

## ANTHOZOAN FAUNA OF TELAŠĆICA NATURE PARK (ADRIATIC SEA, CROATIA)

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Sixty-five anthozoan species were recorded and collected in the area of Telašćica Nature Park during surveys from 1999 to 2006. General and ecological data are presented for each species, as well as distribution and local abundance. The recorded species account for about 56% of the anthozoans known in the Adriatic Sea, and for about 38% of the anthozoans known in the Mediterranean Sea. From Telašćica Nature Park, 16 species are considered to be Mediterranean endemics. The heterogeneity of the substrates and benthic communities in the bay and cliffs is considerable in Telašćica Nature Park; anthozoans are present on most of the different kinds of substrates and in a wide range of benthic communities.

**Key words:** marine fauna, Anthozoa, Telašćica Nature Park, Adriatic Sea.

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Prilikom istraživanja podmorskog dijela Parka prirode Telašćica u razdoblju od 1999. do 2006. godine zabilježeno je i sakupljeno 65 vrsta koralja. Za svaku vrstu izneseni su opći i ekološki podaci, te su zabilježeni nalazi i lokalna brojnost. Pronađene vrste predstavljaju oko 56% dosad pronađenih koralja u Jadranskom moru i oko 38% u Sredozemnom moru. Šesnaest vrsta smatra se endemima Sredozemnog mora. U Parku prirode Telašćica nalazimo razne vrste podloga i razne bentoske zajednice unutar uvale te na vanjskim strmcima, te koralji pokazuju značajne prilagodbe na različite podloge i prilike u okolišu.

**Ključne riječi:** morska fauna, Anthozoa, Park prirode Telašćica, Jadransko more.

### INTRODUCTION

In the past, the sea around and in Telašćica bay has not been a subject of extensive scientific research and only scarce information on the marine benthos has been available. Telašćica is a bay situated in the central part of the eastern Adriatic Sea,

on the south-east part of the Dugi otok [Island]. There are 5 small islets and 25 small coves inside the bay. There is also a variety of land and submarine geomorphologic features. The numerous capes, islets and coves inside the bay, together with three parts separated by narrow, shallow passages, form an exceptional natural phenomenon. This bay and the area around were proclaimed a nature park in 1988. It is 8200 m long and from 150 to 1500 m wide, with the total coastline of 68.78 km.

The area of Telašćica Nature Park is in distinct contrast with the area of the Aleppo pine (*Pinus halepensis*) forests on one side and the bare rocky ground on the other. Three basic phenomena and the main characteristics of the Nature Park are: the unique bay of Telašćica, one of the largest and the safest havens on the Adriatic; the cliffs of the island of Dugi otok, the Stene, as they are called, rising up to 200 m above sea level and falling perpendicularly to 90 m below sea level (Fig. 1); and finally the unique saltwater lake, formed in a karstic depression, called Mir Lake, which has curative characteristics.

Telašćica Bay consists of three parts, three karst sinkholes that, together with the rest of the Adriatic area, were submerged after the last glacial period. The deepest part of Telašćica Bay is near Korotan islet (67 m depth). Rocks of the lower and upper Cretaceous represented mainly by dolomites and carbonate limestone are the geological basis of Telašćica Nature Park.

The tourist impact is limited to the summer season. In general, the sea in Telašćica Nature Park is mostly crystal clear, except for a slight organic pollution at the few sites in Telašćica Bay which are under the direct impact of untreated household waste or input from the tourist ships.

In Telašćica Bay and on the open sea side of the Park there are 19 registered biocoenoses. Inside the bay the most wide-spread biocoenoses are those of: supralittoral rocks, photophyllic algae, *Cymodocea* meadows, silted sands of the protected coasts and more or less silted detritus. There is also an important biocoenosis of *Posidonia* meadows, but it does not cover large areas.

On the open sea side of the Park the registered communities are the biocoenoses of: supralittoral rocks, supralittoral sands, littoral upper and lower rocks, littoral sands, fine surface-sands, fine homogenous sands, photophyllic algae, infralittoral pebbles, *Posidonia* meadows; then there are the precoralligenous aspect of the coralligenous biocoenosis, the coralligenous biocoenosis and the biocoenoses of semi-dark caves, of coastal detrital bottoms and of caves and passages in complete darkness.

To date, 101 species of sea algae, 323 species of sea invertebrates and 56 species of fish (personal unpublished data) have been found in Telašćica Nature Park.

Information about Anthozoa from Adriatic Sea can be found in older literature such as GRUBE (1840); HELLER (1868); GRAEFFE (1884); STOSSICH (1885); BABIĆ & RÖSSLER, (1912); KRUMBACH (1914); CORI (1928) and VATOVA (1949). Knowledge of anthozoan fauna was further increased by the contributions of BROCH (1953) and ABEL (1955), but a large amount of literature and original data on Adriatic anthozoans was then compiled by PAX & MÜLLER (1962) in their regional monograph. These authors mentioned 79 species (61 hexacoral and 18 octocoral species) based broadly on Pax's personal research between 1906 and 1956, but only a few of them were reported for Telašćica Bay. This was before the age of scuba diving, which had







Fig. 1. The cliffs of Telašćica Nature Park.

a large impact on research in marine biology. Adriatic anthozoans were later revisited or reported by ZIBROWIUS & GRIESHABER (1977), KRUŽIĆ (2002), KRUŽIĆ *et al.* (2002) and NOVOSEL *et al.* (2003). Some notes about Adriatic Anthozoa were also mentioned by CHINTIROGLOU *et al.* (1997) and VAFIDIS *et al.* (1997).

The aim of the present study was to investigate the faunal composition and distribution of anthozoans in the mentioned habitats in Telašćica Nature Park and to contribute to the knowledge of anthozoan fauna in the Adriatic Sea.

## MATERIALS AND METHODS

Samples were collected by scuba diving on rocky and sandy bottoms at depths varying from 0.1 to about 65 m depth. Observations were made along 100 m line transects. If possible, the density of the certain coral species was determined *in situ* using 50 × 50 cm quadrants and then calculated in square meters. Besides the bottom type and its configuration, abundances of well recognizable anthozoan species were estimated. Other anthozoans were collected for laboratory identification. Collected specimens were first preserved in 4% formalin and later transferred to 70% ethanol. Some of the collected scleractinian specimens were cleaned in 50% peroxide solution and then dried. Sediment samples from caves and collected for isolation of calyx remains were preserved *in toto* using 70% ethanol. Species reported herein were identified according to PAX & MÜLLER (1962), SCHMIDT (1972), ZIBROWIUS (1980) and WEINBERG (1976; 1998). Specimens are deposited in the Laboratory for Marine Biology, Faculty of Science, University of Zagreb.

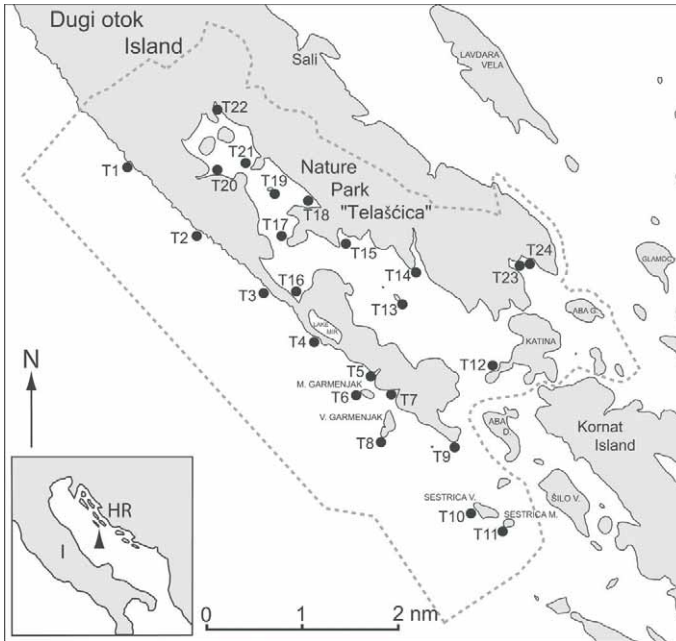


Fig. 2. Sampling sites in Telašćica Nature Park.

## RESULTS

In the material studied, 65 anthozoan species (50 hexacoral and 15 octocoral species) were recorded or collected at 24 stations in the area of Telašćica Nature Park (Fig. 2). The recorded species account for about 56% of anthozoans known in the Adriatic Sea, and for about 38% of anthozoans known in the Mediterranean Sea. Sixteen anthozoan species from Telašćica Nature Park are considered to be Mediterranean endemics. Species are arranged here in order within the higher taxa (Hexacorallia and Octocorallia).

## HEXACORALLIA

### ANTIPATHIDAE

*Antipathes subpinnata* Ellis & Solander, 1786

*Station:* T-1.

*Depth:* 51 m.

*Material:* One colonial specimen collected at cliff, 22 cm long. Polyps were white with 12 tentacles. Horny black to brownish axial skeleton armed with numerous tiny thorns.

