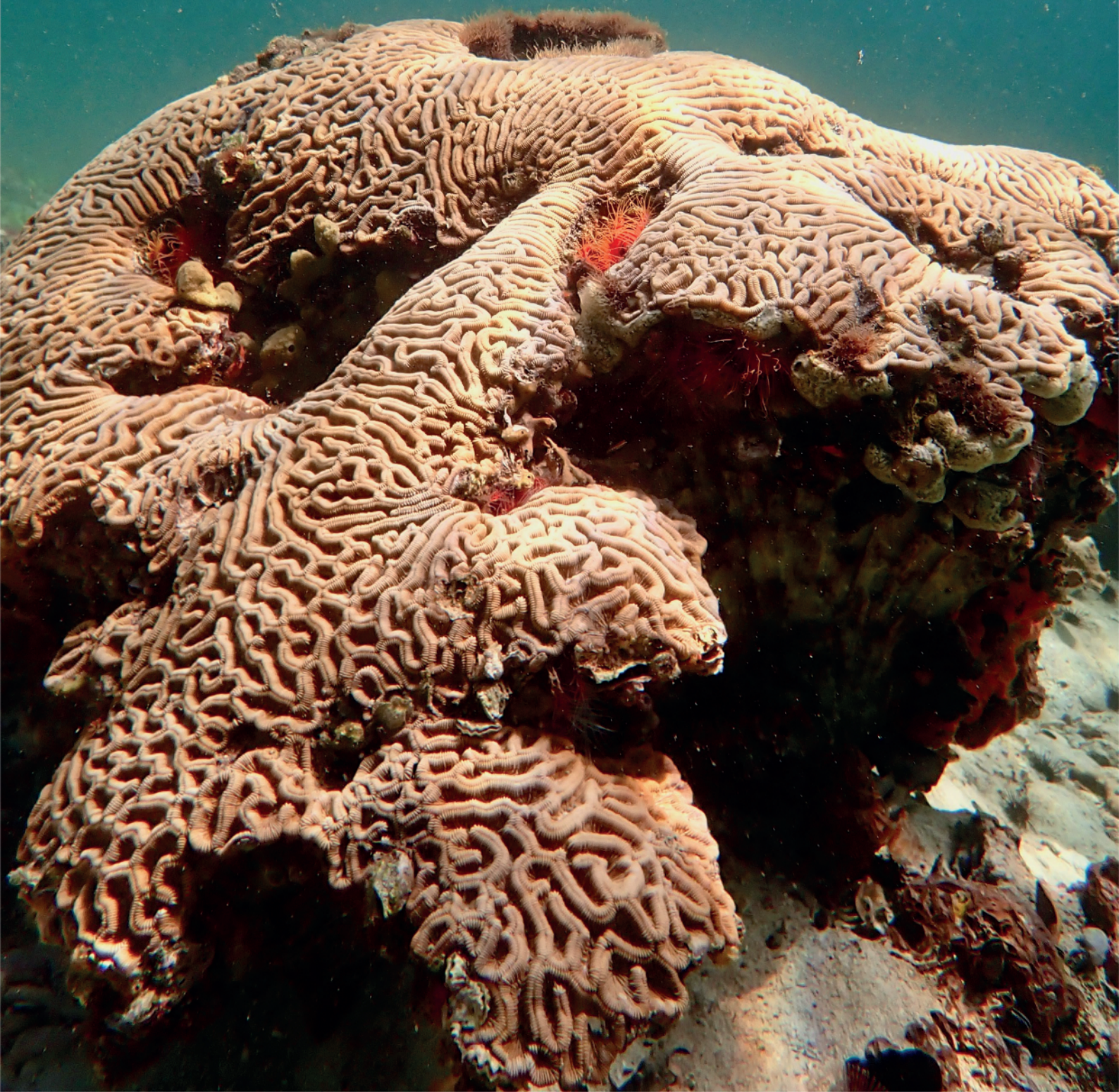
COCOVIVO
BOCAS DEL TORO, PANAMA

cocovivo reef guide

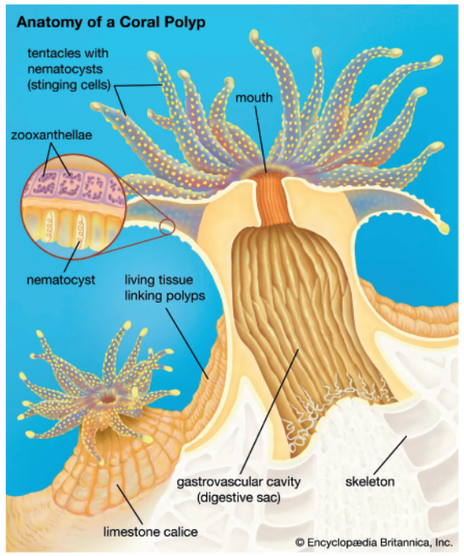
Isla San Cristóbal, Panamá



What are corals?

Discover the world underwater

Corals are extraordinary marine organisms that form the basis of the most biodiverse ecosystems in our oceans. Despite their often mistaken identity as rocks or plants, corals are, in fact, colonies of tiny animals called polyps with tentacles surrounding a central mouth and a soft body. As individual coral polyps grow and reproduce asexually, they create colonies. Over time, as these colonies of corals expand and fuse together, they form large, intricate structures known as coral reefs.



To protect their soft bodies, coral polyps secrete a hard, calcium carbonate exoskeleton (so it's not completely wrong to say that corals are rocks – after all they create limestone or more precisely Aragonite!). This process is continuous, resulting in the gradual growth of the exoskeleton over time.

