

**Composition and abundance of octocorals
in the Sea of Marmara, where the Mediterranean
meets the Black Sea**

Eda N. Topçu, Bayram Öztürk

Supplementary material

Table S1. – Taxonomic list of collected species with data of the material examined and notes on its ecology.

14 octocoral species were collected in the study area at various stations (stations N1 to N17 in the Northern group of Islands and stations S1 to S14 in the Southern group of Islands). Biological samples were deposited at the Octocoral Collection of the University of Istanbul (IUOK).

Phylum CNIDARIA
Class ANTHOZOA Ehrenberg, 1834
Subclass OCTOCORALLIA
Order PENNATULACEA Verrill, 1865
Suborder SESSILLIFLORAE Kükenthal, 1915
Family VERETILLIDAE Herklots, 1858
Genus *Veretillum* Cuvier, 1798
Veretillum cynomorium (Pallas, 1766)

Material examined: IUOK25 (N1), IUOK54 (N3), IUOK24 (N4), IUOK68 (N5), IUOK18 (N6), IUOK31 (N7), IUOK82 (N9), IUOK01 (N13), IUOK44 (N14), IUOK51 (N15), IUOK77 (N16), IUOK12 (N17), IUOK138 (S1), IUOK133 (S7), IUOK124 (S8), IUOK96 (S9), IUOK105 (S10), IUOK112 (S11) and IUOK100 (S13).

This sea pen was common on soft substrates of both Prince Islands and Southern Marmara Islands coasts starting from right after the halocline depth. Uncontracted colonies of various sizes (approximately 5-55 cm) were encountered anytime in the day. The density of *Veretillum cynomorium* varied from 0.2 to 4.2 colonies m⁻² among stations. *V. cynomorium* is a shallow water sea pen found from the first ten meters to 100 meters (Williams 1995, Williams 2011). The species is distributed in the Eastern Atlantic from the Southern Europe to the West Africa coasts and in the Mediterranean Sea (Williams 1995, López-González et al. 2001, Vafidis in Coll et al. 2010: Table S13).

Family PENNATULIDAE Ehrenberg, 1834
Genus *Pteroeides* Herklots, 1858
Pteroeides griseum (Linnaeus, 1767)

Material examined: IUOK110 (S9) and IUOK117 (S10).

This sea pen was found on soft substrates of only the Southern Marmara Islands coasts at 2 stations between 27-38 m. Its density was about 1-2 colonies m⁻². *Pteroeides griseum* is a shallow water sea pen found from the first ten meters to 200 meters (Williams 1995, Williams 2011). The species is distributed along the European coasts of the Atlantic and in the Mediterranean Sea (Williams 1995, Vafidis in Coll et al. 2010: Table S13).

Family FUNICULINIDAE Gray, 1870
Genus *Funiculina* Lamarck, 1816
Funiculina quadrangularis (Pallas, 1766)

Material examined: IUOK99 (S2).

This sea pen was observed at the limit of observation (41 m) of this study on muddy bottom. *Funiculina quadrangularis* is a deep sea species that can be found until 2000 m (Williams 1995, Williams 2011) but rarely above 30 m. The species has a cosmopolitan distribution along the Atlantic, Indo-Pacific and in the Mediterranean Sea (Williams 1995, Vafidis in Coll et al. 2010: Table S13).

Order ALCYONACEA Lamouroux, 1816
Suborder STOLONIFERA Hickson, 1883
Family CLAVULARIIDAE Hickson, 1894
Genus *Sarcodictyon* Forbes (in Johnston), 1847
Sarcodictyon catenatum Forbes, 1847

Material examined: IUOK19 (N1), IUOK92 (N2), IUOK55 (N3), IUOK28 (N6), (N8), IUOK09 (N9), IUOK40 (N12), IUOK123 (S2), IUOK101 (S3), IUOK108 (S4) and IUOK98 (S6).

This encrusting soft coral was found between 18 – 26 m among the calcareous bioconcretions of polychaete tubes in both Prince Islands and Southern Marmara Islands coasts. *Sarcodictyon catenatum* is found from the sublittoral to 100 m on stones and shells in the Mediterranean and the Northeast Atlantic coasts (Vafidis et al. 1994, Ocaña et al. 2000, Vafidis in Coll et al. 2010: Table S13).

