Remarks. Species with wide ecological valence and geographical distribution (NAJT & PALACIOS-VARGAS 1986), already recorded from Brazil in the Maricá coastal sand plain (FERNANDES & MENDONÇA 2004, 2007) in halophyte-psammophyte vegetation areas and foredune zone, as well as in impacted areas. It is herein recorded from Espírito Santo for the first time.

Brachystomella platensis Najt & Massoud, 1974

Material examined. Station 1, Sample # 1141, one specimen; Station 2, Sample # 1144, 15 specimens.

Remarks. Species described based on samples collected from forest litter in Argentina and later recorded from Australia by GREENSLADE & NAJT (1987) in litter, fungi, *Eucalyptus* forest, prairies, turnip culture and grazing land. It is recorded in dune and beach sand litter for the first time in Brazil.

Neanuridae

Pseudachorutinae

Arlesia albipes (Folsom, 1927)

Material examined. Station 1, Sample # 1143, one specimen.

Remarks. Neotropical species with wide distribution in Brazil, previously recorded for the states of Rio de Janeiro, Pernambuco, Pará, Minas Gerais, and Amazonas (ARLÉ 1962, 1966, ARLÉ & RUFINO 1976). Its distribution is here expanded to the State of Espírito Santo.

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LITERATURE CITED

ASSIS, A.M.DE; O.J. PEREIRA & L.D. THOMAZ. 2004. Fitossociologia de uma floresta de restinga no Parque estadual Paulo César Vinha, Setiba, município de Guarapari, (ES). *Revista Brasileira de Botânica* 27 (2): 349-361.

ARLÉ, R. 1962. Sobre Pseudachorutidae da região amazônica (Collembola). *Atas da Sociedade de Biologia do Rio de Janeiro* 6 (1-2): 1-3.

ARLÉ, R. 1966. Collemboles d'Amazonie. I. Poduromorphes nouveaux ou peu connus et notes biologiques sur *Neotropiella carli* (Denis). *Boletim do Museu Paraense Emilio Goeldi, Nova Série, Zoologia*, 60: 1-19.

ARLÉ, R. 1981. Conspecto das espécies brasileiras de Pseudachorutinae, com descrição de uma espécie nova da Colômbia (Insecta, Collembola). *Acta Amazonica* 11 (3): 583-593.

ARLÉ, R. & C. MENDONÇA. 1982. Estudo preliminar das espécies de *Dicranocentrus* Schött, 1893, ocorrentes no Parque Nacional da Tijuca, Rio de Janeiro (Collembola). *Revista Brasileira de Biologia* 42 (1): 41-49.

ARLÉ, R. & E. RUFINO. 1976. Contribuição ao conhecimento dos Pseudachorutinae da Amazônia (Collembola). *Acta Amazonica* 6 (1): 99-107.

BELLINGER, P.F.; K.A. CHRISTIANSEN & F. JANSSENS. 1996-2008. *Checklist of the Collembola of the World*. Available online at: <http://www.collembola.org> [Accessed: 01/X/2008].

BELLINI, B.C. & D. ZEPPELINI. 2004. First records of Collembola (Ellipura) from the State of Paraíba, Northeastern Brazil. *Revista Brasileira de Entomologia* 48 (4): 587-588.

BARRA, J.-A. 2006. Collemboles de l'Île de Socotra, République du Yémen. *Zoosystema* 28 (1): 61-74.

CULIK, M.P.; J.L. DE SOUZA & J.A. VENTURA. 2002. Biodiversity of Collembola in tropical agricultural environments of Espírito Santo, Brazil. *Applied Soil Ecology* 21: 49-58.

CULIK, M.P.; D. DOS S. MARTINS & J.A. VENTURA. 2006. Collembola (Arthropoda: Hexapoda) communities in the soil of Papaya Orchards managed with conventional and integrated production in Espírito Santo, Brazil. *Biota Neotropica* 6 (3): 1-8.

FERNANDES, L.H. & C. MENDONÇA. 2004. Collembola Poduromorpha do litoral de Maricá, Rio de Janeiro, Brasil. *Revista Brasileira de Zoologia* 21 (1): 15-25.

FERNANDES, L.H. & C. MENDONÇA. 2007. Collembola Poduromorpha de áreas preservadas e impactadas do litoral sudeste do Brasil. *Revista Brasileira de Zoologia* 24 (3): 777-785.

FRAGA, C.N. & A.L. PEIXOTO. 2004. Florística e ecologia das Orchidaceae das restingas do estado do Espírito Santo. *Rodriguésia* 55 (84): 5-20.

GREENSLADE, P. & J. NAJT. 1987. Collemboles Brachystomellinae de l'Australie I. Les genres *Brachystomella* et *Rapoportella*. *Annales de la Société Entomologique de France (N.S.)* 23 (4): 435-453.

MENDONÇA, C. & R. ARLÉ. 1992. Variação quetotóxica em *Brachystomella agrosa* Wray, 1953 (Collembola, Neanuridae). *Boletim do Museu Nacional, Nova Série, Zoologia*, 351: 1-9.

MENDONÇA, C. & L.H. FERNANDES. 1997. A new genus of Brachystomellinae from Brazil (Collembola: Neanuridae). *Boletim do Museu Nacional, Nova Série, Zoologia*, 379: 1-7.

NAJT, J. & J.G. PALACIOS-VARGAS. 1986. Nuevos Brachystomellinae

de México (Collembola, Neanuridae). **Nouvelle Revue d'Entomologie** 3 (4): 457-471.

THIBAUD, J.-M. & J.G. PALACIOS-VARGAS. 1999. Brazilian Collembola

from littoral sand with description of *Austrogastrura* gen. n. and *Isotomodes carioca* sp. nov. [Hypogastruridae; Isotomidae].

Revue Française d'Entomologie (N.S.) 21 (1): 25-31.

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