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Sphaerodoridae (Annelida: Polychaeta) from the DIVA-Artabria I project (2002 cruise) with description of a new species from the Ártabro Gulf (NW Iberian Peninsula)

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Abstract: Sphaerodorids (Polychaeta: Sphaerodoridae) collected during the DIVA-Artabria I project (2002 cruise) from soft sediments off NW Iberian Peninsula are described. A total of 47 specimens belonging to two species were collected. *Sphaerodoridium fauchaldi* Hartmann-Schröder, 1993 is reported for the third time since its original description. Additional morphological data on this species are provided to complete the previous descriptions. A new species of the genus *Sphaerodoropsis*, *S. artabrensis* sp. nov., is also described herein. The new species is characterised by having three pairs of lateral prostomial appendages, four spherical to pear-shaped dorsal macrotubercles arranged in a transverse row per chaetiger, a parapodium with prechaetal lobe, 3-4 parapodial papillae, and blades of composite chaetae which are unidentate and bear spinulation along their cutting margin.

Résumé : *Sphaerodoridae (Annelida : Polychaeta) du projet DIVA-Artabria I (campagne 2002) et description d'une nouvelle espèce du Golfe d'Artabro (NW de la péninsule ibérique).* Dans cet article, nous décrivons les sphaerodoridés (Polychaeta : Sphaerodoridae) récoltés sur des fonds meubles du NW de la Péninsule Ibérique lors du projet DIVA-Artabria I (campagne 2002). En tout, 47 spécimens appartenant à deux espèces ont été trouvés. *Sphaerodoridium fauchaldi* Hartmann-Schröder, 1993 est signalée pour la troisième fois depuis sa description originale. Des compléments à la diagnose de cette espèce sont apportés. Une nouvelle espèce, *Sphaerodoropsis artabrensis* sp. nov. est décrite. La nouvelle espèce est caractérisée par la présence de trois paires d'appendices latéraux sur le prostomium, de quatre macrotubercules dorsaux de forme sphérique à piriforme disposés en une rangée latérale par sétigère, de parapodes pourvus d'un lobe présétal et de 3 à 4 papilles, ainsi que par la présence de denticulations sur le bord des articles des soies composées unidentées.

Keywords: Polychaeta • Sphaerodoridae • *Sphaerodoropsis artabrensis* sp. nov. • *Sphaerodoridium fauchaldi* • Atlantic Ocean • Iberian Peninsula

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Introduction

Sphaerodorids (Polychaeta, Sphaerodoridae) are a small group of polychaetes characterized by having their body surface covered with tubercles and/or papillae (Pleijel, 2001). About half of the known species have been reported from waters deeper than 100 m and many of them have been described recently (e.g., Fauchald, 1974; Desbruyères, 1980; Hartmann-Schröder & Rosenfeldt, 1990; Borowski, 1994; Aguirrezabalaga & Ceberio, 2005; Aguado & Rouse, 2006). Sphaerodorids were thus supposed to be less common in shallow waters (but see Katzmann, 1973; Amoureux et al., 1978; Kudenov 1987a & 1987b; Bakken, 2002; Moreira et al., 2004), which may be an artefact due to their small bodies and inappropriate processing of samples (Fauchald, 1977; Borowski, 1994).

The Marine Biological Station of A Graña (Universidade de Santiago de Compostela, Spain) started in 2002 the DIVA-Artabria I project to survey the benthic fauna of the Galician shelf and slope off the Ártabro Gulf (NW Iberian Peninsula) in order to obtain baseline data about diversity, composition and distribution of benthic assemblages. The examination of the samples taken at shelf depths (150-250 m) during the cruise done in September 2002 revealed the presence of 47 sphaerodorid specimens belonging to two species. One of them, *Sphaerodoridium fauchaldi* Hartmann-Schröder, 1993, is recorded here for the third time since its original description. Further morphological data to complete previous descriptions are provided here after the examination of the collected specimens by means of both light microscope and scanning electron microscope. The remaining specimens have been determined as a new species to science belonging to the genus *Sphaerodoropsis* Hartman & Fauchald, 1971, which is described herein as *S. artabrensis* sp. nov.

