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MOST OF US LEAVE HOME FOR WARM CLEAR WATER, SUN-SPLASHED BEACHES AND THE LURE OF A GREAT ADVENTURE. BUT IT'S THE CORAL REEFS IN THESE LOCATIONS THAT DELIVER THE MAIN ATTRACTION – SLIPPING INTO THOSE WARM WATERS BRINGS A DOMAIN OF SYMMETRY AND WONDER LIKE NO OTHER. THERE'S TOWERING ARCHWAYS, COLONNADES, BOULDERS, BRILLIANT SOFT CORALS, STAGHORN GROVES, CONVOLUTED HARD CORAL DOMES AND DEEPER TREASURES.

CORAL COLLAGE



Montipora amplitata.

In 1723 naturalist Jean Andre Peyssonel proposed to the French Academy of Science that corals were animals. His view was so derided he eventually abandoned his scientific work but he's since been proven correct and modern study has shown there are two distinct types of animals – reef building corals and non reef building corals.

In a coral reef where nourishment and shelter are plentiful, living creatures of many colours, compositions and sizes thrive. From the tiny planktonic organisms from which the reef obtains nourishment to the large reef dwellers like the manta ray and shark. Geographic coral distribution depends upon water temperature. Those most favourable to

vigorous growth range from 23° C (75° F) to 29° C (85° F) which limits most reefs to the subtropics and tropical zones. Reef formation itself occurs through the breakdown of coral by the action of waves, plus boring and scraping animals. Fragmented coral and sand are compacted into a rock base, which comprises 90-98% of the reef. Coral colonies secrete a hard skeleton of calcium carbonate (limestone) that protects the coral polyp. Each polyp lives in a skeletal cup or calyx. It can 'hide' in this when threatened or when inactive. As a colony grows, new skeletal material is formed on top of the old. Living corals form only a thin veneer over the dead coral. The architects of this industrious community are small animals that construct their cup-shaped calyxes on top

of their departed ancestors, forming living sculptures. One or several rows of tentacles surround each opening in multiples of six. Corals have living within themselves small plant-like cells or *zooxanthella* and since these organisms require light in order to live, reef corals are generally found in water depths of less than 30 metres (100 feet). All coral reefs were and are built by infinite ratios of animals climbing towards the sun. A stony alga helps to firm the structure. Some corals grow into very large colonies while others live a solitary existence such as the Fungias. There are basically four types of reefs:

FRINGING: Commonly found around elevated tropical islands.
PLATFORM: Large raised areas of reef often found in shallow seas.

BARRIER: Generally developed around continental landmasses, such as Australia's Great Barrier.

CORAL ATOLLS: Usually recognised as tropical islands in the Pacific and the Maldives in the Indian Ocean.

Coral reefs are among some of the richest and most complex ecosystems in the world and the living reef is composed of tiny fragile animals or coral polyps.

The stony corals *Scleratinia* belong to the large and varied phylum of coelenterates – simple multi-cellular animals which include sea anemones, jellyfish and hydroids which have tentacles with stinging cells and a single opening in the body through which food and waste passes. Hard coral's primary

source of food comes from microscopic algae, zooxanthella in their tissues, which convert sunlight into nutrients via photosynthesis. Corals also feed on tiny planktonic animals using their tentacles containing stinging cells or nematocysts that are shot out to capture prey. Those without tentacles use their body mucus to catch plankton and bacteria.

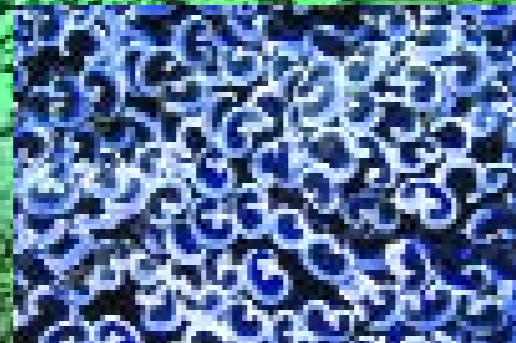
There are many coral species, some very similar in appearance and form. Common varieties encountered are Acropora or staghorn. This important reef builder is the largest genus and extremely widespread. They can be fast growing – 10 centimetres plus a year – and growth form varies from species to species in different habitats. Encrusting and branching forms may even be the

same species; colonies can be tiny clumps or up to 1.2 metres high and tabular forms can be 2 metres or more across. *Montipora*, which is related, is usually found growing as leafy plates and as an irregular encrusting form.

Swimming over a reef flat or a coral terrace you'll come across brown and pink clusters of the bush coral *Pocillopora*. Nearby a stubby clump of the purple *Stylophora*. Small dense thickets of the needle coral *Seriatopora* often have tiny female crabs living in a gall chamber. *Porites* can be found as a micro-atoll on a reef flat, a branching form, or as a massive spherical structure up to 10 metres high and these can be at least 1,000 years old. One coral that extends its polyps during the day is the



Tubipora musica.



Euphyllia ancora (Credit - Jean Deas)



A small gorgonian crab *Xenocarcinus depressus* on a *Melithaea* species of seafan



Goniastrea sp. (Credit - Jean Deas)



Pavona minuta



A shallow scene with a number of different species.



The world's oldest coral reef is said to be 530 million years old and can be found in South Australia. In Derbyshire and southwest England, outcrops of ancient reef can be found, showing that these areas were much warmer than they are today.

