



<http://dx.doi.org/10.11646/zootaxa.3957.5.5>

<http://zoobank.org/urn:lsid:zoobank.org:pub:283F2361-12CA-40A8-BD90-1768CDF765BE>

## Redescription of *Lusitanipus alternans* (Verhoeff, 1893) (Diplopoda, Callipoda, Dorypetalidae) and ecological data on its Laboulbeniales ectoparasites in caves

ANA SOFIA P.S. REBOLEIRA<sup>1</sup> & HENRIK ENGHOFF

Natural History Museum of Denmark (Zoological Museum), University of Copenhagen, Universitetsparken 15, DK-2100 København Ø, Denmark.

<sup>1</sup>Corresponding author. E-mail: [sreboleira@snm.ku.dk](mailto:sreboleira@snm.ku.dk)

### Abstract

The Portuguese endemic callipodidan millipede *Lusitanipus alternans* (Verhoeff, 1893) is redescribed, based on abundant new material collected in caves of central Portugal. The species is illustrated with comprehensive SEM images. The relationships of the genus *Lusitanipus* Mauriès, 1978 to other callipodidan genera of the subfamily Cyphocallipodinae Verhoeff, 1909 are discussed. The major part of the studied material is highly infected with ectoparasitic fungi of the order Laboulbeniales, we also include information about the infection in the subterranean ecosystem.

**Key words:** Cyphocallipodinae, millipede, Laboulbeniaceae, fungi, Iberian Peninsula

### Introduction

The family Dorypetalidae Verhoeff, 1900 is composed of four genera: *Cyphocallipus* Verhoeff, 1909 (1 sp.) and *Dorycallipus* Verhoeff, 1909 (1 sp.), from southern Spain; *Dorypetalum* Verhoeff, 1900 (7 spp.), distributed in the Balkan Peninsula, Carpathians and Asia Minor; and *Lusitanipus* Mauriès, 1978 (1 sp.), from central Portugal (Stoev & Enghoff 2006; Stoev *et al.* 2008).

The subfamily Cyphocallipodinae Verhoeff, 1909, includes the three Iberian endemic genera *Cyphocallipus*, *Dorycallipus* and *Lusitanipus* (Stoev & Enghoff 2006), and can be easily separated from the Dorypetalinae Verhoeff, 1909 by the enlargement and increased complexity of the tip of the telepodite (Mauriès 1978). Hoffman (2009) doubted that the cyphocallipodine genera really belong to the same family as *Dorypetalum*, but until a proper phylogenetic analysis of the Callipodida is done, this matter can hardly be settled.

*Lusitanipus alternans* (Verhoeff, 1893) was first described as *Lysiopetalum alternans* Verhoeff, 1893, based only on 2 females and a juvenile (Verhoeff 1893). In 1895, the same author proposed the subgenus *Silvestria* for two species, including *Lysiopetalum alternans* and describing its male; 14 years after, he provided a key to “*Silvestria*” and related genera (Verhoeff 1909). Verhoeff (1895) did not select a type species for *Silvestria*, but in the same year Cook (1895) selected the other species assigned to *Silvestria* by Verhoeff, viz., *Julus foetidissimus* Savi, 1819, as type species of *Silvestria*. *J. foetidissimus* was, however, already type species of *Lysiopetalum* Brandt, 1840 (by original designation), a genus now regarded as a synonym of *Callipus* Risso, 1826. “*Lysiopetalum/Silvestria*” *alternans* was therefore orphaned until Mauriès (1978) proposed the genus name *Lusitanipus* to accommodate *Lusitanipus alternans*. The only illustration of this species available in the literature is a lateral view of the gonopod from Verhoeff (1928), and all specimens collected so far originate from near the town of Coimbra, Serra da Estrela and Buçaco (Machado 1946).

In the recent years intense fieldwork in caves of Portugal provided abundant millipede material (Reboleira & Enghoff 2014a) and some new troglobiont species were described (Enghoff & Reboleira 2013a,b; Reboleira & Enghoff 2013, 2014b,c). Among this material, several specimens of *Lusitanipus alternans* were identified. We here redescribe the species, providing a genus diagnosis, as well as some ecological features related to infection of *L. alternans* with ectoparasitic fungi of the order Laboulbeniales.