Suborder ALCYONIINA
Family ALCYONIIDAE Lamouroux, 1812
Genus *Alcyonium* Linnaeus, 1758
Alcyonium palmatum Pallas, 1766

Material examined: IUOK02 (N1), IUOK87 (N2), (N3), IUOK23 (N4), IUOK58 (N5), IUOK35 (N6), IUOK79 (N7), IUOK15 (N8), IUOK71 (N9), IUOK34 (N10), IUOK43 (N11), IUOK26 (N12), IUOK07 (N13), IUOK48 (N16), IUOK128 (S1), IUOK126 (S2), IUOK103 (S3), IUOK121 (S5), IUOK130 (S8), IUOK95 (S9), IUOK106 (S10), IUOK137 (S11) and IUOK115 (S12).

This soft coral was the most common octocoral in the study area but did not form dense assemblages. It was found on all types of bottom attached to rocks, stones or shells from the halocline to 40 m depth with densities of 0.1-1.2 colonies m⁻². The colours varied from red, orange to yellow but were mainly whitish. The species is found along the Mediterranean and Northeast Atlantic coasts between 20-200 m (Vafidis et al. 1994, Watling and Auster 2005, Vafidis in Coll et al. 2010: Table S13) on sandy/muddy bottoms but attached to stones or shells (Weinberg 1977).

Alcyonium acaule Marion, 1878

Material examined: IUOK29 (N1), IUOK16 (N8), IUOK38 (N11), IUOK61 (N12), IUOK97 (S1), IUOK134 (S6), IUOK136 ve IUOK129 (S9), IUOK99 (S10), IUOK114 (S12) and IUOK119 (S13).