Materials and methods

This study is based on 47 specimens obtained during the DIVA-Artabria I project (2002 cruise). All material was collected by means of an epibenthic sledge (EBS) on the continental shelf off the north-western coast of Spain. Samples were sieved and then fixed in 10% buffered formalin. Specimens were carefully sorted from the sediment and then preserved in 70% ethanol. Observations, drawings and measurements were made with an Olympus BX51 compound microscope connected to a drawing tube. The type material of *Sphaerodoropsis artabrensis* sp. nov. and eight specimens of *Sphaerodoridium fauchaldi* are deposited at the Museo Nacional de Ciencias Naturales, Madrid, Spain and Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt a. M., Germany. Other examined specimens are kept in the collection of the senior author at the Estación de Bioloxía Mariña da Graña (Spain). Specimens used for scanning electron microscopy (SEM) were dehydrated via a graded ethanol series, coated with gold in a sputter coater, and examined and photographed under a JEOL JSM-6400 scanning electron microscope at the RIAIDT, Universidade de Santiago (CACTUS), Spain. The terminology used to describe prostomial appendages follows that of Aguirrezabalaga & Ceberio (2005).

Abbreviations: meda – median antenna; anpa – antenniform papilla; inta – intermediate antenna; perc – peristomial cirrus; prpa, prostomial papilla; bopa, body papilla; matu, macrotubercle; popa, parapodial papilla; prlo, prechaetal lobe; veci, ventral cirrus; MNCN – Museo Nacional de Ciencias Naturales; SFNM – Senckenberg Forschungsinstitut und Naturmuseum.

Systematics

Family SPHAERODORIDAE Malmgren, 1867

Genus *Sphaerodoropsis* Hartman & Fauchald, 1971

Sphaerodoropsis artabrensis sp. nov.
(Figs 1, 2 & 3A)

Material examined

Holotype. Complete specimen, 1.4 mm in length, 0.2 mm in width, with 14 chaetigers, St. EBS-200, 8 September 2002, 43º40.192'N, 08º43.760'W, 209 m, muddy sand (MNCN 16.01/11043).

Paratypes. 5 specimens, St. EBS-150, 8 September 2002, 43º35.451'N, 08º34.432'W, 152 m, sandy mud (MNCN 16.01/11044). 3 specimens, St. EBS-200 (MNCN 16.01/11045). 3 specimens, St. EBS-250, 14 September 2002, 43º41.113'N, 08º44.297'W, 257 m, muddy sand (SMF 16881).

Description

Specimens measuring between 1.20 and 1.75 mm long, 0.17-0.35 mm wide excluding parapodia, with 13-16 chaetigers. Body short, grub-like, lacking pigmentation, transparent-whitish in ethanol. Tegument with a granulated appearance (Fig. 3A).

Prostomium bluntly rounded, fused to peristomium. Median antenna and 3 pairs of lateral prostomial appendages (Fig. 1B, 2A-B). Median antenna short, distally blunt. Dorsal antenniform papillae slender, shorter than median antenna. Intermediate antennae and palps digitiform, longer than median antenna. Peristomial cirri similar in size and shape to intermediate antennae and palps. About 8 digitiform papillae encircled by lateral prostomial

