

New species of sponges (Porifera, Demospongiae) from the Turkish coast

Bülent GÖZCELİOĞLU^{1*}, Rob Van SOEST², Belinda ALVAREZ³, Belma KONUKLUGİL⁴

¹The Scientific and Technological Research Council of Turkey, Ankara, Turkey

²Department of Marine Zoology, Naturalis Biodiversity Center, Leiden, the Netherlands

³Museum and Art Gallery of the Northern Territory, Darwin, Australia

⁴Faculty of Pharmacy, Ankara University, Ankara, Turkey

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Abstract: The census of shallow-water sponges from the northern Aegean and Marmara sea coasts resulted in the collection of 10 species of Demospongiae. A new *Hymedesmia* species, *Hymedesmia (Hymedesmia) anatoliensis* sp. nov., is described from the western coast of Turkey. Three further species of demosponges, *Axinyssa aurantiaca* (Schmidt, 1864), *Halichondria (Halichondria) contorta* (Sarà, 1961), and *Dictyonella incisa* (Schmidt, 1880), are new to the sponge fauna of Turkey.

Key words: Porifera, Demospongiae, *Hymedesmia anatoliensis*, new species, new records, Turkey

1. Introduction

Studies on Demospongiae diversity of the Aegean and Mediterranean coasts of Turkey are scarce. Yazıcı (1978) identified 15 species around the islands Gökçeada and Bozcaada in the Çanakkale area, and Ergüven et al. (1988) and Katağan et al. (1991; in Topaloğlu, 2001) identified 34 species around Gökçeada. Topaloğlu (2001) found 13 species around Gökçeada. Çinar et al. (2002) reported *Sarcotragus muscarum* Schmidt (1864) from the Aegean Sea. Okuş et al. (2004) identified 25 species in 16 genera in the Gökova and Datça-Bozburun Marine Protected Areas. Gözcelioğlu et al. (2011) reported 27 species from the Turkish coasts, of which 5 species were new records for the marine fauna of Turkey. Evcen and Çinar (2012) reported 29 species in 19 families from the Turkish coasts, of which 1 species was a new record for the eastern Mediterranean, 8 species were new records for the marine fauna of Turkey, and 19 species were new records for the Levantine Sea. Topaloğlu and Evcen (2014) reported 131 sponge species from the Turkish coasts. All studies on sponges in Turkey have been carried out in coastal areas, which may explain the low number of species recorded thus far. Kefalas et al. (2003) and Voultsiadou (2005a, 2005b), for example, identified 200 sponge species living in the Greek Aegean Sea.

In this study, we report Demospongiae species collected from Turkey's northern Aegean and Marmara sea coasts in 2012.

2. Materials and methods

Collection sites (Figure 1) were in İbrice (Edirne, northern Aegean Sea coast) and Değirmendere (Kocaeli, eastern Marmara Sea coast). Sampling was carried out by SCUBA diving with a maximum diving depth of 30 m. All sampling stations were situated in the upper infralittoral zone. All samples were fixed with alcohol (70%). Species were identified in the Zoological Museum of Amsterdam, the Netherlands, using the method described in detail by Van Soest et al. (2000).

The preparation of the material was done in the following way. For thick sections, a representative piece of the sponge was transferred into 96% ethyl alcohol. It was then cut with a razor blade, the presence of both ectosomal and choanosomal portions on the section was confirmed, and it was dehydrated by adding 100% alcohol and xylol. For temporary mounts, fragments of the sponge were placed on a microscope slide and a few drops of sodium hypochlorite were added. After disintegration of the soft parts, a cover slip was added. The samples (spicule mounts) were mounted on slides for examination. For permanent mounts, the following steps were taken: soft parts of the sponge fragments were dissolved in a test tube using boiling concentrated nitric acid. Spicules were washed with tap water by shaking and centrifuge. Spicules were washed twice in 96% alcohol. After removal of the sediment, the samples were allowed to dry, and a few drops of mounting medium were then added before covering with a cover slip.

* Correspondence: bulent.gozcelioglu@gmail.com



Figure 1. Map of Turkish seas and site locations of new species and new records of sponges.

3. Results

More than 25 demosponge specimens were collected, belonging to 10 species. The material is deposited at the Zoological Museum, Amsterdam (RMNH - Rijksmuseum van Natuurlijke Historie) and the Faculty of Pharmacy, Ankara University (AUEF).

Ten species have been identified in total (Table).

