Field Guide to the Corals of Fiji

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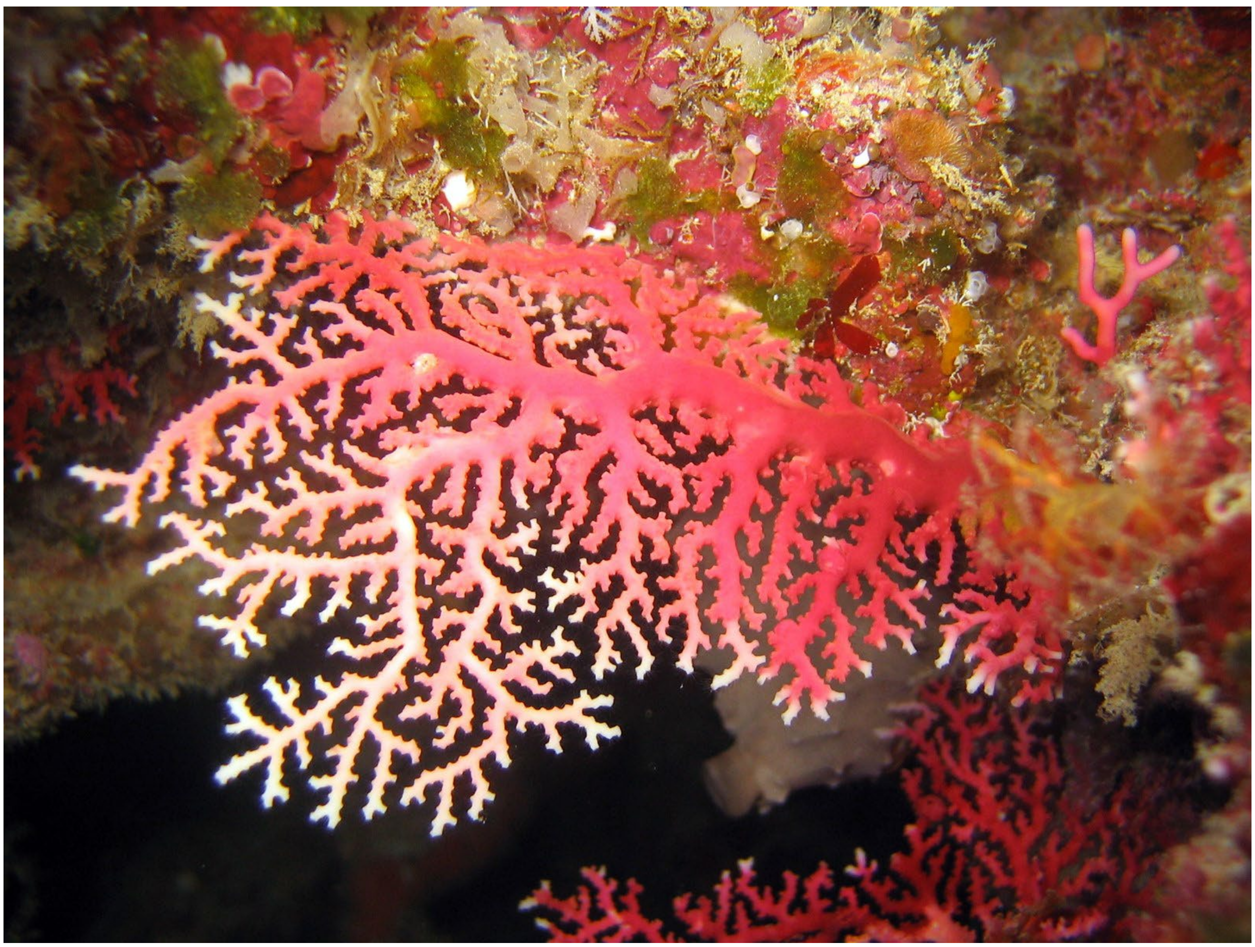
A guide to the underwater identification of 224 species of living reef corals in 62 genera that secrete hard skeletons in Fiji.



A colony of *Stylaster* sp., Fiji.

All photographs in this guide were taken in Fiji. All photos in this guide are by the author, unless stated otherwise. All species in this guide are in Fiji and look the way the corals look here. This is a first draft ID guide for Fiji. In future years I hope to photograph many more corals and add many more species to this guide. Parts of the introductory text are the same as in these other guides.

To Carden Wallace, for all you have done to advance the study of corals.

Other books by the same author:

Fenner, D. 2022. Corals of Hawai'I, 2nd Edition. Field Guide, Coral Diseases, Coral Biology, Coral Reef Ecology, Hawaiian Reefs. Mutual Publishing, Honolulu. 400 pp.

Fenner, D. 2022. Field Guide to the Corals of the Marshall Islands. MIMRA.

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Fenner, D. 2020. Field Guide to the Corals of the Commonwealth of the Northern Mariana Islands. Pdf.

Fenner, D. 2020. Field Guide to the Corals of New Caledonia. Pdf.

We stand on the shoulders of giants: this guide would not have been possible without the work of many coral taxonomists who went before me: J.E.N. "Charlie" Veron, Carden Wallace, Bert Hoeksema, Richard Randall, Francisco Nemenzo, John Wells, and Austin Lamberts to name but a few. I thank Lance Smith at NOAA Fisheries' Pacific Islands Regional Office for supporting the development of this guide.

Table of Contents

Corals are presented in the conventional taxonomic order, because it puts corals that are morphologically similar together, which facilitates learning to distinguish them. A few modifications of that order have been introduced to help put similar looking species closer together. The classification based on DNA-sequencing data is presented below this contents listing.

Corals by the New Systematics: DNA-sequencing (PCR) Phylogeny

Here, families are listed alphabetically, genera within each family are listed alphabetically, and species with each genus are listed alphabetically. The species names used are those of the new taxonomy, based on DNA sequencing. There are quite a few changes in which genera species are in and which families genera are in. The old families were based completely on morphology, and morphology had little to base families on. It was impossible to visually identify families. So it is not surprising that DNA sequencing has indicated new groupings of genera into families. What is surprising is that several genera are indicated by the DNA sequencing to be in families that are morphologically very different. So for instance, *Alveopora* which has polyps almost identical to *Goniopora*, is moved from the Poritidae to the Acroporidae to join *Acropora*, *Montipora*, *Astreopora*, *Isopora*, and *Anacropora*, none of which have polyps or skeleton like *Alveopora*. However, under the electron microscope, *Alveopora* is seen to have minute scales on its skeleton like all the other genera in Acroporidae (and a few other species in other genera and families). And, that result has now been replicated using a method that uses much more DNA. Also, the Faviidae in the Pacific and Pectinidae are no more, species in those genera have been moved into the Merulinidae. The faviids, pectinids, and merulinids are all quite different morphologically but all are now in the Merulinidae. The former *Favia* in the Pacific have been renamed *Dipsastrea*, except *Favia stelligera*, which was moved into *Goniastrea*. *Diploastrea* and *Plesiastrea* get their own families. *Montastraea* in the Pacific was divided into *Astrea*, *Phymastrea*, and *Paramontastrea*, which is not surprising, Veron has commented that it seemed to be a collection of different things. The families Mussidae and Echinophyllidae are no more, their species have been moved into a new family, the Lobophyllidae. The morphology of the species in Muissidae and Echinophylliidae are quite different. The genus *Symphyllia* is no more, all the species in *Symphyllia* have been moved into *Lobophyllia*. *Psammocora explanata* and *Coscinaraea wellsi* have been placed in *Cycloseris*, which they don't remotely resemble. *Fungia concinna* and *Fungia repanda* are moved out of *Fungia* which they closely resemble, into the genus *Lithophyllon*, which they don't remotely resemble. Several species in *Fungia* have been moved into *Pleuractis*, and several others into *Danafungia*, and one into *Lobactis*. Only one species remains in *Fungia*, *Fungia fungites*.

Learning to identify corals is less difficult when similar species are compared, and the old taxonomy based on morphology tended to group corals together that had more similar morphology. So the order that corals are presented in this guide is more similar to the old taxonomy than the new systematics. The order of families, genera, and species in the new systematics as shown below is derived from Montgomery et al (2019) which was based on WoRMS (World Register of Marine Species, marinespecies.org). It is said that convergent evolution has produced similar appearances in species that are not closely related, but so far there is no independent evidence for that for most cases with coral taxonomy.

Introduction

This field identification guide was written to help identify corals in Fiji. All the photos were taken in the Fiji, so the photos look like the corals there. Corals look different from each other on a wide range of scales from near to each other to different reefs to different archipelagoes close together to archipelagos very far apart. No species are included in this guide that are not present in Fiji, so you don't have to pick your way through many species that aren't in Fiji. This is a first version of this and so many corals that are in the Fiji are not yet in this guide, but with additional visits by the author more species will be added. The order in which genera are presented is one that has been commonly used in the past (e.g., Veron, 2000) because it tends to put species together that look similar, which hopefully aids learning to distinguish them. The order of genera and species has been modified slightly here to try to put similar-looking species close together in the order, to assist identification.

Fringing reefs typically have two major types of habitats for coral reefs and barrier reefs and atolls typically have four. All three have fore reef slopes, which are on the outside of the fringing reef, barrier reef, or atoll and slopes steeply at about a 45-degree angle down into the abyss. Another habitat that all three types of reef have is the reef flat: a flat, shallow reef area between the reef crest where the waves break and either the lagoon or the island. A habitat that only barrier reefs and atolls have is the inside slope from the island or reef flat down into the lagoon. And the fourth that barrier reefs and atolls have consists of patch reefs some of which are in the shape of pinnacles, in the lagoon. Lagoons are typically sandy bottomed and are usually between about 30 m and 100 m deep. There are often patch reefs or pinnacles in lagoons. The fore reef slope typically has wave surge that decreases with depth and may have currents at times. The reef flat has waves coming across it after they break at the crest, and anything extending above the flat may be exposed to air at extreme low tides. The reef flat on the lagoon side of islands is much more protected than the outer reef flat and thus may have different communities. The slope and patch reefs in the lagoon are protected from open ocean waves and typically have no current. The ring of reefs may have passes where the ring of coral is deeper than elsewhere. Such passes usually have strong currents as water levels outside the lagoon rise or fall with the tides. On rising tides, water rushes through passes into the lagoon, and on falling tides water rushes out. Water on the outer fore reef slope is usually very clear, while that in the lagoon may not be as clear. Each of these zones typically hosts different species of coral, and species that live on one often don't live on the others or are less common on the others. In addition, coral communities are affected by how much wave action they are exposed to. If one side of an atoll has continual heavy wave action and the other side is always calm, there may be quite different coral communities on those two sides. Depth also affects corals, probably from both decreasing light with depth, and decreasing wave surge with depth. Many coral species show some depth zonation, being most abundant at one depth and less abundant deeper or shallower than that. Some may even not be present at some depths. A few species have very wide depth ranges.

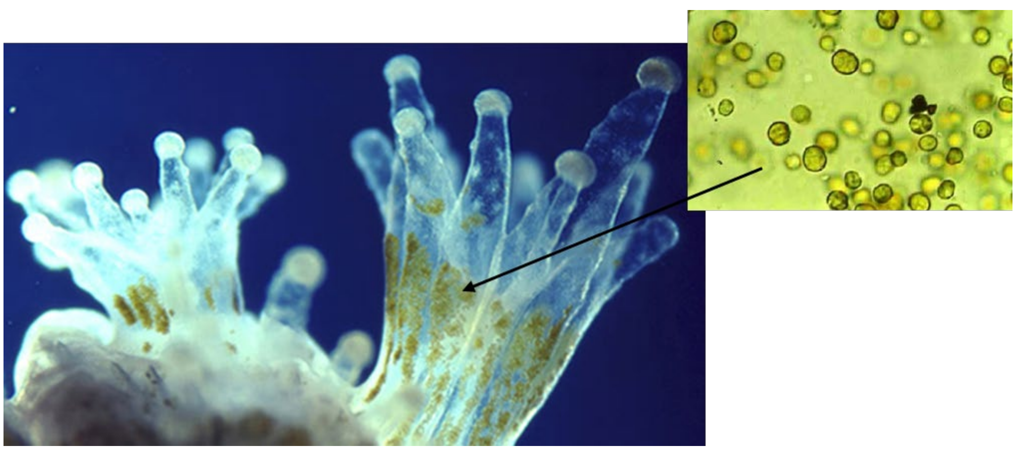
For more background information on marine environments in Fiji and on coral reef ecosystems and habitats in Fiji, see Wells, S. (1978), Lovell and McLardy (2008) and Mangubhai et al (2019). For more information on coral reefs and corals in general, see Veron (1995; 2000), Wallace (1999), Goldberg (2013) Sheppard et al (2018), Sheppard (2021) and Fenner (2022).

Coral Anatomy and Biology: what are corals? Corals 101.

Corals are animals made up of units or modules called "polyps." A polyp is a bag full of seawater, with a thin wall made of 3 layers, an outer layer of cells called the "epidermis," a middle layer of connective tissue called the "mesoglea." and an inner layer of cells called the "gastroderm." The opening of the bag is the mouth, and it is actually turned inside the opening of the bag. There is a ring of tentacles around the mouth. Each tentacle is a hollow tube much like the finger on a glove, filled with water that is continuous with the water inside of the polyp. The water-filled space inside the polyp is called the "gastrovascular cavity" because it serves the function of both a digestive cavity and a circulatory system. Polyps are very simple and lack organs like a heart, blood vessels, and a brain. The gastrovascular cavity has only one opening, the mouth, unlike the tube digestive systems of higher animals, which have two openings and can digest things in a sequence like an assembly line. Anything that is indigestible has to be spat out the mouth. The inner two layers of the body wall project in a series of curtains called "mesenteries" that extend into the gastrovasuclar cavity. Hard corals have ether six mesenteries or multiples of six, and they have as many tentacles as mesenteries. Usually they have multiples of six. Coral polyps vary in size between species, ranging from less than 1mm diameter up to as much as 30 cm diameter.

Corals and their relatives are carnivores, sit and wait predators. They have a remarkable and unique type of stinger in their tentacles, called a "nematocyst." Nematocysts are actually sub-cellular structures inside cells, secreted by the cell, and not alive. They are oval capsules, with a coiled thin tube inside them. The opening of the tube connects to the end of the capsule which touches the cell surface that is exposed to the water. When an animal touches the trigger on the surface of the cell, it provides a chemical that is only found in animals, a short polypeptide. In addition, the movement of the animal provides a mechanical stimulus. Both chemical and movement are necessary to trigger the nematocysts off. Corals and their relatives eat animals. When the nematocyst is triggered, water from the cell moves into the capsule, but the capsule is rigid and does not stretch. So the pressure goes up very high, about that of a scuba tank, the highest in any organism. There are 3 spines inside the tube which are attached to the tube and their sharp points are against the capsule where the capsule touches the cell surface that is exposed to the outside water. The pressure pushes the spines through the capsule wall, releasing the pressure, which then pushes the tube inside out, and outside the capsule and pushes the spines into the prey. The tube has many tiny spines attached inside it, initially pointing inward. As the tube turns inside out like a sock, the tiny spines are thrust out the end where the tube is being turned inside out, and stick into the prey. As the tube turns inside out, then they stick into the prey backwards, holding the tube in the prey. The spines poke into the prey and anchor the tube in the prey, and pull the tube into the prey. The tiny tube is very long, vastly longer than the capsule in which it was tightly wound up. Thus it can go well into the prey. The capsule is filled with a wide variety of nasty venoms, which attack nerve cells, blood and body cells. The end of the tube is open, so it serves as a hypodermic needle, invented by evolution probably over 500 million years ago. The prey is then pushed into the mouth and on into the gastrovasucular cavity by the tentacles. The layers of cells in the body wall have muscle cells in it which can cause the tentacles or body wall to contract. Once in the gastrovacular cavity, the food item is surrounded by the edges of the mesentery curtains, which have cells on the edge which secrete enzymes that digest the prey. The digested juice of the prey leaks out from between the mesentery edges into the gastrovascular cavity and diffuses through it, sped by body wall contractions that move the water inside it, so the juice reaches cells throughout the body wall and tentacles and feeds them.

The gastrodermis also has single algae cells in it, living inside the coral animal cells. They are called "zooxanthellae" which simply means "colored algae cells that live in animal cells." The zooxanthellae are in a group of single cells called "dinoflagellates" which when they are in water, have two flagella (hairs) that beat, one on the end of the cell, and one in a groove around the equator of the cell. When they beat, the cell swims and spins. The cells have chloroplasts in them that have chlorophyll, and can do photosynthesis in light. They also have other pigments that are red, orange or yellow, and together with green chlorophyll they always look brown. When they build glucose sugar in photosynthesis, some of it leaks out into the coral cell and feeds it. Thus, corals have two sources of food, animals they eat, and sugar from photosynthesis. The sugar is high in energy and low in nutrients, and supplies much of the coral's energy needs. The animals that corals eat are mostly small, and called "zooplankton." They provide the nutrients like nitrogen and phosphorus the coral animal cells need. The algae living inside the animal cell gets the waste products of the animal which are nutrients, fertilizer for plants. Plus, it gets a very well defended, stable spot in the sun. This is a mutualistic symbiosis, two different organisms living together, both benefitting, and it produces tight recycling of nutrients in low-nutrient water. The polyps are all connected by continuous tissue, and the gastrovascular cavities are all connected. The nervous system consists of nerve cells connected together like a net, with no brain or ganglion to control it. All the polyps behave as one connected individual coral organism. In addition, the polyps are all genetically identical and all the same sex. Thus, the colony is the individual, not the polyp. Polyps are modules within an individual.