This exoskeleton forms the backbone of coral reefs. Through its complex 3-dimensional structure it provides habitats for an immense variety of marine life, serving as nurseries for fish and other organisms (If you join us for a night snorkel try and shine your dive light in the nooks and crannies of the reef, you'll be surprised to see who and what is hiding in there). It is estimated that coral reefs support roughly 25% of all marine species, despite covering only 0.2% of the ocean floor surface. As such, they support more species per unit area than any other ecosystem in the world, more even than the Amazon rainforest!

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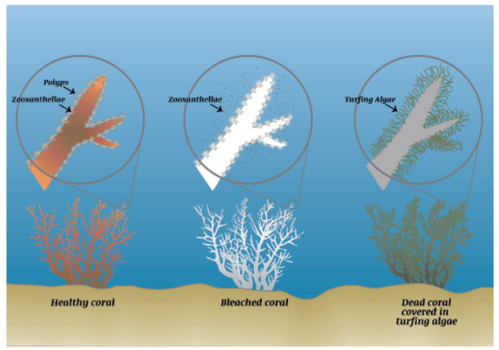
HOW DO CORALS FEED?

Most corals are equipped with specialized cells called nematocysts or cnidocytes on their tentacles. These cells contain stinging structures that help capture prey. Corals extend their tentacles to catch small organisms, such as plankton and other microscopic particles, floating in the water. This process is known as filter feeding. Some coral species are even capable of actively capturing larger prey, such as small fish or invertebrates. Additionally, corals absorb dissolved organic matter directly from the water column.