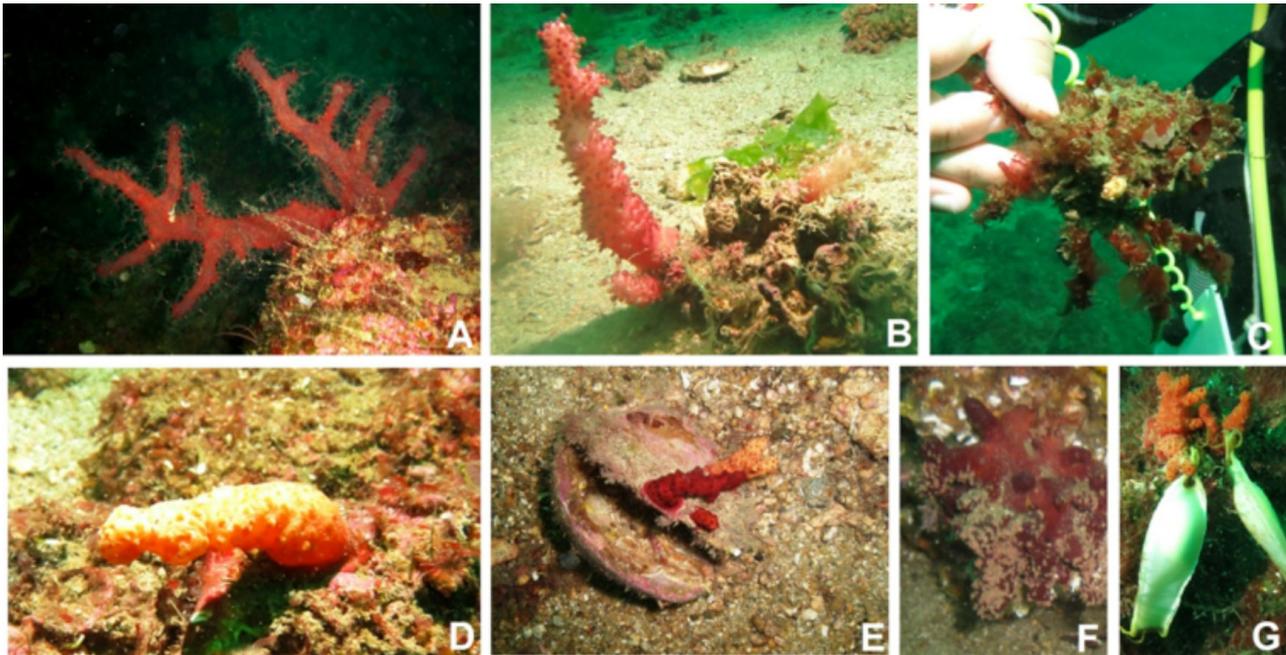


Fig. S1. – Red *Alcyonium acaule* colony on rocky bottom at station S1 (A); colony on bioconcretion at station S9 (B); colony on the crab *Maja crispata* at station S6 (C); orange colony at station S6 (D); two small colonies on a dead mussel shell at station S13 (E); surface brooder colony at station S1 on august 2013 (F) and shark egg cases attached colony at station S1 (G).

Alcyonium acaule was found on rocky bottoms and calcareous bioconcretions or attached to stones/shells on sandy bottom in both Prince Islands and Southern Marmara Islands coasts from 30 to 40 m (Fig. S1). This soft coral was rather rare in the northern stations whereas it formed assemblages in the southern stations with densities of 0.8 to 3.4 colonies m⁻². The colours varied from whitish cream to orange but wine red was the most common. Shark egg cases were common observations on this coral (Fig. S1). This species is distributed in the Mediterranean between 12-45 m on rocky bottoms (Weinberg 1977, Vafidis et al. 1994) but also present in the Northeast Atlantic coasts (Watling and Auster 2005).

***Alcyonium coralloides* (Pallas, 1766)**

Material examined: IUOK33 (N1), IUOK14 (N4), IUOK63 (N7), IUOK90 (N8), IUOK46 (N10), IUOK74 (N11), IUOK127 (S2), IUOK107 (S3), IUOK111 (S4), IUOK132 (S5) ve IUOK104 (S12).

Alcyonium coralloides was common in both Prince Islands and Southern Marmara Islands coasts between 20-40 m. The soft coral mainly covered calcareous bioconcretions and Chaetopterid polychaetes tubes but also gorgonian skeletons; besides, lobular forms were observed on pinna and mytilus shells. In the Mediterranean it is found from 2 to 100 m mainly on gorgonian skeletons but also tunicates, shells and stones/rocks (Weinberg 1977). The species is distributed in the Mediterranean Sea but also present in the Northeast Atlantic coasts (Vafidis et al. 1994, Watling and Auster 2005, Vafidis in Coll et al. 2010: Table S13).

Family MAASELLIDAE Poche 1914

Genus *Paralcyonium*

Milne-Edwards and Haime, 1850

***Paralcyonium spinulosum* Delle Chiaje, 1822**

Material examined: IUOK08 (N1), IUOK52 (N2), IUOK84 (N4), IUOK42 (N5), IUOK50 (N6), IUOK65 (N7), IUOK60 (N8), IUOK11 (N10), IUOK21 (N11) ve IUOK116 (S2).

This soft coral was common in the Prince Islands coasts with densities of 1-7 colonies m⁻² and rare in the Southern Marmara Islands. It was found between 25-38 m on rocky bottom and stones/shells on soft substrates. In the Mediterranean Sea, the species is found between 22-90 m on hard bottom (Weinberg 1977, Vafidis et al. 1994). It is also present in the Northeast Atlantic coasts (Watling and Auster 2005).

Suborder HOLAXONIA Studer, 1887

Family PLEXAURIDAE Gray, 1859

Genus *Paramuricea* Koelliker, 1865

***Paramuricea clavata* (Risso, 1826)**

Material examined: IUOK17 (N1), IUOK36 (N2), IUOK03 (N4), IUOK56 (N8), IUOK81 (N10), IUOK93 (N12), IUOK125 (S3) ve IUOK109 (S12).

Red gorgonian was found on rocky substrates in the study area between 30-40 m but did not form dense assemblages. It was generally below *Eunicella cavolini* assemblages and associated with *Savalia savaglia* colonies. All observed colonies had reddish pink coloration and were generally about 20 cm in height. In the Mediterranean, the species is found from 6 to 100 m but is most abundant between 40-60 m mainly on

vertical walls and rocks (Carpine and Grasshoff 1975, Weinberg 1976). It is also present in the Northeast Atlantic coasts (Watling and Auster 2005).

