



A reappraisal of the monophyly of the genus *Pseudomonocelis* Meixner, 1943 (Platyhelminthes: Proseriata), with the description of a new species from the Mediterranean

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Abstract

Pseudomonocelis paupercula **nov. sp.** is described from brackish-water habitats of the Mediterranean. It is distinguished from other members of the genus by the copulatory organ provided with a stylet, combined with lack of vagina and presence of a muscular organ close to the female pore. Its phylogenetic relationships have been investigated sequencing complete 18S rRNA gene and partial 28S rRNA gene, spanning variable domains D1-D6. Both BI and ML suggest a sister-taxon relationships of *P. paupercula* **nov. sp.** with the east African *P. cf cavernicola*. However, statistical support is low. Conversely, MP indicates *P. paupercula* **nov. sp.** as sister-taxon to all the remaining *Pseudomonocelis* and *Minona ilenae*. Overall, results of the combined analysis do not support the monophyly of the genus *Pseudomonocelis*. The need for wider molecular and taxonomic sampling is stressed.

Key words: *Pseudomonocelis paupercula*, microturbellarian, karyotype, taxonomy, biodiversity, molecular phylogeny, 18S, lrsDNA

Introduction

The Monocelididae Hofsten, 1907 (Platyhelminthes: Proseriata) include marine interstitial flatworms, with a comparatively simple morphology. Among the few morphological characters on which their systematics is based, particular weight has been traditionally attributed to the position of the ovaries in relation to the pharynx (Martens, 1983). In most Monocelididae the ovaries are placed just in front of the pharynx, while a few species display post-pharyngeal ovaries. However, the paucity of characters available for taxonomy and the chances of parallel evolution raise suspicions that groupings of taxa exclusively based on relative position of the ovaries may be homoplastic (Martens, 1983; Curini-Galletti *et al.*, 2010). Among the genera with posterior ovaries, the genus *Pseudomonocelis* Meixner, 1943 appears indeed particularly heterogeneous. It includes species showing all stages from the presence of a fully functional accessory organ provided with a stylet (*Pseudomonocelis hoplites* Curini-Galletti, 1997) to a reduced state which has lost both the stylet and the glandular function (*P. cavernicola* Schockaert & Martens, 1987), to the total loss of the organ (Curini-Galletti, 1997; Curini-Galletti & Casu, 2005; Curini-Galletti *et al.*, 2011; Schockaert & Martens, 1987). So far, the monophyly of the genus has never been tested using gene sequence data. *Pseudomonocelis hoplites* has not been sequenced yet. *Pseudomonocelis* cf *cavernicola*, in a molecular study of the *Pseudomonocelis agilis* complex, clustered with the rest of the *Pseudomonocelis* species (Casu *et al.*, 2009). However, branch support was very low, and the molecular sample too limited to allow any sound conclusions.

Recently, during sampling campaigns performed in the Mediterranean under the sponsorship of the project BIOIMPA ('Biodiversity of Inconspicuous Organisms in Marine Protected Areas'), a new species of *Pseudomonocelis* was found which, similarly to *P. cf cavernicola*, presents an accessory organ without stylet. Here we present