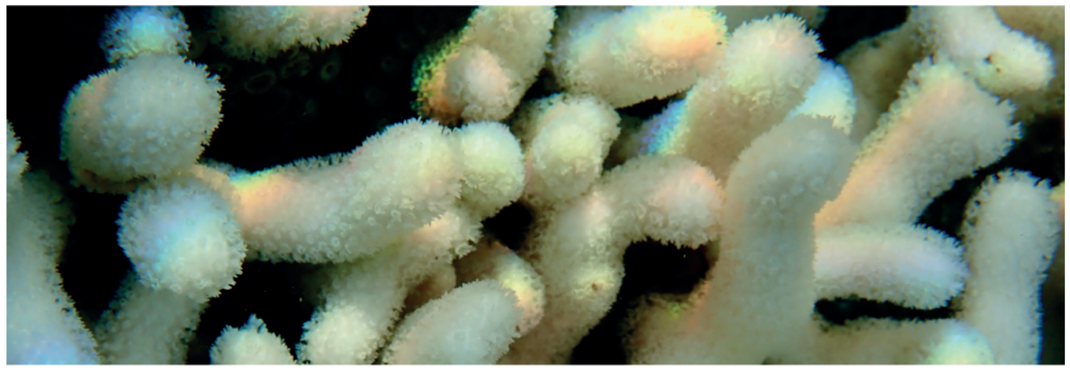
However, more than 90% of a coral's nutritional intake stems from their symbiotic relationship with tiny photosynthetic algae known as zooxanthellae (so yes, in a way corals are plants too!). The algae reside within the coral tissues, providing essential organic nutrients through photosynthesis, while the coral offers a protected environment and inorganic nutrients necessary for photosynthesis. This mutualistic partnership has allowed corals to thrive in the nutrient-poor water of the tropics, and is also responsible for the vibrant colors seen in healthy coral reefs.

WHAT IS CORAL BLEACHING?

Coral bleaching is a phenomenon where corals lose their vibrant colors due to the expulsion of symbiotic algae from the coral's tissue cells, thus exposing the white skeleton. Bleaching is usually triggered by an environmental stressor: Elevated water temperatures due to marine heat waves are the most important cause, but pollution, for example through fertilizer run-off, can also result in algae loss. Elevated sea surface temperatures due to marine heat waves are the most important bleaching cause and affect reefs globally. Locally, pollution caused by for example fertilizer run-off from industrial agriculture can also result in algae loss.



While the overall projections for corals on this planet beyond the turn of the century are gloomy, tentative hope stems from the observations that some coral colonies that have undergone bleaching in the past, now exhibit a vastly increased tolerance to thermal stress. This suggests that some corals are more resilient than previously thought and might be able to adapt to higher temperatures.



What corals can you find at **Cocovivo**?

FINGER CORAL - *porites spp*

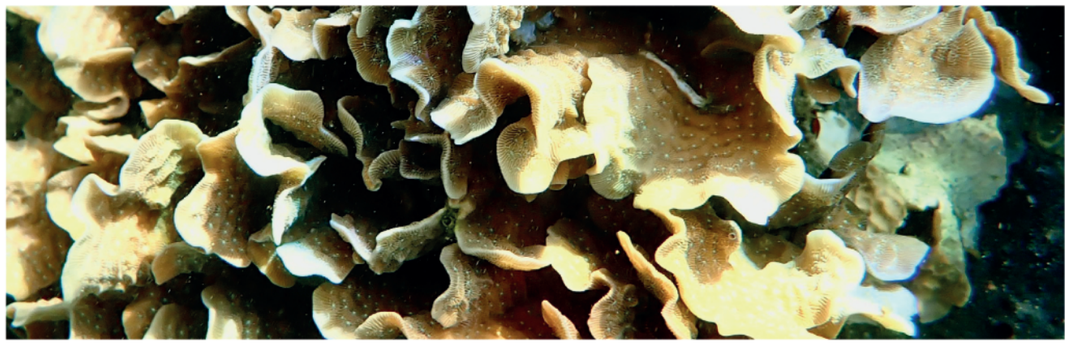
The shallow areas of the reef are dominated by Finger coral (Porites spp.), which is one of the few hard corals that have their polyp tentacles extended during the day (most corals only feed at night).