Paramuricea macrospina (Noch, 1882)

Material examined: IUOK05 (N1), IUOK76 (N2), IUOK69 (N3), IUOK27 (N4), IUOK89 (N5), IUOK06 (N6), IUOK72 (N7), IUOK86 (N8), IUOK65 (N9), IUOK30 (N10), IUOK53 (N11), IUOK73 (N12) ve IUOK135 (S12).

This gorgonian was found on rocky bottoms or attached to stones/shells on sandy bottom mainly in Prince Islands coasts from 21 to 40 m with densities of 0.1-3.9 colonies m⁻². The colonies were generally fan shaped but sometimes less branched and the colours varied from creamy white to orange and brownish pink but were mainly yellow. In the Mediterranean sea, the species is found attached to boulders on detritic bottoms or sometimes sandy/muddy bottoms between 40-100 m until 200 m (Carpine and Grasshoff 1975). The species is distributed in the Mediterranean Sea but also present in the Northeast Atlantic coasts (Grasshoff 1992, Vafidis et al. 1994, Watling and Auster 2005).

Genus *Spinimuricea* Grasshoff, 1992

Spinimuricea klavereni
(Carpine and Grasshoff, 1975)

Material examined: IUOK10 (N1), IUOK82 (N2), IUOK47 (N3), IUOK20 (N4), IUOK39 (N5), IUOK62 (N6), IUOK22 (N7), IUOK78 (N8), IUOK45 (N9), IUOK85 (N10), IUOK59 (N11), IUOK64 (N12), IUOK94 (N13), IUOK41 (N14), IUOK88 (N16), IUOK120 (S3) and IUOK102 (S12).

Spinimuricea klavereni was found between 23-45 m on rocks, boulders and attached to pebbles/stones/shells on soft substrates. This gorgonian was common in the Prince Islands coasts with densities of 0.1 to 3.1 colonies m⁻² but rare in the South. In the Mediterranean it is found between 25-130 m on similar bottoms (Carpine and Grasshoff 1975, Vafidis et al. 1994, Bo et al. 2012). The species is distributed in the Mediterranean Sea but also present in the Northeast Atlantic coasts (Grasshoff 1992, Vafidis et al. 1994, Watling and Auster 2005).

Family GORGONIIDAE Lamouroux, 1812

Genus *Eunicella* Verrill, 1869

Eunicella cavolini (Noch, 1887)

Material examined: IUOK04 (N1), IUOK57 (N2), IUOK75 (N4), IUOK32 (N7), IUOK70 (N8), IUOK67 (N9), IUOK91 (N10), IUOK49 (N11), IUOK80 (N12) and IUOK118 (S3).

Eunicella cavolini was found between 30-40 m on vertical walls or large rocks in both Prince Islands and Southern Marmara Islands coasts with densities of 0.1 to 13.9 colonies m⁻². In the Mediterranean Sea, the endemic gorgonian is found between 10-30 m on hard bottoms but can reach 150 m deep (Carpine and Grasshoff 1975, Weinberg 1976).

Eunicella singularis (Esper, 1791)

Material examined: IUOK131 ve IUOK122 (S2).

Eunicella singularis was found at 37 m on small rocks in only one station in the Southern Marmara Sea. The colonies did not harbour zooxanthellae, were bright white and their shape was more branched than generally observed for this species. In the Mediterranean Sea, this endemic gorgonian is found from 7 to 52 m on both hard and sandy/muddy bottoms (Carpine and Grasshoff 1975, Weinberg 1976).

Eunicella verrucosa (Pallas, 1766)

Material examined: IUOK13 (N1) and IUOK113 (S3).

Eunicella verrucosa was found only at two stations in the Marmara Sea on hard bottoms at 34 and 38 meters. The colours were orange-pink in the North and white in the South. The species is distributed in the Atlantic coasts where it is common (from the Scotland to Angola) and in the Mediterranean Sea as a rare occurrence between 35-200 m (Carpine and Grasshoff 1975, Grasshoff 1992).

Video S1. – Video taken in 1975 at Balıkçı Island by a local diver. In the video, a very dense assemblage of *Savalia savaglia*/*P. clavata* is clearly seen, revealing large colonies.