*Habitat:* Rocky and gravelly bottom.

*Remarks:* Relatively rare species in the Adriatic Sea. The depth range from Telašćica is remarkably shallow for the Mediterranean Sea. Previously reported by HELLER (1868) near Lastovo Island and recently (1997) by B. Furlan (pers. comm.) near Svetac Island at 70 m depth and a few colonies near Mljet Island (KRUŽIĆ, 2002).

## CERIANTHIDAE

*Cerianthus membranaceus* (Spallanzani, 1784)

*Stations:* T-5, 9, 12, 14, 15, 16, 18, 19, 22, 23, 24.

*Depth:* 8–39 m.

*Material:* Up to 12 individuals were found per station. Marginal tentacles arranged in pseudocycles, up to 10 cm long, pale buff shading to white at the tips. Tentacles were plain buff, dark brown, purple or white. Often found near and in *Posidonia oceanica* meadows.

*Habitat:* All individuals were buried in coarse or muddy coarse sand.

*Remarks:* A common species in the Adriatic Sea, often abundant in coarse gravel or muddy sand.

*Pachycerianthus multiplicatus* Carlgren, 1912

*Stations:* T-15, 19, 21.

*Depth:* 10–20 m.

*Material:* 1–2 individuals per station. Long columns were dull brown to pale white. The length of the column and span of the tentacles is up to 300 mm and the column is much stouter than in the common *Cerianthus membranaceus*. There are up to 200 very long marginal tentacles arranged in four pseudocycles, up to 20 cm long. The colour of the inner tentacles is pale buff, marginal tentacles are whitish with fine brown bands, or plain white.

*Habitat:* Lives in a long thick tube, often 1m long, in mud or muddy sand, from 10 m to over 100 m depth.

*Remarks:* A quite rare species in the Adriatic Sea. It could be mistaken for *C. membranaceus*, but *Pachycerianthus multiplicatus* is a larger specimen with a stouter column.

## EPIZOANTHIDAE

*Epizoanthus paxii* Abel, 1955

*Stations:* T-1, 2, 3, 4, 6, 7, 9, 12, 13, 15, 17, 20, 21, 23.

*Depth:* 6–22 m.

*Material:* Stolon-like band formed by coenenchyme with polyps arising at irregular intervals. Oral disc is translucent. Each polyp has a serrated parapet at the top of the column and 24–32 long, translucent white tentacles, each with a tiny white tip. Polyps were variable in size, up to 10 mm tall and 6 mm in diameter. Colour of polyps translucent yellowish white. Colonies recorded on rocky bottom (T-1, 2, 3, 4, 5), on empty shells of gastropods and bivalves (T-17, 19, 21).

*Habitat:* Colonies encrust rocks, stones or shells.

*Remarks:* Colonies may easily be overlooked unless the polyps are expanded, because stolon is often overgrown by other encrusting organisms. This is common species in many localities on the eastern coast of Adriatic Sea.

## PARAZOANTHIDAE

*Parazoanthus axinellae* O. Schmidt, 1862 (Fig. 3)

*Stations:* T-2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14.

*Depth:* 12–58 m.

*Material:* Basal encrusting coenenchyme forming broad stolons which branch and anastomose. Polyps set close together, up to 15 mm tall and 5 mm in diameter. Tentacles moderate to long, up to 34 in number. The colour of the polyp is usually yellow, often orange around the mouth. Colonies were found on the sponge *A. damicornis* (Esper, 1794) and *A. verrucosa* (Esper, 1794). In the coralligenous biocoenosis it can be found on rock in caves and crevices.

*Habitat:* Colonies encrust mostly sponges of the genus *Axinella*, rarely rocks, shells, polychaete worm tubes and dead gorgonians.

*Remarks:* A common and well known species along the eastern Adriatic coast (PAX & MÜLLER, 1962). At station T-5 this species was found on red algae *Peyssonnelia squamaria* (Gmelin) Decaisne.

*Gerardia savaglia* (Bertholoni, 1819)

*Stations:* T-1, 3, 8.

*Depth:* 47–65 m.



Fig. 3. Red algae *Peyssonnelia squamaria* with colony of *Parazoanthus axinellae* at the station T-5.



*Material:* Arborescent colonies exceeding 1 meter in height, fixed by a very broad base. Polyps yellow in colour and up to 30 mm high with 28 tentacles. Polyps cover a rigid, dark brown skeleton whose nature is similar to that of *Antipathes subpinnata*.

*Habitat:* In sheltered places on vertical walls and near cave entries from 30 to more than 120 m of depth.

*Remarks:* Quite a rare species in the Adriatic Sea. At station T-1 one colony was found at 65 m, at station T-3 at 51 m and at station T-8 at 47 m depth. This species is often improperly named »Black coral« because of the nature of its skeleton.

## ACTINIIDAE

*Condylactis aurantiaca* (Delle Chiaje, 1825)

*Stations:* T-2, 5, 6, 7, 10, 11, 12, 13, 14, 16, 19, 20, 22.

*Depth:* 5–25 m.

*Material:* Column wider than the base and disc. Colour of the column pale with orange longitudinal stripes. Disc was pale with dark brown stripes. Tentacles moderate in length, neaty and hexamerously arranged. Colour of tentacles fluorescent light green with purple tips. Diameter of specimens disc from Telašćica up to 18 cm.

*Habitat:* Burrows in mud, sand or gravel.

*Remarks:* The pontoniid shrimp *Periclimenes amethysteus* (Risso, 1827) can be often found in association with this anemone.

*Actinia equina* Linnaeus, 1758

*Stations:* T-2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24.

*Depth:* 0.1–3 m.

*Material:* Anemone with broad base, wider than column. Column and tentacles are usually dark red. Disc is wide and flat with the mouth on an elevated hypostome. Diameter of base was up to 50 mm, span of tentacles up to 70 mm. Abundant in the mediolittoral zone.

*Habitat:* Occurs attached to any convenient hard substratum in exposed or sheltered sites.

*Remarks:* A very common species in the Adriatic Sea. Green and brown specimens were also found, although they are quite rare in the Adriatic Sea (KRUŽIĆ, 2002). Reproduces by viviparity, producing fully formed young anemones.

*Actinia cari* Delle Chiaje, 1841

*Stations:* T-4, 7, 8, 12, 14, 15, 17, 20, 22, 23.

*Depth:* 1–3 m.

*Material:* Diameter of base ranged from 10 to 20 mm. Column low, smooth and cylindrical, up to 15 mm tall. Usually brown or green and invariably marked with dark concentric lines.

*Habitat:* In the shallow infralittoral in the photophilous algae community. Usually attached to bare rocks and stones. Common at 0.5 to 3 m depth, exceptionally at 20 m.

*Remarks:* *A. cari* is a Mediterranean endemic and is generally considered a rare species (SCHMIDT, 1972).

*Actinia striata* (Rizzi, 1907)

*Stations:* T-5, 9, 13, 16, 21.

*Depth:* 0.5–1 m.

*Material:* Specimens with basal plate not larger than 15 mm. Column up to 10 mm tall. Colour red-brown with dark vertical lines.

*Habitat:* Infralittoral species, living on hard substrate, often among algae.

*Remarks:* Often found in groups of three or more individuals.

*Anthopleura ballii* (Cocks, 1849)

*Stations:* T-7, 9, 14, 17.

*Depth:* 10–25 m.

*Material:* The column of this sea anemone is divided into scapus and capitulum, with a parapet and fosse. The scapus has vertical rows of small warts. Base wider than column and moderately adherent, up to 50 mm in diameter. In full extension column trumpet shaped with verrucae. Disc is wide and flat. Tentacles long, up to 96 in number. Colour of the column brown or yellow.

*Habitat:* Infralittoral species, living on hard substrate, often in holes or crevices amongst rocks and beneath boulders. Rarely buried in sand or mud.

*Remarks:* Quite local distribution in the Adriatic Sea.

*Anthopleura thallia* (Gosse, 1854)

*Stations:* T-5, 12, 22.

*Depth:* 5–10 m.

*Material:* Similar column as in *A. ballii*. Base moderately adherent, wider than the column, up to 30 mm in diameter. Column is tall with irregular arranged verrucae. Disc is wide and flat. The tentacles are rather stiffly held and irregularly arranged. Green tentacles long, up to 100 in number. Colour of the column green or brown.

*Habitat:* Rocky shores, pools and crevices.

*Remarks:* Reproduces by longitudinal fission. Locally abundant in the Adriatic Sea.

*Bunodactis verrucosa* (Pennant, 1777)

*Stations:* T-2, 3, 4, 5, 6, 9, 12, 14, 15, 16, 18, 20, 22.

*Depth:* 1–15 m.

*Material:* Basal plate exceeding 20 mm in diameter. Disc is greenish in colour with well developed verrucae and dark radial lines in between. Long tentacles are brilliant green with lighter rings.

