

PHYLUM CNIDARIA

The Phylum Cnidaria is a diverse group of aquatic, and predominantly marine organisms, including approximately 9 000 species worldwide, of which 750 are known to occur in the Mediterranean Sea. Cnidarians are unique in that they possess stinging or adhesive organelles known as cnidocysts, which are mainly used to capture food (Fig. 1),

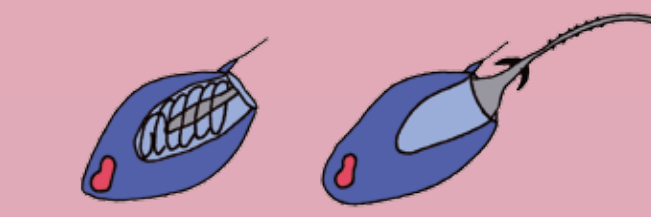


Fig. 1 Resting and exploded cnidocyst.

and in that they can exhibit two body forms: a polyp, which is attached to a surface, and a free-swimming medusa (Fig. 2).

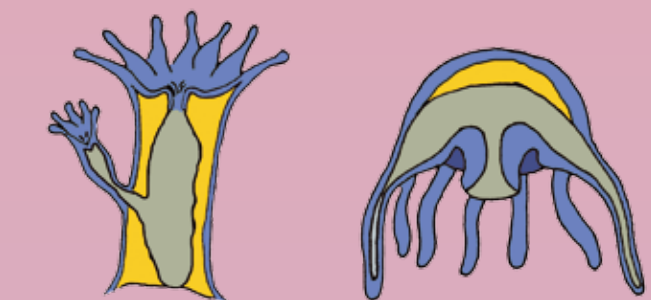


Fig. 2 Cnidarian polyp and jellyfish.

Most cnidarians alternate between these two forms. Cnidarians adopt two feeding strategies: predation and suspension feeding, which can be active or passive. They show a great variety of morphologies and sizes, spanning from solitary polyps, living attached to other organisms and occasionally parasitic, to large arborescent colonies or intricate carbonate frameworks. They are found from the intertidal zone to the abyssal plains, both on rocky and muddy bottoms, and many deep-sea species (living below 200 m in depth) are considered important structuring species forming dense aggregations on the sea bottom in the form of gardens or reefs. This Phylum is divided into 5 classes: Hydrozoa (often referred to as hydroids); Scyphozoa and Cubozoa (the typical large jellyfishes); Staurozoa (including small stalked jellyfishes); and Anthozoa, which includes species forming colonies without the medusa form.

CLASS ANTHOZOA

The term Anthozoa refers to the flower-like appearance of these organisms: they live attached to the substrate, often branched and tree-like, usually quite colourful, and their polyps have one or more crowns of tentacles. Anthozoans are divided into two subclasses: Octocorallia and Hexacorallia mainly distinguished by the number of tentacles in each polyp (respectively 8 and 6 or multiples). In many species, polyps may form colonies showing various types of skeletal supports and a great plasticity depending on the environment. They can be found buried in soft sediments as well as attached to rocks and other organisms. In the Mediterranean Sea, anthozoans account for about 200 species. About 30% of them live between the shelf break and the bathyal plain, where they are able to form complex three-dimensional habitats by aggregating in dense forests that attract numerous other organisms and are therefore referred to as structuring species. Usually very long-lived, some species reach large sizes, a fact that enhances their catchability by means of bottom fishing gears.

Hexacorals

Cup-shaped hard corals

Desmophyllum dianthus is a solitary, brownish-orange hard coral that has earned the name of cockscomb cup coral because of its distinct cup-shaped (or tubular) morphology and its marked white septa. It can form pseudo-colonies with younger individuals growing on the skeleton of older ones.

Size: normally less than 8 cm in height.

Depth and habitat: 20-1 200 m; distributed in the entire Mediterranean basin, often associated with the reef-forming species *Lophelia pertusa* and *Madrepora oculata*.