Three species found during the present study, namely *Axinyssa aurantiaca* (Schmidt, 1864), *Halichondria (Halichondria) contorta* (Sarà, 1961), and *Dictyonella incisa* (Schmidt, 1880), are new records for the Turkish coasts.

Order Poecilosclerida Topsent, 1928

Suborder Myxillina Hajdu, van Soest & Hooper, 1994

Table. Checklist of Demospongiae species found along the Turkish coasts.

Species	Locality	Depth (m)	Date	Reference
<i>Hymedesmia (Hymedesmia) anatoliensis</i> sp. nov.	İbrice (Edirne) 40°36'8"N, 26°32'33"E	10	30.08.12	Present paper
<i>Suberites carnosus</i> (Johnston, 1842)	Değirmendere (Kocaeli) 40°42'31.5468"N, 29°44'17.2572"E	12	18.08.12	Present paper
<i>Axinella verrucosa</i> (Esper, 1794)	İbrice (Edirne) 40°36'8"N, 26°32'33"E	32	30.08.12	Present paper
<i>Axinyssa aurantiaca</i> (Schmidt, 1864)	İbrice (Edirne) 40°36'8"N, 26°32'33"E	36	30.08.12	Present paper
<i>Axinyssa digitata</i> (Cabiocch, 1968)	İbrice (Edirne) 40°36'8"N, 26°32'33"E	15	30.08.12	Present paper
<i>Raspailia (Parasyringella)</i> sp.	İbrice (Edirne) 40°36'8"N, 26°32'33"E	28–32	30.08.12	Present paper
<i>Dictyonella incisa</i> (Schmidt, 1880)	İbrice (Edirne) 40°36'8"N, 26°32'33"E	26	30.08.12	Present paper
<i>Haliclona (Rhizoniera) sarai</i> (Pulitzer-Finali, 1969)	İbrice (Edirne) 40°36'8"N, 26°32'33"E	22	30.08.12	Present paper
<i>Halichondria (Halichondria) contorta</i> (Sarà, 1961)	İbrice (Edirne) 40°36'8"N, 26°32'33"E	20	30.08.12	Present paper
<i>Acanthella acuta</i> Schmidt, 1862	İbrice (Edirne) 40°36'8"N, 26°32'33"E	18	30.08.12	Present paper

Family Hymedesmiidae Topsent, 1928

Genus *Hymedesmia* Fristedt, 1885

Subgenus *Hymedesmia* Fristedt, 1885

Hymedesmia (Hymedesmia) anatoliensis sp. nov.

(Figure 2)

Material examined:

Holotype RMNH Por. 7465, İbrice Harbor (Edirne), 40°36'8"N, 26°32'33"E, Saros Bay, northern Aegean Sea, Turkey, coll. field number Ibrice13.

Description. Thin encrustation on a limestone conglomerate consisting of dead oysters, serpulid tubes, and massive bryozoans. The available material consists of a larger limestone fragment, 2 × 2 × 0.5 cm in size, and several smaller pieces. The sponge coating of less than 1 mm in thickness grew on the surface and insinuated into holes and crevices, but is lacking from the upper surface of the limestone fragment. The color is reddish-yellow to brown in dried condition and this persists in alcohol, indicating that the live color may be similar. The sponge surface is microhispidated. Consistency is fragile.

Skeleton. Hymedesmioid, with acanthostyles erect on the substrate with the heads embedded in a basal spongin plate. Tornotes are arranged in thin, lax bundles of 3 or 4 in cross-section, at right angles to the substrate. They fan out at the surface and support the dermal membrane, which is penetrated by the points of the larger acanthostyles.

Microscleres, sigmas only, are visible in the dermal membrane, becoming scarce in the interior. Overall spicular density is low.

Spicules. Large acanthostyles, small acanthostyles, tornotes, sigmas; no chelae.

Large acanthostyles, relatively thin, rather sparsely spined, with heads barely developed and irregularly shaped, 155–193.6–215 × 3.5–5.4–8 μm.

Small acanthostyles, rather similar to the larger ones, not clearly separated morphologically, 85–93.9–112 × 3–3.8–5 μm.

Tornotes thin, straight, inequidended, one end sharply pointed, the other mucronate or swollen elongately, often irregular, 143–162.6–191 × 0.5–1.05–1.5 μm.

Sigmas thin, with ends somewhat incurved, with irregular surfaces, in a large size range, possibly in 2 almost overlapping size categories, overall 14–19.3–30 μm, larger 22–30 μm, smaller 14–20 μm.

Etymology. The species is named from the word "Anatolia", since the species lives along the western coasts of Anatolia.