*Habitat:* Usually in shaded places, sheltered rock and under boulders down to 20 m depth. Could be found in *Posidonia oceanica* meadows.

*Remarks:* Well camouflaged and difficult to detect, even when abundant.

*Anemonia viridis* (Forskål, 1775)

*Stations:* T-5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 23.

*Depth:* 5–25 m.

*Material:* Abundant at all stations. The column is smooth, with a row of inconspicuous warts on the rim of the parapet. Column is variable in height, often short and covered by tentacles. Tentacle long and irregularly arranged. Column is greyish to greenish brown in colour with irregular pale streaks, tentacles are bright grass-green with purple tips. Size of the column is up to 15 cm across the base.

*Habitat:* Occurs mainly from about mid-tide level down to 25 m depth, mostly at locations exposed to strong wave action. Also recorded in sheltered places and in *Posidonia oceanica* meadows.

*Remarks:* The most commonly observed actiniarian species in the Croatian part of the Adriatic Sea.

*Cribrinopsis crassa* (Andres, 1883)

*Stations:* T-2, 3, 4, 14, 15, 17, 23.

*Depth:* 5–15 m.

*Material:* Column variable in height, becoming tall and trumpet-shaped when fully extended. Verrucae are small, yellow with red tips, arranged in 48 longitudinal rows. Disc is wide with moderately long tentacles. Colour of the tentacles fluorescent light green with streaks and purple tips.

*Habitat:* Under stones, in rock holes and in *Posidonia oceanica* meadows.

*Remarks:* When not disturbed, column height up to 15 cm. Common in the Adriatic Sea.

## PHYMANTHIDAE

*Phymanthus pulcher* Andres, 1883

*Stations:* T-2, 4, 5, 6, 12, 15, 16, 21, 24.

*Depth:* 10–15 m.

*Material:* Relatively rare with a few individuals per station. Base up to 3 cm in diameter, column up to 5 cm. Tentacles up to 2 cm long. Oral disc and tentacles green, column orange to yellow in colour. Upper part of column has adhesive white verrucae.

*Habitat:* Typically on sheltered biogenic substrate. Occasionally near *Posidonia oceanica* meadows (T-12, 15) and in coralligenous biocoenosis. This species occurred usually from 15 to 70 m depth (PAX & MÜLLER, 1962).

*Remarks:* The species is a Mediterranean endemic.

## CORALLIMORPHIDAE

*Corynactis viridis* Allman, 1846 (Fig. 2)

*Stations:* T-2, 5, 7, 13, 17.

*Depth:* 7–25 m.

*Material:* Dense aggregations at all stations. Base is lightly adherent and wide. Tentacles short with tiny wart-like nematocyst batteries and a well defined acrosphere. Size of the whole anemone is up to 10 mm. Coloration very variable. At stations T-2, 5 and 7 emerald green with brown tentacles and at stations T-13 and 17 pink with yellowish tentacles.

*Habitat:* Usually on rock, in particular on vertical rock surfaces (stations T-2, 5 and 7). At other stations aggregations were found in sheltered overhangs.

*Remarks:* The distribution of *C. viridis* in the Mediterranean and Eastern Atlantic has been presented in detail by DEN HARTOG *et al.* (1993). In the Adriatic Sea this species was locally abundant and was found near the islands of Jabuka (ZAVODNIK *et al.*, 2000), Prvić, Vis, Lastovo, Hvar, Brač and near Brela (personal records). Often found near undersea freshwater springs (vruljas).

## AIPTASIIDAE

*Aiptasia diaphana* (Rapp, 1829)

*Stations:* T-3, 5, 7, 8, 12, 14, 17, 23.

*Depth:* 2–15 m.

*Material:* Base cylindrical adhering to a well-developed limbus. Column is greyish white. Tentacles are long, thin and brownish-green due to the zooxanthellae. At stations T-5 and 7, *A. diaphana* was noted in abundant populations (more than 10 individuals per m<sup>2</sup>).

*Habitat:* Under stones or beneath overhangs at a relatively shallow depth.

*Remarks:* In the field it resembles *A. mutabilis*, but *A. diaphana* is usually of a smaller size.

*Aiptasia mutabilis* (Gravenhorst, 1831)

*Stations:* T-1, 4, 5, 6, 7, 8, 10, 13, 14, 15, 16, 17, 18, 20, 22, 23.

*Depth:* 5–20 m.

*Material:* The column of this sea anemone is smooth, not divided into regions, tall in extension and trumpet-shaped. The tentacles are long, stout, tapering to fine points, not readily retracted. Acontia are present, fairly readily emitted from pores in column. Base is adherent. Column is variable in shape, up to 10 cm tall, greenish brown and often with irregular white streaks. Disc is wider than column, concave, brown with white spots. Colour of tentacles translucent brown to green with white streaks.

*Habitat:* At the lower shore under stones or beneath overhangs and among algal holdfasts. Could be found also in *Posidonia oceanica* meadows.

*Remarks:* A well camouflaged species, not rare in the Adriatic. A few individuals per station were found.

## ALICIIDAE

*Alicia mirabilis* Johnson, 1861

*Stations:* T-11, 13, 16.

*Depth:* 10–14 m.

*Material:* When observed during a night dive, the specimens were expanded, about 30 cm high with tentacles up to 40 cm long. Column surface covered by irregularly spaced prominent groups of warty outgrowths which were more densely crowded in the lower part. Long tentacles attenuated towards the end, typically floating in the current. Column and tentacles are usually transparent greenish brown.

*Habitat:* Infralittoral and circalittoral zones at 10–50 m depth, on rocky and gravel bottoms. A few individuals found on bedrock and near *Posidonia* meadows and on the leaves of *Posidonia oceanica* (stations T-13 and 16).

*Remarks:* Previously known from the western Mediterranean and the north eastern Atlantic (CHINTIROGLOU *et al.*, 1997). Recently found quite often in the Adriatic Sea.

## AURELIANIDAE

*Aureliania heterocera* (Thompson, 1853)

*Stations:* T-7, 14, 17, 21.

*Depth:* 18–38 m.

*Material:* The column is divided into scapus and narrow capitulum, with a parapet and fosse. Base is wider than column, up to 30 mm in diameter. Column is bell-shaped when expanded, up to 50 mm high. Colour of column slate grey. Disc is flat with tentacles on its edge. Tentacles are brown and consist of a short stalk and a terminal pointed knob.

*Habitat:* At station T-7 three specimens were found on rock at 38 m depth. At stations T-14, 17 and 21 few specimens were found on gravel sand from 18 to 26 m. The depth range of this species is between the lower shore and 600 m (SCHMIDT, 1972). Found buried in sand or gravel with the broad base acting as an anchor.

*Remarks:* The broad base may be suitable for living free on soft substrata. Colour of column and tentacles may vary from brown, grey, orange to dark red.

## DIADUMENIDAE

*Haliplanella luciae* (Verrill, 1899)

*Stations:* T-1, 5, 9, 13, 16, 19, 24.

*Depth:* 10–45 m.

*Material:* Base moderately adherent and usually wider than the column. Column divided into scapus and a long capitulum. Scapus is tall at full extension. Tentacles are long and usually irregular in arrangement. Scapus is olive green with longitudinal yellow or white stripes. Tentacles are translucent white or grey.

*Habitat:* At stations T-1, 5 and 9 specimens were found on rock at cliff from 26 to 45 m depth. At stations T-13, 16, 19 and 24 few specimens were found on gravel sand from 10 to 22 m.

*Remarks:* Rare specimens could be found with scapus unstriped. It is generally accepted that this species originated from the western Pacific and has been transported on ship hulls.

## EDWARDSIIDAE

*Scolanthus callimorphus* Gosse, 1853

*Stations:* T-7, 15, 17.

*Depth:* 10–45 m.

*Material:* Column elongated up to 120 mm in length and 10 mm in diameter, usually earth brown in colour. Scapus is small with 16 tentacles up to 50 mm long. Disc is pale buff with well defined dark brown pattern. Tentacles transparent brown, spotted with opaque white.

*Habitat:* Buried in sand or gravel, often near *Posidonia oceanica* meadows (T-7, 15).

*Remarks:* Could be confused with *Edwardsia claparedii* (Panceri, 1869). Relatively rare in the Adriatic Sea.

## HORMATHIIDAE

*Hormathia coronata* (Gosse, 1858)

*Stations:* T-7, 13, 15.

*Depth:* 18–32 m.

*Material:* Bell shaped column divided into orange scapus and brown scapulus with pale scapular ridges. Tentacles short and light brown, up to 96 in number with irregular white streaks on tentacles. Acontia present, emitted through mouth only. Base diameter up to 20 mm, specimens' height up to 45 mm.

*Habitat:* Species found attached to organic substrata (polychaete tubes, shells etc.), stones and rock down to 100 m deep (SCHMIDT, 1972). At station T-7 a specimen was attached on rock and at stations T-13 and 15 on the bivalve *Pinna nobilis* Linnaeus, 1758.