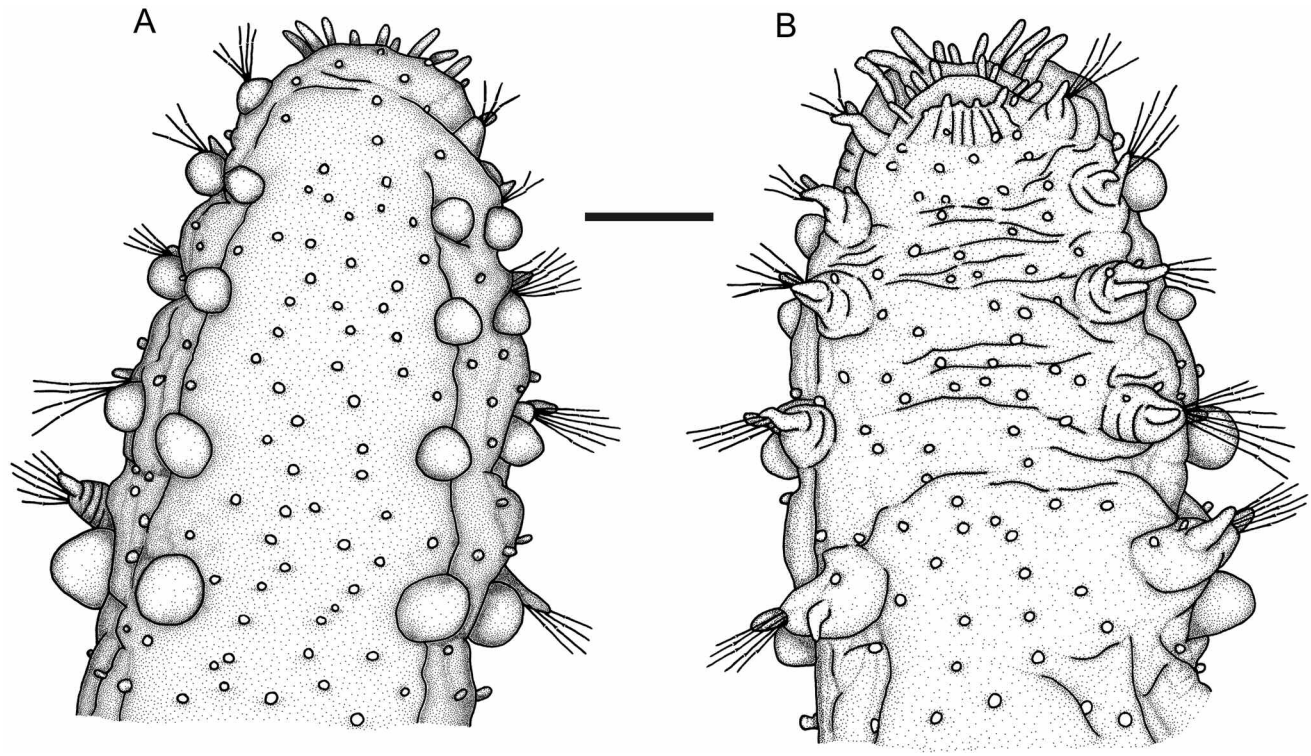

Figure 1. *Sphaerodoropsis artabrensis* sp. nov. Paratype. **A.** Habitus, dorsal view. **B.** Habitus, ventral view. Scale bar: 0.1 mm.
Figure 1. *Sphaerodoropsis artabrensis* sp. nov. Paratype. **A.** Habitus, vue dorsale. **B.** Habitus, vue ventrale. Echelle : 0,1 mm.

appendages; about 6 digitiform papillae surrounding mouth opening ventrally. Eyes not present. Pharynx visible by transparency, smooth, not provided with papillae; muscular proventricule cylindrical, extending over three chaetigers, with 16-18 cell rows, muscle cells similar in size.

Dorsal macrotubercles sessile, spherical to pear-shaped (Fig. 1A). Two (sometimes three) macrotubercles on chaetiger 1; from chaetiger 2 backwards four macrotubercles in a transverse row on each chaetiger. Dorsal body surface covered with rounded papillae following a more or less defined zig-zag pattern. Ventral body surface without macrotubercles, but covered with papillae similar to those on dorsal surfaces.

Parapodia uniramous, with wrinkled surface, longer than wide (Fig. 2C-D). Digitiform prechaetal lobe from chaetiger 2 backwards, projecting beyond acicular lobe; postchaetal lobe absent. Ventral cirri digitiform, slightly shorter or as long as prechaetal lobe, surpassing acicular lobe tip. Parapodia with 3-4 papillae: one on dorsal surface behind prechaetal lobe, one on anterior lateral surface and 1-2 on ventral or ventro-lateral surface behind ventral cirrus.