Desmophyllum dianthus

Bright yellow or salmon-pink hard corals

Both *Dendrophyllia cornigera* and *Dendrophyllia ramea* form arborescent, rigid colonies that may develop a large basal trunk. *D. cornigera* usually forms small, bright yellow colonies, with an irregular distribution of the corallites (the skeletal cups in which polyps sit and into which they can retract), while *D. ramea* shows short, circular corallites often arranged in two lateral rows. The colonies are salmon-pink or light orange with whitish polyps.

Size: usually 20-30 cm (*D. cornigera*) to almost 1 m (*D. ramea*) in height.

Depth and habitat: *D. cornigera*, 30-800 m; *D. ramea*, 20-172 m. Both species are distributed along the entire basin, mainly occurring as scattered colonies settled on hard grounds, although they occasionally form dense aggregations on soft bottoms.



Dendrophyllia cornigera

D. ramea

Dead dendrophyllids

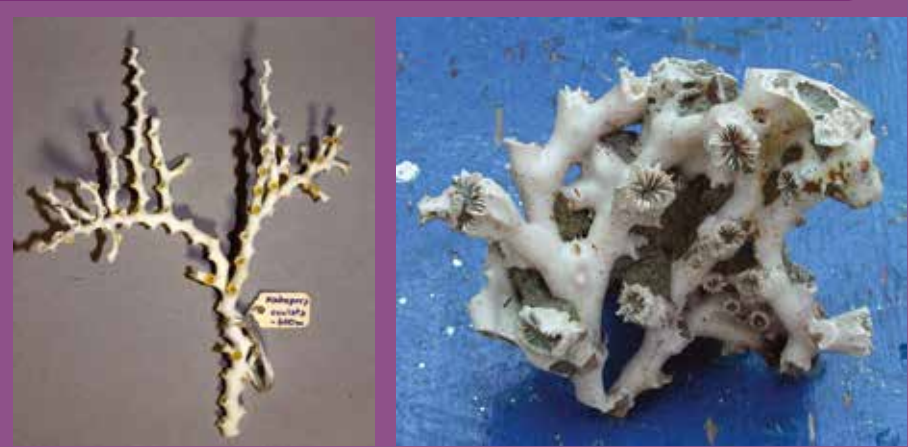
White corals

The white colour characterizing their skeletons has earned these habitat-forming species, *Madrepora oculata* and *Lophelia pertusa*, the name of white corals, although they can occasionally show a salmon-pink coloration. They can be individual colonies or intricate carbonate frameworks, usually made of both living and dead portions. *M. oculata* has a distinctive zigzag pattern of the corallites, while *L. pertusa* has characteristic trumpet-shaped corallites with marked septa.

Occasionally, dead skeletons of dendrophyllids (see account above) can be mistaken, on-board, for white corals. Proper identification is possible only after close examination.

Size: more than 1 m in height.

Depth and habitat: ca. 200-1 800 m; on rocks or on dead and fossilized coral skeletons, often along canyons, ridges and seamounts.



Madrepora oculata

Lophelia pertusa

Arborescent black corals

Corals characterized by spiny skeletons that appear black when the colony loses its living tissue. *Leipathes glaberrima* is a tree-like species, with short, curved branchlets, orange or white in colour. Its skeleton is smooth and shiny. *Antipathes dichotoma* colonies show numerous, long and flexible ramifications giving it an overall willow-like aspect; polyps are very large and whitish-opaque yellow. *Antipathella subpinnata* shows a tree-like morphology, with plumose, thin ramifications covered by small, white polyps.

Size: *L. glaberrima*, up to 2 m in height; *A. dichotoma* and *A. subpinnata*, up to 1.5 m in height.

Depth and habitat: 60-2 000 m; on rocky bottoms; *A. subpinnata* is the shallowest, mainly living on the deepest coastal hard grounds.