*Remarks:* Considered a Lusitanian species. Occurring in the Mediterranean and the east coast of Atlantic (France and Great Britain).

*Amphianthus dohrni* (Koch, 1878)

*Stations:* T-3, 6, 13, 14, 17, 21.

*Depth:* 12–35 m.

*Material:* A small species (up to 15 mm across base) with base adherent and variable in shape, often elongated. Column short, cylindrical. Tentacles short, irregularly arranged in four cycles, about 50 in number. Disc is flat and oval in outline. Colour of the column buff with faintly visible white streaks. Disc is buff, orange on its outer part. Tentacles are translucent buff.

*Habitat:* Occurs on various gorgonians, polychaete tubes and other organic structures from 10 to 1000 m depth (SCHMIDT, 1972). At station T-3 two specimens were collected on the gorgonian *Eunicella singularis* (Esper, 1791), and at station T-14 a specimen was collected from the leaf of *Posidonia oceanica*.

*Remarks:* Rarely observed and collected elsewhere in the Mediterranean (SCHMIDT, 1972). Recently, large populations of this species were found on the tuna farm cages in the central Adriatic Sea (personal observations). Reproduces by basal laceration.

*Calliactis parasitica* (Couch, 1838)

*Stations:* T-5, 11, 12, 13, 15, 16, 18, 21, 23, 24.

*Depth:* 5–27 m.

*Material:* Base wider than column, capable of firm adhesion. Column surface is rough with a grainy appearance. White acontia emitted when the anemone is disturbed. Disc concave, wide when fully expanded. Tentacles moderate in length and very numerous (up to 700). Diameter of the adherent base up to 60 mm, height of the column up to 80 mm. Colour of column is buff or light brown with brown freckles, often arranged in longitudinal stripes. Disc and tentacles are translucent cream or yellowish. *C. parasitica* was collected from shells of the gastropods *Hexaplex trunculus* (Linnaeus, 1767) and *Cassidaria echinophora* (Linnaeus, 1758), inhabited by hermit crabs of the genera *Pagurus* and *Dardanus*.

*Habitat:* Usually found in association with hermit crabs. Specimens were also recorded from hard substrata such as stones or rock. A typical sublittoral species that occurs down to about 60 m depth.

*Remarks:* Species well known for its commensal association with hermit crabs. Commonly, more than one anemone was attached on the gastropod shell inhabited by hermit.

*Adamsia carciniopados* (Otto, 1823)

*Stations:* T-11, 13, 15, 21, 23.

*Depth:* 5–17 m.

*Material:* Base and lower part expanded laterally, forming two lobes enveloping a hermit crab and its gastropod shell so that the disc is beneath the crab with the two lobes on its dorsal side. Upper part of the column is short and cylindrical. From the lower part of the column, long acontia are emitted at the slightest provocation. Base of specimens collected at Telašćica up to 65 mm in diameter. Column white to yellow with pink spots. Tentacles white or yellowish up to 30 mm, acontia usually pink, rarely white (station T-15).

*Habitat:* Common on sand and gravel down to 200 m depth (SCHMIDT, 1972).

*Remarks:* This anemone lives almost exclusively in association with the hermit crab *Pagurus prideaux* Leach, 1815. Rarely, other species of hermit crabs are involved. Normally, one anemone per crab was found. At station T-21 this species was quite abundant, up to 12 species per square meter.

## HALCAMPOIDIDAE

*Halcampoides purpurea* (Studer, 1878)

*Station:* T-15.

*Depth:* 8 m.

*Material:* One specimen collected. Column is about 10 cm high. Disc is small, about 1 cm in diameter. Tentacles 12, up to 10 cm long. Pharynx is visible inside the transparent column. Column is transparent pink with white streaks. Disc and ten-

tacles are transparent, greyish brown or pink. Specimen embedded in coarse sand deposited in a crevice between rocks.

*Habitat:* Coarse sand, inside and outside caves and near the *Posidonia oceanica* meadow.

*Remarks:* *H. purpurea* is mainly nocturnal, remaining buried in the sand during the day. In addition, when an expanded individual is touched or disturbed, it immediately disappears into the sand. This is the reason why it has rarely been recorded. Previously known from the western Mediterranean (CHINTIROGLOU *et al.*, 1997). At station T-15 the specimen was found during the day, near *Posidonia oceanica* meadow.

## HALOCLAVIDAE

*Peachia cylindrica* (Reid, 1848)

*Stations:* T-7, 13, 17, 18, 22.

*Depth:* 12–26 m.

*Material:* This burrowing sea anemone has an elongated column, which is sausage-shaped, with a rounded base, sometimes with adherent sand grains. Column up to 200 mm in length and 20 mm in diameter. There are 12 tentacles, long in extension. Because of the mucous present, the translucent brown column was covered with sand. Disc and tentacles were translucent brown, patterned.

*Habitat:* Burrowing in sand or muddy gravel up to 50 m depth.

*Remarks:* Locally abundant in the Adriatic Sea. Only one specimen per station was collected.

## ISOPHELLIIDAE

*Telmatactis forskali* (Ehrenberg, 1834)

*Stations:* T-19, 21.

*Depth:* 5–12 m.

*Material:* Column cylindrical up to 50 mm high. Colour of column red-brown with pale rings. Tentacles are short (up to 10 mm) and brown.

*Habitat:* Epibiontic and bedrock.

*Remarks:* Relatively rare species in the Adriatic Sea. At the station T-21 one specimen was found on dumped truck tyre at 12 m depth.

## SAGARTIIDAE

*Actinothoe sphyrodeta* (Gosse, 1858)

*Stations:* T-5, 9, 13, 14, 16, 21, 22.

*Depth:* 10–27 m.

*Material:* Small anemone, up to 30 mm in diameter with expanded tentacles. Base is wider and more lightly adherent than column. Acontia are freely and copiously emitted. There are up to 100 tentacles which are irregularly arranged, rather stout at the base, tapering to fine points, moderate in length. Column is greyish in colour,



tentacles and acontia translucent white. Disc is white with grey streaks, sometimes orange to yellow in colour.

*Habitat*: At all stations specimens were attached to rock, except at station T-22 where one was found attached to algae from the genus *Cystoseira*. Occurs on the shore and in the sublittoral, down to 50 m depth. Usually on rocks or other similar flat surfaces.

*Remarks*: Locally abundant in the Adriatic Sea.

*Cereus pedunculatus* (Pennant, 1777)

*Stations*: T-3, 6, 10, 12, 14, 15, 17, 23, 24.

*Depth*: 5–32 m.

*Material*: Base a little wider than the column and closely adherent. Column is tall in extension. Disc is always wider than the base when fully expanded. Tentacles are numerous (up to 1000) and short, arranged hexamarously. Diameter of the disc up to 80 mm, height of column very variable, but at least 100 mm. Column beige, greenish or dark grey with light grey stripes. Colour of disc and tentacles grey to brownish with dark grey or white lines.

*Habitat*: When on hard substrate usually inserted with its base in a deep hole or crevice into which it can withdraw when disturbed. Rarely recorded on soft substrate, buried in mud or sand.

*Remarks*: A common species in the Adriatic Sea. At stations T-12 and 17 this species was abundant (up to 10 specimens per square meter). Reproduces viviparously, often producing numerous young.

*Sagartia elegans* (Dalyell, 1848)

*Stations*: T-4, 9, 13, 17, 23.

*Depth*: 10–42 m.

*Material*: In the base this species is wider than in the column and closely adherent. Column not divided into regions and has numerous suckers, appearing as pale spots, present on its upper part. Column tall in expansion with freely emitted acontia. Tentacles are long (up to 60 mm) and irregularly arranged. Base diameter up to 30 mm. Column variable in colour; from light brown (stations T-4 and 9) to greyish green (stations T-13, 17 and 23). Tentacles and acontia are plain white. Disc and tentacles are usually patterned.

*Habitat*: At stations T-4 and 9 specimens were found beneath overhangs and at other stations mostly under stones. At station T-23 species was very abundant and formed aggregations.

*Remarks*: Common in the Adriatic Sea. In the central Adriatic this species is locally abundant on the coasts of the outer islands. Often occurs in large aggregations, particularly in areas with strong currents.

*Sagartiogeton entellae* Schmidt, 1972

*Stations*: T-3, 6, 18.

*Depth*: 6–38 m.

*Material:* Base wider than the disc and firmly adherent. In full extension column very tall, up to 100 mm high. Acontia emitted when specimen was disturbed. Disc is wide and moderately flattish. Tentacles hexamerously arranged and up to 50 mm long. Column is light brown with darker streaks. Upper part of column with brown spots. Disc is translucent grey with brownish pattern. Tentacles pale grey to whitish.

*Habitat:* Found buried in coarse sand (station T-18) or attached on rock (stations T-3 and 6).

*Remarks:* Common in the Adriatic Sea.

## POCILLOPORIDAE

*Madracis pharensis* (Heller, 1868)

*Stations:* T-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.

*Depth:* 14–56 m.