Coral polyps on the left have tentacles. The white on the end of the tentacles and white bumps on the sides of tentacles are large cells called "nematocyst batteries" because they have many nematocysts. (Image: ocean.si.edu) The brownish green spots are zooxanthellae, seen in a microscope photo on the right. (Image: www.captivereefs.com).

Sexual maturity comes when the colony reaches a certain size, not when polyps reach full size. Eggs and sperm are produced by groups of cells which form gonads on the sides of the mesenteries. In a majority of species, the eggs and sperm are released into the water in what is called "broadcast spawning", where sperm from other colonies of the same species fertilize the eggs. The eggs and sperm are released together in egg-sperm bundles, which float to the surface and then break apart. Once the eggs are fertilized, they begin to divide and it takes about a week for them to divide enough to form a little larva, about the size of the head of a pin, called a "planula' larva. It is then capable of settling if it can find a suitable surface. If not, it can continue to float in the water. Over time, if they don't find a substrate, more and more die, and the last ones may live up to 100 days or so. In some places like the Great Barrier Reef, most coral species all spawn on the same night every year. The floating eggs are so numerous there they can form slicks on the surface so large they can be seen by aircraft. Most larvae probably don't go very far, with fewer and fewer going farther and farther with the currents. In other coral species the eggs are retained in the parent and sperm released, and sperm enter through the mouth to fertilize the eggs inside the parent. Then the egg divides and develops into a larva inside the parent, before being released. These are called "brooded larvae." Brooded larvae are able to settle immediately after being released, or they can float with the currents like other larvae. Some brooders release a few larvae every night, with more during some moon phases and times of the year. In addition, a majority of coral species are hermaphroditic, producing both eggs and sperm in one colony. A minority of species have separate sexes. Broadcast spawning and brooding are types of sexual reproduction.

When a coral planula larva settles, it then metamorphoses into a coral polyp of the same, tiny, size. The polyp then grows until it reaches a mature size. The mature size of polyps differs between species. Once the founding polyp reaches the mature size, it starts to divide. It can divide equally into two new polyps. It divides by the two polyps slowly growing and pulling away from each other. But they don't finish the job of dividing, they continue to stay attached to each other by a thin connection. So all corals start out as one tiny polyp which then grows to a mature size and divides into two. As those two grow, they reach the mature size and then they divide into 4. Then 4 into 8, 8 into 16, and so on until there may be hundreds, thousands, or millions of polyps.

Corals also can reproduce asexually, mainly by fragmentation. If something breaks a coral colony, the pieces can survive and grow if they are stable on a hard surface which they can attach to. In some relatively fragile branching species, this is the primary way they reproduce. In other, sturdier colonies, asexual reproduction by fragmentation is rare. Colonies can also have partial colony mortality which may leave islands of tissue living. In that case, as the islands of living tissue grow, they may reach each other and fuse. Only genetically identical tissue will fuse, when different colonies grow until they touch, they do not fuse. All fragments broken off of one colony are genetically identical and can be called "clone mates." Some species like staghorns form extensive thickets of these clones and are called "clonal." Branching corals like staghorns grow fast at the tip and slow on the sides. At the tip, only thin walls are secreted between corallites so the skeleton is highly porous and weak. Then with time the tissue keeps adding calcium to thicken the walls, until low on the branch not only is the branch thicker but it is nearly solid and very strong. If you think about it, leverage means that pressure near the end of the branch produces much more breaking force low on the branch than near the tip. The fact that the low part of the branch is thicker and more solid and thus much stronger, guards against breakage at the base. Thus, it appears that evolution has actually selected branching corals to resist breakage. That is probably because many fragments do not get stabilized on hard substrate and do not survive. Asexual reproduction by fragmentation can come at a high price. Mushroom corals have a few additional variations on these asexual fragmentation themes. When the larva of a mushroom coral settles, the polyp it forms, grows larger and then taller, and then the top surface with the corallte and septa starts widening beyond the stem-shaped part of the corallite. Then the tissue dissolves a crack in the skeleton under the wide top of the polyp. Then only the tissue holds the top on, and something like wave surge breaks the tissue and it falls off. That top that falls off is the shape of a mushroom coral, and grows much larger without ever attaching to anything. In the two species of "*Diaseris*" mushroom corals, the mature corallite dissolves a crack in its skeleton across the disc, and then the two halves are held together only by tissue. Something breaks the tissue and now there are two, half-disc mushroom corals which proceed to regenerate the other half and then dissolve another crack to do it all over again. As a result, those species can form large numbers of clone mate mushroom corals.

Coral polyps are very similar to sea anemone polyps, but reef building corals are usually colonial with several to many polyps, while anemones are solitary with single polyps that can, in some species, grow quite large. Reef building corals can grow large and have many polyps, and they almost always have zooxanthellae. Other corals are usually small, often solitary, don't have zooxanthellae, and live often in the dark, often in deeper water, and those that live in deep water are in very cold water and a few species live in cold polar waters. Reef building corals live only in warm, shallow water and usually live in clear water. Thus, coral reefs are all in warm, shallow water. All corals build what we call a skeleton, made of calcium carbonate. Calcium and carbonate are abundant in sea water, and actually have a higher concentration than needed to precipitate (but precipitate slowly). Corals take calcium carbonate out of the water and secrete it beneath themselves in a single structure that is external, underneath the living polyps, and not alive. So it is different from our skeleton, which have many separate pieces which are inside and have cells in them and are alive (and our skeletons are made of a complex phosphate compound, "hydroxyapatite"). Calcium carbonate can exist in at least two solid forms, one called "calcite" which forms thick crystals, and another called "aragonite" which forms long thin fiber-like crystals. Corals only build aragonite skeletons. After the larva settles on a surface, it secretes skeleton that is cemented to the substrate. Most coral species are firmly attached to hard substrate, but a few are not. Because the skeleton is not alive, it doesn't matter if other organisms like sponges burrow in the skeleton. As long as it doesn't break, it makes no difference to the living coral which is only on the surface of the skeleton. Each polyp sits in a cup in the skeleton called a "corallite." The inside surface of the cup has walls of skeleton that project into the cup and are called "sclerosepta" with "sclero" meaning hard and "septa" means walls. The corallite shape fits very closely to the polyp and reflects all the fine details of the polyp size and shape. The skeleton is much more permanent than the polyp and can retain its shape indefinitely out of water in a museum, and so is used for identification and taxonomy. All the taxonomy with only one exception is based on the skeleton shape. The irony is that a species is a group of living organisms, but we define coral species based on their skeletons, which are not alive. Both the shapes of colonies and the fine details of the corallites and other details of the skeleton, usually observed under a microscope, are used to separate species. Identification of living corals is not definitive, it requires confirmation by examining skeleton. Living corals in the water have some advantages for studying species, since you can see the whole colonies instead of pieces in a museum, and you can see large numbers of colonies, and it is non-destructive. Skeletons in a museum have the advantage that living tissues are not in the way of you seeing the skeleton details, and you can use a microscope, and you can see the same skeletons other people see.

There are a few general things about coral morphology that may be of help to you as you go along. The main unit in coral morphology is the polyp, and the corresponding cup in the skeleton which a polyp sits in. The cup in which a polyp sits is called a "corallite" and includes both the inside and the outside surfaces of the cup. The inside of the cup is called a "calice." There are walls that extend from the inside wall of a corallite into the central space of the corallite, which are called "septa." Each corallite has at least six septa. Septa come in sets, the first set having six septa, the second set also having six which are between the first set of six and usually smaller than the first set of six. The third set is 12 and is in between the existing 12 septa, the next set is 24, etc. In the center of the corallite there is a small structure called a “columella” which may be a single solid column or more often many small columns, or curving, twisted columns. The septa commonly extend up over the rim of the corallite and down the outside surface of the corallite, where they are called costae (costa is singular). Septa and costae may have teeth or granules on the edge and granules on their sides. Corallites can come in many different sizes and shapes. They range in size from about 0.5 mm to about 30 cm diameter. Some are circular, others oval, some quite elongated. Each elongated corallite corresponds to an elongated polyp which has several or many mouths but shares a single gastrovascular cavity. The corallite walls in that case are elongated and usually meander, forming a “meandroid” coral, commonly called a “brain coral.” There are many other details.

Coral Identification

Coral species are notoriously difficult to identify. Coral identification and taxonomy are not for the faint hearted. You need all the help you can get. We all do. The purpose of this identification guide is to help you to learn to identify coral species you see in Fiji. This is a preliminary version of the guide, as the author gets more time underwater and finds and photographs more corals, more species will be added. The goal is to present photographs of the corals taken in the Fiji and have clear and helpful text that points out the features of the corals that can help in identification and how each species differs from others. One of the advantages of a pdf is that it can easily be updated as often as desired. Another is that photographs can fill the whole screen. The larger the photographs, the better you can see the corals that you are trying to identify. This guide attempts to show both pictures of the whole colony shape, and of close-ups of the corals, and some of the variation between corals. There are valuable identification clues in both the colony shapes and in the features of the corallites and areas in between corallites. You need to be able to see as many of these features as possible to help you identify the corals you see.

At any one reef, only a portion of Fiji's coral fauna will be present, and an even smaller portion of that fauna will be common enough that you encounter it frequently. The more often you see a coral, the more chance you have to practice your identification skills. The author recommends looking at the guide as often as possible, including before you get in the water. Then it is good to look again after you get out of the water. Going between the guide and looking underwater, back and forth, is one of the best ways to learn coral species. You will see corals in the water that don't fit well with the species in this guide. You will also see things in the guide that you won't initially see in the water, but with more and more time in the water you will see more and more of them. The author is doing the same thing, finding more species with time spent underwater in more places, and using pictures taken to add to the guide. But a local guide has several advantages over a guide that presents all species from all over the world (such as Veron's "Corals of the World"). For one thing, many of the species in a worldwide guide aren't at your location. That means you have to look through many photos of all sorts of things that aren't on your reef. For another, not all coral species look the same everywhere. Some can look quite different in different parts of the world or on different archipelagoes. Some look virtually identical, but others don't. Most or even all of the pictures taken in a worldwide guide weren't taken in Fiji, and so many of them may look quite different than corals in Fiji. This guide helps you by only showing you coral species that are in Fiji, and only showing you photos of corals in Fiji, so the photos look as much as possible like the corals you see.

Unfortunately, there are only a few common names that have been applied to coral species consistently, and most of those apply to groups of corals. So some corals are called "staghorns" and others "table corals" and others "brain corals." But there are several staghorn species and several table coral species. In this guide, similar looking species are presented together as far as possible. Genera are presented in a traditional order, which tends to put corals that look similar together. In addition, within genera corals that appear similar are put together, so all the "staghorn corals" are together, and all the "table corals" are together, and so on. But the species are all labelled with the scientific (Latinized) names, because only those names correspond (as far as possible) to the actual biological species. Common names in widespread use are also given, but usually there are several species that have the same common name. So there is no easy way around using the scientific names.

There are two major reasons that corals are difficult to identify. The first is a naming problem, and the second is a problem of figuring out what group of organisms is the species you are studying. Names are arbitrary human inventions, while the group of organisms is something that exists in nature whether we give it a name or not. We need species names in order to be able to communicate to each other what we are talking about, but the name itself is arbitrary, any name would do, and everybody has a bfdifferent idea of what name they would like to call it. The solution is a set of rules invented by Linnaeus. You probably know some of the rules. One of the most important is that the first name correctly applied to a species is the one that is correct. This is called "priority." A second rule is that species names must have two words, the first is the genus and is capitalized, the second is the species and is not capitalized, and both are in italics. Any words can be used, from any language, but the words must be Latinized, making them look like Latin. So the word in English, "bushy", taken from a reef in the Great Barrier Reef where a coral was first discovered, was converted to Latin and became "bushyensis" and the species was named "*Acropora bushyensis*". Another rule is that the name and a description of the species must be published. The rule book does not specify where the name must be published. There are other rules, which are contained in a rulebook, "The International Code of Zoological Nomenclature" (which is available online open-access). This is in effect the rulebook for a game played by taxonomists, that is, naming species. There are a variety of problems with this, but one of the worst come from the publications that commonly are used for new species. Very few people are interested in the original descriptions of new species, mostly just other taxonomists that work on the same group of animals, and usually there are only a few of those in the whole world. No widely read journal that publishes papers that many people think are important will publish original descriptions of new species, because almost no one will be interested and read it. So almost all descriptions of new species are published in obscure little journals that almost no one reads, and almost no libraries subscribe to them, since almost no one uses them. One result is that most coral taxonomists have not read most original descriptions, primarily because they can't find copies of them. So many taxonomists have described as new species, species that were described before, sometimes many times. These are called "synonyms", when two names refer to the same species. Taxonomists occasionally write "revisions" of groups of organisms, in which they give new descriptions, and they list all the names that have been previously applied to what is now all considered one species. This requires considerable taxonomic knowledge and skill, because you have to look at lots of old descriptions to figure out which are all the same species. Yet a single species varies between individuals and locations, so original descriptions from different places are often a little different even though it is the same species, and everyone uses different words and sentences, making this a difficult task.

In addition, the rules do not specify which language must be used in original descriptions. At first, most were written in Latin, because that was the scholarly language of the time in Europe where taxonomy originated. Then they were written mostly in a variety of European modern languages, and now most are written in English. Even in English, the language has changed over time, particularly in coral taxonomy. Older publications in English use terms that they didn't define, and which we don't use now. That makes it harder even in English. I have seen an original description of a coral species that consisted of two sentences in Latin. Your Latin better be very good, the whole definition could hang on the meaning of one word in Latin.

Originally there were no samples of the new species, or photographs (photography had not been invented!) or even drawings of the new species. Then people started including drawings in their new species descriptions. The drawings were often made from a particular piece of the species, and slowly those pieces, in a museum, were taken to be "type specimens" that helped define new species. In time, photographs were added. In 2000, the rules were revised to require the description of a new species to include designating a type specimen (usually in a museum). Type specimens are extremely helpful, because if an original description leaves out something that you now think is important, you can look at the type specimen and find out what that is. Further, it is often difficult to imagine what a species looks like from a description. The saying goes that "a picture is worth a thousand words." Of course, we are handicapped by the fact that for the species that were named long ago, there are no type specimens. Another problem is that some old type specimens are in terrible shape. One that Veron has a picture of on his website (Corals of the World) looks like it was dragged behind a car on beach for a couple miles, all the surface is worn off. You can't even tell what genus it is in. This may not be quite as bad a problem as that, most type specimens are not in bad condition. Another problem is that the type specimen doesn't have to be typical of the species, and the original description doesn't either. That's in part because a wide range of samples of a species are almost never available when a new species is being described, and a large collection of samples is needed to determine the variation within the species and what is typical. At this time, for most coral species, we still don't know the range of variation over the geographical range of the species. No one can go to everywhere there are corals and sample many colonies from every site of every species. But we know they vary from site to site. So some or many type specimens may not be typical, and for most species we don't even know whether they are typical or not.

It has been said that the main job of 20th Century taxonomists was to try to clean up the mess left to them by earlier taxonomists. Much of that comes from the arbitrary naming rules, but some comes from the variability in the organisms themselves.

The second great hurdle for recognizing coral species and doing taxonomy on them, is the question of what group of individual organisms comprise a species. This is an empirical question. With some species, it is easy. For *Homo sapiens*, we have the advantage that no other human species is alive today. Our nearest living relatives, chimpanzees and bonobos, are so different from us no one would ever confuse one with a human, and many people don't believe we're related at all. If Neanderthals were alive, it would be much more difficult.

Almost all species ever named and described were named and described based on their morphology and anatomy alone. Originally, only morphology was known and could be included. Plus, morphology until recently has been the quickest and easiest thing to use to describe species. And it makes it possible to identify species in the field. About 1-2 million species of all types of life on earth have been described, but it is estimated that there are 10-30 million species on earth (and other estimates that run from 3 million to a billion; nobody really knows). After about 250 years, we may have only named and described about 10% of the organisms on earth, and we have little prospect of speeding that up substantially. It is not immediately obvious how large the anatomical differences need to be between individuals for them to be different species. There is lots of variation within some species, so something that is different might be a new species or just a variation within a species. How do you tell? Not easy. One thing is that it is helpful to have at least two different features that are different between two species, and that the two go together. So species 1 has features A and B, and species 2 has features a and b. and individuals that have A and b or a and B are rare or can't be found. Another rule of thumb is that in a single feature that has variation between individuals within a species as well as between species, the distribution of that feature (such as length or body weight) has two modes (one for each species) and at least a small gap in between with no individuals. Of course these things require a lot of knowledge about many individuals within a species. That sort of information is very rarely available when describing a new species, but sometimes is available later on when much more is known about the species. Describing new species remains a fairly intuitive thing.