finger coral – *porites spp*

mat zoanthid *zoanthus pulchellus*

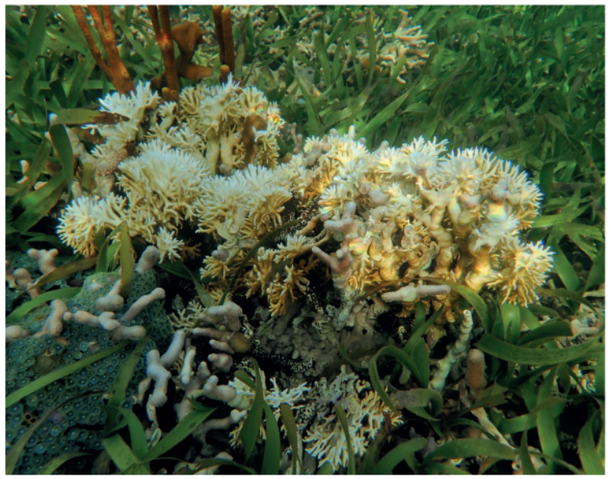
THIN LEAF LETTUCE CORAL - *agaricia tenuifolia*

The second most common hard coral species is Thin Leaf Lettuce coral (Agaricia tenuifolia). This species produces fluorescent proteins that act as sunblock for the coral and its algal symbionts by absorbing harmful UV-radiation. At night this makes these corals light up in fluorescent green when you shine a UV-light at them (we have one here at Cocovivo, you can ask for it if you go snorkeling at night to see for yourself!).

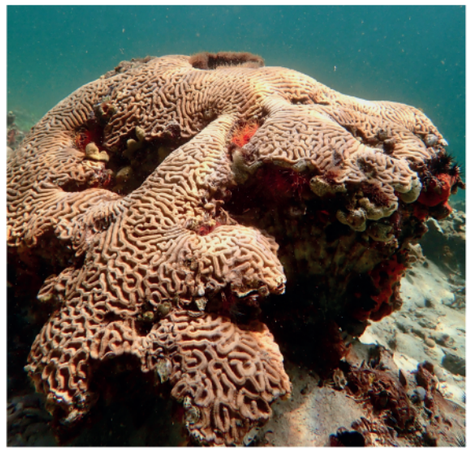


BRANCHING FIRE CORAL - *millepora alcicornis*

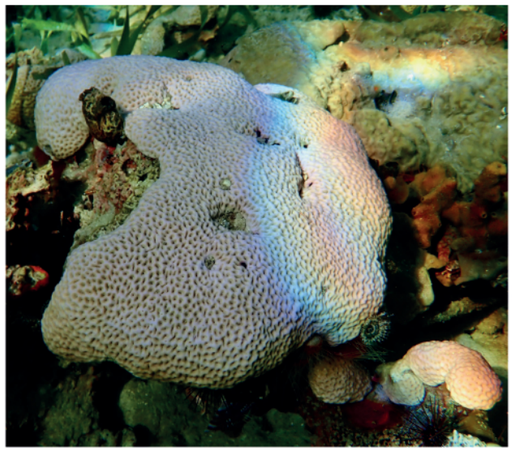
There are also some Branching Fire Coral (Millepora alcicornis), but we have only detected one adult colony so far (let us know if you see another one!). At slightly bigger depths you'll also find Massive Starlet Coral (Siderastrea sidereal) and Boulder Brain coral (Colphophyllia natans), which can be the preferred daytime hiding place for nocturnal animals like the Caribeean Reef Octopus.



branching fire coral



boulder brain coral



massive starlet coral

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What else will you see here?