*Material:* Colonial coral with low closely packed corallites. Simple columella connected with septa. Septa slightly exert. Diameter of the calyces up to 3 mm. Polyps translucent white (without zooxanthellae) or brownish green (with zooxanthellae). At the outer cliffs of the nature park, colonies were recorded in caves and crevices (stations T-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11) up to 56 m depth and in crevices in Telašćica Bay (stations T-12, 13) up to 22 m depth.

*Habitat:* Roof of caves and crevices, sheltered places or at cave entrance.

*Remarks:* Depending of the light level, this species can be zooxanthellate, or azooxanthellate in caves. When transferred into the sunlight outside the cave, colonies become zooxanthellate. Prior to the development of modern diving methods *M. pharensis* was rarely recorded in the Adriatic Sea. In fact, it is widely distributed and common in the eastern Adriatic Sea (ZIBROWIUS & GRIESHABER, 1977) and personal observations).

## FAVIIDAE

*Cladocora caespitosa* (Linnaeus, 1767)

*Stations:* T-8, 9, 10, 12, 13, 14, 15, 17, 19, 20, 21, 23, 24.

*Depth:* 8–27 m.

*Material:* Corallites closely spaced, up to 360 per dm<sup>2</sup>, height may exceed 150 cm in old colonies. Corallites are circular, from 3 to 6 mm in diameter. Number of septa from 30 to 44, their number not always related to corallite diameter. Polyps are brownish green and always with zooxanthellae.

*Habitat:* Species occurs from shallow waters to depths of about 40 meters (where the amount of light still allows the photosynthesis in the symbiotic zooxanthellae) on rocky bottoms in sites with calm water or exposed to strong currents.

*Remarks:* *C. caespitosa* is the most common colonial zooxanthellate coral of the Mediterranean euphotic zone. It is a Mediterranean endemic species. The semioval bush-like colonies live solitarily or form »beds« (numerous colonies living more or less close to each other) or »banks« (colonies connected together in a large formation more than 1 meter high and covering several square meters). At Mljet Island colo-

nies of *C. caespitosa* form the largest bioherm of this species ever recorded, covering an area of 650 m<sup>2</sup> at depths from 5 to 20 meters (KRUŽIĆ, 2002). This coral bank thrives under special conditions of currents, temperature and sedimentation. The rich endofauna of the colonies is dominated by filter-feeders and deposit-feeders. At station T-17 numerous big colonies of *C. caespitosa* form a coral bed, covering an area of 200 m<sup>2</sup> at depths from 12 to 24 meters.

## CARYOPHYLLIDAE

*Caryophyllia smithii* Stokes & Broderip, 1828

*Stations:* T-1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 22, 23, 24.

*Depth:* 14–45 m.

*Material:* Solitary subcylindrical, constricted in the lower part with exert septa. Pali encircle columella. Columella composed of twisted lamellae or rods. Costae well developed at the upper margin of theca. Tentacles of polyp long in full extension. Long axis of calyx up to 23 mm, height up to 50 mm. Polyp is variable in colour, translucent brown, yellow, green or white.

*Habitat:* Attached to rocks or shells.

*Remarks:* Quite abundant at all stations. Specimens collected at deeper stations are larger than those from shallow sites. Common in the Adriatic Sea.

*Caryophyllia inornata* (Duncan, 1878)

*Stations:* T-1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 14, 17, 21, 23.

*Depth:* 1–45 m.

*Material:* Similar to *C. smithii*, but calyx outline more circular. Corallum is cylindrical, typically 5–7 mm in diameter, but taller in proportion to its diameter. Calyx diameter is up to 12 mm, height up to 15 mm. Polyp translucent brown, yellow, red or white.

*Habitat:* Attached to rock in caves, crevices or other sheltered places. Could be found also under stones and between algae.

*Remarks:* One of the most common scleractinian species in the Adriatic.

*Caryophyllia cyathus* (Ellis & Solander, 1786)

*Stations:* T-1, 12.

*Depth:* 38–43 m.

*Material:* A few specimens per station attached to crevice wall. Solitary subcylindrical coral, constricted in the lower part. Pali encircling central large columella. Number of septa ranged from 54 to 82, in five cycles. Corallum white to slightly beige peripherally. Polyp is transparent white. This is a quite shallow depth for this species.

*Habitat:* Circalittoral, typically attached to hard substrata (ZIBROWIUS, 1980).

*Remarks:* PAX & MÜLLER (1962) and ZIBROWIUS & GRIESHABER (1977) noted that *C. cyathus* had rarely been noted for Adriatic fauna by authors of the 19th century. PAX & MÜLLER (1962) reported having seen a specimen from Šolta Island in the

Natural History Museum of Split. These unverified old records were considered doubtful by ZIBROWIUS & GRIESHABER (1977). The records reported here and at Mljet Island (KRUŽIĆ, 2002) are thus the first reliable ones from the Adriatic Sea.

*Ceratotrochus magnaghii* Cecchini, 1914

*Stations:* T-1, 7, 9.

*Depth:* 25–45 m.

*Material:* Corallites from Telašćica up to 18 mm high, diameter up to 8 mm. Columella well developed. Septa slightly exert. Theca is thick with well conspicuous circular corrugation.

*Habitat:* Attached to rock, mostly in crevices, on cave walls and in steep-sided gullies.

*Remarks:* At station T-1 *C. magnaghii* was found under an aggregation of calcareous red algae, *Pseudolithophyllum expansum* (Philippi) Lemoine. At the other stations attached to a roof of small caves.

*Coenocyathus cylindricus* Milne Edwards & Haime, 1848

*Station:* T-9.

*Depth:* 32 m.

*Material:* Typically 48 septa arranged in four cycles. Pali present as small low lobes. Corallum of live collected colonies off-white to beige. Expanded polyps (with tentacles about 10 mm in length) light brownish. Small colonies were found under an overhang at 32 m depth incrusting by red algae and bryozoans.

*Habitat:* Live colonies attached to rock substrate.

*Remarks:* This species was not noted in the literature review of the Adriatic Sea by PAX & MÜLLER (1962). A few previous records of this species are available from the south western Mediterranean and from the Atlantic coast of north western Africa, especially Morocco and Senegal (ZIBROWIUS, 1980, 1983).

*Paracyathus pulchellus* (Philippi, 1842)

*Stations:* T-1, 7, 12, 13.

*Depth:* 12–30 m.

*Material:* Inversely conical with a narrow base. Outline of calyx elliptical to circular. Septa exert with a finely granulate surface. Pali and columella well developed. Costae developed towards the upper margin of theca. Heights of specimens from Telašćica were up to 20 mm, diameter up to 10 mm.

*Habitat:* Caves, crevices and other sheltered places.

*Remarks:* At station T-1 this coral was found under an aggregation of calcareous red algae, *Pseudolithophyllum expansum* (Philippi) Lemoine.

*Polycyathus muelleriae* (Abel, 1959)

*Stations:* T-2, 3, 4, 6, 8, 10.

*Depth:* 10–35 m.

*Material:* Colonial species that forms small clusters. Pali and columella well developed. Heights of specimens from Telašćica were up to 22 mm, calyx diameter up to 10 mm.

*Habitat:* Caves and crevices.

*Remarks:* Most of the specimens were incrustated with calcareous red algae.

*Thalamophyllia gasti* (Döderlein, 1913)

*Station:* T-1, 9, 12.

*Depth:* 38–47 m.

*Material:* Small bushy colonies. Corallites up to 60 mm high, calyx diameter up to 5 mm with exert septa. No columella and no pali. Polyps translucent white.

*Habitat:* Caves and crevices.

*Remarks:* At station T-1 a small colony was found in a crevice. At the other two stations colonies occurred in small caves.

*Hoplangia durothrix* Gosse, 1860

*Stations:* T-1, 2, 3, 4, 5, 6, 10, 12.

*Depth:* 12–35 m.

*Material:* Colonial species forming small clusters with individual corallites budding from stony basal encrustation. Costae are well developed and prominent above. Corallites are cylindrical up to 5 mm in diameter and 10 mm high. No pali and no columella present. Septa slightly exert, hexamerously arranged in four cycles. Polyps with long tentacles, light brown in colour.

*Habitat:* Attached to rock in caves and crevices, usually at shaded or dark sites.

*Remarks:* At stations T-1 and 3, colonies were found under aggregations of red algae thalli *Pseudolithophyllum expansum* (Philippi) Lemoine. At other stations attached to rock in caves and crevices.

*Phyllangia mouchezii* (Lacaze-Duthiers, 1897)

*Stations:* T-1, 3, 4, 6, 7.

*Depth:* 10–30 m.

*Material:* Colonial species forming clusters by extratentacular budding. Outline of calyx circular. Septa exert. Theca with fairly distinct costae. Polyps translucent white to pink. Living colonies were collected at the entrance of crevices. Diameters of colonies from Telašćica were up to 100 mm, calyx diameter up to 10 mm.