For corals, the morphology that is used in coral taxonomy is the morphology of the skeleton. Originally, the only thing available to taxonomists was the skeleton. Long sailing voyages of creaky old wooden European sailboats went long distances, sometimes around the world. Along the way the crew would pick up all kinds of curiosities, sometimes including corals. Months or even years later, the ship would return to Europe, and by then the coral had long had all the tissue rot off, and only the skeleton was left. If the taxonomist was lucky, the skeleton had not been broken into many pieces or ground against other pieces as the ship rocked. In time, deliberate collecting voyages were organized, financed, and crewed with people whose purpose was to collect. Corals were usually collected by dredging, pulling a dredge behind a boat which broke many corals and gathered many broken pieces of coral. But only within the lifetime of older people living now, has it become possible to dive into the water with scuba gear and view living corals in their natural state. Pieces of coral in museums are exactly that, they are almost always just pieces, and the overall colony shapes usually can't be seen. Further, it is possible now to see large numbers of living, whole colonies underwater, many more than can be seen in museums. Plus viewing corals is non-destructive. I know one coral taxonomist who has collected over 30,000 coral specimens in his lifetime. That is still tiny compared to the hundreds of millions of colonies destroyed by a single, natural, hurricane. But still it is significant. The colony shape of corals is one of the more useful cues that can be used to identify species, but it is usually only available when they are viewed alive on a reef. So viewing corals alive on a reef has its advantages for identifying coral. One disadvantage is that viewing a living coral is ephemeral and in and of itself you usually can't show it to a variety of colleagues. Now, underwater photography fills that gap, and it is possible to show pictures of whole living colonies and close-ups of smaller features to as many people as you wish. Another disadvantage with living corals is that the skeleton on which the taxonomy and secure identification rests, cannot be seen directly, usually, because it is covered with living tissue. The living tissue obscures many of the features you need to use in identification, such as skeletal septa, spines, etc. Further, underwater you can't use a dissecting microscope, your mask fogs up, waves or currents throw you around, you have to do a lot of other things to stay safe like watch your buddy and check your dive computer and air gauge, all the while you are trying not to break coral and to handle the camera and perhaps collecting tools. So there are advantages to working on a piece of skeleton in a lab or museum as well. But it is good to remember that an identification of a coral in the water is a hypothesis, and firm identification requires examination of skeletal samples under a microscope. The present guide is not yet backed up with examination of skeleton under a microscope by the author, but that is planned for the future. Identification of living corals is guesswork, hopefully well educated guesses, which can be checked against skeleton.

Discovering or studying species requires some idea of what a species is. Darwin wrote that many scientists differ in how they define what a species is, they have an intuitive feel for what it is. By now, about 30 different definitions of species have been offered. What I was describing in the previous paragraph is something like a definition of a species based on morphology, which has been called a "morphospecies." Another famous definition is what is called the "biological species". That defines a species as a group of organisms that interbreed within the group, but not with other groups. Reproductive isolation from other species is the hallmark of a "biological species." Reproductive isolation makes sense of some major problem cases for the morphological definition of species. For instance, dogs have enormous morphological variation. The differences between many dog breeds is far greater than that between many wild species. Yet we are sure all dogs are one species. Why? Because they can interbreed freely. Humans also have lots of variation, yet all modern humans are the same species, we can all interbreed. Another problem with morphospecies is illustrated by parrotfish. There are parrotfish that were described as different species because they are different sizes and have different color patterns. But subsequently, they were seen to be interbreeding, they were different sexes of the same species. Many (but not all) species are dimorphic to some degree, with different morphology in males and females. Sexual dimorphism is an example of polymorphism. There are some species, such as some butterflies, that have multiple morphs that look different, but interbreed freely, they are the same species. So the reproductive isolation definition of species handles these problems well. Intuitively we know that reproductive isolation is a better definition of species than morphology alone. However, one problem with reproductive isolation is that it takes a LOT more time and effort to gather the information needed to define species this way than by morphology alone, and we have millions of species left to describe so we don't have the luxury of testing reproductive isolation with each new species (or most of the old species).

There are at least two other major problems with the reproductive isolation definition of species. One is that a majority of all species are extinct and we know them only through fossils. Yet we can't record in fossils which organisms interbreed with each other and which don't. All we have is morphology. Second, there are some species that don't interbreed at all. Rotifers are entirely unisexual and do not interbreed, and have not been interbreeding for about 200 million years, it is thought. Some microorganisms don't interbreed. Bacteria exchange genetic material, but that's not interbreeding in the sense we mean, and bacteria can easily exchange DNA between different species. So interbreeding isn't much help there. In zooxanthellae, interbreeding has never been observed except in the original description of *Symbiodinium*. So it is in some cases not possible to use the reproductive isolation, and in most or almost all cases it is impractical. There is one study with about 20 species of *Acropora* which spawn all on the same night on the Great Barrier Reef, where reproductive isolation was studied. All possible crosses of these species were made, and whether the crosses would produce fertilized eggs. Several were able to cross, including at least one pair of species that had nearly as high frequency of fertilization success and within species. But most did not cross, and most that did cross had fairly low fertilization success.

The newest challenger is of course genetics. It is possible now to quickly get DNA sequencing data from large numbers of samples. One problem is simply handling the enormous volume of information when more than just single genes or small stretches of DNA are sequenced. Interpretation of the results in some cases is not always clear. For many types of animals, there is a relatively small stretch of DNA that is highly variable between species. The DNA sequence in that locus is unique for each species. This is the technique called "DNA finger printing" or "bar coding." If you define a species by morphology and then sequence this locus in the DNA, then you can sequence that locus in many individuals blindly and the results are "fingerprints" or "bar codes" that can identify the species for you. Thus, for the first time, large volumes of samples and species can be separated into species groups without the laborious task of identifying based on morphology. It is easy to sequence large numbers of individuals and use the fingerprints to divide the samples into species. Then matching to databases of known species sequences, you can identify species. You can only get a species name if a taxonomist has identified a species and it has had its DNA sequence fingerprint taken. Further, you have to sample each individual you want to identify, which would be impractical for some types of ecological surveys or monitoring. For most corals, the problem is that there is not enough variation in these markers to separate species (though it may work for genera), and no one has yet found a new stretch of DNA that works. Markers that do work for species have been found for *Pocillopora* and the Agariciids. So genetic fingerprinting doesn't work with all corals at this time, but it does for some. Note that if you compare a DNA sequence pppfor an individual coral with a database, you have to assume that the specimen for which the sequence appears in the database was correctly identified. That assumption may not be warranted for corals, people without significant training in coral ID may get ID's wrong.

The main problem with morphology for corals, is that corals are so highly variable in morphology within species. There is variation at every possible level. Variation between spines in a single corallite. Variation between neighboring corallites on a single colony. Variation between regions (like top and side) of a single colony. Variations between adjacent colonies (in the same environment). Variation between colonies in different zones of the same reef. Variations between reefs, between islands within the same archipelago, between adjacent archipelagoes and between distant archipelagoes. When you're trying to tell two species apart, they both have variations at all these levels, with all the different morphological features they have, all at the same time and perhaps independently. The variation within species is large, and often the variation between species is small. Some studies have quantitatively measured many features in the same individual coral, on the order of 30 or more features, on several corallites or locations of each coral. Do that on more than a few colonies and the work quickly becomes enormous, do it on all the archipelagoes within a species range and it has never been done and may never be done because the work is way out of proportion to the value of the end product, it is too inefficient.

For more on the results of DNA sequencing of corals, see the section after "Contents" on "Corals by the New Systematics: DNA-sequencing (PCR) Phylogeny' and Kitahara et al (2016). For more on the conflict between DNA sequencing and morphology, see Losos et al (2012). For more on the problems of morphological taxonomy with corals, see Veron (1995; 2000) and Veron et al (2020).

Yet we still very much need to be able to identify corals to species in the field, for studies of ecology, monitoring, and conservation. So we struggle along, doing the best we can. My suggestion is to concentrate on enjoying the feeling of accomplishment each time you learn to identify one more species. Don't dwell on the fact that there are many to go, enjoy learning to identify coral species as you progress.

There are a few general things about coral morphology that may be of help to you as you go along. The main unit in coral morphology is the polyp, and the corresponding cup in the skeleton which a polyp sits in. The cup in which a polyp sits is called a "corallite" and includes both the inside and the outside surfaces of the cup. The inside of the cup is called a "calice." There are walls that extend from the inside wall of a corallite into the central space of the corallite, which are called "septa." Each corallite has at least six septa. Septa come in sets, the first set having six septa, the second set also having six which are between the first set of six and usually smaller than the first set of six. The third set is 12 and is in between the existing 12 septa, the next set is 24, etc. In the center of the corallite there is a small structure called a “columella” which may be a single solid column or more often many small columns, or curving, twisted columns. The septa commonly extend up over the rim of the corallite and down the outside surface of the corallite, where they are called costae (costa is singular). Septa and costae may have teeth or granules on the edge and granules on their sides. Corallites can come in many different sizes and shapes. Some are circular, others oval, some quite elongated. Each elongated corallite corresponds to an elongated polyp which has several or many mouths but shares a single gastrovascular cavity. The corallite walls in that case are elongated and usually meander, forming a “meandroid” coral, commonly called a “brain coral.” There are many other details.

Useful Terms

The descriptions often refer to "corallites." These are the skeleton cups that the polyps sit in. The word "corallite" refers to both the inside of the cup and the outside.

The descriptions also commonly refer to several different colony shapes. Here are some of the shapes:

Massive = dome shaped, rounded or hemispherical colonies without deep cracks, but can be any size.

Submassive = appear massive, but there are very deep cracks in it because it is actually branching. The polyps are only on the ends of the branches, and the cracks may not be visible. *Lobophyllia, Caulastrea, Fimbriaphyllia*.

Branching = having branches that have side branches and can go in any direction.

Columnar = having near vertical columns that don't branch or don't branch much.

Encrusting = forming a thin crust over the substrate and attached to it, with no space under the coral. Much like paint though not usually as thin as paint.

Foliose = Plate = a relatively thin, nearly flat structure that is thin and has two sides like a plate. Plates are commonly near horizontal but sometimes can be vertical.

Mushroom coral = resembles the overturned cap of a mushroom.

Staghorn = branching, with branches that look like staghorn (always in genus *Acropora*)

Table = a flat top surface held up by a pedestal which is usually under the center of the table (always in genus *Acropora*)

Digitate = branches look like fingers, without any side branches, not very long, and usually parallel, extending upward from an encrusting base (always in genus *Acropora*).

Corymbose = similar to digitate, but thinner branches, which are often growing up from larger horizontal branches (always in genus *Acropora*).

Hispidose = in the shape of a bottlebrush, with short thin branchlets radiating from a central larger branch (always in genus *Acropora*).

The identifications in this guide are primarily based on Veron (2000); Veron et al (2020); Wallace (1999); Wallace et al (2012); and Hoeksema (1989), Randall and Cheng (1984) and references therein, and type specimens and original descriptions (mostly for *Acropora*).

The words in **bold red** on the same line as the species name are the categories for endangered species. Some coral species have been listed as "threatened" under the U.S. ESA (Endangered Species Act), and some listed as "vulnerable" under the IUCN (International Union for the Conservation of Nature) Red List, (www.iucnredlist.org), and some both.

The Corals

Phylum Cnidaria

This phylum contains animals that have a very simple body with three layers of cells and no organs. The body has a mouth that leads to a gastrovascular cavity, but the mouth is the only opening to the cavity. It has a ring of tentacles around the mouth, which are extensions of the body wall. The body shape can be a polyp which has an upward facing mouth and the downward end of the body is attached to a surface, or a medusa, which is a jellyfish which is free swimming. In some classes, polyps and jellyfish (=medusa) alternate; in one (Anthozoa), only polyps are present.

Subphylum Anthozoa

This class contains animals that have only a polyp stage (no medusa stage). It has two main groups in it, those with exactly 8 tentacles (Octocorals: soft corals, gorgonians, and sea pens), and those with multiples of six tentacles (Hexacorals).

Class Zoantharia or Hexacorallia

This subclass contains animals that have six tentacles or multiples thereof: sea anemones, Scleractinia (hard corals), black corals, ceranthid anemones, zoanthids, and coralimorphs.

Order Scleractinia

This order contains animals that build calcium carbonate (aragonite) skeletons underneath themselves. In the corallites that polyps sit in, there are “sclerosepta” that are thin walls made of skeleton that project into the calice (the inside of the corallite). This includes almost all of the reef-building hard or stony corals. The reef-building corals have zooxanthellae (single-celled algae inside the coral cells), though there are almost as many scleractinian corals that don’t have zooxanthellae and live in deep, dark, and/or cold water or a few that live in shady locations on reefs. Those that have zooxanthellae are called “zooxanthellate” and those that don’t are called “azooxanthellate.” Most azooxanthellate species are small, many have only one polyp, but a couple of species that live on reefs are large enough to be reef builders (and have many polyps). Most Scleractinia are attached to a hard surface, but a few like the mushroom corals are not attached. Most reef-building Scleractinia have multiple to many polyps and corallites, but a few are solitary, with only one polyp. For those that have many polyps, the colony is the individual, and polyps are modules not individuals. In a sense a polyp could be considered an individual, but the polyps in a colony are all connected together with continuous tissue. Further, all polyps are the same sex in a colony, all are genetically identical, and their digestive systems and nervous systems are connected. They reach sexual maturity when the colony reaches a minimum size, not when polyps reach a minimum size. They function and behave as a single individual with modular units, from which a piece can break off and regrow. Polyps vary greatly in size between species from less than 1 mm diameter to as large as 30 cm diameter, and they vary greatly in shape and other details. Colonies also vary greatly in shape, which is helpful in identification.

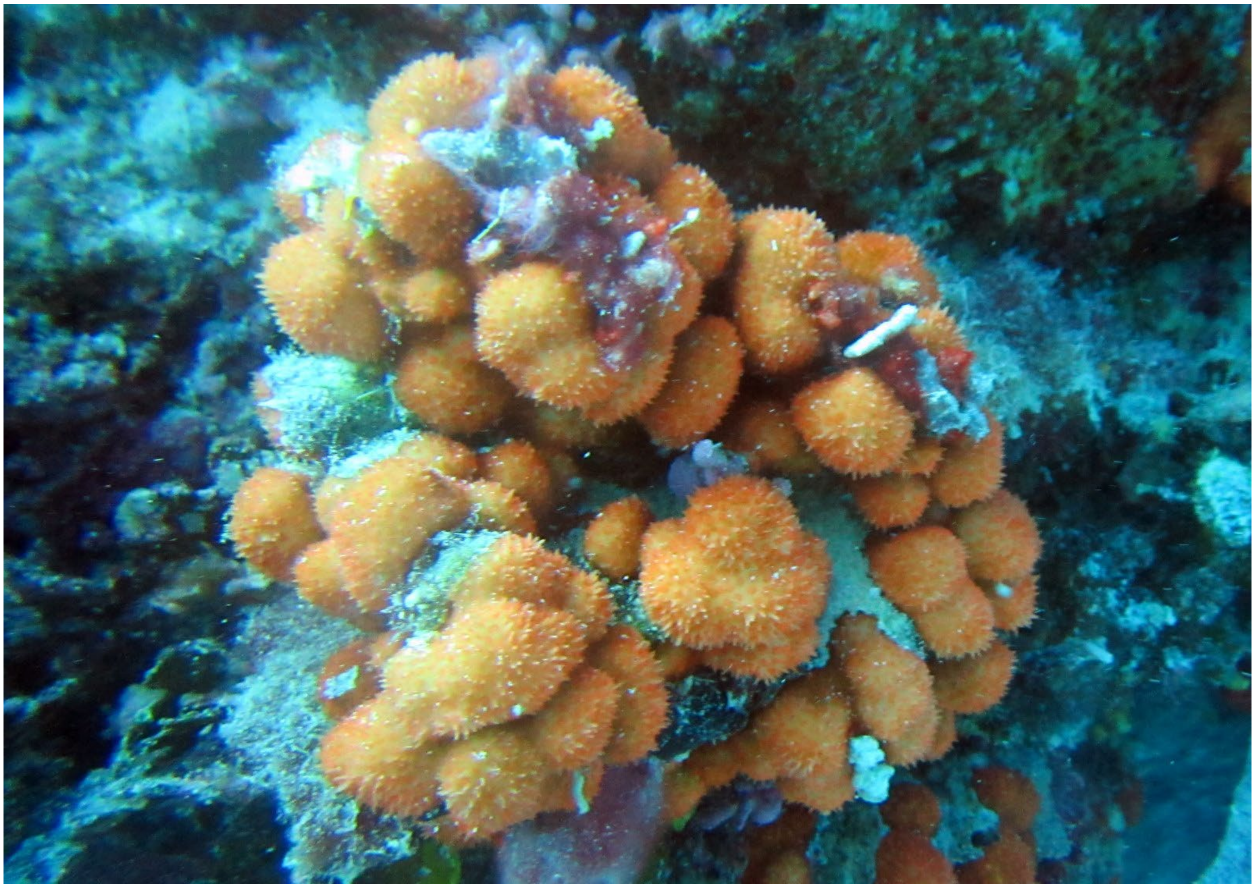
Stylocoeniella

Colonies are encrusting, and may be moderately large and lumpy, or small and smooth. Each corallite has one tiny spine next to it. *Montipora* often has similar size spines, but the surface is covered with spines.

Sylocoeniella guentheri

Colonies are encrusting and usually a foot or less in diameter. The surface usually is lumpy, though it can lack lumps. Lumps are rounded and usually about the diameter of a finger or thumb. *Stylocoeniella armata* has small encrusting colonies that do not have lumps. *Montipora* species that have spines have many more spines than *Stylocoeniella*.

A colony of *Stylocoeniella guentheri*.