OTHER CNIDARIANS

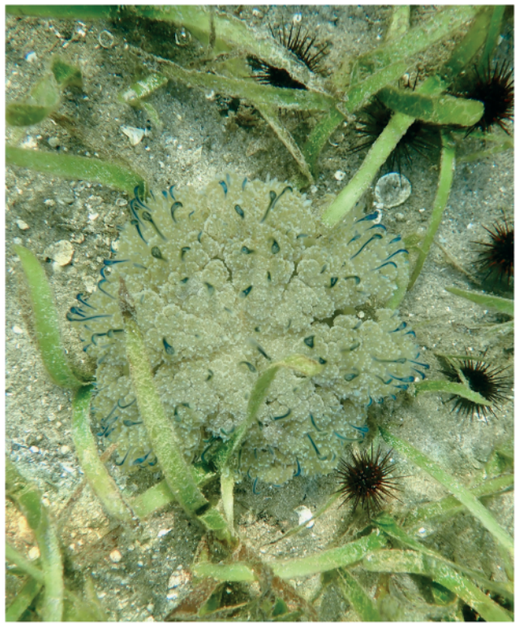
Hard corals belong to phylum Cnidarians, just like jellyfish, anemones and soft corals (corals that do not produce a calcium carbonate skeleton). In fact the most important substrate category here alongside reef-building corals are mat zoanthids (Zoanthus pulchellus), which grow on deceased coral and other available hard substrate. Like corals, zoanthids are colonial organisms, meaning they form colonies consisting of numerous individual polyps. Each polyp has a cylindrical body with a central mouth surrounded by tentacles.

An important difference to reef-building corals is that zoanthids do not produce an exoskeleton. This can give them a competitive advantage over corals, which must divert energy into the calcification of their skeleton, especially when corals are already compromised by ocean acidification or bleaching. Other cnidarian species at Cocovivo include the Giant Caribbean Anemone (Condylactis gigantea), Moon jellyfish (Aurelia aurita) and the Upside-down jellyfish.

magnificent feather duster worm

cushion starfish

disco clam



upside down jelly

SPONGES

YOU'LL FIND A GREAT VARIETY OF SPONGES AT THE COCOVIVO REEF

Sponges are filter feeders, meaning they filter and extract organic particles, bacteria, and detritus from the water column. This helps maintain water quality by reducing particulate matter and preventing the buildup of organic material. Sponges are also an essential part of the reef nutrient (re)cycling system. Some sponges' filter cells (choanocytes) divide up to every 5 to 6 hours, representing the fastest cell cycle found in any multicellular organism to date.

This rapid cell production is counterbalanced by massive shedding of old filter cells as particulate organic matter (detritus) into the water column, making it available to other reef fauna. Thus, sponges help transfer the ubiquitous organic matter to higher trophic levels in the coral reef ecosystem.

SPONGES COME IN ALL COLOURS AND SHAPES IMAGINABLE AND THUS ADD STRUCTURAL COMPLEXITY TO THE REEF ECOSYSTEM.

SEA URCHINS

Sea Urchings play an important role in keeping coral reefs healthy. They are herbivores, primarily feeding on macroalgae (not to be mistaken with the symbiotic algae living in the coral tissue!). Excessive algal growth can be detrimental to corals, as it competes with corals for space and resources. Through their grazing activities sea urchins keep algal populations in check and prevent them from outcompeting corals, thus maintaining the ecological balance of the reef . Sea urchins also indirectly support the recruitment of coral larvae. Corals require a suitable substrate for settlement, and when algae is kept in check, it creates space for coral larvae to attach and grow.