*Habitat:* Hard bottom in sheltered niches.

*Remarks:* *P. mouchezii* is considered by ZIBROWIUS (1980) to be a thermophilic species uncommon in the colder parts of the Mediterranean like northern Adriatic Sea.

FLABELLIDAE

*Monomyces pygmaea* (Risso, 1826)

*Stations:* T-1, 9, 12.

*Depth:* 20–40 m.

*Material:* Solitary species with a variable shape of corallite, often compressed. Calyces were subcircular to very elongate. A few individuals from each station were collected. Corallite up to 20 mm high, diameter up to 8 mm. Polyyps translucent white.

*Habitat:* Cave walls and crevices, or sheltered rocky surfaces.

*Remarks:* All specimens were collected from the cave walls and were encrusted with calcareous red algae.

## GUYNIIDAE

*Guynia annulata* Duncan, 1872

*Stations:* T-1, 7, 11, 13.

*Depth:* 22–30 m.

*Material:* Tiny solitary species of unusual shape, roughly resembling a serpulid tube. Corallite is elongate, narrow, typically attached to the substrate all along the lateral side. Wall more or less marked by transverse and/or longitudinal ridges and generally also by distinct longitudinal series of whitish »spots« corresponding to rectangular zones of a different microstructure delineated by ridges. Small number of septa (6 to 8), and a simple lamellar columella was compressed. Polyp translucent white to yellow. At all stations, specimens were found in caves.

*Habitat:* The tiny vermiform coral lives attached on the surface of caves or in a coralligenous community. Dead specimens could be usually found in the sediment inside and outside of caves.

*Remarks:* Previous records of *G. annulata* from the Croatian part of Adriatic Sea are from the islands of Prvić, Veli Ćutin and Mljet (KRUŽIĆ, 2002; KRUŽIĆ *et al.*, 2002).

## DENDROPHYLLIIDAE

*Balanophyllia europaea* (Risso, 1826) (Fig. 4)

*Stations:* T-2, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 19, 22, 23, 24.

*Depth:* 0,5–18 m.

*Material:* Solitary, zooxanthellate coral. Calyces are circular in young specimens, more or less compressed in adults. Specimens from Telašćica were up to 30 mm in height, up to 22 mm in diameter. Septa slightly exert. Polyyps are brownish green and always with zooxanthellae.

*Habitat:* Hard bottom in euphotic zone.

*Remarks:* The most common and abundant solitary scleractinian coral from the euphotic zone.

*Leptopsammia pruvoti* Lacaze-Duthiers, 1897

*Stations:* T-1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12.

*Depth:* 17–62 m.

*Material:* Solitary stony coral. Corallum often tall and inversely conical, its texture is slightly spongy. Corallite variable in shape, from short to tall and from cylindrical to conical. Height up to 55 mm, diameter of calyx up to 15 mm. Septa exert and hexamerously arranged in five cycles. Columella is variable in size, often large.

Theca is thick with fairly distinct costae. Disc and tentacles yellow, rarely orange. Usually up to 96 tentacles.

*Habitat:* Attached to rock in sheltered areas, usually on cave roofs or crevices. Some specimens were incrustated by calcareous red algae, sponges and bryozoans.

*Remarks:* Common along the eastern Adriatic coast.

## OCTOCORALLIA

### CORNULARIIDAE

*Cornularia cornucopiae* (Pallas, 1766)

*Stations:* T-5, 9, 13, 15, 17.

*Depth:* 15–25 m.

*Material:* Polyps arising from a slender stolon. Colonies usually form small clusters. Fully extended polyps are up to 15 mm high. Colour of polyps translucent white to brownish.

*Habitat:* In shaded places on rocks, or at the entrance of crevices.

*Remarks:* At each station a few clusters were found at the entrance of crevices. At station T-13 colonies were found on the rhizomes of the sea-grass *Posidonia oceanica*.



Fig. 4. Zooxanthellate coral *Balanophyllia europaea* at station T-6.

## ALCYONIIDAE

*Alcyonium palmatum* Pallas, 1766

*Stations:* T-1, 7, 12, 15, 17, 21.

*Depth:* 10–38 m.

*Material:* Colonies with finger-like lobes of irregular shape. A few colonies collected, up to 150 mm high, polyps up to 7 mm. Colour of coenenchyme pink to white, polyps white.

*Habitat:* Sandy and rocky bottom.

*Remarks:* Common in the eastern Adriatic Sea.

*Alcyonium acaule* Marion, 1878 (Fig. 5)

*Stations:* T-2, 3, 4, 5, 6, 9.

*Depth:* 14–35 m.

*Material:* Colony with many small, branching finger-like lobes. A single colony collected by grab, 60 mm high, polyps up to 5 mm. Coenenchyme blood-red, polyps red with white tentacles.

*Habitat:* Attached to rock, usually with algal cover.

*Remarks:* At stations T-2 and 3 this species was quite abundant from 18 to 25 m depth (up to 12 specimens per square meter). Relatively common in the Adriatic Sea.



Fig. 5. Colony of *Alcyonium acaule*. Station T-5.



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

*Stations:* T-2, 3, 4, 6, 8, 10.

*Depth:* 20–45 m.

*Material:* Encrusting colony with polyps up to 6 mm high. The anthocodia are about 4 mm tall, excluding tentacles. Coenenchyme is deep red with translucent white or yellow polyps.

*Habitat:* Epibiontic, usually forms encrusting sheets on gorgonians, shells and rock.

*Remarks:* Typical in coralligenous biocoenosis. In Telašćica, *A. coralloides* was found only encrusting the gorgonian *Eunicella singularis* (Esper, 1791). Outside the Mediterranean, this species can be found as lobate colonies or as small nodules connected by stolons of coenenchyme. At the station T-10 *A. coralloides* was found encrusting rock at 16 m depth. Old name for this species was *Parerythropodium coralloides*.

**CLAVULARIIDAE*****Clavularia crassa*** (Milne Edwards, 1848)

*Stations:* T-5, 13, 18, 22.

*Depth:* 15–35 m.

*Material:* Stolon as a flattened band up to 3 mm wide, often laterally expanded. Along the stolon, polyps arise at irregular intervals. Expanded anthocodia are up to 5 mm tall. Tentacles are up to 6 mm long. Stolon is usually brownish. Polyps translucent white.

*Habitat:* Attached to rock and stones. At the station T-22 specimen was attached to gastropod shell.

*Remarks:* Relatively common in the eastern Adriatic Sea.

**PARALCYONIIDAE*****Paralcyonium spinulosum*** (Delle Chiaje, 1822)

*Stations:* T-5, 9, 14, 16, 17.

*Depth:* 10–22 m.

*Material:* Colonies consist of aggregates of polyps interconnected with each other by stolons. Stolons are short and brownish. Polyps opaque to translucent brown, oral disc of polyps fluorescent green. Polyps from Telašćica were up to 15 mm high.

*Habitat:* In crevices on rocky bottoms, under stones and in *Posidonia oceanica* meadows (stations T-14 and 17).

*Remarks:* Relatively common in the Adriatic Sea.

**CORALLIIDAE*****Corallium rubrum*** (Linnaeus, 1758) (Fig. 6)

*Stations:* T-4, 8.

*Depth:* 57–66 m.

*Material:* Branching colonies with massive blood-red calcareous axis and sclerites embedded in the coenenchyme. The colonies are arborescent with an average height of 100 mm. White polyps (autozooids) protrude from calyces with eight regular lobes and can reach 10 mm when fully extended.

*Habitat:* Lives in caves or under overhangs between 30 and 200 m depth (WEINBERG, 1976), in clear water and at reduced sedimentation.

*Remarks:* Typical species of coralligenous biocoenosis. In the past it was fairly common and commercially important in the eastern part of the Adriatic Sea (PAX & MÜLLER, 1962), but due to the man activities, *C. rubrum* became rare or even exterminated at many sites. At Telašćica stations only small populations were found in crevices at 57 and 66 meters depth. Colonies from the station T-8 up to 120 cm high, with base up to 10 mm thick.

## GORGONIIDAE

*Eunicella cavolinii* (Koch, 1887) (Fig. 7)

*Stations:* T-1, 2, 3, 4, 6, 7, 8, 9, 10, 11.

*Depth:* 14–55 m.

*Material:* Base of the colony expanded. Colonies are irregularly branching, more or less fan-shaped. Branches of colonies were similar in diameter with calyces all around the branches. Colonies were up to 50 cm high, yellow in colour. Polyps translucent white.

*Habitat:* Usually found on the vertical walls, in crevices and near the cave entries from 15 to more than 120 m depth.



Fig. 6. Precious coral *Corallium rubrum* at the station T-8.

