



***Troglo-drilus jugeti* n. sp. (Annelida, Clitellata, Tubificinae), a new stygobiont oligochaete species from south-western Europe**

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Abstract

We use a morphological approach focused on characters of the reproductive organs to assess the taxonomic status of the stygobiont oligochaete species *Troglo-drilus galarzai* (Giani and Rodriguez, 1988). After the evaluation of 23 characters, diagnostic differences in the spermathecal vestibule, the penial sac and the penial sheath are observed between northern Iberian Peninsula populations and south-eastern France populations. Recent molecular analyses based on mitochondrial gene data have revealed a high genetic variation in *T. galarzai*. Given that both molecular and morphological data support the presence of two species within *T. galarzai*, we propose the specific status for the French populations under the name *Troglo-drilus jugeti* n. sp. As a result, the type species of the genus, *T. galarzai*, is now restricted to the Iberian Peninsula. A possible paleogeographic scenario is hypothesised for the evolution of *Troglo-drilus* during the Para-Tethys regression in the Neogene stage.

Key words: groundwater, oligochaete, cryptic speciation, new species

Introduction

Troglo-drilus galarzai was first described by Giani and Rodriguez in 1988 from groundwaters in the northern Iberian Peninsula (Argatxa and Goiketxe caves, Santa Eufemia-Ereñozar karst unit, Spain, Fig. 1). Three characters led the authors to ascribe the species to the marine-estuarine genus *Tubificoides* Lastockin, 1937: the presence of a bulbous spermathecal duct, the histological differentiation in the atrial epithelium and the ringed glandular epidermis in the body wall. The finding of new specimens in Mairulegorreta cave (Gorbeia karst unit, Spain, Fig. 1) in 1987 as well as in the subterranean gallery of Montgelas and in Crotot cave (France, Fig. 1) between 1998–2001, enabled Juget *et al.* (2006) to document the intraspecific geographical variation of *T. galarzai*. In addition, Juget *et al.* confirmed an apical entrance of the vas deferens into the atrium, instead of opposite to the prostate junction (as shown in Fig. 4 in Giani & Rodriguez 1988, probably due to a particular orientation of the atrium in one individual). This, together with the histology of the atrial duct (two kinds of epithelial cells: densely granulated ones in the concave part near the prostate junction and non granulated ones in the convex and ectal part), justified the erection of the new genus *Troglo-drilus* Juget *et al.*, 2006. Recently, mitochondrial gene data have revealed maximum genetic distances of 18% for COI sequences and 10% for 16S sequences (uncorrected pairwise distances) between Gorbeia and Montgelas populations (Achurra *et al.* 2011), which may indicate the presence of two distinct species. Given that delimiting species based on measurements of sequence similarity is an approach still under debate (Hebert *et al.* 2003, 2004; DeSalle *et al.* 2005; Meier 2008), any conclusion on *T. galarzai* needs also other evidence. Therefore, the aim of present study is to do a morphological re-evaluation of characters in the four known populations of the nominal species *T. galarzai*, looking for diagnostic differences.