L. glaberrima

A. dichotoma

A. subpinnata

Bottlebrush black corals

Parantipathes larix is the fourth most common Mediterranean forest-forming black coral species, characterized by a single-stem or sparsely branched colonies with a bottlebrush morphology in which the pinnules (the lateral, thin and short ramifications) are arranged in various rows around the stem and branches. If damaged, it may easily lose the lateral pinnules, making its stem look like a spiny black stick. It has very small, whitish polyps organized in one row along the lateral branches.

Size: up to 2 m in height.

Depth and habitat: 100-2 000 m; on flat or gently sloping rocky bottoms.



Parantipathes larix

Octocorals

Soft corals

Soft corals lack a rigid skeletal support, making them capable, when collected, of contracting and greatly reducing their size. *Alcyonium palmatum* is the most common species and has a finger-like appearance; it is orange in colour. The basal part of the colony is white with no polyps and ends in a short stalk that is buried in the sediment. A far less common species is *Chironephytha mediterranea*, with branched, tree-like colonies, orange-white in colour and so far reported only from the western basin.

Size: about 10-20 cm in height when contracted.

Depth and habitat: *A. palmatum*, 20-200 m; on muddy and sandy bottoms fixed to shells and pebbles. *C. mediterranea*, 100-200 m; attached to hard substrata.



Alcyonium palmatum

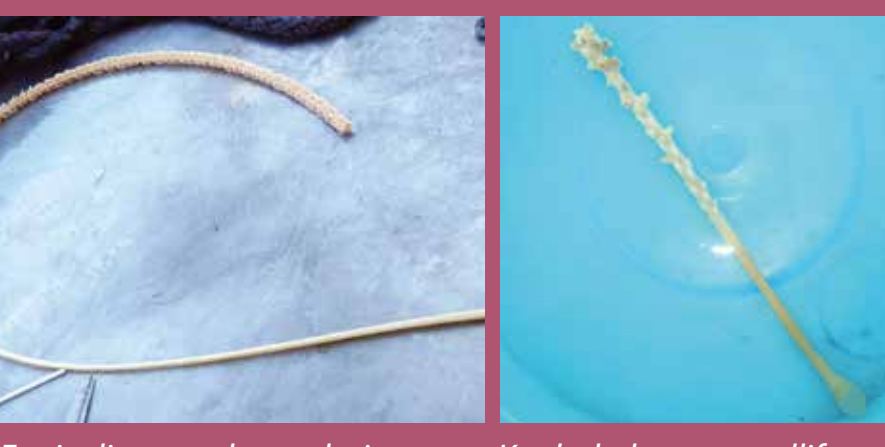
Chironephytha mediterranea

White, single-stem sea pens

Various sea pens thrive in the deep Mediterranean Sea forming dense clusters in undisturbed areas. *Funiculina quadrangularis* is characterized by whitish-creamy, whip-like colonies. Despite being flexuous, colonies have a brittle axial skeleton and spiny polyps. *Kophobelemnon stelliferum* forms elongated, cylindrical and clavate colonies with a greyish coloration. *Virgularia mirabilis* is characterized by feathery-like, white to creamy yellow colonies, with a very slender stem and the ability to bury.

Size: *F. quadrangularis*, more than 2 m in length; *K. stelliferum*, up to 20 cm in height; *V. mirabilis*, up to 60 cm in height.

Depth and habitat: *F. quadrangularis*, 20-2 000 m, in compact mud bottoms; *K. stelliferum*, 200-800 m, on soft bottoms; *V. mirabilis*, 20-400 m, in muddy coarse sands.



Funiculina quadrangularis

Kophobelemnon stelliferum

Thin, delicate pale-coloured fan-shaped gorgonians

Small-sized, fan-shaped gorgonians with thin ramifications and a rough surface, although never with a spiny appearance, and with a grey, white, yellow, reddish or brown coloration. A clear distinction between these species is possible only after a detailed microscopic analysis. *Paramuricea macrospina* is often associated with coralligenous concretions or maerl beds and it is the most colourful species. *Villogorgia bebrycoides* and *Muriceoides lepida* are well known in the coral gardens of the shelf break and are both whitish. *Placogorgia* species are very rare and are also known to occur in very deep canyon waters.

