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Scientific Note

New record of *Yosiiella mira* Hüther, 1967 (Collembola, Isotomidae, Anurophorinae) for Amazon

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Abstract. *Yosiiella mira* Hüther, 1967 is recorded here for the first time outside Brazilian territory, in Peruvian Amazon. The species was found through of litter extraction from an ore exploration area. From this record, we believe that *Y. mira* could potentially be widely distributed in the Amazon biome. The Isotomidae fauna from Peru now pass for 34 species in 14 genera.

Keywords: Euedaphic springtails, species distribution, endemic species, monotypic taxa, soil fauna.

Yosiiella Hüther, 1967 is an endemic monotypic genus of Anurophorinae (Isotomidae) with the type species *Yosiiella mira* Hüther, 1967 by original designation. The species was described from Belém (type locality) and additional localities close to this municipality in the state of Pará, Brazil (Hüther 1967). After almost 30 years, *Y. mira* was registered in the primary and secondary forests from Amazonas State, Brazil (Oliveira & Deharveng 1995).

The Isotomidae fauna of is known for about 1,500 species in 112 worldwide genera (Bellinger et al. 2022), of which 33 species in only 13 genera have been recorded in Peru (Mari-Mutt & Bellinger 1990; Mari-Mutt et al. 2022), but these data evidently do not reflect the true fauna that needs to be explored in the country. So, here we record *Y. mira* first time outside Brazilian territory, in Peruvian Amazon, and provide a records map for the species.

Specimens preserved in ethanol 92% were cleared with Nesbitt's solution and then mounted on glass slides in Hoyer's medium following the procedures described by Cipola et al. (2018). Specimens in ethanol gel were photographed using a stereomicroscope (M165C) attached to a DFC420 digital camera with a dome as presented in Kawada & Buffington (2016). Photographs were digitally corrected using Leica Application Suite V3.4.1. The records map of species was made after Shorthouse (2010). The examined material is deposited at the Invertebrate Collection of the National Institute of Amazonian Research (INPA), Manaus, Brazil.

Yosiiella mira Hüther, 1967

Figs. 1-2

Yosiiella mira Hüther, 1967: 169-173, figs 1-12, Belém, Pará, Brazil (orig. descr.).

Examined material. 2 females on slides (INPA): Peru, Madre de Dios, Inambari District, Santa Rita Alta, ore exploration near km 299-300 of road 30C (Interoceanica Sur), 12°55'00''S, 70°14'00''W (Fig. 1), 282 m., 11.xi.2018, litter extractor (Berlese-Tullgren funnel) on 96 days, EAH Villalobos leg (License of collect: N° 001-2018-SERNANP-JEF).

Distribution and habitat. *Yosiiella mira* is found in the Amazon Rainforest phytogeographic domain from Brazil and Peru (Fig. 1), i.e. Good's biogeographic zone 26 from Neotropical region (Good 1974). The climate of the areas following the Köppen-Geiger system is tropical (Af and Am), characterized by wet and dry seasons (Kottek et al. 2006).

In Peruvian Amazon, as well as Amazonas State (Oliveira & Deharveng 1995), specimens of *Y. mira* were collected from soil extractors (Berlese-Tullgren funnel), therefore they live under the litter until the first upper layers of the soil. This habit added to its small size (up to 0.8 mm) with worm-shaped elongated body, short appendages (antennae and legs), and devoid of furcula (Fig. 2), indicates that this species can be considered euedaphic (Eisenbeis & Whichard 1987). From this record, we believe that *Y. mira* could potentially be widely distributed in the Amazon biome. However, the euedaphic habit of *Y. mira* is a factor that most likely limit its dispersion, therefore populations from different localities (Fig. 1) need to be investigated molecularly to know if they actually consist of a single species. Regardless, *Y. mira* can be identified by fourth antennal segment with 9-10 sensillae including a subapical club-shaped microsensilla; eyes absent (Figs. 2A-B); postantennal organ narrow and with smooth margins, median region slightly contracted towards the interior; prelabral chaetotaxy with 2 chaetae; second thoracic segment to the fifth abdominal segment respectively with 1,1|1,1,1,1,3,1 sensillae; fifth and sixth abdominal segment with a pair of spines on each (Fig. 2C); and collophore with 4 lateral and 3 posterior chaetae. Chaetotaxy pattern of the antennae, head, thorax, abdomen and legs, as per the original description (Hüther 1967).