Composite chaetae numbering 4-15 per fascicle, with dorsoventral gradation in length (32-30 µm long dorsally, 25-15 µm long ventrally in midbody parapodia). Blades unidentate with recurved tip and thin spinulation along cutting margin (Fig. 2E).

Pygidium small, with two spherical dorsal cirri, similar to dorsal macrotubercles, and midventral digitiform anal cirrus (Fig. 2F). Several specimens carrying ovoid oocytes visible through body wall, no nucleus distinguishable.

Remarks

Sphaerodoropsis artabrensis sp. nov. belongs to the group of *Sphaerodoropsis* species having four macrotubercles per segment arranged in a single transverse row ("group 1" according to Borowski, 1994). This group is currently represented by 23 species (see Borowski, 1994; Aguirrezabalaga & Ceberio, 2005; Aguado & Rouse, 2006) in which *S. artabrensis* sp. nov. differs from *S. corrugata* Hartman & Fauchald, 1971, *S. longipalpa* Hartman & Fauchald, 1971, *S. elegans* Fauchald, 1974, *S. laevis* Fauchald, 1974 and *S. simplex* Amoureux, Rullier & Fishelson, 1978 in having a prechaetal lobe on the parapodium while the others lack a prechaetal lobe. Furthermore, *S. artabrensis* sp. nov. clearly differs from all species of Borowski's (1994) "group 1" in having only 3-4 papillae per parapodium instead of the 10 to >20 present in