Size: up to 20 cm in height.

Depth and habitat: 40-1 000 m; mostly known to occur in the western basin.



Paramuricea macrospina

Placogorgia coronata

Small, bush-like or Y-shaped gorgonians

Small branched colonies, with relatively few branches and a smooth, fine-grained surface. Polyps, conical in shape, are distinctly scattered and are easily recognizable. *Bebrycia mollis* has a more bush-like appearance with irregular ramifications and a brownish, yellow coloration. *Swiftia pallida* is very fragile, with few thin ramifications and often a Y-shaped morphology. It may be pale yellow, white or red. They might be locally abundant.

Size: *B. mollis*, up to 20 cm in height. *S. pallida*, 5-10 cm in height.

Depth and habitat: 90-800 m; commonly found in the shelf break on cobble beds and detritic substrates, but also on rocky outcrops.



Bebrycia mollis

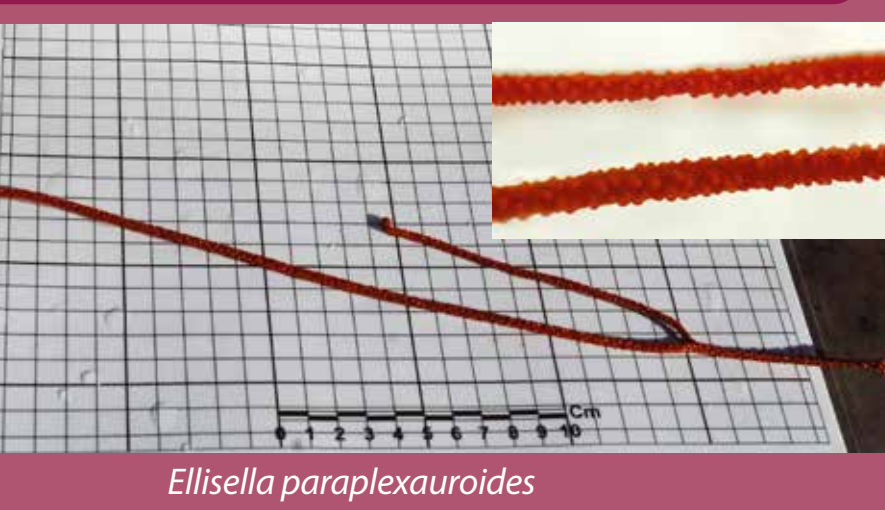
Swiftia pallida

Candelabrum-shaped, red gorgonians

Ellisella paraplexauroides displays large, branched and flexuous colonies with long, whip-like, upright branches usually rising near the base of the colony and resulting in a candelabrum-shaped appearance. Colonies are typically brick red. Polyps are not elevated and are found all around the stem. This species is rare and patchily distributed in the western Mediterranean basin, mainly along its southern coasts. It is locally abundant in the Alboran Sea and Sicily Channel.

Size: up to 2 m in height.

Depth and habitat: 15-250 m; on rocky bottoms along deep coastal areas.



Ellisella paraplexauroides

Sea pens

Sea pens are colonial octocorals, showing a feather-like or elongated, cylindrical appearance, usually characterized by bright colours. Polyps can arise from lateral branches or lamellae (as in the case of the red *Pennatula rubra* and *P. phosphorea*, respectively with 2 and 1 rows of polyps on each lamella, or the spiny *Pteroeides spinosum*) or directly from the central stalk (as in the case of *Veretillum cynomorium*). They all live anchored in soft bottoms by means of a bulbous peduncle located at the end of the stalk but still, some of them, are capable of limited movements. They may form dense populations in undisturbed areas.

Size: up to 10 cm in height.

Depth and habitat: 20-600 m; on soft bottoms.



Pteroeides spinosum

Pennatula rubra

Veretillum cynomorium

Bamboo corals (Family Isididae)

The overall finger-like appearance due to the clear alternation of white carbonate internodes and brown proteinaceous joint-like nodes along the ramifications, make the species belonging to this group look like a bamboo plant. *Isidella elongata* is the most common bamboo coral in the Mediterranean Sea, displaying the typical candelabrum-shaped morphology and a whitish coloration. Colonies form dense meadows in undisturbed areas. A similar species, but less known from the basin, is *Acanella arbuscula* showing a more bush-like, orange aspect.