Figure 1. Records map of *Yosiiella mira* Hüther, 1967 in South America, star represents the type locality and red circles represents additional record in original description, both in Pará state (Hüther 1967); red circles in Amazonas state indicate record previous (Oliveira & Deharveng 1995), and square represent new record in Inambari, Peru.

Remarks. *Yosiiella* is an endemic Amazonian taxon that resemble other anurophorids genera which were described more recently, so they were not compared in the original description (Hüther 1967).

Yosiiella resemble to *Dimorphacanthella* Potapov, Bu, Huang, Gao & Luan, 2010 endemic from China, and *Martynovella* Deharveng, 1978 from Palearctic, also a monotypic genus. However, *Yosiiella* differ these genera by a pair of spines also present on fifth abdominal segment (Fig. 2C). Regarding *Dimorphacanthella* and *Martynovella*, the anal spines is present only on sixth abdominal segment (Deharveng 1978; Potapov 2001; Potapov et al. 2010; 2017). Regardless, the phylogenetic relationships among Anurophorinae genera with anal spines is also still unknown, as well as the origin of *Yosiiella* in Neotropical region, since almost all genera are in the Holarctic realm (Potapov et al. 2017; Bellinger et al. 2022).

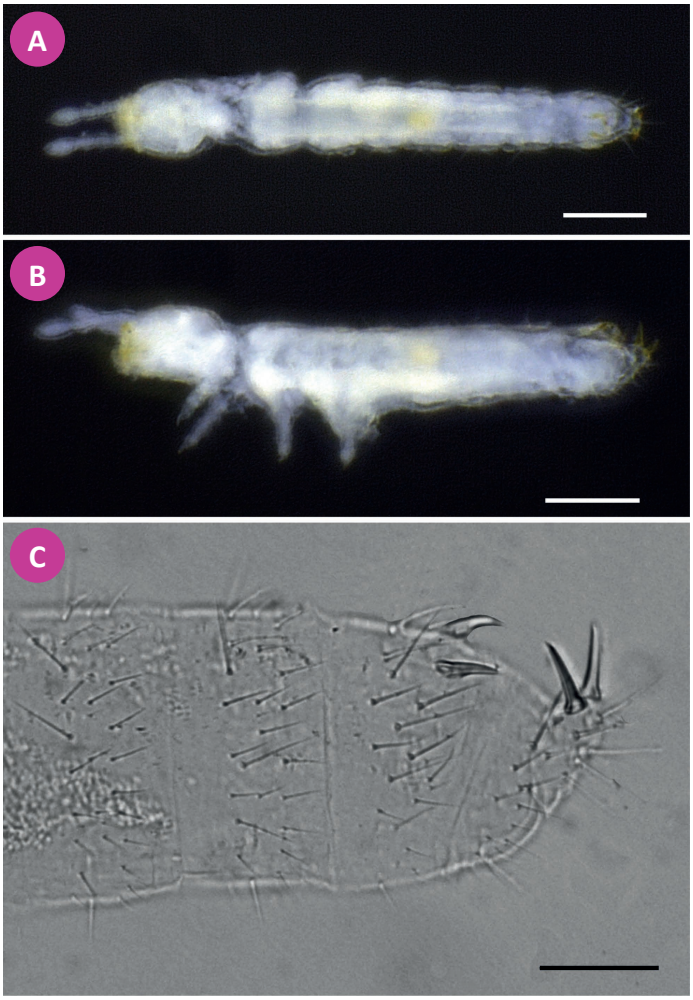

Figure 2A-C. *Yosiiella mira* Hüther, 1967. **A**, dorsal habitus of specimen fixed in alcohol; **B**, lateral habitus of specimen fixed in alcohol; **C**, Dorsal chaetotaxy of the Abd III-VI (in lateral view) of specimen fixed in slide. Scale bar: A-B = 0.1 mm, C = 0.05 mm.

The new record of *Y. mira* extends of 33 species (in 13 genera) to 34 species (in 14 genera) of Isotomidae known for Peru (Mari-Mutt & Bellinger 1990; Mari-Mutt *et al.* 2022), and we hope that the data provided here will be useful to understand the distribution and biogeographic patterns of Isotomidae taxa in Neotropical region.

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Authors' Contributions

NGC, identified the species and prepared the manuscript. EAHV conducted the field and laboratory work, and revised the final version of the manuscript.

Conflict of Interest Statement

The authors declare no conflict of interest.

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