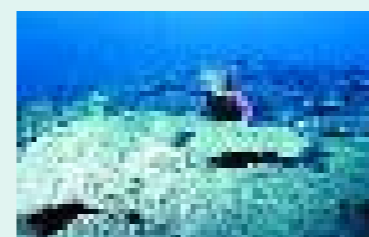
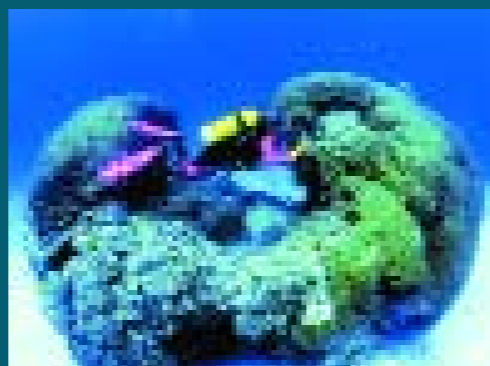


anemone coral *Goniopora* another is the dome shaped bubble coral *Euphyllia*.

There's a number of creatures called brain corals in domed forms, though the genus can also be flat and encrusting – *Favia*, *Favities*, *Goniastrea*, *Platygyra*, *Leptoria*, *Oulophyllia* and *Monastrea*. *Pavonia* can be found in delicately sculptured forms or as massive colonies. The majority of the genus *Fungia*, commonly called mushroom corals, are abundant and widespread on fringing reefs slopes usually below the wave action. They are attached by a stalk to the substrate as juveniles but eventually become detached and live free usually on rubble substrates and are prevalent on the slopes of fringing reefs.



Soft corals and seafans are common name for species scientifically grouped under *Alcyonacea* and do not build



reefs. Their polyps have eight tentacles, hence their name 'octocorals'. Many are found in both warm and cold water environments in shallow and deep locations. They're usually slow growers and lack a solid calcium carbonate skeleton. However, some do contain a form of skeletal pieces called sclerites, often called spicules, which provide some support and can be used to identify the coral.

There are however, some that don't fit the soft coral term such the blue coral, *Heliopora coerulea* and the organ pipe coral *Tubipora musica*. Blue coral has an internal sky-blue skeleton and the organ pipe has upright red-coloured calcium carbonate tubes joined together.

The hydrozoan *Millepora* is important in reef building, distinguished from the stony *Scleractinian* corals by the tiny microscopic pores on its smooth surface and the lack of corallites and septa. Divers who come into contact with it will remember it – its extended hair-like tentacles deliver a powerful and burning sensation when brushed against! It's common names are stinging coral and fire coral.

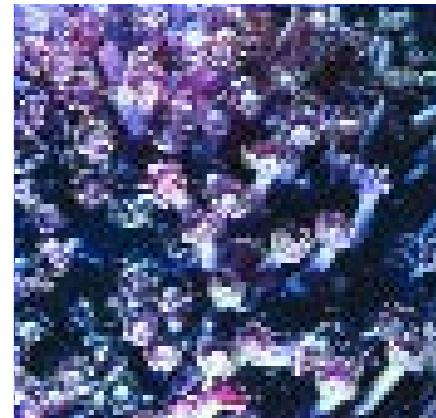
Soft corals are colonial growths, at times colourful and showing a tuber lobed or mushroom shape. Seafans or gorgonians form erect branched or unbranched colonies. They have an axial skeleton of a horny material which is covered by a softer sheath of tissue in which the polyps are imbedded and are usually coloured red, orange or yellow.

The corals mentioned briefly here are a fraction of the many species found worldwide. Coral reefs vary in size, form and type and all are extremely biologically rich – they are the marine equivalent of a tropical rainforest. For centuries these reefs have been bountiful providers of food and shells as a source of currency.

Reefs have been exploited commercially for trochus shell, beche-de-mer (sea cucumber) and fish. Today the biggest impact on many reefs is human over-exploitation – shells, coral, turtle by-products for sale to tourists. Then add overfishing, varied pollution, dynamiting to collect fish, plus the impact of tourism.

But we should do our homework. Tourism is increasingly a major income earner to small island nations and communities which adds significantly to their economies. We, as divers, should assume a degree of responsibility to protect coral reefs everywhere. Good operating and diving techniques are essential to avoid unnecessary damage.

Divers, take care not to destroy the very resource that attracts visitors like you. Take photographs – not coral.



Left, top to bottom -
 • *Stylophora pistillata*
 • *Sarcophyton* sp. Soft Coral
 • *Millepora dichotoma*
 • *Pocillopora edouxi*
 • *Symphyllia* close-up (Credit- Jean Deas)

Right -
 • *Fungia (Fungia) fungites*
 • Brain corals are among the most massive and slow growing of corals (Credit - Jean Deas).
 • *Acropora grandis*.
 • The shapes of hard corals are infinitely variable. Here a massive *Porites lobata* juts up from the sea bed.
 • *Porites* micro-atoll growth forms on a reef flat.

Above, top to bottom -
 • *Dendronphthya* sp. soft Coral.
 • *Dendronephthya* in close-up. (Credit- Jean Deas). Soft Coral.
 • The wide table shapes of some *Acropora* corals can cover several square metres.
 • *Seriatorpora hystrix*

Above right -
 • *Goniopora* sp.
 • *Monilpora verrucosa*