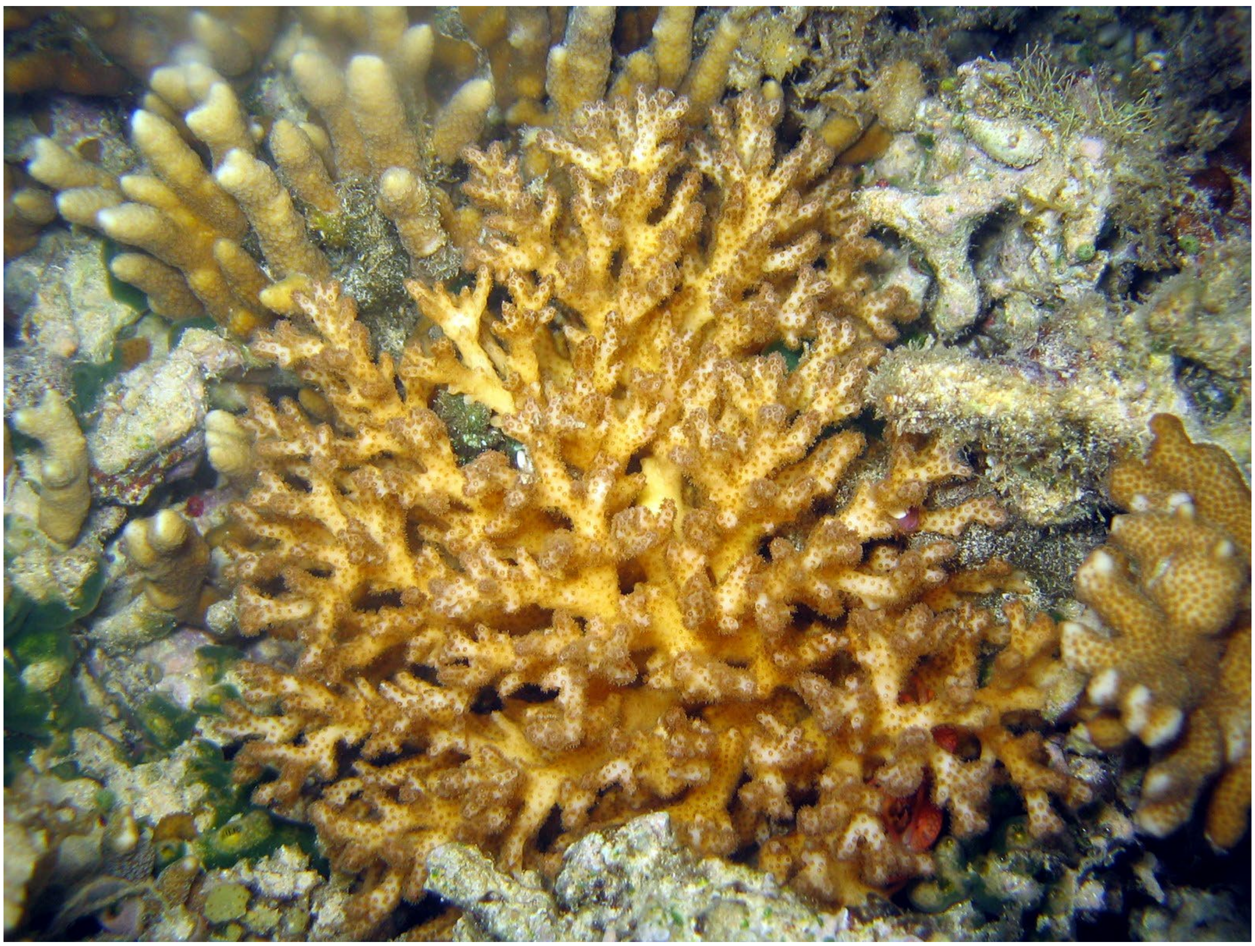
A close-up photo of *Stylocoeniella guentheri*.

Pocillopora

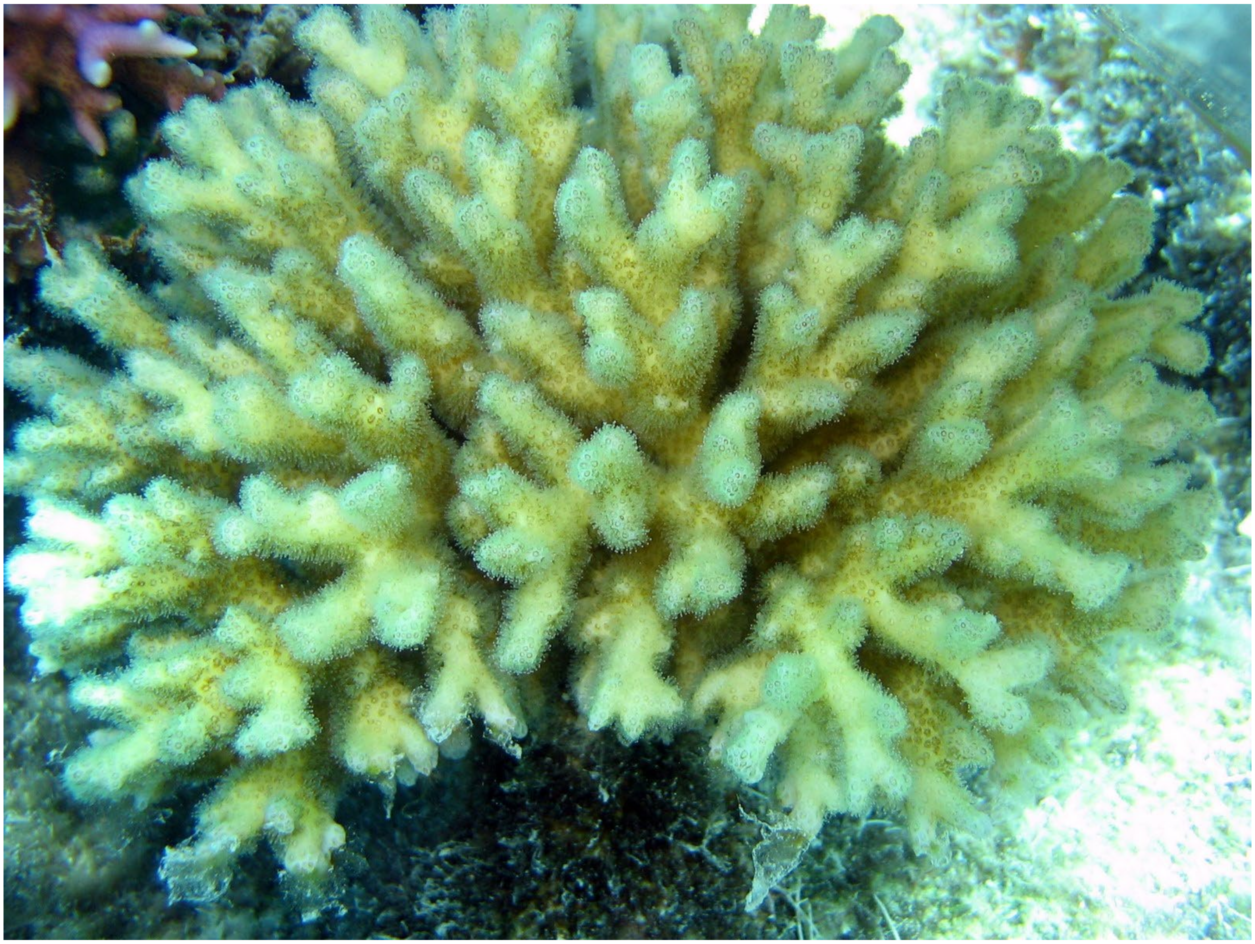
Colonies are always branching and always have little bumps called "verrucae" which are about 2-3 mm diameter and tall. The corallites are tiny, only about 1 mm diameter, and are all over the verrucae and between verrucae. *Seriatopora* has branches that are similar in size and shape to some *Pocillopora* species, but has tiny spines instead of little bumps. A few species of *Montipora* have bumps called "verrucae", but they are usually on encrusting colonies and are smooth as they lack any corallites on them.

Pocillopora damicornis

Colonies are usually less than 1 foot in diameter. Branches divide repeatedly until the ends of branches are the same size as verrucae. All other *Pocillopora* species have larger branches.



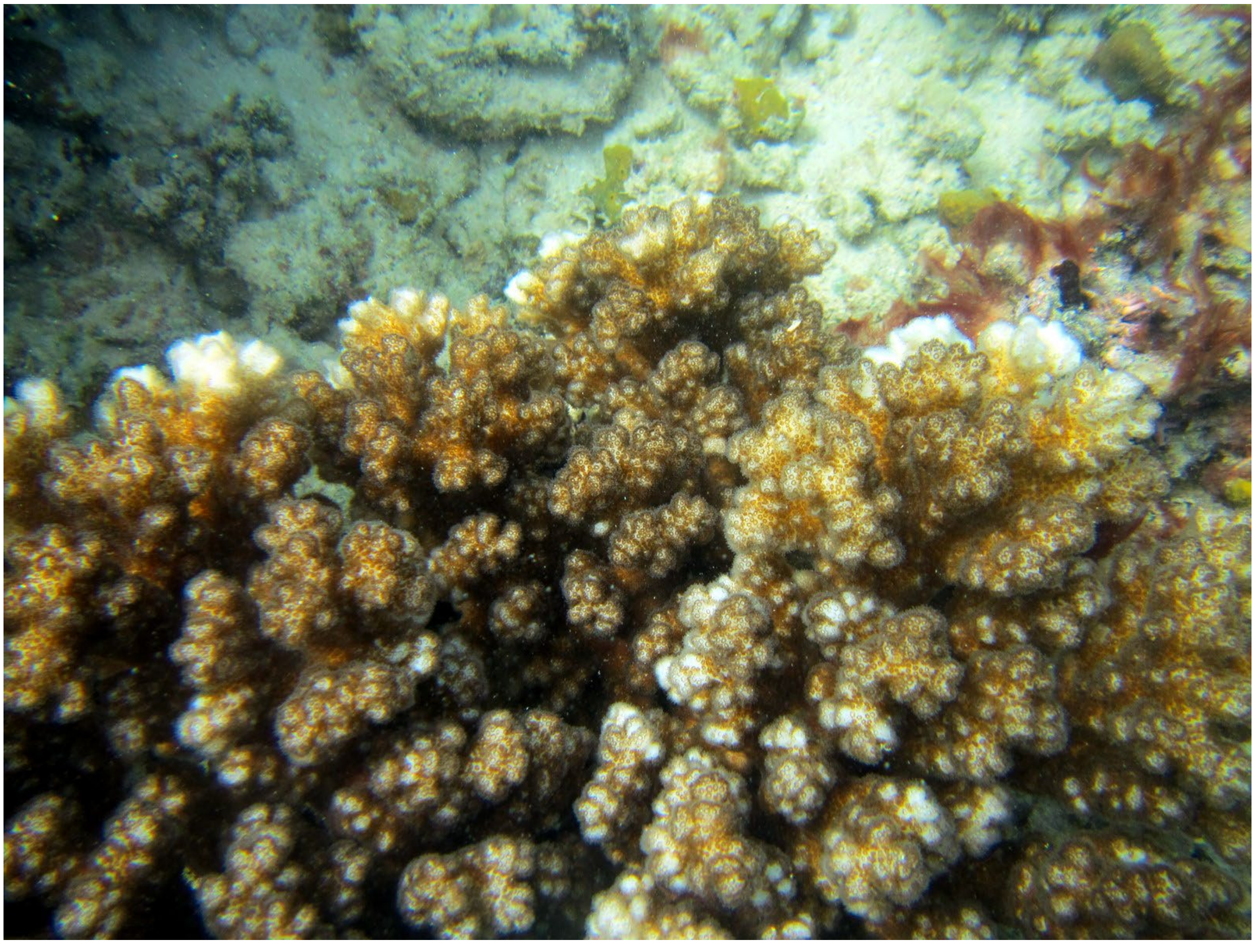
A colony of *Pocillopora damicornis*.



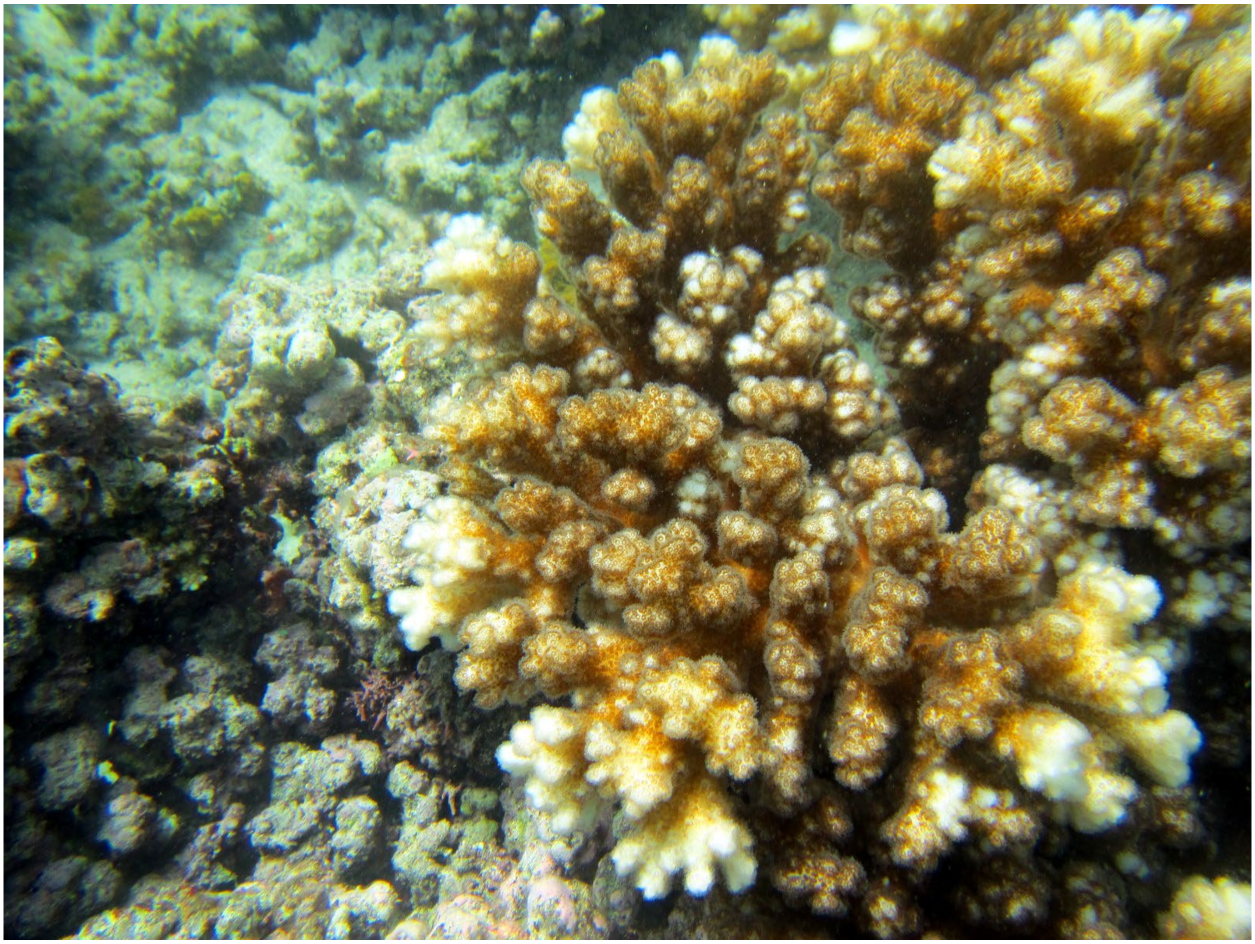
A close-up photo of *Pocillopora damicornis*. It is slightly fuzzy as the tiny tentacles are out. In some places, tiny spots can be seen, those are corallites

Pocillopora brevicornis

Colonies have branches that are irregular shapes and close together, with verrucae projecting. Colonies are often 1-2 feet diameter and in some places they can form fields. The branches are larger than on *Pocillopora damcornis*, but smaller than on most other *Pocillopora* species.



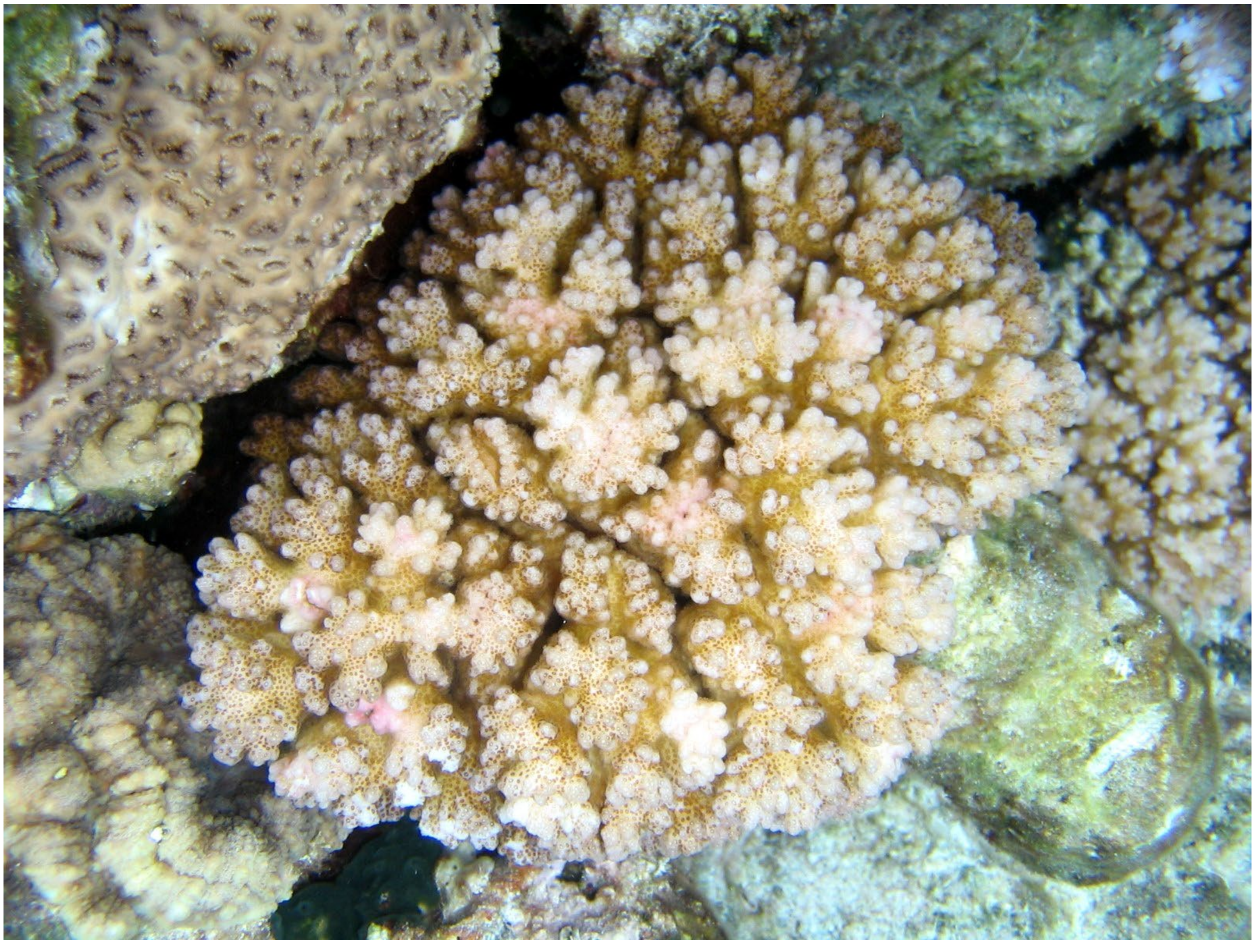
A colony of *Pocillopora brevicornis*.