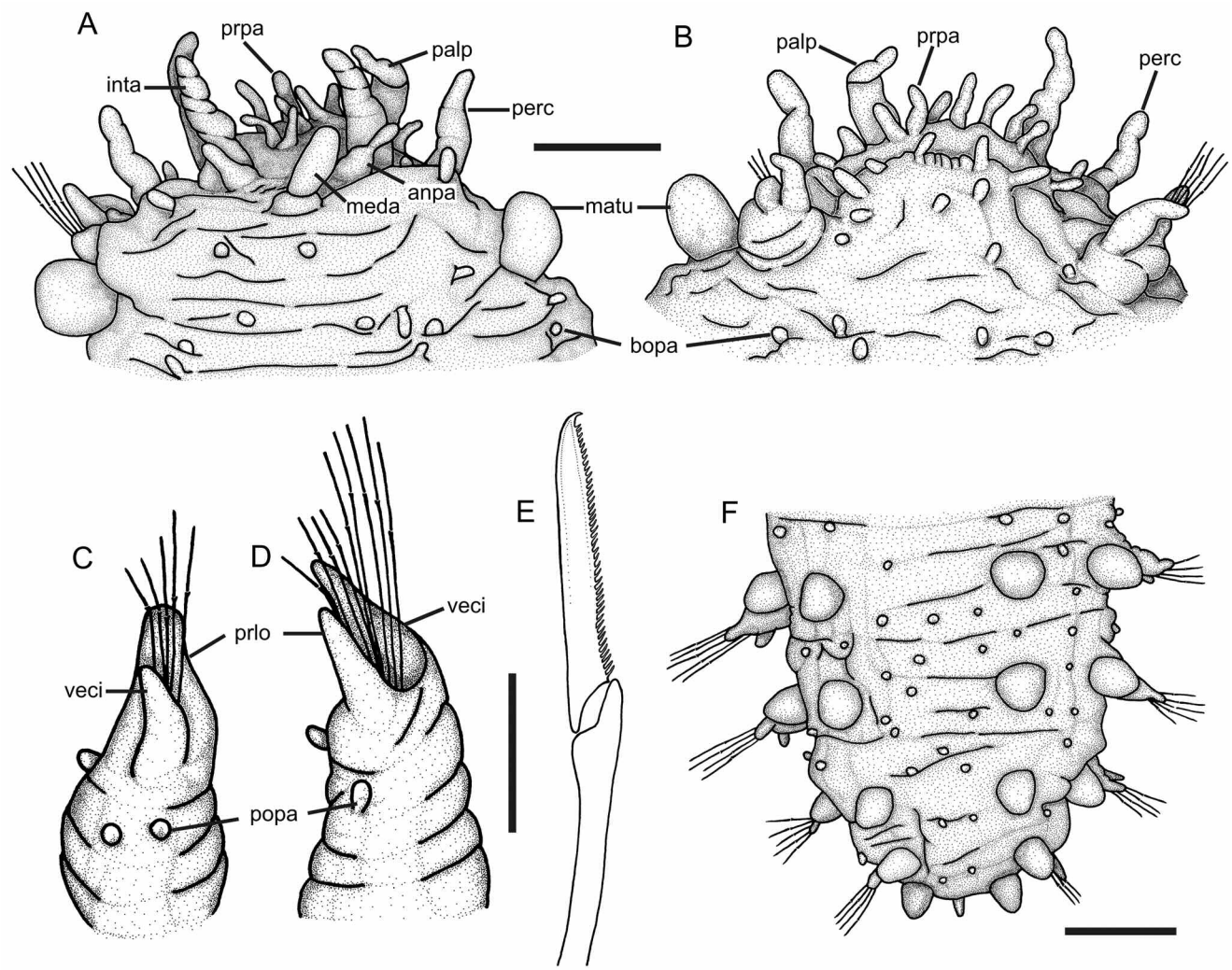

Figure 2. *Sphaerodoropsis artabrensis* sp. nov. Paratype. **A.** Anterior end, dorsal view. **B.** Anterior end, ventral view. **C.** Parapodium, left side, ventral view. **D.** Parapodium, right side, dorsal view. **E.** Composite chaeta (drawn from SEM micrographs). **F.** Posterior end, dorsal view. Scale bar: A-B, 50 µm; C-D, 40 µm; E, 10 µm; F, 0.1 mm.

Figure 2. *Sphaerodoropsis artabrensis* sp. nov. Paratype. **A.** Région antérieure, vue dorsale. **B.** Région antérieure, vue ventale. **C.** Parapode, côté gauche, vue ventrale. **D.** Parapode, côté droit, vue dorsale. **E.** Soie composée (dessinée à partir de photographies au SEM). **F.** Région postérieure, vue dorsale. Echelles: A-B, 50 µm; C-D, 40 µm; E, 10 µm; F, 0.1 mm.

S. philippi (Fauvel, 1911), *S. parva* (Ehlers, 1913), *S. biserialis* (Berkeley & Berkeley, 1944), *S. longiparapodium* (Katzmann, 1973), *S. laureci* Desbruyères, 1980, *S. longesetosa* (Averincev, 1972), *S. longipapillata* Desbruyères, 1980, *S. sibuetae* Desbruyères, 1980, *S. vittori* Kudenov, 1987, *S. discolis* Borowski, 1993 and *S. anae* Aguado & Rouse, 2006. In addition, *S. artabrensis* sp. nov. further differs from *S. triplicata* Fauchald, 1974 in having 3-4 subequal papillae rather than two larger distal papillae per parapodium; *S. laevis* Fauchald, 1974, *S. martinae* Desbruyères, 1980 and *S. exmouthensis* Hartmann-Schröder, 1981 differ from *S. artabrensis* sp. nov. in lacking parapodial papillae. *Sphaerodoropsis furca* Fauchald, 1974 differs from *S. artabrensis* sp. nov. in having one papilla on each face of the parapodium, in lacking ventral parapodial papilla(e) and in the fact that its prostomium bears bifurcate "superior lateral antennae" (Fauchald, 1974). *S. artabrensis* sp. nov. resembles *S. anae* and *S. biserialis* (as redescribed by Aguado & Rouse, 2006) in having composite chaetae that show dorsoventral gradation in length of blades; blades of *S. artabrensis* sp. nov. differ, however, from those of the aforementioned species in length, spinulation and shape. Finally,