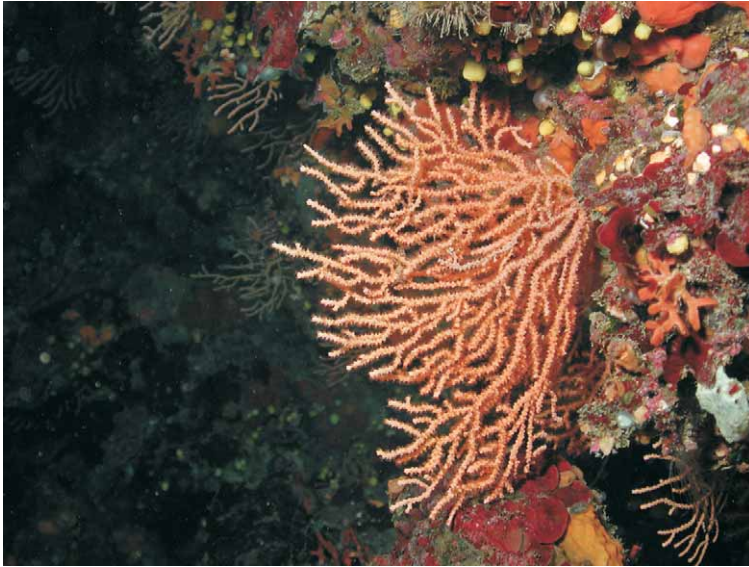


Fig. 7. Gorgonian *Eunicella cavolinii* at the station T-2.

*Remarks:* Colonies are usually oriented across prevailing water currents. The gastropod *Neosimnia spelta* (Linnaeus, 1758) could be recorded on the coral branches, but not at Telašćica stations. At all stations this gorgonian was found together with the encrusting *Alcyonium coralloides* (Pallas, 1766). This species is very common along the eastern coast of Adriatic Sea.

*Eunicella verrucosa* (Pallas, 1766)

*Stations:* T-1, 9, 11.

*Depth:* 20–37 m.

*Material:* Colonies branching, irregularly fan-shaped, but can also appear in bushy forms. Diameter of colonies up to 300 mm. Polyps close set and irregularly arranged on the branches. Polyps retracted in eight-lobed calyces. Colour of colonies varied from white and yellow to orange.

*Habitat:* On vertical rocks and overhangs. Colonies are usually oriented across prevailing water currents.

*Remarks:* Only the white form of colonies was found at Telašćica stations. This colour is typical of Mediterranean specimens. Relatively rare in the Adriatic Sea.

*Eunicella singularis* (Esper, 1791)

*Stations:* T-2, 3, 6, 7, 8, 9, 10, 12, 14.

*Depth:* 10–30 m.

*Material:* General morphology of colonies largely depends on local hydrodynamic conditions. Colonies are composed of relatively long and straight branches, growing

parallel to each other with few ramifications. In most cases branches are oriented in one plane. Colour of colonies varies from bright white to a dirty greyish white. Colonies from Telašćica were up to 400 mm high. Polyps, often on all sides of the branches, up to 4 mm long when fully expanded. Polyps translucent brown-green (because of symbiotic zooxanthellae) with gastrodermal cavity visible inside.

*Habitat:* On rocks or stones on coarse sand bottom. This is a photophilic species which occurs on horizontal and subhorizontal surfaces.

*Remarks:* Locally could be quite abundant, as at stations T-2 and 6. Common in the Adriatic Sea.

## PLEXAURIDAE

*Paramuricea clavata* (Risso, 1826) (Fig. 8)

*Stations:* T-1, 2, 3, 4, 6, 8, 10, 11.

*Depth:* 30–45 m.

*Material:* Colony arborescent, usually as broad as high, whose trunk can measure 40 mm in diameter at the base. The flexible colony is fixed on a hard substrate with its widened base. Colony can reach more than 1 m in width. The colour can vary from one colony to another; from entirely purple, carmine red colonies and other carmine at the base and yellow towards the end of the branches. Polyps are entirely retractile, coloured from the red to yellow, identical to the branch which carries them.

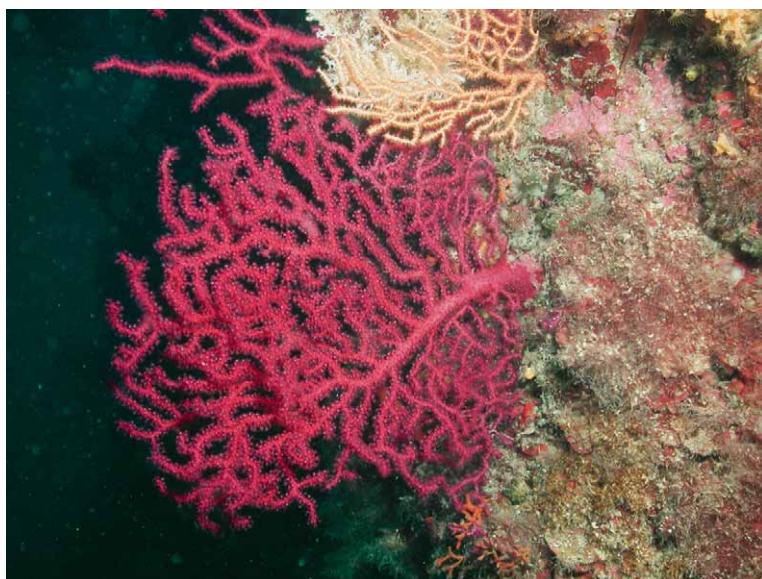


Fig. 8. Gorgonian *Paramuricea clavata* at the station T-8.

*Habitat:* Typical gorgonian species of sublittoral communities found on rocky substrates from 20 to 150 m depth, preferentially in zones of strong hydrodynamism.

*Remarks:* It is one of the largest sessile invertebrates of the Mediterranean Sea. The geographical distribution is limited to the Western Mediterranean and the Adriatic, rather in the coldest areas.

## VERETILLIDAE

*Veretillum cynomorium* (Pallas, 1766)

*Stations:* T-12, 13, 17.

*Depth:* 17–24 m.

*Material:* Specimens up to 200 mm high. Colour of the colony pale yellow. Polyps up to 5 mm long when fully expanded, translucent white with gastrodermal cavity visible inside.

*Habitat:* Silty or sandy-silty sediment.

*Remarks:* At the station T-17 one specimen was found on coarse sand. Rarely recorded in the Adriatic Sea.

## VIRGULARIIDAE

*Virgularia mirabilis* (O. F. Müller, 1776)

*Station:* T-15.

*Depth:* 21 m.

*Material:* Only one specimen recorded. Elongated, very slender colony with narrow »leaves« bearing polyps was 400 mm long. Polyps up to 4 mm high. Stalk was equal in length to the rachis. An internal calcareous skeletal rod (axis) is round in this species and often protrudes from the top of the colony. Up to 12 autozooids on each side of the rachis. Colour yellowish or whitish, luminescent in darkness.

*Habitat:* Muddy coarse sand in sheltered area, up to 400 m depth.

*Remarks:* Common in the Adriatic Sea. Locally abundant, as in the Prokljan marine lake near Šibenik (personal observations).

## PENNATULIDAE

*Pennatula phosphorea* Linnaeus, 1758

*Station:* T-19.

*Depth:* 16 m.

*Material:* One colony collected, 140 mm long. Autozooids are fused and form leaves arranged in two lateral rows. Siphonozooids occur on the broad band on each side of the naked dorsal tract. Colony translucent pale pink, anthocodia of the autozooids white.

*Habitat:* Lives with the fleshy stalk embedded in mud, sand or gravel. Always off-shore in depths greater than 10m. Usually found up to 100 m depth.

*Remarks:* Relatively common in the Adriatic Sea.

*Pteroeides spinosum* (Ellis, 1764)

*Stations:* T-14, 21, 23.

*Depth:* 18–27 m.

*Material:* One colony per station, 20 cm high, pen shaped. Central axis is moderately wide. Polyps clustered in small groups on rachis just dorsally to the leaf basis. Colour of colony greyish white, polyps white.

*Habitat:* Sandy or muddy sediments up to 300 m depth.

*Remarks:* Colony from coarse sand with silty fraction. Rare in the Adriatic Sea. Occasionally was collected by dredging.

## DISCUSSION & CONCLUSIONS

There is a high diversity of benthic communities in Telašćica Nature Park marine area. The heterogeneity of substrates and benthic communities in the bay and on the cliffs is considerable, with anthozoans present on the most different kinds of substrates and in a wide range of benthic communities.

Samples thus originated from various bionomic assemblages: well illuminated zones, *Posidonia oceanica* and *Cymodocea nodosa* meadows, submerged cliffs, semi-dark habitats, submarine caves and sandy or silty deposits. Sixteen species are commonly considered Mediterranean endemics (*Cerianthus membranaceus*, *Epizoanthus paxii*, *Condylactis aurantiaca*, *Phymanthus pulcher*, *Cribrinopsis crassa*, *Alicia mirabilis*, *Sagartiogeton entellae*, *Balanophyllia europaea*, *Cladocora caespitosa*, *Ceratotrochus magnaghii*, *Alcyonium palmatum*, *Alcyonium acaule*, *Paralcyonium spinulosum*, *Corallium rubrum*, *Eunicella singularis* and *Paramuricea clavata*).