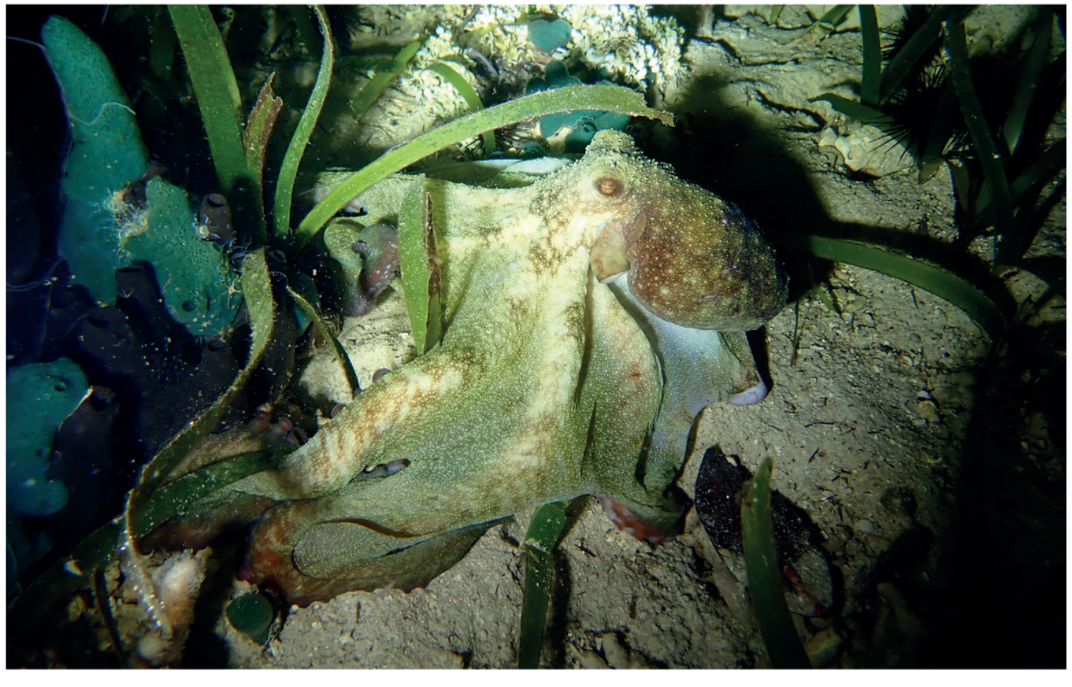
SEA PEARLS

They get their own section because everyone asks about them - sea pearls, the large shiny bulbs embedded in the reef structure, are actually a type of macroalgae!

OTHER INVERTEBRATES

Everyone's favourite aquatic animal at Cocovivo is the **Caribbean Reef octopus** (Octopus briareus). These fascinating animals are extremely intelligent (they have 9 brains after all!), are masterful shapeshifters and live only for 12 months. Adult octopuses die soon after mating and the offspring matures without parental guidance. They are nocturnal animals, which means you'll have the best chance of spotting one if you go snorkeling at night. Other beloved invertebrates at Cocovivo include the Magnificent feather duster worm, the cushion starfish and disco clams.

GO SNORKELING AT NIGHT TO SEE THEM!