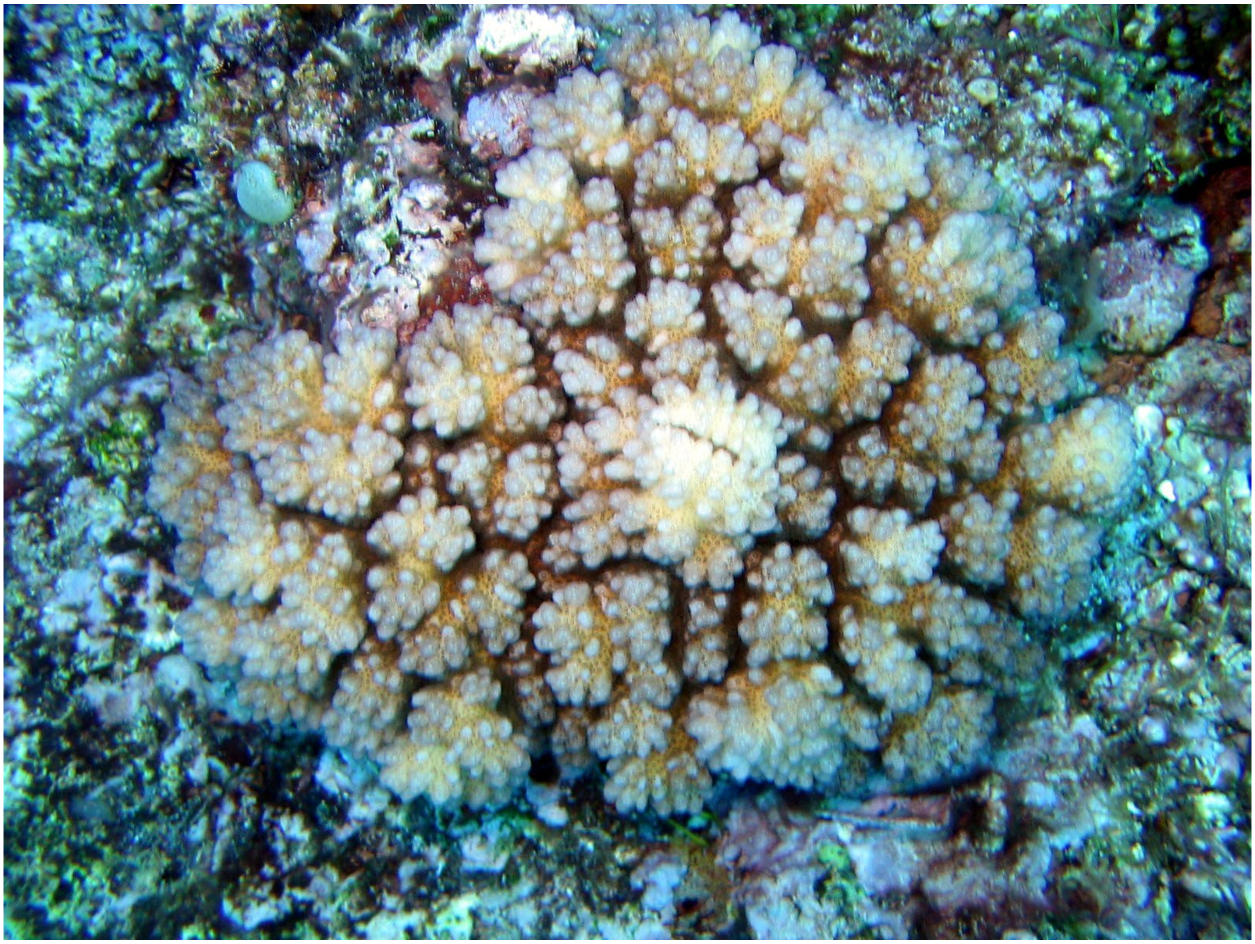
A colony of *Pocillopora brevicornis*.

Pocillopora setchelli

Colonies have branches that are irregular in shape and very close together. Colonies are fairly small and are near or on reef crests. Branches are closer together than most other *Pocillopora* species.



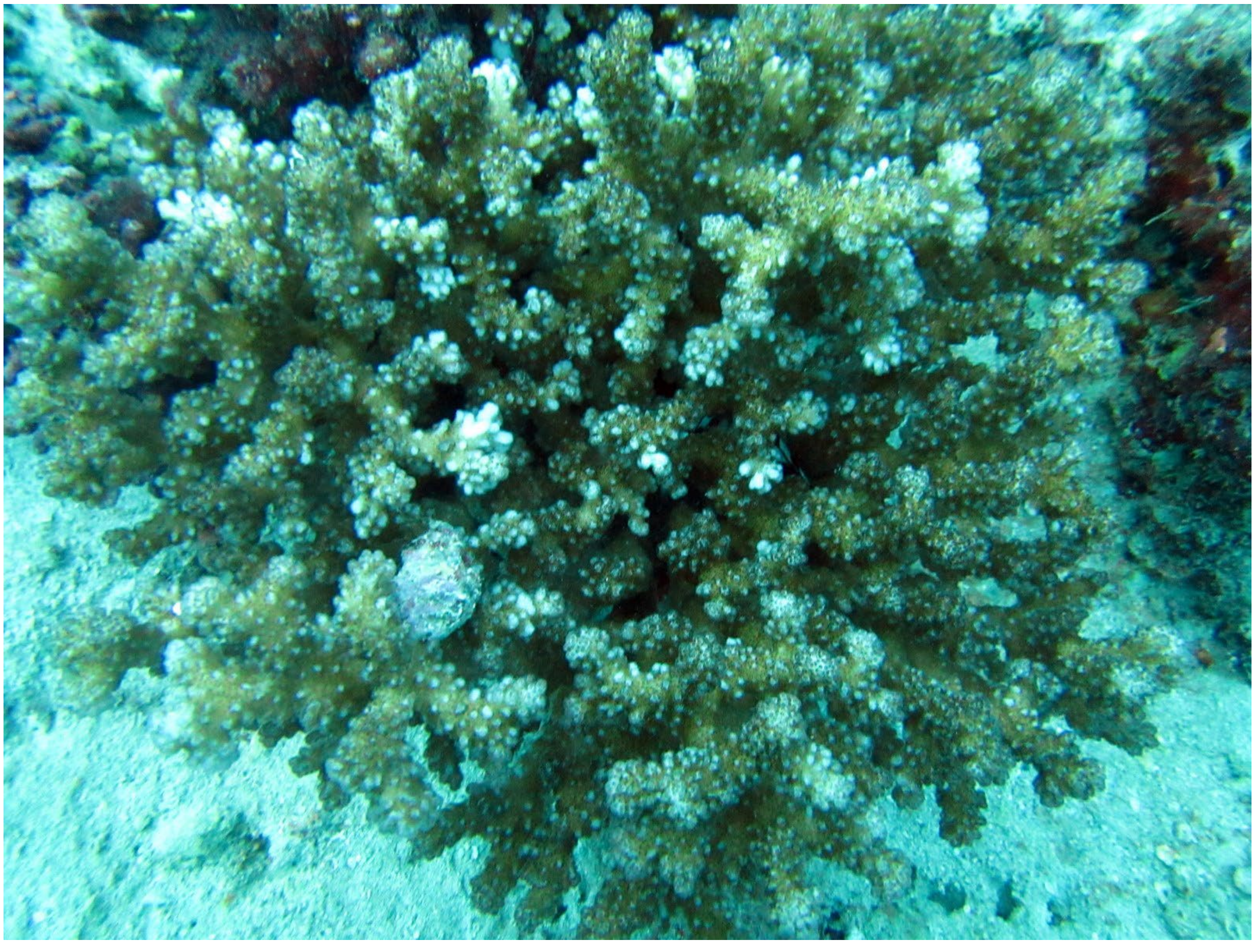
A colony of *Pocillopora setchelli*.



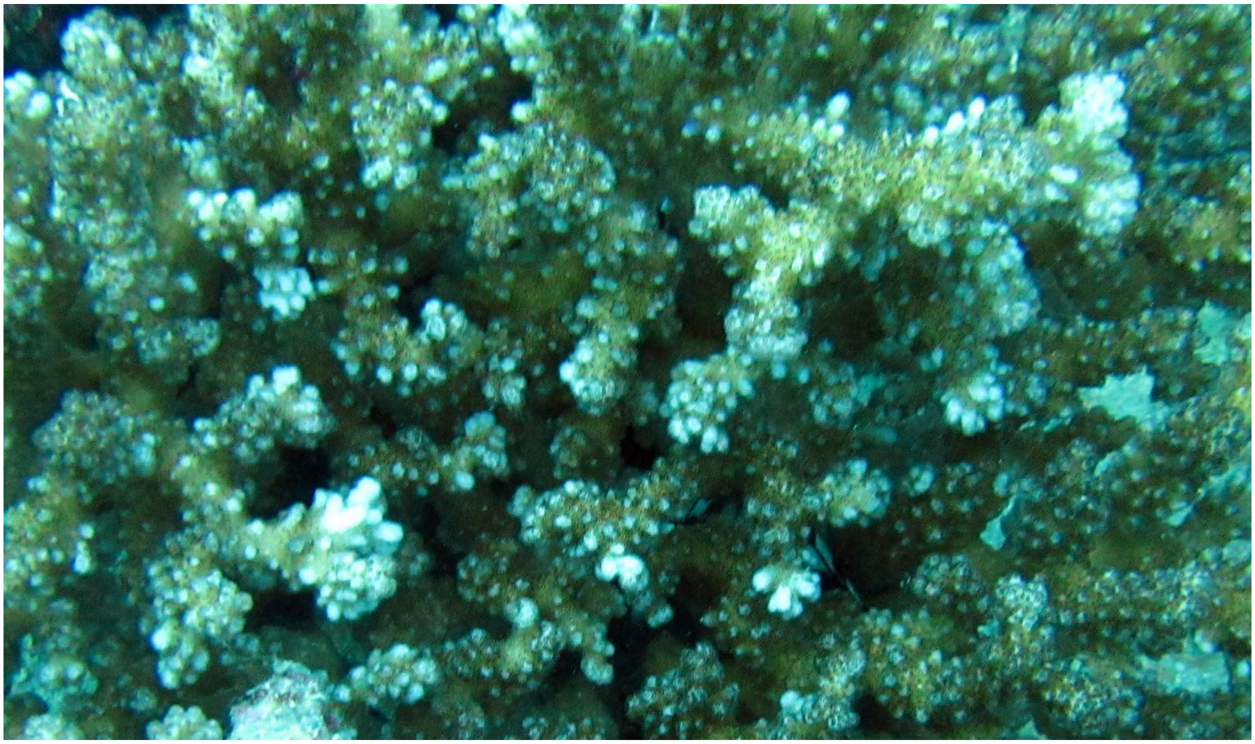
A colony of *Pocillopora setchelli*.

Pocillopora danae Vulnerable

Colonies have cylindrical branches, some of which are horizontal. The verrucae are variable in size and widely spaced. *Pocillopora verrucosa* has more vertically projecting branches and more uniform corallites, and branches may be thicker. This species is usually rare. The branches are more cylindrical and horizontal and verrucae more irregular in size than in other species of *Pocillopora*.



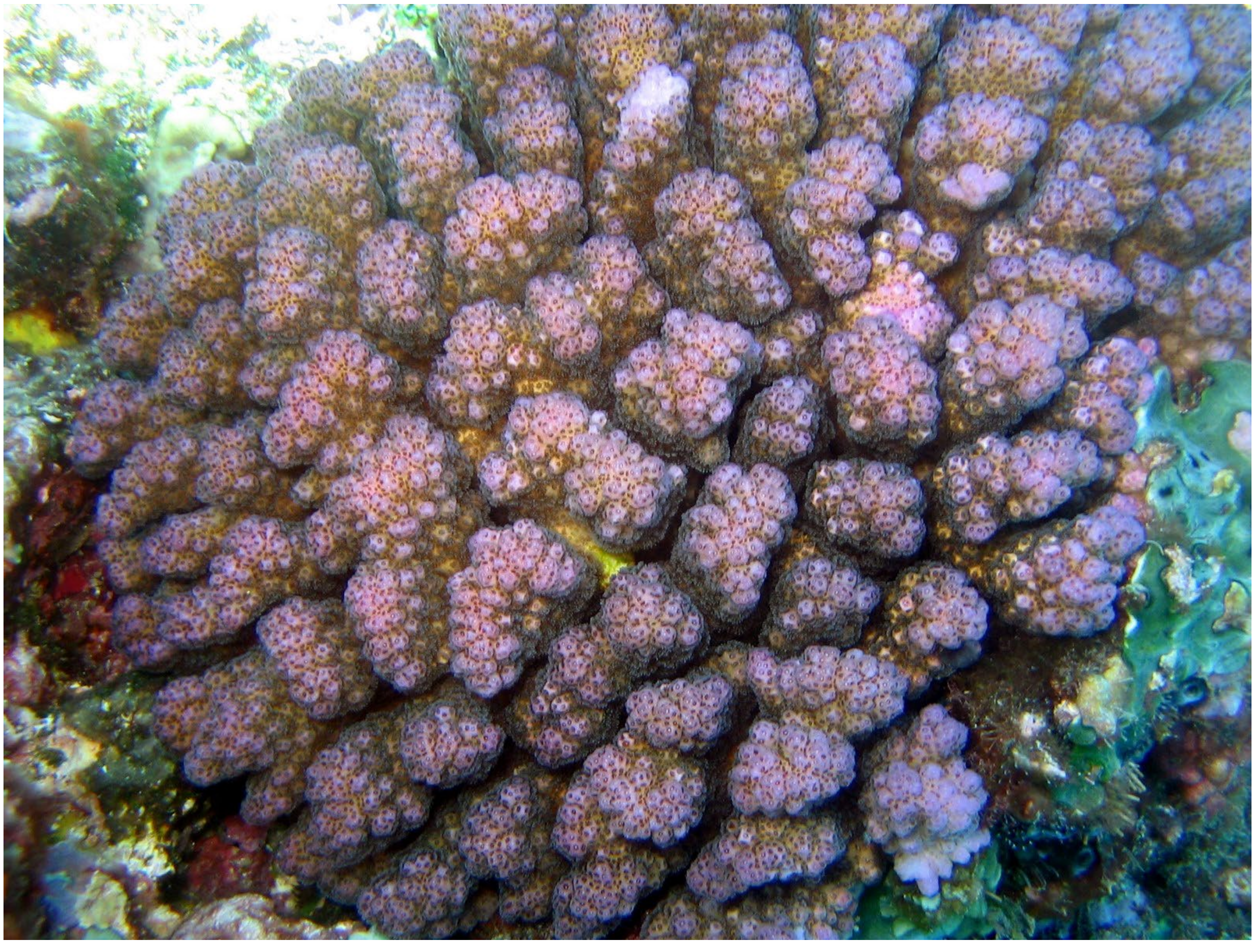
A colony of *Pocillopora danae*.



