Four new species of Acoela from Chile

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Abstract

Acoels are with few exceptions marine worms and a common component of the interstitial meiofauna. In this study we present
new species to science belonging to Isodiametridae and Solenofilomorphidae. The new species, Isodiametra finkei n. sp.,
Postaphanostoma nilssoni n. sp., Pseudaphanostoma hyalinorhabdoida n. sp. and Solenofilomorpha pellucida n. sp. were all
collected in Chile during March 2012. Nucleotide sequences for the ribosomal genes 18S rDNA and 28S rDNA as well as COI
mtDNA have been determined for the new species and used in a maximum likelihood analysis to further support their
classification.

Key words: Isodiametridae, Solenofilomorphidae, Interstitial, Meiofauna, Southeastern Pacific Ocean

Introduction

Acoela are small marine worms that live interstitially in sandy or muddy sediments, among algae, or, more rarely,
in the pelagic zone. They occur in all oceans and climates, often in very high abundance. Acoel diversity and
taxonomy has mostly been studied in the North East Atlantic (e.g. Westblad, 1942, 1945, 1946, 1948; Dörjes
1968), the Sao Paolo Area (Marcus 1948, 1950, 1954a, 1957) and in parts of the East Coast of the United States
(e.g. Hooge and Tyler 2003, Hooge and Smith 2004). In spite of their evolutionary significance and controversial
phylogenetic position (see Edgecombe et al. 2011 with references), the appreciation of acoel diversity outside of
the above-mentioned areas is virtually non-existing.

From the whole Pacific Coast of South America only four species of Acoela are known, all of them from
southern Chile: Amphiscolops gemelliporus Marcus, 1954b, Haplogonaria idia (Marcus, 1954b), Isodiametra urua
(Marcus, 1954b) and Rimmicola glacialis Böhmig, 1908. Compared to the 83 species known from the North Sea
island Heligoland (Germany), this low number is illustrative of the lack of knowledge on acoel biodiversity in the
South Pacific. A database summarising what is known about acoel diversity and distribution and presenting the
current classification can be found at http://acoela.myspecies.info. A subset of these data is also available at http://
www.marinespecies.org/aphia.php?p=taxdetails&id=2847

Here we report on four new species of Acoela from the central Chilean coast collected in 2012 during a visit to
the Estación Costera de Investigaciones Marinas in Las Cruces, Metropolitan province. To reconstruct the
phylogenetic position of the new species and to provide molecular “barcodes” to facilitate their identification we
sequenced the nuclear ribosomal SSU (18S) and LSU (28S) genes as well as a portion of the mitochondrial
Cytochrome oxidase subunit I (COI) from each species. For phylogenetic analysis the sequences were appended to
the acoel dataset published in Jondelius & Wallberg et al. (2011).

Material and methods

Sampling and documentation

Samples were collected by SCUBA diving, snorkeling or simply by scooping up the top layer of the sediment
the single testis, and the position of the ovaries posterior to the male copulatory organ supports the position within Solenofilomorphidae. The lack of rhammites and a penis further supports the position within *Solenofilomorpha* according to the diagnoses in Dörjes (1968) and Crezee (1975). The maximum likelihood analysis of the concatenated 18S, 28S and COI sequences provides high support for a clade containing *Solenofilomorpha*, *Endocincta* and *Oligofilomorpha* corresponding to the family Solenofilomorphidae. The individual monophyly of these genera based on molecular data has not yet been addressed. Hence, classification of the new species within *Solenofilomorpha* is reasonable since this is the type genus for Solenofilomorphidae (Fig. 16).

**TABLE 2.** Selected characters for species within *Solenofilomorpha*.

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<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Length/width-ratio</td>
<td>1:18</td>
<td>1:14</td>
<td>1:14</td>
<td>1:5</td>
<td>1:19</td>
</tr>
<tr>
<td>Body pigmentation</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Position of ovaries</td>
<td>Reaches to posterior-most part of body</td>
<td>Mid-body region</td>
<td>Mid-body region</td>
<td>Posterior third of body not reaching posterior-most part of body</td>
<td>Mid- to posterior third of body</td>
</tr>
<tr>
<td>Antrum</td>
<td>Absent</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>Seminal bursa</td>
<td>Absent</td>
<td>Present</td>
<td>Present</td>
<td>Absent</td>
<td>Absent</td>
</tr>
</tbody>
</table>

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**References**


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NEW ACOELA FROM CHILE

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