With regard to anthozoan ecology, there are species which clearly settle on a well defined and characteristic substratum, whereas others have a broad habitat range. The mediolittoral belt is inhabited by *Actinia equina*, on bedrock and in rock pools. *A. cari* and *A. striata* are attached to barren stones and rock in the shallow infralittoral.

Biocoenosis of photophilic algae is widespread at all investigated stations. Although in this biocoenosis photophyllic algae dominate as primary producers, there are also several characteristic anthozoans that benefit from this community. These are mostly zooxanthellate species depending on having sufficient light for photosynthesis and species that are hidden between algae or under rocks. Characteristic species of the photophilic algae community are *Anemonia sulcata*, *Aiptasia mutabilis*, *A. diaphana*, *Balanophyllia europaea* and gorgonian *Eunicella singularis*.

The large bed of the coral *Cladocora caespitosa* was found at station T-17, covering an area of 200 m<sup>2</sup> at depths from 12 to 24 m. This zooxanthellate colonial coral benefits from the strong currents, optimal temperature and high organic input in the bay. There is a possibility that numerous colonies living close to each other in a future will become connected to create a coral bank. At station T-21 a small coral bed of *C. caespitosa* was also found from 8 to 11 m depth. Other anthozoan species in this community are less conspicuous and have a scattered distribution.

The biocoenosis of *Cymodocea* and *Posidonia* meadows covers areas in Telašćica Bay (especially large areas at stations T-23 and 24). However, *Posidonia* meadows occur at stations outside the bay (stations T-5, 6, 7, 8, 9, 10 and 11). *Posidonia* meadows shelter *Cerianthus membranaceus*, *Anemonia viridis*, *Scolanthus callimorphus*, *Cribrinopsis crassa*, *Bunodactis verrucosa*, *Clavularia crassa* and *Paralcyonium spinulosum*, all living in the sediment between the rhizomes. A rare specimen in the Adriatic, *Halcampoides purpurea*, was found at station T-15 in the vicinity of *Posidonia* meadow. Other species were collected from the detritic or sandy deposits in which they are buried: *Pachycerianthus multiplicatus*, *Cerianthus membranaceus*, *Condylactis aurantiaca* (quite abundant at stations T-12 and 17), *Veretillum cynomorium* and *Pteroeides spinosum*. All those species show an irregular local distribution pattern in several biocoenoses: biocoenosis of littoral sands, biocoenosis of fine surface-sands, biocoenosis of fine homogenous sands. Here it was also possible to find *Calliactis parasitica* and *Adamsia carcinopados*, known for commensal association with hermit crabs.

At the coralligenous-photophilic algae interface there occur several species which are basically coralligenous, but can develop a special community named a precoral-ligenous facies (PÉRÈS & GAMULIN-BRIDA, 1973). Certain anthozoans were recorded here, such as *Caryophyllia smithii*, *Phyllangia mouchezi*, *Alcyonium acaule* which, by origin, belong to the coral-ligenous biocoenosis.

A coralligenous biocoenosis on the outer cliffs is rich in cave species and shadowed niche inhabitants, such as *Parazoanthus axinellae*, *Caryophyllia inornata*, *Cerato-trochus magnaghii*, *Paracyathus pulchellus*, *Thalamophyllia gasti*, *Monomyces pygmaea*, *Guynia annulata* and *Leptopsammia pruvoti*. The coralligenous biocoenosis is a habitat for many sciaphylic organisms with great biodiversity and it is considered to be endangered in the Mediterranean. Gorgonian species like *Paramuricea clavata* and *Eunicella cavolinii* make large populations at stations on the outer cliffs. Colonies of *Gerardia savaglia* seem to be much more common in the eastern Adriatic, as one can conclude on the basis of the existing data.

The precious red coral *Corallium rubrum* is rare in Telašćica Nature Park. Small populations were found only at two stations (T-4 and 8) in small caves. It is presumed that the populations on the other cliff stations were devastated by local fishermen and »coral hunters«.

Some colonial species (*Madracis pharensis*, *Hoplania durothrix*, *Polycyathus muelle-rae*) cover large surfaces on roofs and walls of semi-dark and dark caves. The coral *Madracis pharensis* was found only on cliffs, at the entrance of caves with symbiotic zooxanthellae and in caves, in the complete dark, without zooxanthellae. A large population was located near station T-8 (the islet Veli Garmenjak) on the roof of a dark cave at 26 m depth.

The black coral *Antipathes subpinnata* has been rarely recorded in the Adriatic Sea. In Telašćica Nature Park, it was collected at station T-1, a rather shallow area for this species (51 m depth).

A major problem when discussing anthozoan records in the Adriatic Sea is the sparseness and lack of precision of earlier collection data. No real historical survey series exist and the attention given to different parts of the Adriatic Sea has been

unequal. This is especially true of the central part of the Adriatic. Some of the species studied seem to be really rare and to occur only locally. The new findings do not indicate just recent colonisation, but simply show that limited populations were previously overlooked (ZIBROWIUS & GRIESHABER, 1977; CHINTIROGLOU *et al.*, 1997; KRUŽIĆ, 2002; KRUŽIĆ *et al.*, 2002).

The scarcity of deep water data is another problem. New research input may confirm the occurrence of additional species in deeper areas like the Jabuka depression and the deep southern part of Adriatic Sea.

There is a great diversity of habitats, including caves and deep cliffs, on the submerged coast of Telašćica Nature Park, characterised by many islets. The finding of only a few anthozoan species does not necessarily mean that they are rare species in the area, but perhaps that they are rather difficult to sample or that they inhabit niches only partially studied. Further research on the status of anthozoan fauna in the Adriatic Sea seems to be necessary.

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## S A Ž E T A K

## Fauna koralja Parka prirode Telašćica (Jadransko more, Hrvatska)

P. Kružić

Prilikom istraživanja podmorskog dijela Parka prirode Telašćica u razdoblju od 1999. do 2006. godine zabilježeno je i sakupljeno 65 vrste koralja. Pronađene vrste predstavljaju oko 56% dosad pronađenih koralja u Jadranskom moru i oko 38% u Sredozemnom moru. Šesnaest vrsta utvrđenih koralja su endemi Sredozemnog mora. Na vanjskim podmorskim stijenama, te unutar uvale Parka prirode Telašćica utvrđeno je 19 bioloških zajednica ili biocenoza. Uzorci koralja sakupljeni su na osvijetljenim, poput biocenoze fotofilnih alga i biocenoze morske cvjetnice *Posidonia oceanica*, na zatamnjanim biocenzama poput biocenoza polutamnih ili potpuno tamnih spilja, te na tvrdoj stjenovitoj podlozi ili mekoj podlozi poput pijeska ili zamuljenog pijeska. Najraširenija biocenoza je biocenoza fotofilnih alga, koju nalazimo na svim istraživanim postajama. U ovoj biocenozi česte su vrste koralja koje žive u simbiozi sa algama zooksantelama, poput vrsta *Anemonia viridis*, *Aiptasia mutabilis*, *A. diaphana*, *Balanophyllia europaea* i gorgonija *Eunicella singularis*. Na postaji T-17 kolonijalni koralj *Cladocora caespitosa* prekriva površinu od oko 200 m<sup>2</sup>, na dubini od 12 do 24 metra. Livade morske cvjetnice *Posidonia oceanica* nalazimo unutar uvale Telašćica, ali i na vanjskim postajama. Ovdje nalazimo vrste *Cerianthus membranaceus*, *Anemonia viridis*, *Scolanthus callimorphus*, *Cribrinopsis crassa*, *Bunodactis verrucosa*, *Clavularia crassa* i *Paralcyonium spinulosum*, koje žive na sedimentu između čuperaka morske cvjetnice. Na pomičnom dnu utvrđene su vrste *Pachycerianthus multiplicatus*, *Condylactis aurantiaca*, *Veretillum cynomorium*, *Pteroeides spinosum*, te vrste *Calliactis parasitica* i *Adamsia carcinopados* poznate po suživotu s rakovima samcima.

U koraligenskoj biocenozi nalazimo scijafilne vrste koralja poput *Parazoanthus axinellae*, *Paracyathus pulchellus*, *Phyllangia mouchezi* i *Leptopsammia pruvoti*. Crveni koralj *Corallium rubrum* utvrđen je na dvije vanjske postaje, na većim dubinama. Ova je vrsta, najvjerojatnije zbog pretjeranog vađenja, prilično rijetka na podvodnim strmcima Parka prirode Telašćica. Na vanjskim postajama utvrđene su i veće populacije gorgonija *Eunicella cavolinii* i *Paramuricea clavata* i inače čestih vrsta u ovom dijelu Jadrana.

S obzirom na veliku raznolikost staništa u području Parka prirode »Telašćica«, uključujući špilje i duboke podmorske klifove, potrebna su daljnja istraživanja kako bi se dobila potpuna slika o fauni koralja na tom području.