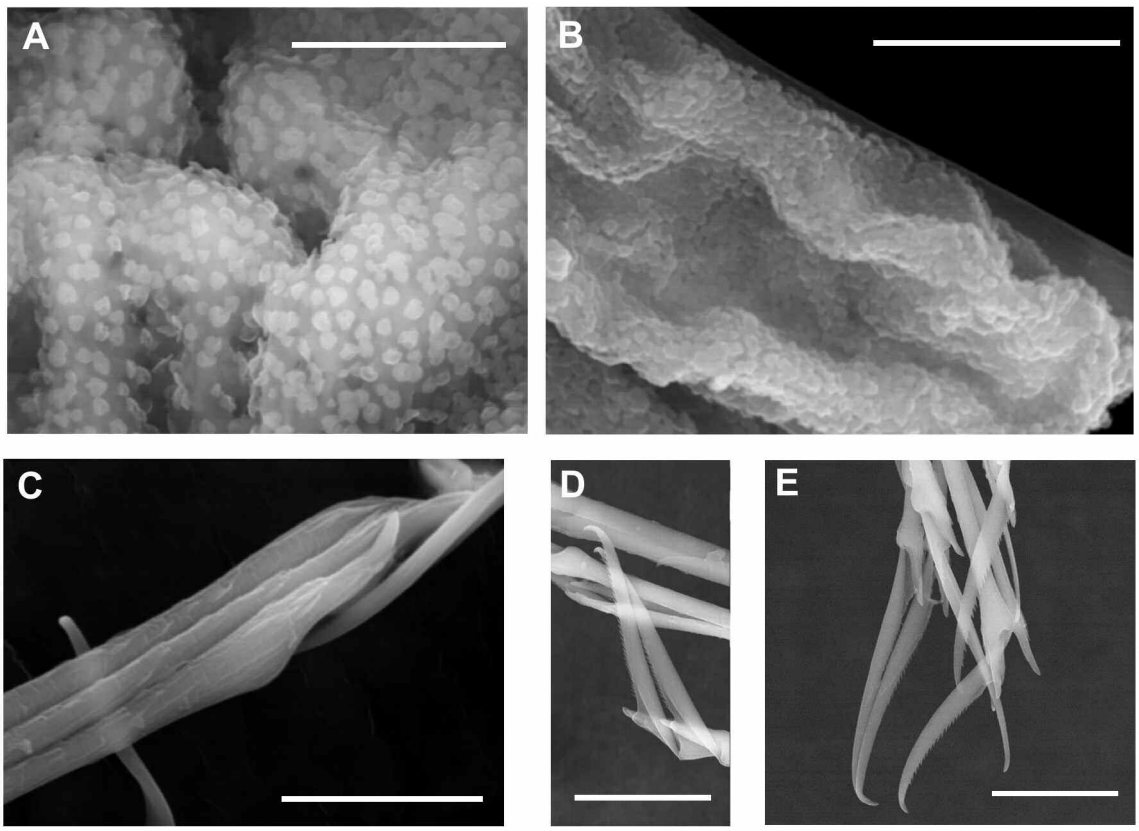

Figure 3. Scanning electron microscope micrographs. **A.** *Sphaerodoropsis artabrensis* sp. nov., tegument (detail). **B-E.** *Sphaerodoridium fauchaldi*. **B.** Tegument (detail). **C.** Composite chaetae, shaft (detail). **D-E.** Composite chaetae. Scale: A-B, 10 µm; C-E, 5 µm.

Figure 3. Photographies au microscope électronique à balayage. **A.** *Sphaerodoropsis artabrensis* sp. nov., tégument (détail). **B-E.** *Sphaerodorium fauchaldi*. **B.** Tégument (détail). **C.** Soies composées, article (détail). **D-E.** Soies composées. Echelles: A-B, 10 µm; C-E, 5 µm.

S. artabrensis sp. nov. and all other species of "group 1" differ from *S. malayana* (Augener, 1934) by lacking a row of macrotubercles on its ventral surface.