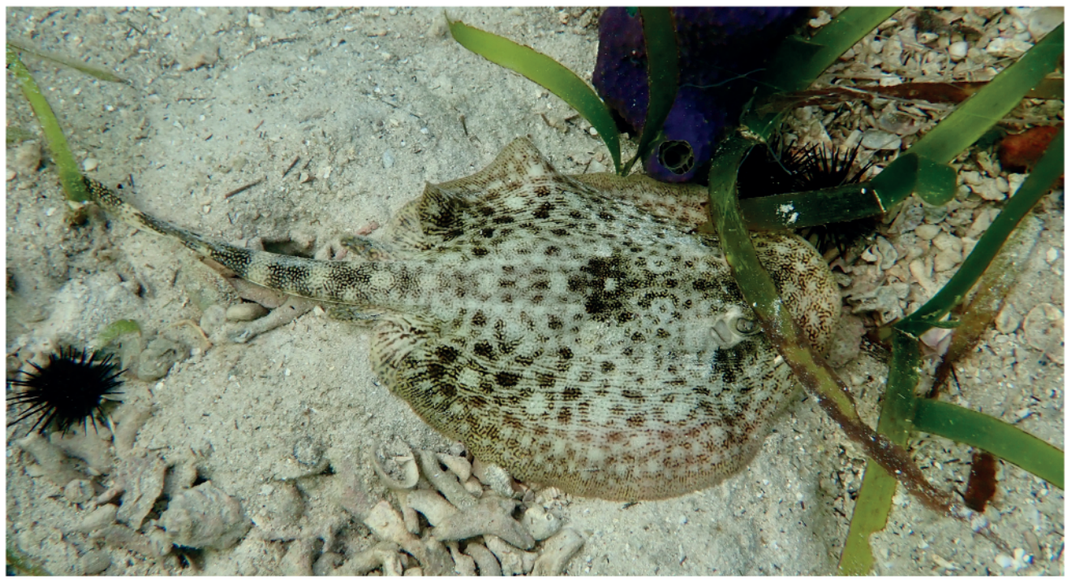


RAYS

Rays are not permanent residents of the reef, they'll stop by occasionally to feed or visit the cleaning station, a location where large-bodied marine species congregate to be cleaned by smaller creatures.

caribbean whiptail

Some of the species spotted here include the Caribbean whiptail stingray, the yellow stingray.



yellow stingray

THEY COMMONLY LIVE NEAR MANGROVE LAGOONS.

caribbean whiptail

YOU'LL SEE A GREAT VARIETY OF FISH HERE

FISH

SOME **25 SPECIES** HAVE BEEN IDENTIFIED WITH PHOTOS SO FAR BUT THERE ARE PROBABLY MORE.

foureye butterflyfish

schoolmaster snapper

white grunt

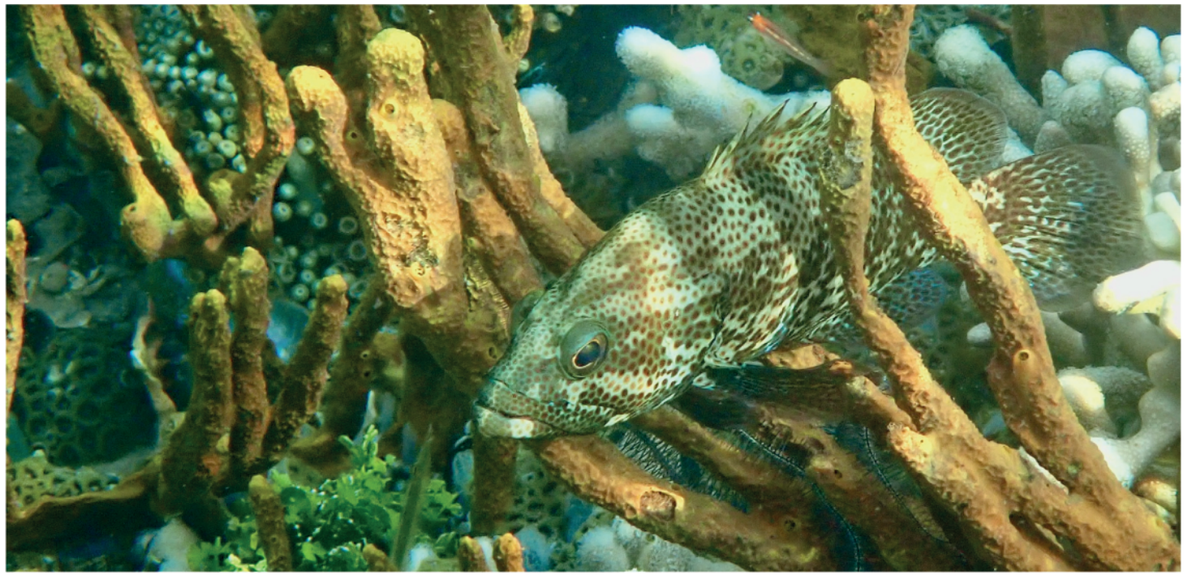
SCRAWLED COWFISH

THESE COWFISH ARE GENERALLY YELLOWISH TO OLIVE GREEN, WITH DARK BLUE TO VIBRANT BLUE SCRAWLING PATTERNS AND DARK SPOTS OR SPLOTCHES. THEY HAVE 'HORNS' OVER THEIR PROMINENT EYES, AND A SLOPED PROFILE TO A PUCKERED MOUTH, GIVING THEM THEIR COWFISH NAME.