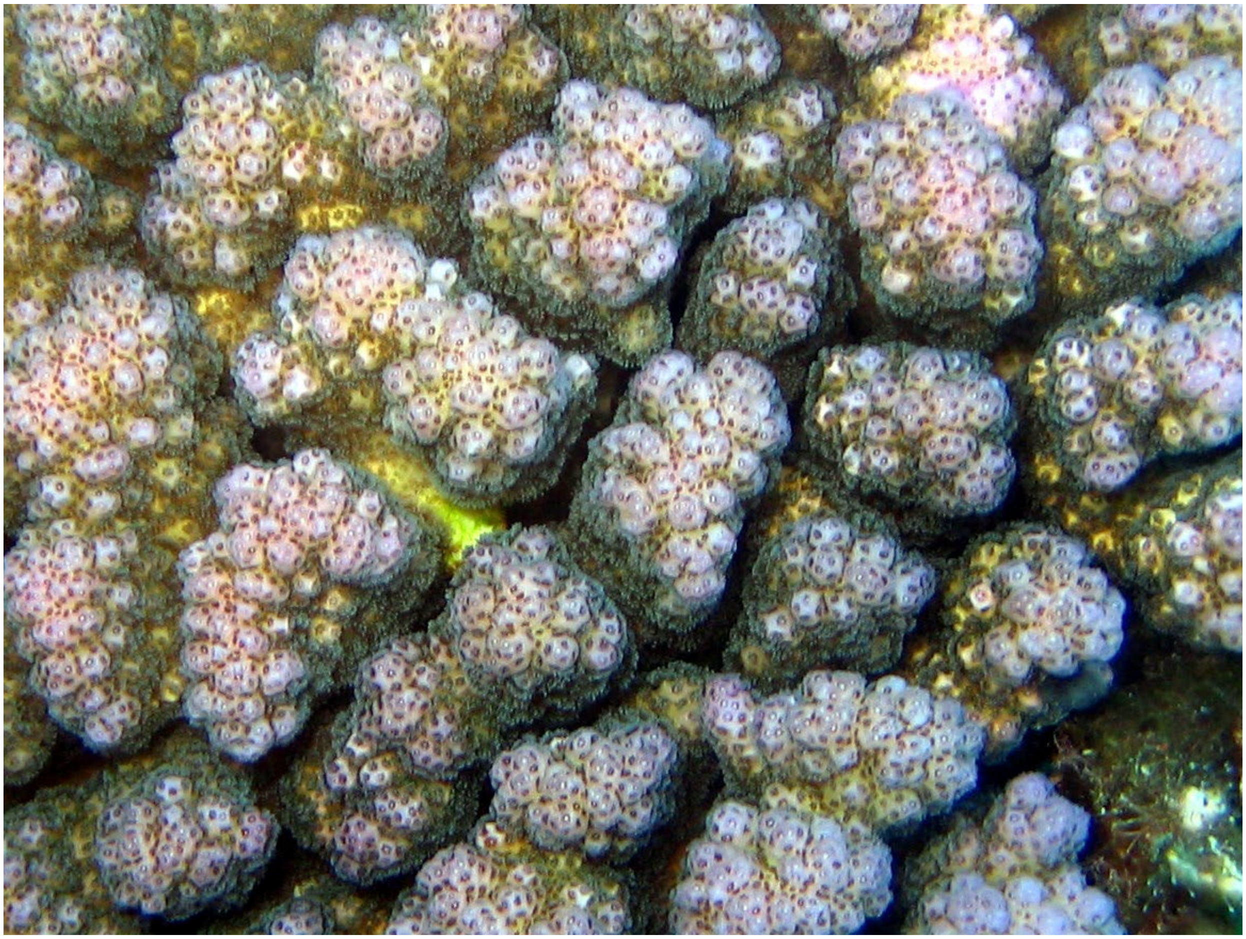
A close-up photo of *Pocillopora danae*.

Pocillopora verrucosa

Colonies are usually a foot or less in diameter. Most branches are cylindrical or nearly so. The branches are thicker than on *Pocillopora danae*, and the verrucae are closer together and more uniform. The branches are less flattened than on *Pocillopora meandrina*.



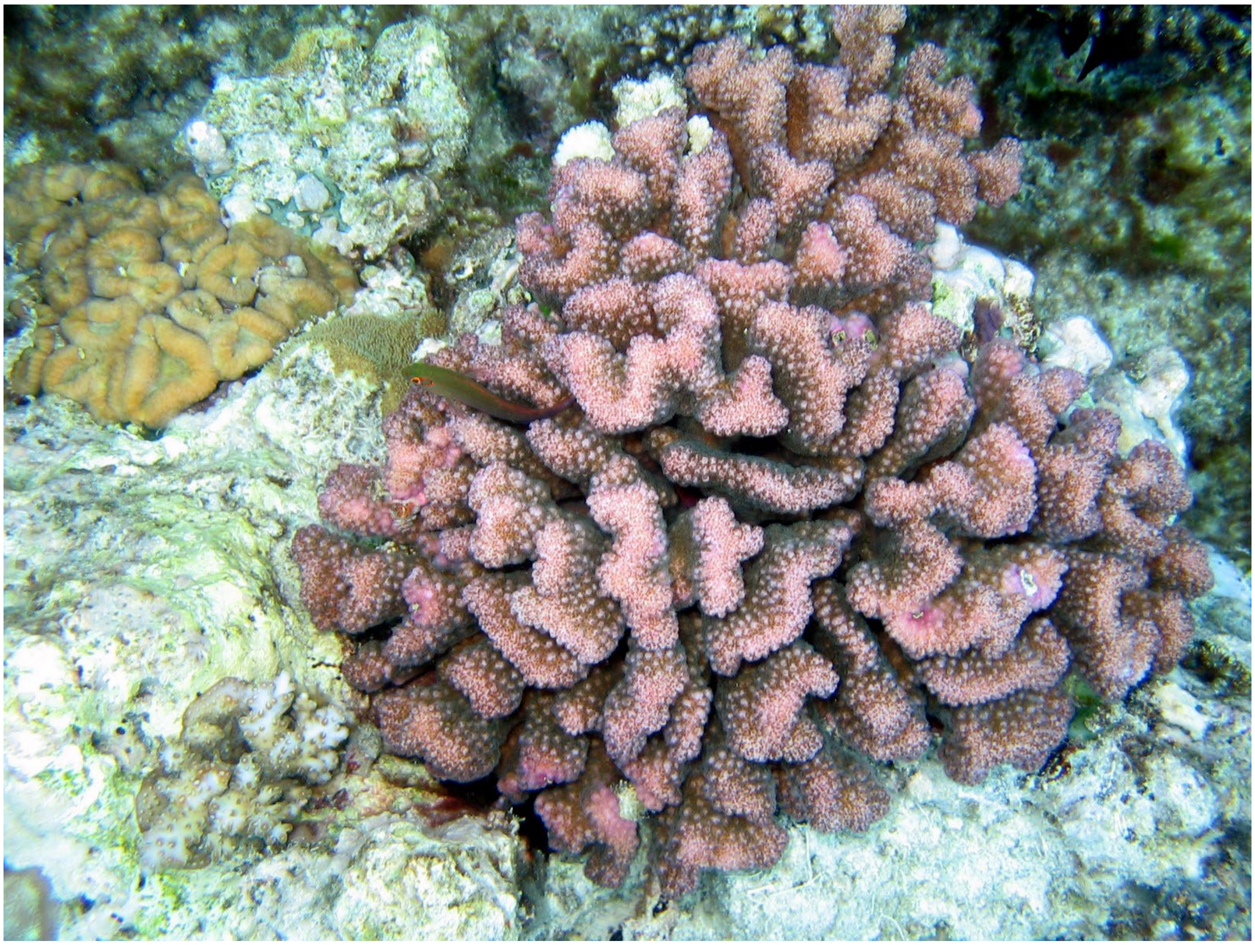
A colony of *Pocillopora verrucosa*.



A close-up photo of *Pocillopora verrucosa*. The black dots are corallites, about 1 mm diameter.

Pocillopora meandrina

Colonies have radiating or vertical branches, many of which are flattened, and some are curved ("meandering"). Branches are more flattened than on *Pocillopora verrucosa*, but smaller and closer together than on *Pocillopora eydoui*. There are many colonies that appear to be intermediate between *Pocillopora verrucosa* and *Pocillopora meandrina*, having several somewhat flattened branches. A genetics study has reported that these two are separate, valid species.



A colony of *Pocillopora meandrina*.

A colony of *Pocillopora meandrina*.

Pocillopora kelleheri or Pocillopora molokensis

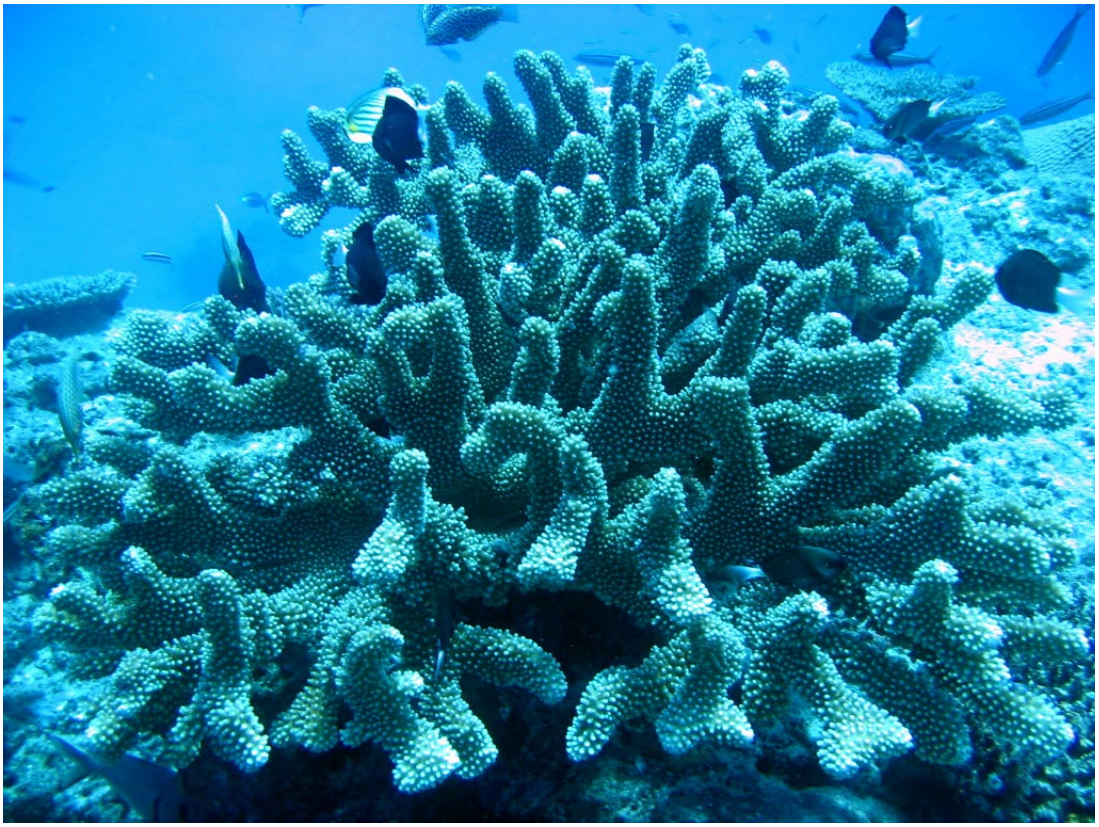
Colonies have horizontal branches. This is a rare coral that may be more common in deep water or shade. Verrucae are more uniform than on *Pocillopora danae*.

A photo of *Pocillopora kelleheri* or *molokensis*.

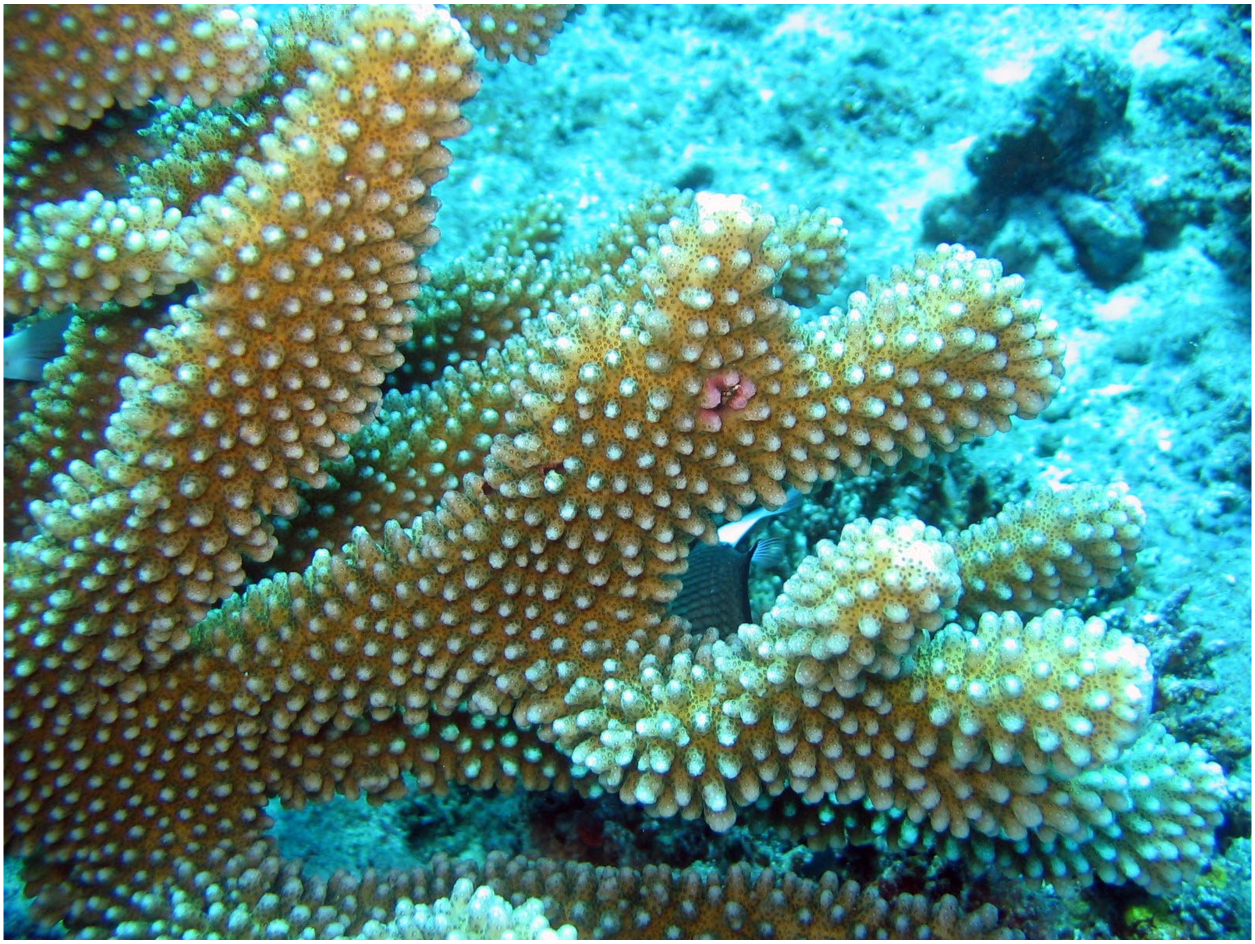
A closer photo of *Pocillopora kelleheri* or *molokensis*.

Pocillopora grandis This used to be referred to as Pocillopora eydoux

Colonies can be large, and they have long, widely spaced branches. Some colonies have flattened branches much like *Pocillopora meandrina*, while other colonies have cylindrical branches. Most places, colonies with flattened branches are more common than colonies with cylindrical branches. Colonies can range up to at least 1 m tall and/or wide. This speciies is larger or has larger, more widely spaced branches than other species of *Pocillopora*.



A colony of *Pocillopora eydouxi*.



A close-up photo of a branch of *Pocillopora eydouxi*.

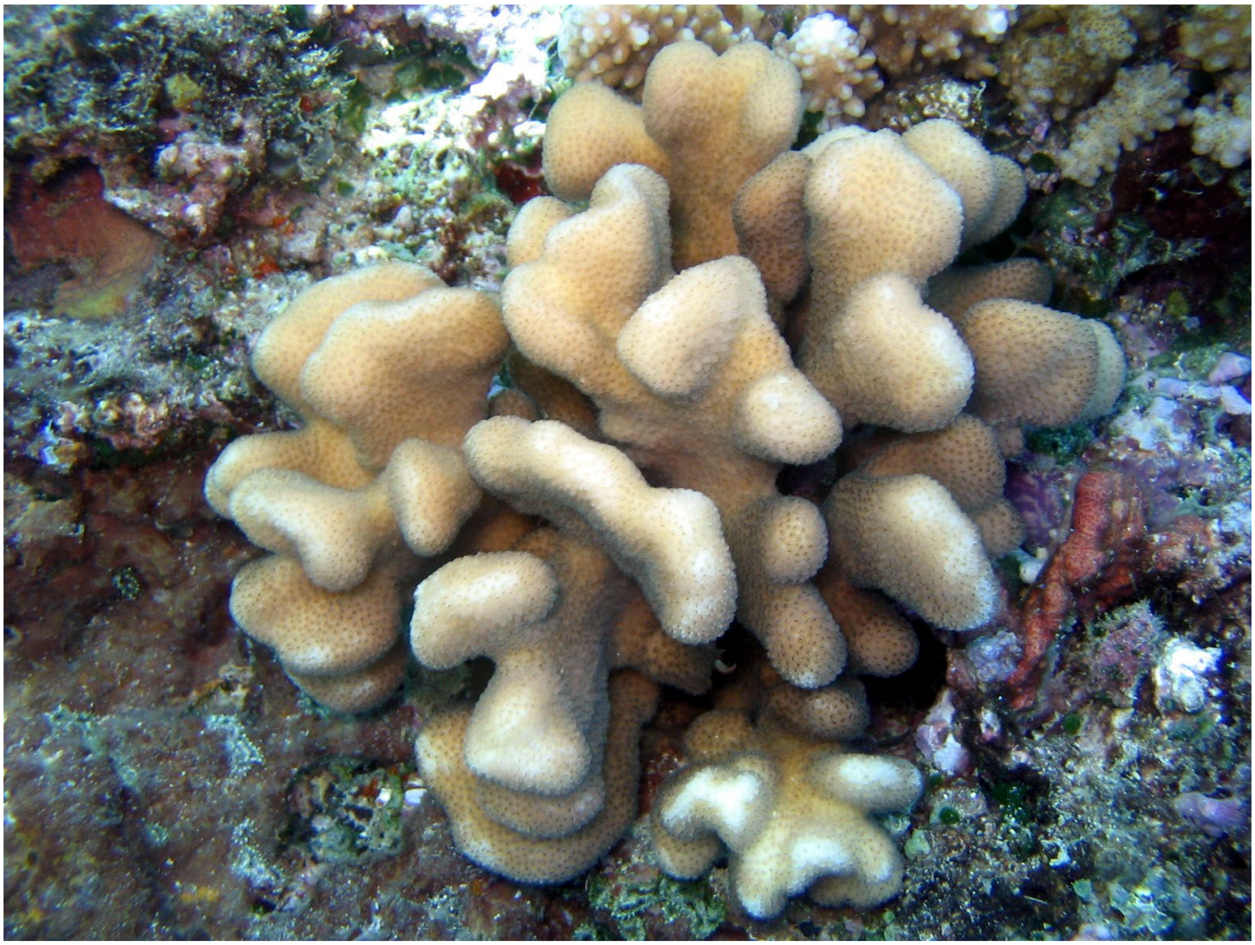
Stylophora

This genus is branching in the Pacific. Each corallite has a tiny, pointed hood over it, which can be called a spine. The hoods are small enough they are hard to see. Colonies can have shapes and sizes similar to some *Pocillopora*, but do not have bumps (verrucae) but instead have tiny hoods over corallites that are sharp like spines. *Seriatopora* has thinner branches and no hoods or spines.