They both use a root-like structure to anchor themselves in the mud.

Size: up to 70 cm in height.

Depth and habitat: 120-1 200 m; in compact mud.



Isidella elongata

Precious red coral

Corallium rubrum is the most famous anthozoan of the basin due to its commercial value. Its colonies have a completely calcified axis, totally inflexible, normally red which has earned it the common name of red coral. When freshly collected, non-retracted polyps appear white. Occasionally, long-dead colonies can be found in the bycatch, in this case the red coloration is masked by white carbonate encrusting organisms and the skeleton may show small, circular holes produced by boring sponges.

Size: usually 10 to 20 cm in height.

Depth and habitat: 30-1 000 m; in the eastern Mediterranean basin, populations are less abundant and much deeper with respect to the other areas. They may form dense aggregations along vertical walls or overhangs.



Corallium rubrum

Flexible white and salmon-pink fan-shaped gorgonians

Large, fan-shaped colonies, well-branched in all directions and with densely crowded polyps. Ramifications have a smooth, fine-grained surface. *Eunicella cavolinii* shows a yellow, orange, or salmon-pink coloration with branches terminating in a cylindrical apex. *Eunicella verrucosa* is generally white with shorter branches showing a pointed apex surrounded by tall polyps. While *E. cavolinii* has a wide distribution in the basin, *E. verrucosa* is particularly abundant in the western sector.

Size: *E. cavolinii*, usually 30-50 cm in height. *E. verrucosa*, up to 70 cm in height.

Depth and habitat: *E. cavolinii*, 5-120 m. *E. verrucosa*, 2-200 m. Both of them are forest-forming species on hardgrounds including silted flat areas.



Eunicella cavolinii

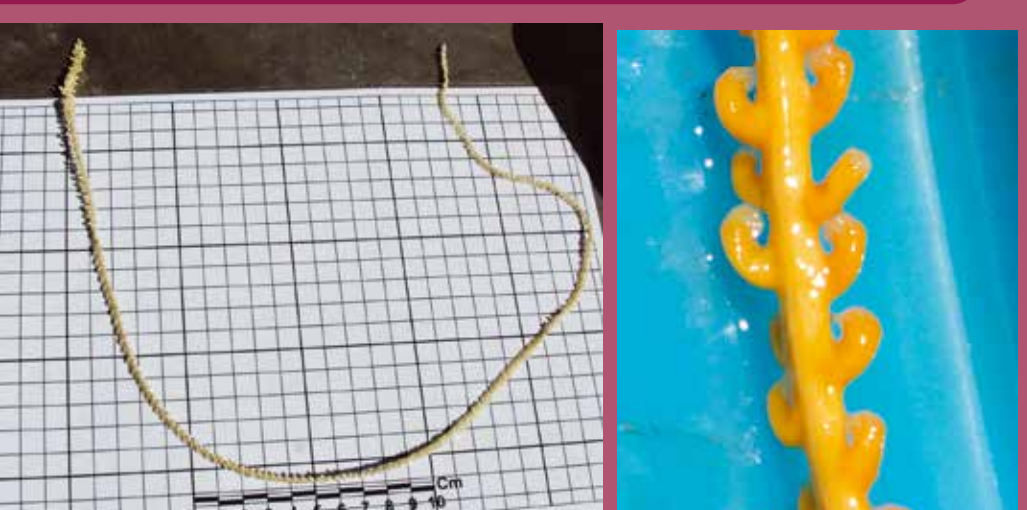
Eunicella verrucosa

Tall, white or yellow whip gorgonians

Viminella flagellum is characterized by large, whip-like colonies occasionally with one or few branches, usually rising from the middle of the stem. The colony is robust but still very flexible, with a thick stem and ramifications. Polyps are easily recognizable, being large, cylindrical and bent upwards, usually arranged in two rows. Two different colorations are known, white or orange-yellow that do not change when the colony is dried.