Habitat. The sponge is very rare on subhorizontal surfaces of mixed sand and rock, up to 30 m depth.

Geographic distribution. Western coasts of Turkey. Thus far, known only from the type locality, İbrice Harbor (Edirne), Saros Bay, northern Aegean Sea.

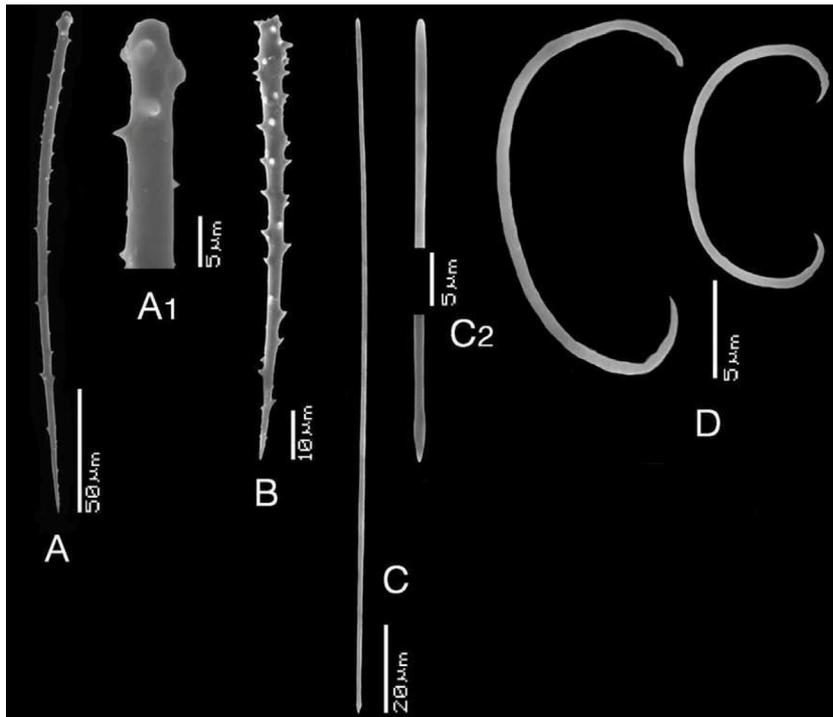


Figure 2. *Hymedesmia (Hymedesmia) anatoliensis* sp. nov., SEM images of the spicules of the holotype RMNH Por. 7456: A. Large acanthostyle; A1. Detail of head; B. Small acanthostyle; C. Tornote; C1. Details of apices of tornote; D. Large and small sigmas.

Remarks. *Hymedesmia* spp. possessing sigmas but lacking chelae are quite rare. In the Northeast Atlantic-Mediterranean area, there is only a single species described with this combination of spicules, *Hymedesmia* (*Hymedesmia*) *tenuisigma* Lundbeck, 1910, from the deep-sea habitat in the waters around Iceland. This species clearly differs from our material by having much larger sigmas (84–120 μm) and much longer acanthostyles of the larger category (300–830 μm). There is little similarity between the 2 species other than their possession of sigmas as the only microsclere type. Some superficial similarity is also apparent with *Hymesigmia japycina* Topsent, 1927, a deep-water species from the Azores, which combines a hymedesmioid skeleton with the absence of chelae and the presence of sigmas. However, the sigmas of the latter species are quite peculiar, forming almost a closed ring and being polytylote. Van Soest (2000) assigned *H. japycina* to the genus *Hymenancora* Lundbeck, 1910 on account of shared sigma morphology with chela-bearing *Hymenancora inaequalis* (Topsent, 1927). The sigmas (70–85 μm) and acanthostyles (660 μm) of *H. japycina* are clearly larger than those of our species.

Order Halichondrida Gray, 1867

Family Halichondriidae Gray, 1867

Genus *Axinyssa* Lendenfeld, 1897 (Figure 3)

Axinyssa digitata (Cabioch, 1968)

Syn. *Pseudaxinyssa digitata* Cabioch, 1968

Material examined. RMNH Por. 7479, Turkey, Bebek 4.

Description

Growth form. Massive, uniformly covered with thin fistules approximately 1 cm long projecting perpendicularly from base; 2 specimens about 3 \times 4.5 \times 6 cm and 6 \times 7 \times 6 cm (in Figure 3, A1, A2, C).

Color. Light yellow.

Surface. Hispid.

Ectosome. Not specialized; thin and clear collagen membrane pierced by choanosomal spicules.