Stylophora pistillata

This was called Stylophora mordax before 2000.

Colonies have branches as thick as a thumb or thicker. Branches may be cylindrical or flattened. Colonies are usually a foot or less in diameter. *Stylophora subseriata* has thinner branches.



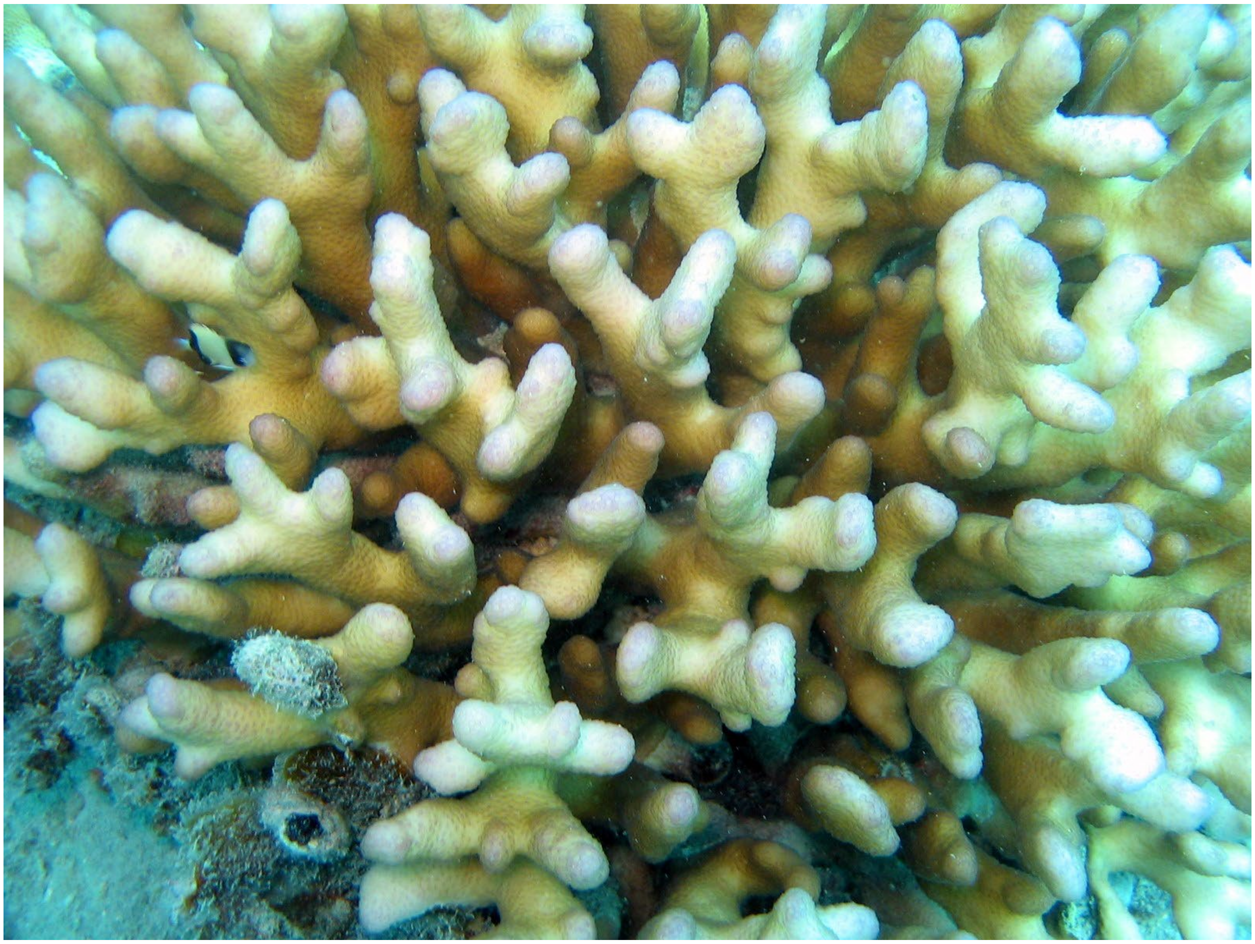
A colony of *Stylophora pistillata*.

A colony of *Stylophora pistillata*.

Stylophora subseriata

This species used to be called *S. pistillata* before 2000.

Colonies have branches as thin or thinner than a finger. *Styophora pistillata* has thicker branches.



A colony of *Stylophora subseriata*.

A colony of *Stylophora subseriata*. The flattened structures with a thin crack in the middle are crab galls.

Seriatopora

Colonies have thin branches, about the diameter of a pencil or less. Branches taper to a sharp point in most species but have rounded tips in one species. Some species have long branches, others short. Corallites on branch sides are tiny, about 1 mm diameter, and usually (but not always) hard to see. The branches are thinner than on *Stylophora* and do not have hoods/spines.

Seriatopora caliendrum

Colonies have long thin branches with rounded tips. Other species in the genus have sharper branch tips.

A colony of *Seriatopora caliendrum*.

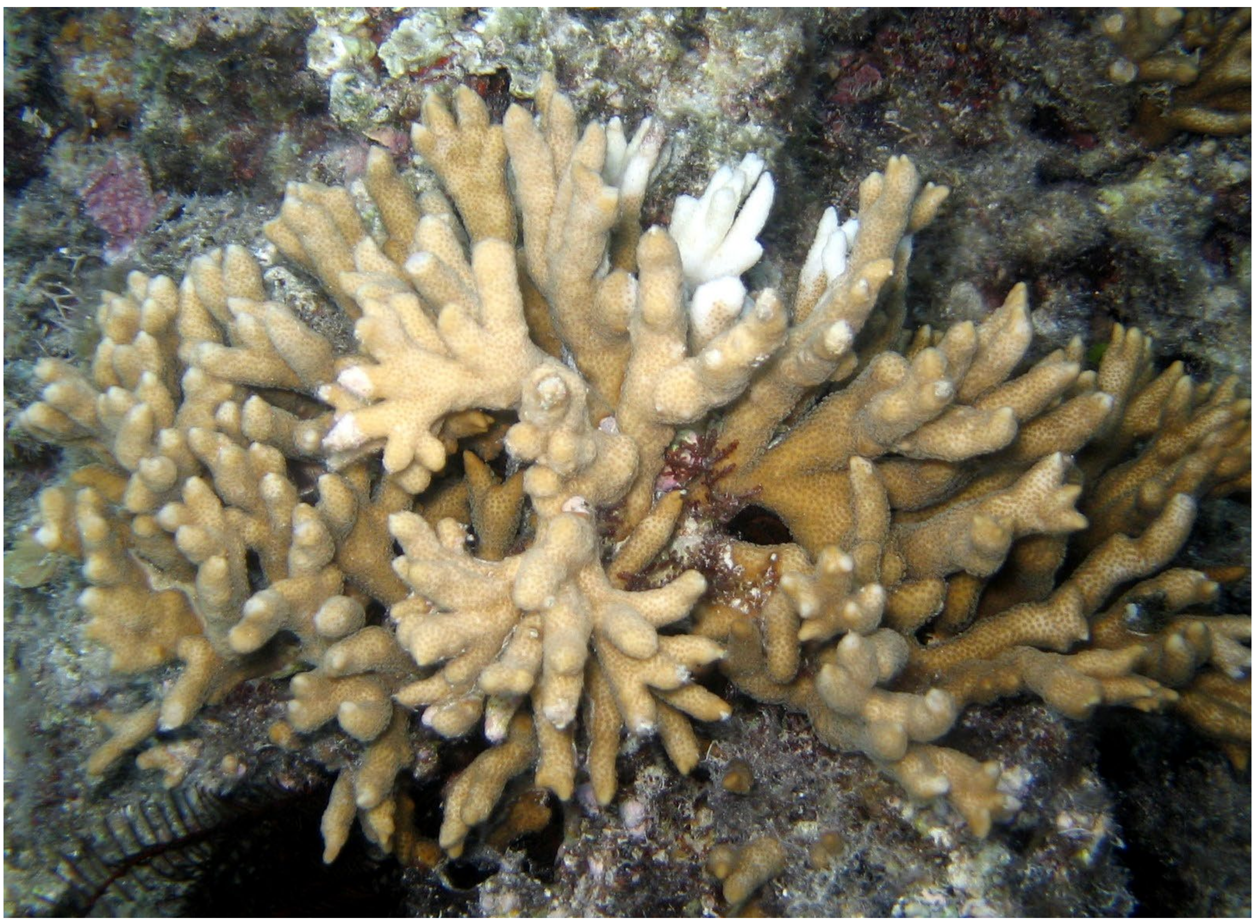
A close-up photo of *Seriatopora caliendrum*.

Montipora

Colonies can be encrusting, foliose (plates), branching, or massive. Corallites are about 1 mm diameter. Some species have tiny spines called papillae that are narrower than corallites, others have smooth bumps called "verrucae" (the Latin word for blister) that are about 2-4 mm diameter but have no corallites on them. Some have thin ridges between corallites. Others have larger irregular lumps one to several centimeters diameter on them that do have corallites on them. Still others have smooth surfaces. A couple species have corallites recessed in funnels. This is the second largest genus of corals, with at least 75 species in it. *Pocillopora* also has "verrucae" but there are corallites all over the verrucae as well as between them. *Pocillpora* also is always branching. *Stylocoeniella* has spines, but many fewer than *Montipora* species that have spines.

Montipora digitata

Colonies are branching, with rounded, smooth branches that have smooth rounded tips with no corallite at the end of the branch. The corallites are flush with the surface and there are no bumps. *Montipora altasepta* and *Montipora stellata* have tiny bumps on their branches.



A colony of *Montipora digitata*.

A close-up photo of *Montipora digitata*.

Montipora altasepta Vulnerable

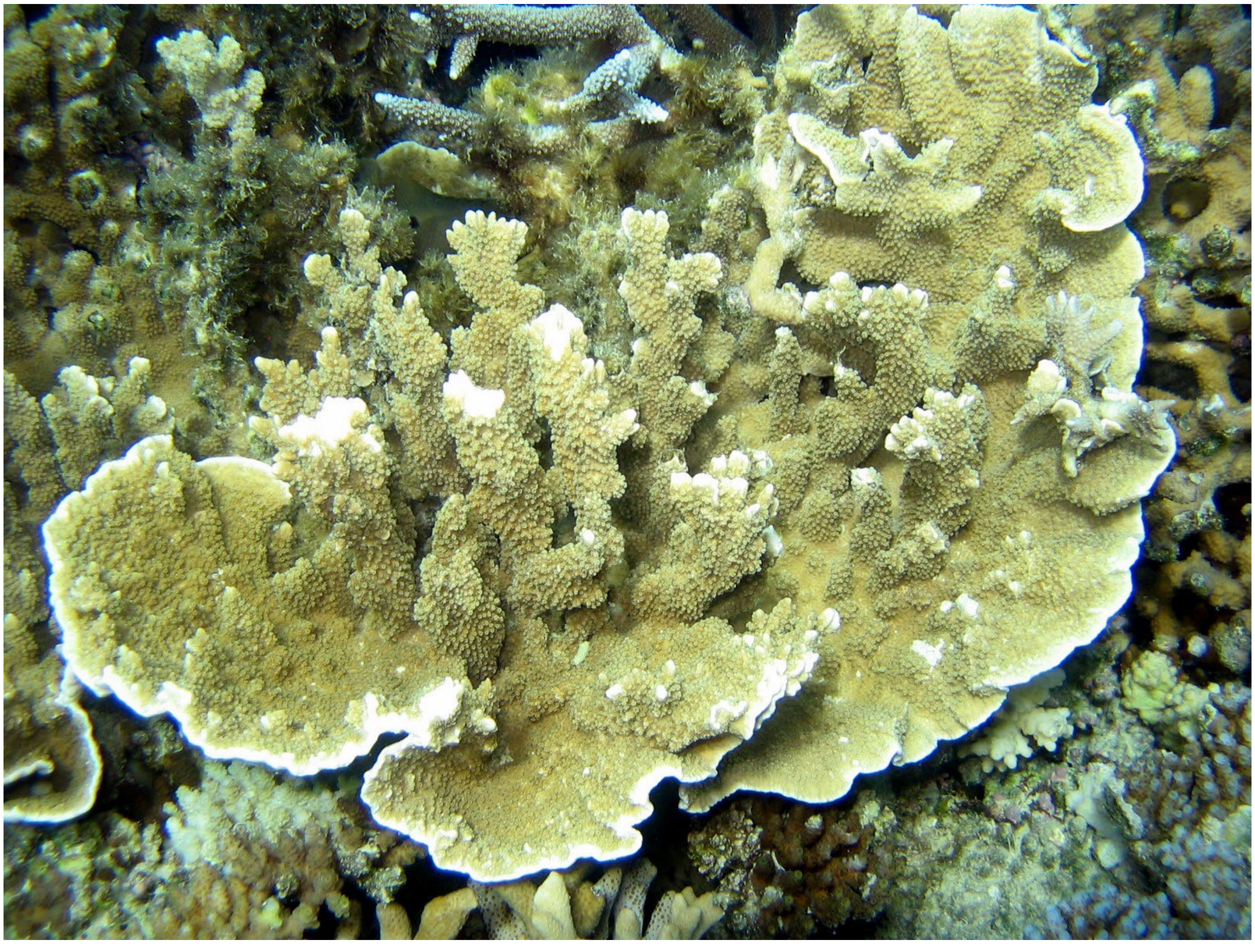
Colonies are branching. The branch surfaces are finely rough with slightly raised lower lips of some corallites and with other tiny bumps. Branch surfaces are rougher than on *Montipora digitata* but not as spiny as on *Montipora stellata* which has both papillae and thin ridges (near branch ends).

Colonies of *Montipora altasepta*.

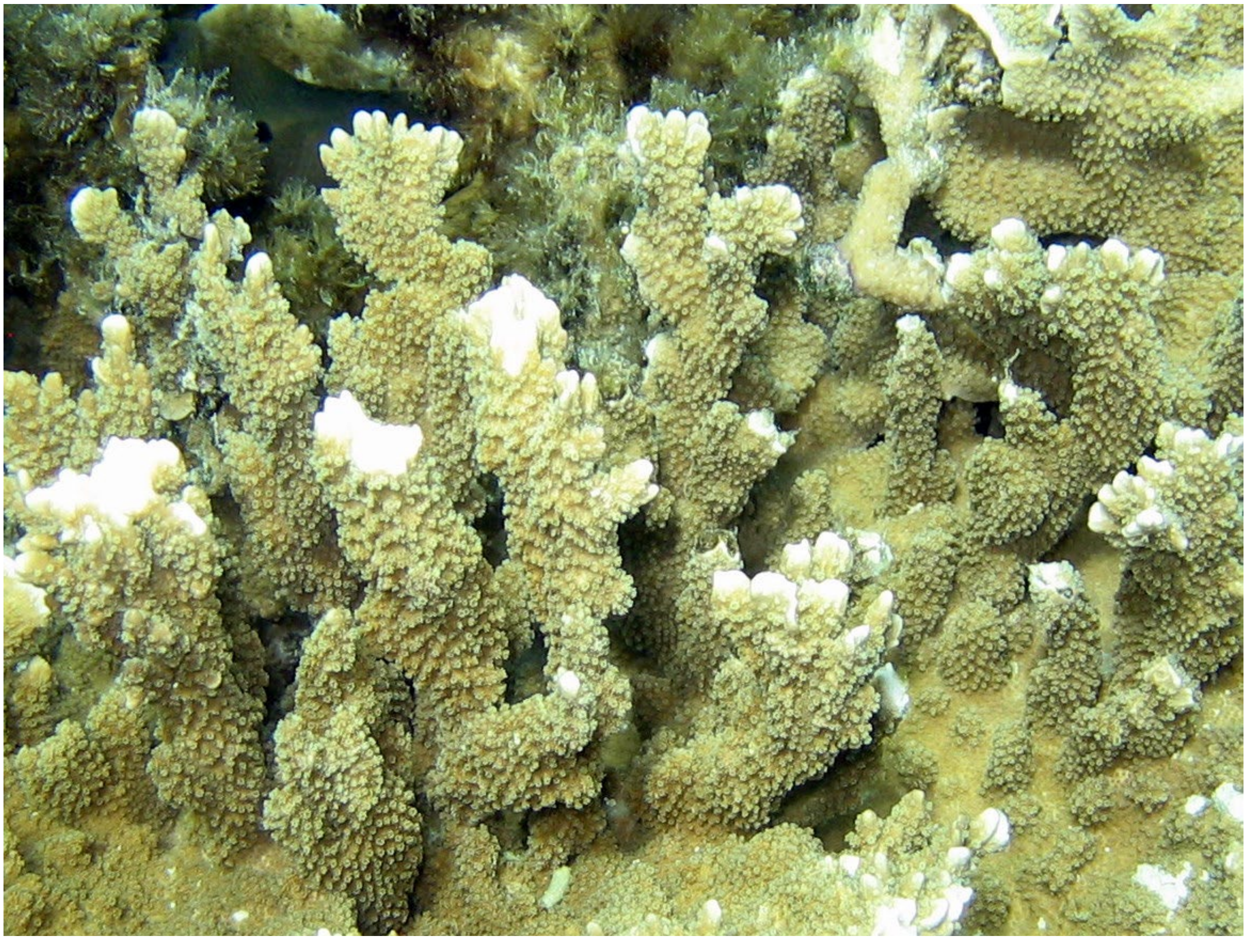
A close-up photo of *Montipora altasepta*.