Size: more than 1 m in height.

Depth and habitat: 100-500 m; it seems to have preferences for hard substrata along the deepest coastal areas, continental shelf break and slope where it forms dense meadows.



Viminella flagellum

CLASS HYDROZOA

Hydrozoans typically form small and slender branched colonies of polyps that live attached to rocks or other hard substrates (including other organisms). They may show an encrusting, feather-shaped or bush-like morphology and a small group has also adapted to a pelagic lifestyle. They usually display a flexible structure, although some species have a rigid carbonate skeleton. Normally, they produce microscopic, pelagic jellyfish, not commonly visible to the naked eye, whose function is sexual reproduction. In the Mediterranean Sea, hydrozoans account for about 460 species. Not much is known about the deep-sea species as they have received little attention due to their generally small size that makes them difficult to sample. Bottom trawling fisheries may directly impact the larger species, which form aggregations on deep bottoms.

Feather-like hydroids

Lytocarpia myriophyllum is the largest hydroid of the Mediterranean Sea, with its golden coloured, feather-like colonies. Colonies are anchored to the sea bed by means of a complex root-like apparatus similar to a spongy web of filaments, which adheres to small sand grains or animal fragments. On-board, wet colonies may still show the lateral ramifications, which disappear when they become dry.

Size: up to 1 m in height.

Depth and habitat: 40-1 000 m; distributed in the entire basin on detritic and sandy bottoms.



Detail of root-like apparatus

Lytocarpia myriophyllum

Salmon-pink, brittle fan-shaped gorgonians

Callogorgia verticillata is the only species belonging to the Family Primnoidae known to occur in the Mediterranean basin. It is characterized by branched, fan-like colonies, whose feathery branches resemble palm leaves. Polyps, as suggested by its name, are organized into whorls or verticils. The dense content of their carbonate sclerites (small skeletal features resembling spines or needles) gives this gorgonian a brittle consistency. Coloration is typically salmon-pink.

Size: more than 1 m in height.

Depth and habitat: 90-900 m; always found on hard substrata, frequently observed forming mixed coral gardens with other gorgonian species.



Callogorgia verticillata

Thick and tall red, yellow fan-shaped gorgonians

Large, fan-shaped or arborescent gorgonians with colonies characterized by a rough or spiny surface. *Acanthogorgia hirsuta* displays bright yellow colonies, with a spiny appearance due to the crown of long thin sclerites of its polyps. *Acanthogorgia armata* is a rather similar species, although it is more commonly collected in the Alboran area. Finally, *Paramuricea clavata* is a shallower species characterized by large, rigid colonies, thick ramifications lacking long spines, and a carmine red and/or yellow coloration. All these species turn black when dried.

Size: *A. hirsuta*, up to 30 cm; *A. armata*, up to 15 cm; *P. clavata*, up to 1 m in height.

Depth and habitat: *A. hirsuta*, 70-500 m; *A. armata*, 300-1000; *P. clavata*, 50-250 m; all occurring on hard bottoms.



Acanthogorgia hirsuta

Paramuricea clavata

SIMILAR LOOKING GROUPS (seaweeds, sponges, other cnidarians, bryozoans)

Among the various groups that can be mistaken for one of the listed taxa, there are numerous filiform, finger-like, branched or bush-like organisms, such as seaweeds, sponges and bryozoans. They may appear as flexible, branched colonies or they may show a smooth, variously coloured, carbonate skeleton, but they never display polyps. Moreover, there exist numerous other anthozoan or hydrozoan species that are not shown in this visual guide, mainly because they are very difficult to identify, less relevant in terms of abundance or due to their shallower distribution.



Sertularia gayi (Yellow hydroid)

Stelligera sp. (Sponge)



Tubicellepora avicularis (Bryozoan)

Myriapora truncata (Bryozoan)

Axinella cannabina (Sponge)

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