



A second new species of *Tyrrhenoleuctra* discovered by means of molecular data: *Tyrrhenoleuctra lusohispanica* n. sp. (Plecoptera: Leuctridae)

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Abstract

Tyrrhenoleuctra lusohispanica sp. n., a new species of the leuctrid genus *Tyrrhenoleuctra* from the southern Iberian Peninsula (southern Portugal and Spain) is described solely on molecular characters. Molecular analyses clearly indicated the distinctness of this species and demonstrated the presence of cryptic species in the genus *Tyrrhenoleuctra*. We also describe the systematic affinities of *T. lusohispanica* sp. n. to other species in the genus. With all *Tyrrhenoleuctra* species, *T. lusohispanica* sp. n. exhibits marked phenotypic variability.

Key words: stonefly, Portugal, Spain, mitochondrial gene, 12S gene, phenotypic variability

Introduction

In the last fifteen years, the systematics of the leuctrid genus *Tyrrhenoleuctra* has been the subject of intensive studies (Sezzi *et al.* 2000; Sezzi 2001; Fochetti *et al.* 2004, 2009; Fochetti & Tierno de Figueroa 2009). Morphology, allozymic, and molecular aspects were studied and a new species, *T. antoninoi* was described on the basis of biochemical and molecular characters (Fochetti & Tierno de Figueroa 2009).

Fochetti & Tierno de Figueroa (2009) presented a systematic arrangement for the described species:

Tyrrhenoleuctra antoninoi Fochetti & Tierno de Figueroa [Spain: Balearic Islands] (*Tyrrhenoleuctra* sp. A in the original paper)

T. minuta (Klapálek) complex

Tyrrhenoleuctra sp. B [Spain: Córdoba]

Tyrrhenoleuctra sp. C [Spain: Sierra de Grazalema; Portugal: Algarve]

T. tangerina (Navás) [Spain: Ceuta (North Africa), Algeciras (S Cádiz)]

T. zavattarii (Consiglio) [France: Corsica, Italy: Sardinia].

This arrangement derived from a phylogram based on recovered haplotypes from the analysis of a combined molecular dataset (COI + 12S; Fochetti *et al.* 2009) (Fig. 1). Two major clades can be identified from the Maximum Likelihood tree (ML) (Fig.1): a Sardo-Corsican clade, including *T. zavattarii* and an Ibero-Maghrebian clade including four lineages, respectively from the Balearic Islands (*T. sp. A*, later described as *T. antoninoi* (Fochetti & Tierno de Figueroa 2009)), from northern Africa (Ceuta) and southernmost Spain (Algeciras) (*T. tangerina*), and a complex preliminarily referred to as *T. minuta*, which includes two lineages, one from Córdoba, *T. sp. B* and one from Sierra de Grazalema and Portugal, *T. sp. C*. The Córdoba population can be referred to *T. minuta*; the type locality of this species is Sierra Morena, the location of Córdoba. However, Klapálek (1901) did not specify a type locality. It is unknown if all *Tyrrhenoleuctra* populations occurring along the entire Sierra

Affinities and remarks. *Tyrrhenoleuctra lusohispanica* is indistinguishable based solely on morphological characters from other known *Tyrrhenoleuctra* species. Table 2 presents morphological characters with range of variation. These measurements indicate that individuals for example of *T. lusohispanica* fall within ranges measured for *T. minuta* from Córdoba, making morphological determinations problematic.

According to molecular sequences (Fochetti *et al.* 2009), *T. lusohispanica* is more closely related to the other southern Iberian *Tyrrhenoleuctra* species, *T. minuta* and *T. tangerina*, rather than to the Corso-Sardinian clade, indicating a phylogenetic affinity with the Ibero-Maghrebian clade of the genus.

Tyrrhenoleuctra lusohispanica is a typical representative of the “thermophilous association” (Aubert 1963a), inhabiting more or less temporary streams with warm waters. It has been collected with *Guadalgenus franzi* (Aubert), *Hemimelaena flaviventris* (Pictet), *Nemoura lacustris* Pictet, *Capnioneura gelesae* Berthélemy & Baena, other species often associated with temporary streams. The marked phenotypic variability found in *T. lusohispanica*, as in other *Tyrrhenoleuctra* species, can be related to the thermal variability characteristic of temporary streams. This is consistent with Lillehammer (1976) observations that morphological features of the family Leuctridae can be influenced by environmental factors.

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