Choanosome. Plumose-halichondroid; confused and disorganized at base and becoming plumose near surface; bounded by clear spongin with some areas clear of spicules. Axial skeleton not differentiated. Spongin fibers not developed. Spicule tracts multispicular, plumose, poorly developed at choanosome base; anastomosing and diverging towards surface where they become more defined; projecting slightly through ectosome.

Spicules. Oxeas curved, fusiform or hastate; often with one end bent or bifurcated; thinner forms common. Less common styles in the same size category; axial filament visible; 589.6–976.6 μm (736.8 ± 84.3) \times 4.7–17.3 μm (13.8 ± 2.7)

Habitat. The sponges are common on subhorizontal surfaces of mixed sand and rock, up to 40 m depth.

Geographic distribution. This species was originally described by Cabioch (1968) from the Atlantic coast of France (Roscoff), and was subsequently reported to occur in the Gulf of Cadiz near the Straits of Gibraltar by Carballo et al. (1996). Unconfirmed records of the species were provided by Mustapha et al. (2003) from Tunisia and by Voultsiadou (2005a, 2005b) from the Lebanese coasts.

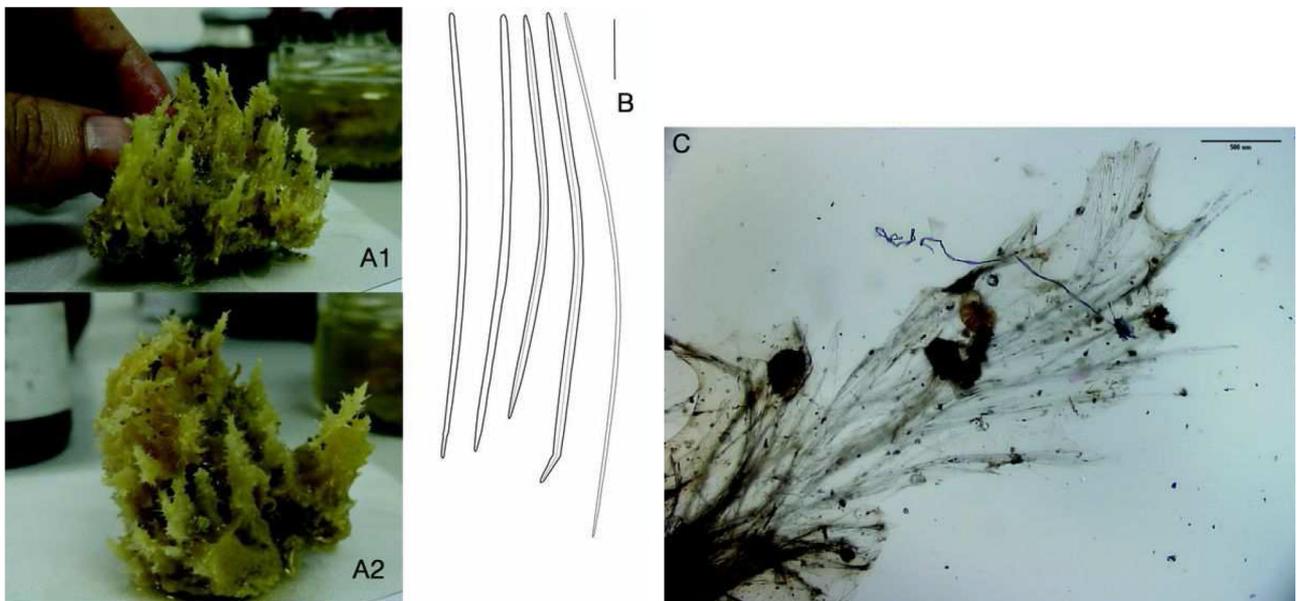


Figure 3. *Axinyssa digitata* (Cabioch, 1968): A1–A2, habit of specimen RMNH Por. 7479; B. Drawing of various oxeate and stylote spicules, scale bar = 100 μm ; C. Cross-section of surface projection showing lax arrangement of spicules, scale bar = 500 μm .

This first record from the coast of Turkey and the Aegean Sea confirms its presence in the eastern Mediterranean.

Three further species we recorded are new to the sponge fauna of Turkey.

Axinyssa aurantiaca (Schmidt, 1864). One specimen from station İbrice (Edirne) at a depth of 36 m on 30.08.2012.

Halichondria (Halichondria) contorta (Sarà, 1961). One specimen from station İbrice (Edirne) at a depth of 20 m on 30.08.2012.

Dictyonella incisa (Schmidt, 1880). Two specimens from station İbrice (Edirne) at a depth of 18 m on 30.08.2012.

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