Sphaerodoropsis artabrensis sp. nov. is most closely related to *S. stellifer* Aguirrezabalaga & Ceberio, 2005 from the Bay of Biscay in body appearance and the shape of prostomial appendages and parapodia. However, *S. artabrensis* sp. nov. differs from *S. stellifer* in the arrangement of its 3-4 rather than 7 parapodial papillae, and its rounded instead of star-shaped body papillae. Furthermore, *S. artabrensis* sp. nov. has composite chaetae with spinulation along the cutting margin of the blade whereas the blades are smooth in *S. stellifer*.

Distribution

Only known from the type locality, off north-western Iberian Peninsula; between the depths of 152-257 metres, in sediments ranging from muddy sand to sandy mud.

Derivatio nominis

The epithet refers to the Ártabro Gulf (north-western Iberian Peninsula) where this species was discovered.

Genus *Sphaerodoridium* Lützen, 1961 amend. Fauchald 1974

Sphaerodoridium fauchaldi Hartmann-Schröder, 1993 (Fig. 3B-E)

Sphaerodoridium fauchaldi Hartmann-Schröder, 1993: 123-125, figs. 1-9. Aguirrezabalaga & Ceberio, 2005: 16-19, figs. 5-6.

Material examined

Thirty-five specimens (8 specimens deposited at the MNCN: MNCN 16.01/11046), St. EBS-150, 8 September 2002, 43º35.451'N, 08º34.432'W, 152 m, sandy mud. Most

of the specimens complete, measuring between 1.1 and 2.8 mm long, 0.3-0.5 mm wide excluding parapodia, with 14-19 setigers.

Remarks

To date, *Sphaerodoridium fauchaldi* was based only on two specimens, namely the holotype from the North Sea (Hartmann-Schröder, 1993) and a further specimen reported from the Bay of Biscay by Aguirrezabalaga & Ceberio (2005). The present record extends, therefore, the known distribution of this species to the West in the Atlantic Ocean. Our specimens agree in general terms with the descriptions provided by Hartmann-Schröder (1993) and Aguirrezabalaga & Ceberio (2005). Nevertheless, the examination of several specimens under the scanning electron microscope revealed that blades of composite chaetae have a cutting edge with conspicuous spinulation (Fig. 3D-E). The distal end of the shaft is also provided with some spinulation (Fig. 3C). On the contrary, Hartmann-Schröder (1993) and Aguirrezabalaga & Ceberio (2005) reported blades with a slightly serrated edge under the light microscope. Furthermore, the examination of the tegument revealed a granulated appearance (Fig. 3B) similar to that of *Sphaerodoropsis garciaalvarezi* Moreira, Cacabelos & Troncoso, 2004 and *Sphaerodoropsis artabrensis* sp. nov. described herein. On the other hand, several specimens showed some middle parapodia with two distal papillae on their posterior distal edge instead of one. In addition, a pair of eyes in the peristomium is visible through the body wall in some specimens. Aguirrezabalaga & Ceberio (2005) also pointed out that the ventral spherical papillae might be provided with a short stalk whose presence was confirmed in the specimens from the Ártabro Gulf. Although the aforementioned ventral papillae seem to be irregularly distributed (Aguirrezabalaga & Ceberio, 2005), some specimens examined here showed six papillae on parapodial areas on their middle segments and one additional papilla on their intersegmental areas. Furthermore, a cylindrical muscular proventricule provided with about 18-20 cell rows is present, extending about three chaetigers. The presence of proventricule was not previously reported for *S. fauchaldi* and is similar to that present in *Sphaerodoropsis anae* Aguado & Rouse, 2006 and *Sphaerodoropsis artabrensis* sp. nov.

Distribution

North Sea (Hartmann-Schröder, 1993); Bay of Biscay (Aguirrezabalaga & Ceberio, 2005); north-western Iberian Peninsula (this work); between the depths of 152-495 metres, in soft bottoms.

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