leather jacket

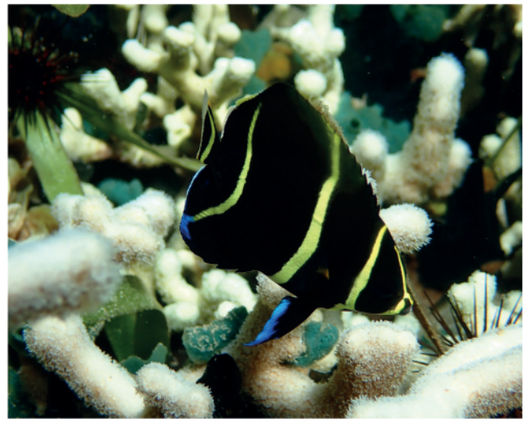
black hamlet

striped parrotfish



graysby

gray angelfish



juvenile gray angelfish

sergeant major

dog snapper

flat needlefish

atlantic spadefish

giant barracuda

great barracuda juvenile

barred hamlet

white grunt

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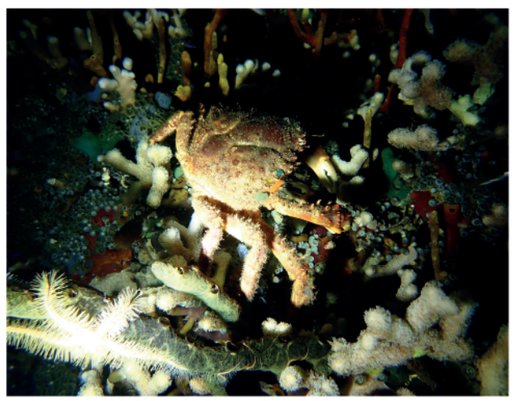
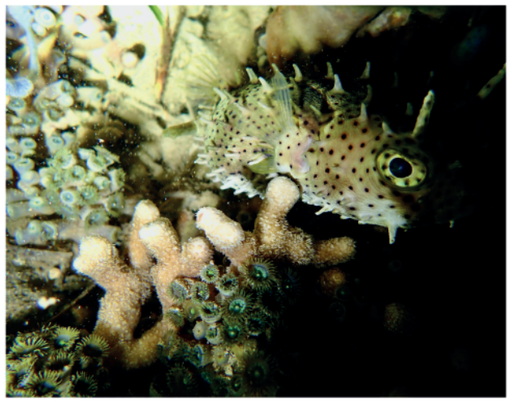
IT'S A GOOD IDEA TO DO SNORKEL AT NIGHT!

bridled burrfish

IF YOU TURN OFF THE LIGHTS YOU CAN SEE BIOLUMINESCENCE



caribbean king crab



bridled burrfish

WHAT CAN YOU DO TO HELP PROTECT THE REEF?

- **Don't Touch the Coral**: Remember, coral is a living organism. Please avoid touching, stepping on, or picking up coral while snorkeling or diving. Even a small touch can harm these delicate creatures.

- **Choose Reef-Safe Sunscreen**: Protect your skin and the coral by using sunscreens without oxybenzone, octinoxate, and octocrylene. These ingredients can harm coral reefs. Look for sunscreens with zinc oxide or titanium dioxide instead (or borrow ours!).

- **Wash with Eco-Friendly Products**: In your cabin, you'll find eco-shampoos and soaps (like Dr. Bronners!). Using these helps prevent harmful chemicals from reaching the ocean. They're just as effective and much kinder to our marine friends!

- **Kayak and Paddleboard Mindfully**: While enjoying kayaking or paddleboarding, please be mindful of where you are. Avoid paddling over coral reefs to prevent accidental damage.

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Thank you for helping us keep our coral healthy and vibrant!

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