Occurrence of the interstitial nemertean
*Ototyphonemertes duplex* (Nemertea: Hoplonemertea) in the Cabo de Gata Natural Park (Mediterranean, south-east Spain)

ALFONSO HERRERA-BACHILLER AND JUAN JUNOY
EU-US Marine Biodiversity Research Group, Departamento de Ciencias de la vida and Instituto Franklin, Universidad de Alcalá, AP 20 Campus Universitario, 28871 Alcalá de Henares, Madrid, Spain

The interstitial hoplonemertean *Ototyphonemertes duplex*, originally described from Naples, is collected for the first time on the Spanish Mediterranean coast at the Cabo de Gata Natural Park (Mediterranean, south-east Spain). Morphological data and pictures of this species are provided.

**Keywords:** Nemertea, *Ototyphonemertes duplex*, new record, Mediterranean, Spain, Cabo de Gata Natural Park

Submitted 17 July 2014; accepted 29 September 2014

**INTRODUCTION**

The knowledge about the nemerteans inhabiting beaches is scarce due to their low abundance in these habitats and they are slightly documented in books about beach ecology (e.g. McLachlan & Brown, 2006). Recent beach studies involving an intensive sampling (e.g. Junoy et al., 2005, 2013) have discovered very unusual species such as *Lineus acutifrons* Southern, 1913 or *Psammamphiporus elongatus* (Stephenson, 1911) (Herrera-Bachiller et al., 2008; Puerta et al., 2010).

Interstitial nemerteans are more elusive to collect in benthic samples due to their size (like many other invertebrates the nemerteans also have their smallest species in the interstitial fauna) and there are fixation problems that make their identification difficult.

Sampling of beaches from Cabo de Gata Natural Park (south-east Spain) (Figure 1) revealed the presence of the nemertean *Ototyphonemertes duplex* Bürger, 1895. The aim of this paper is to document this record and provide morphological data for the species.

**MATERIALS AND METHODS**

Sedimentary samples of volcanic coarse sand from the Embarcadero beach (36°47.603'N 2°3.605'W) (Figure 1) were collected and examined following the method described in Corrêa (1949). Nine specimens (five ♀, four ♂) of *O. duplex* were obtained on 21 June 2014. The specimens were examined alive both before and after anaesthetization in 7.5% MgCl₂. The nine specimens were live squeezed to observe the stylet region. Sediment samples also contained specimens of the heteronemertean *Ramphogordius lacteus* Rathke, 1843.

**RESULTS**

The body is extremely slender. Colour is orange in the intestine region, the anterior part is whitish and it is reddish around the cerebral ganglia (Figure 2A, C). Specimens measure up to 16 mm in length but no more than 1 mm in width. Head is bluntly rounded in shape (Figure 2D, E), not demarcated from the trunk, but in motion sometimes slightly oval; lacks eyes. A pair of statocysts is found dorsal to the cerebral ganglia; each one contains a statolith with two granules (Figure 2F). One cephalic furrow posterior to statocysts is observed reaching around body, dorsally forming an angle pointing caudally and ventrally pointing anteriorly (Figure 2C). Tactile cirri are present in the cephalic region; their number and position are variable (Figure 2E). The back end is slightly pointed with adhesive plate; caudal cirri are present. The proboscis occupies only the anterior third part of the body (Figure 2C). The stylet is smooth; all specimens have two accessory stylet pouches containing up to 3 stylets each (Figure 2G); the direction of the accessory stylets is both forward and backward in six specimens and forward in three specimens. The middle chamber is bulbous. Measurements of the stylet apparatus of the specimens are shown in Table 1. Specimens were sexually mature in June (Figure 2C). They move quickly in the trays with sand and survive in captivity in small containers without any special care for several weeks.
Ototyphlonemertes duplex has been recorded in Mediterranean waters of Naples (Italy), Villefranche-sur-Mer (France) and the south of England (Bürger, 1895; Corréa, 1953; Kirsteuer, 1971; Envall, 1996). The specimens from Cabo de Gata Natural Park constitute the first record of the species in Spain. There were only two records of the genus Ototyphlonemertes from the Iberian Peninsula. Envall & Norenburg (2001) collected a single specimen of O. brunnea from Barcelona beaches and Norenburg (2008) listed O. macintoshi from Mindelo (Portugal).

The morphology of the Spanish specimens is consistent with the descriptions of O. duplex provided by Bürger (1895), Corréa (1953) and Envall (1996). They have the same colour pattern as the one represented in the original description by Bürger (1895: plate 2, figure 6) (Figure 2B). Kirsteuer (1977) suggested an intraspecific constancy in number and distribution of cirri and Norenburg (1988) proposed a system to account for it. A basic distributional pattern has not been detected in the Spanish specimens; only some specimens showed a regular pattern similar to O. duplex represented by Envall (1996: figure 1b). The validity of the cirri as a specific character has been discussed by Envall & Norenburg (2001).

Spanish specimens were collected together with the heteronemetean Ramphogordius lacteus (=Lineus lacteus). The common occurrence of both species in the same area has been also reported by Bürger (1895) and Corréa (1953); the ecological significance of these data remain still unknown.

**ACKNOWLEDGEMENT**

We are extremely grateful to two anonymous referees for their constructive comments about the original manuscript.

**Table 1.** Measurements recorded for the stylet apparatus of nine specimens of Ototyphlonemertes duplex.

<table>
<thead>
<tr>
<th>Specimen</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of central stylet (µm)</td>
<td>40</td>
<td>45</td>
<td>45</td>
<td>46</td>
<td>40</td>
<td>45</td>
<td>42</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>Length of basis (µm)</td>
<td>35</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>43</td>
<td>40</td>
<td>38</td>
<td>40</td>
<td>37</td>
</tr>
<tr>
<td>Maximum width of basis (µm)</td>
<td>12</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Ratio of basis length to central stylet length</td>
<td>0.87</td>
<td>0.89</td>
<td>0.89</td>
<td>0.87</td>
<td>1.08</td>
<td>0.89</td>
<td>0.91</td>
<td>1.08</td>
<td>1</td>
</tr>
<tr>
<td>Ratio of basis length to basis width</td>
<td>2.92</td>
<td>2.67</td>
<td>2.67</td>
<td>2.67</td>
<td>3.31</td>
<td>3.08</td>
<td>2.53</td>
<td>3.08</td>
<td>2.47</td>
</tr>
<tr>
<td>Number of accessory stylet pouches</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Number of reserve styles per pouch</td>
<td>2.2</td>
<td>3.3</td>
<td>3.3</td>
<td>3.2</td>
<td>2.2</td>
<td>2.2</td>
<td>1.3</td>
<td>2.3</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Fig. 2. Ototyphlonemertes duplex: (A) photograph of a complete specimen (dorsal view); (B) original illustration, reproduced from Bürger (1895: plate 2, figure 6); (C) photograph of a complete live squeezed female specimen showing the gonads. Cephalic furrow (arrow); (D) microphotograph of the head of a live squeezed specimen showing the head and the position of the tactile cirri (arrowheads). Inset shows a detail of the cirri; (E) microphotograph of the statocyst; (G) microphotograph of a live squeezed specimen showing the central stylet and its basis and the two pouches of accessory stylets. Scale bars: A, 2 mm; C, 3 mm; D–E, 0.5 mm; F, 10 μm; G, 50 μm.

REFERENCES


and


Correspondence should be addressed to:

J. Junoy
Departamento de Ciencias de la Vida
Universidad de Alcalá
28871 Alcalá de Henares, Spain
email: juan.junoy@uah.es