Montipora hispida

Colonies form thin plates which may be flat or bowl-shaped. On the upper surfaces of most colonies, thin irregular columns grow which may fuse partly to nearby columns or do a little branching. The surfaces are rough like sandpaper with tiny papillae. Colonies are usually brown. Other *Montipora* do not have thiin plates, thin irregular columns, and brown color.



A colony of *Montipora hispida*.

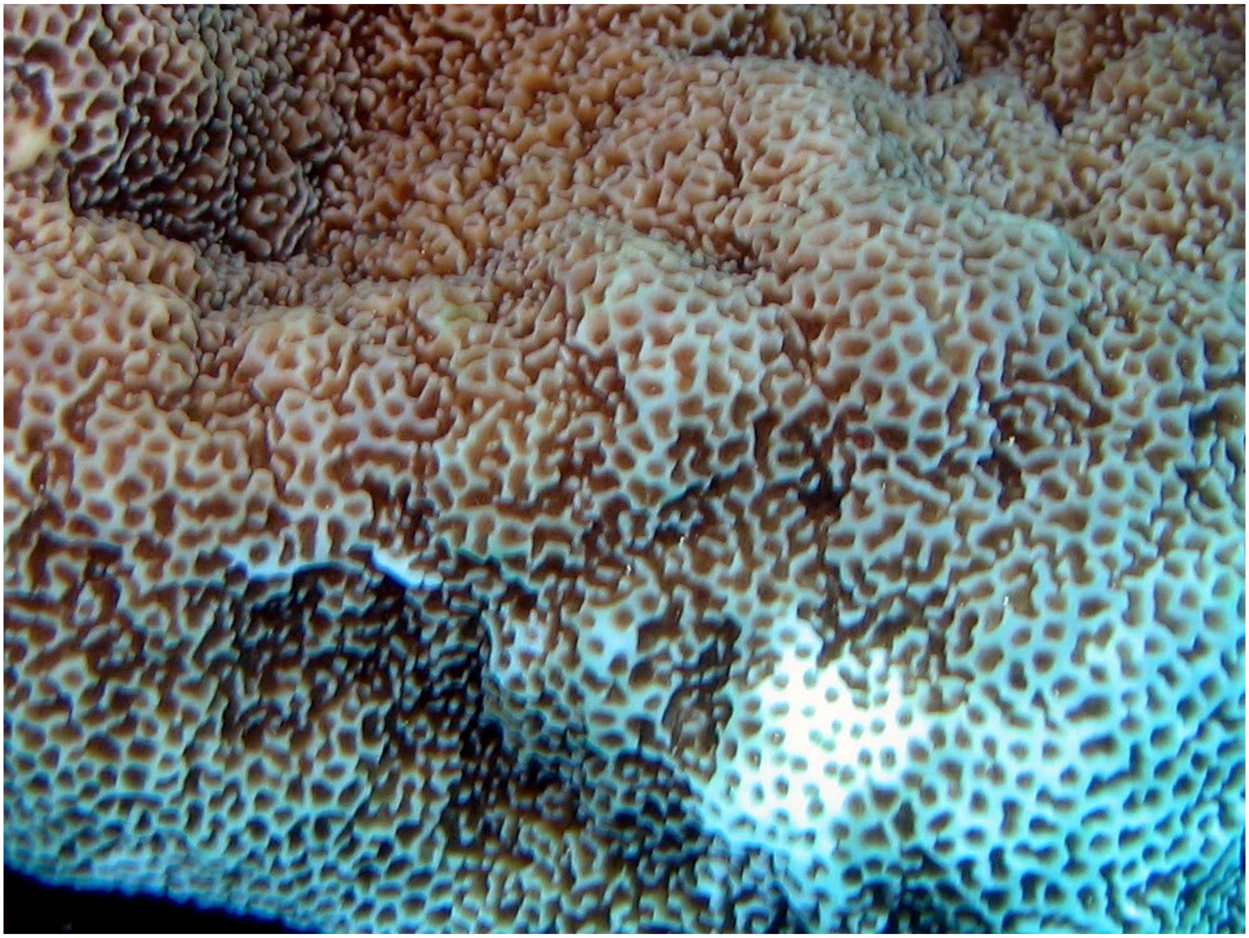


A closeup photo of *Montipora hispida*.

Montipora caliculata Vulnerable

Colonies are massive or encrusting. The surfaces are covered with thin ridges that at least partly surround corallites. In places the ridges are broken up into individual papillae. The ridges between corallites on *Montpora foveolata* are continuous, not broken.

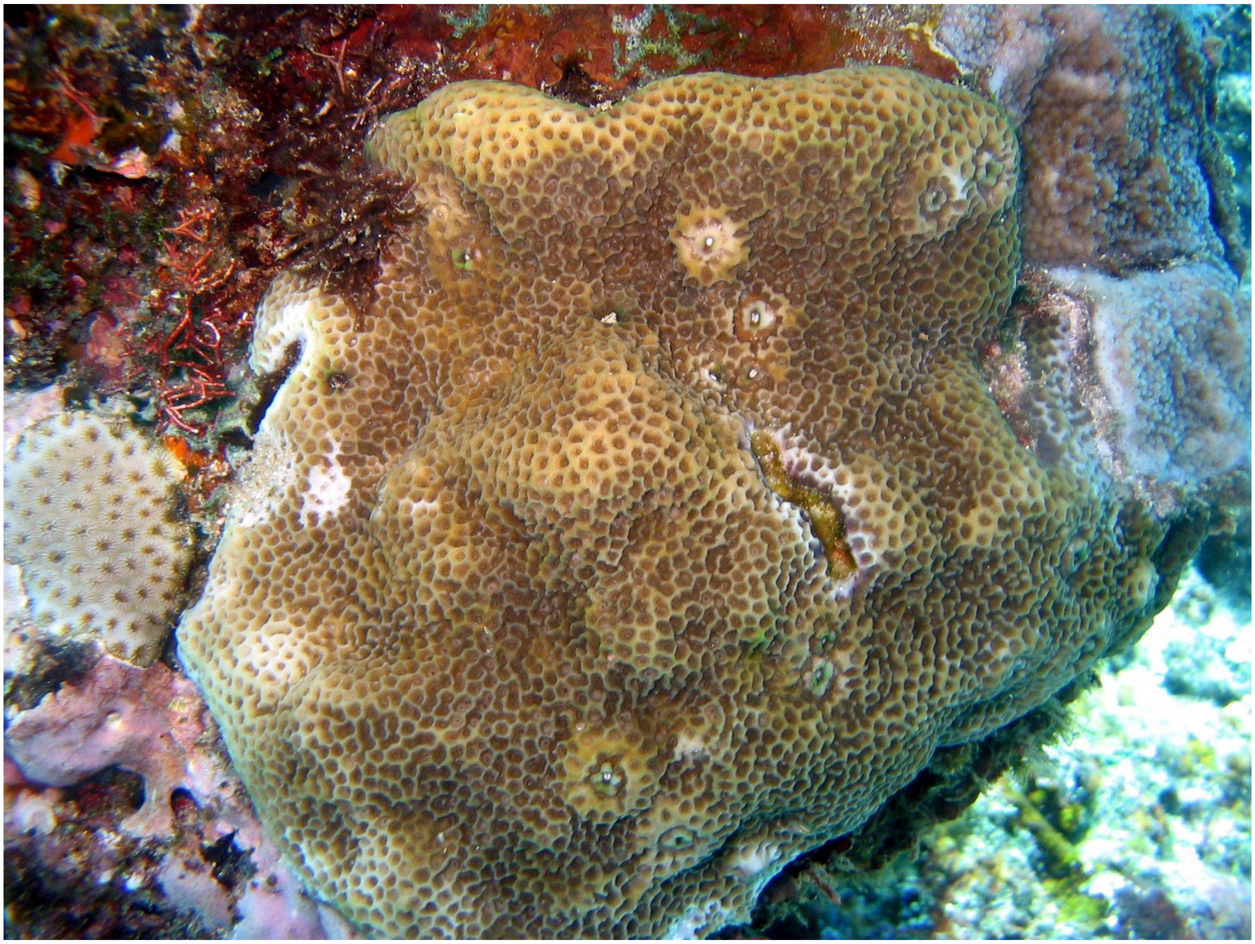
A colony of *Montipora caliculata*.



A close-up photo of *Montipora caliculata*.

Montipora foveolata

Colonies are encrusting or massive. Corallites are completely surrounded by thin ridges, and are recessed down in a funnel between the ridges. The word "foveolate" means recessed in a funnel. Corallites are completely surrounded by ridges compared to *Montipora caliculata* where they are partially surrounded. Corallites are less recessed on *Montipora venosa*. Colonies resemble *Goniastrea minuta* but the openings between ridges are larger on *Goniastrea minuta*.

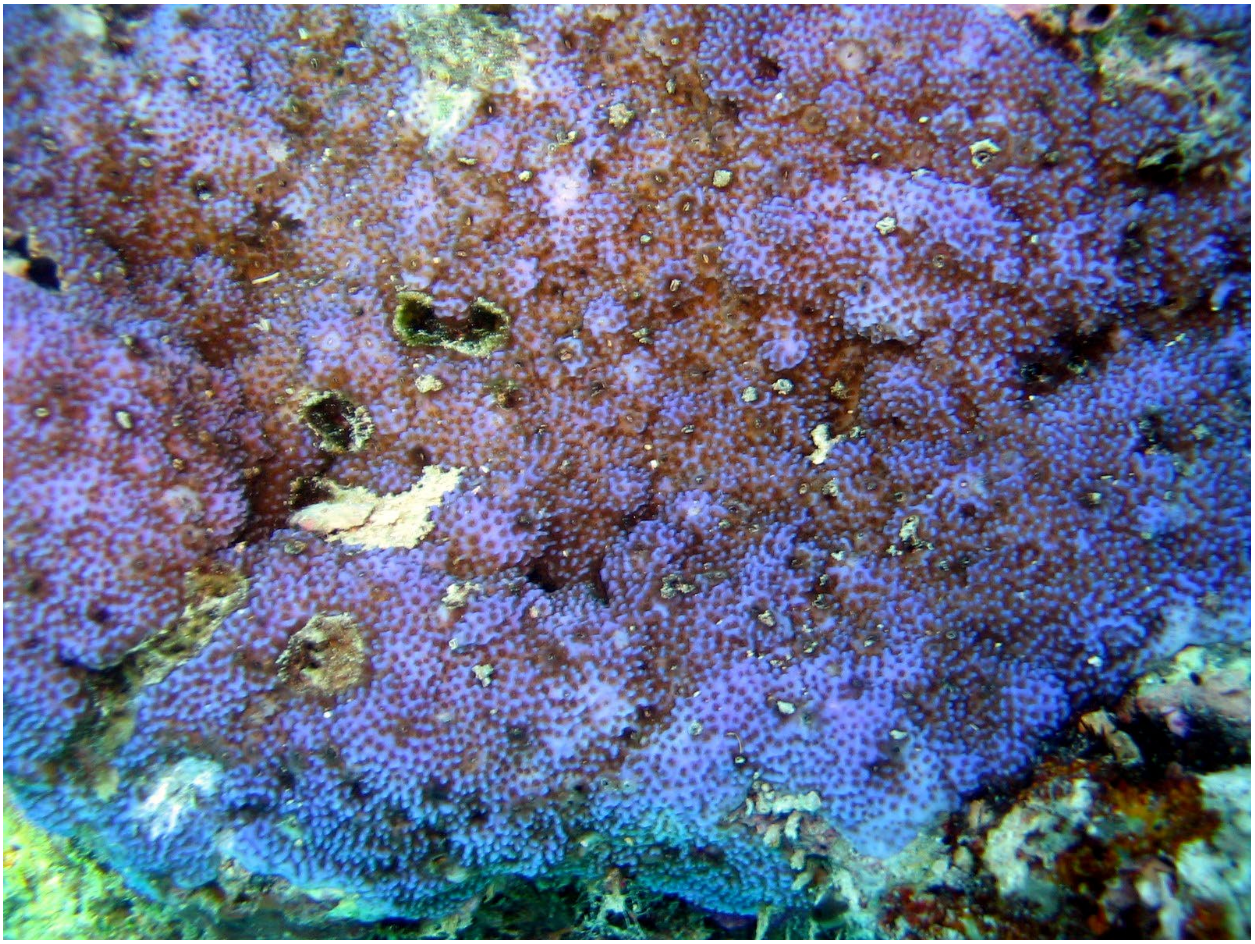


A colony of *Montipora foveolata*.

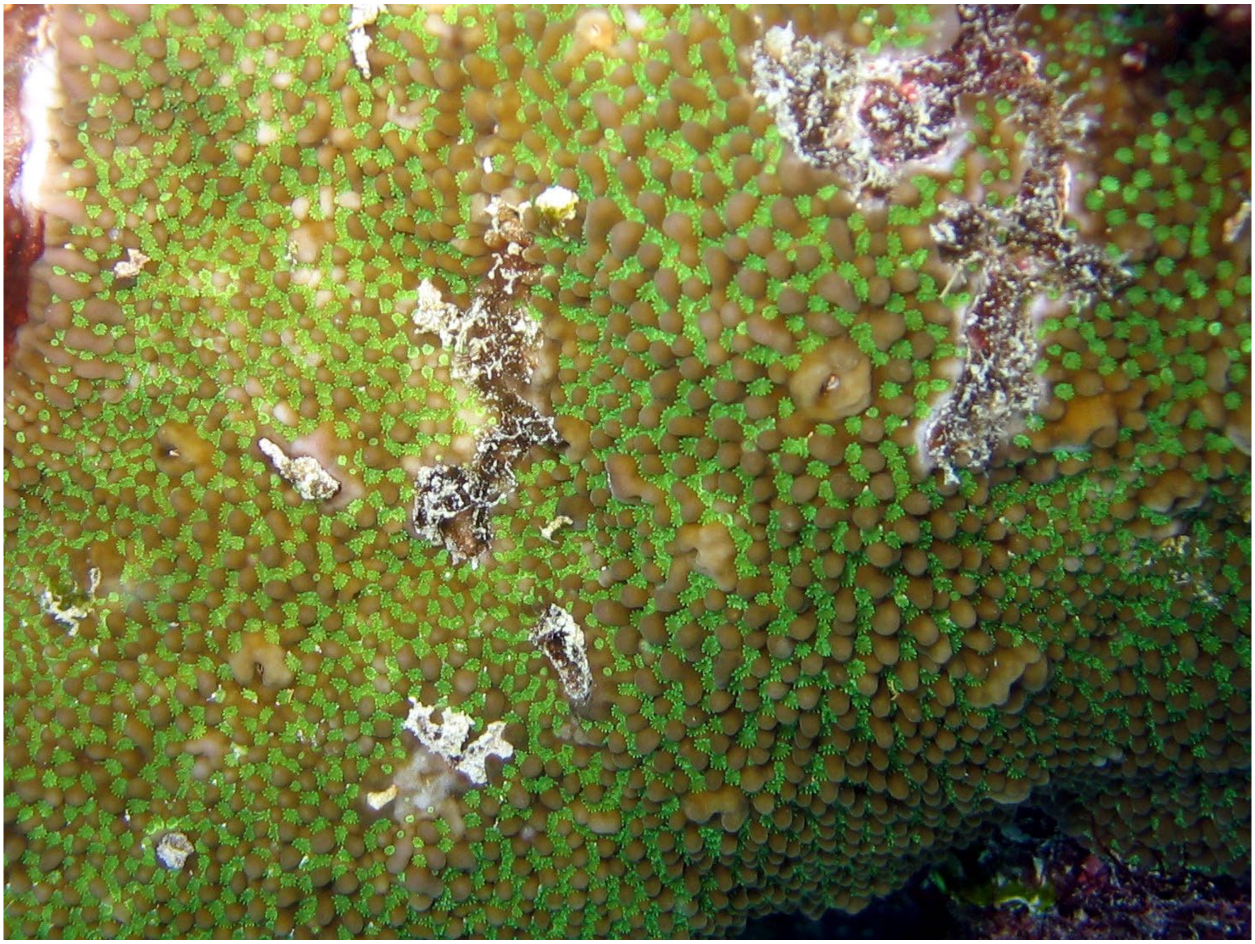
A close-up photo of *Montipora foveolata*.

Montipora tuberculosa

Colonies have tiny rounded bumps that are about the diameter of corallites. They are called "tuberculae." The tuberculae are smaller than the verrucae on *Montipora capitata* but larger than the papillae on some other species of *Montipora*, and which are smaller than corallites (and called "papillae").



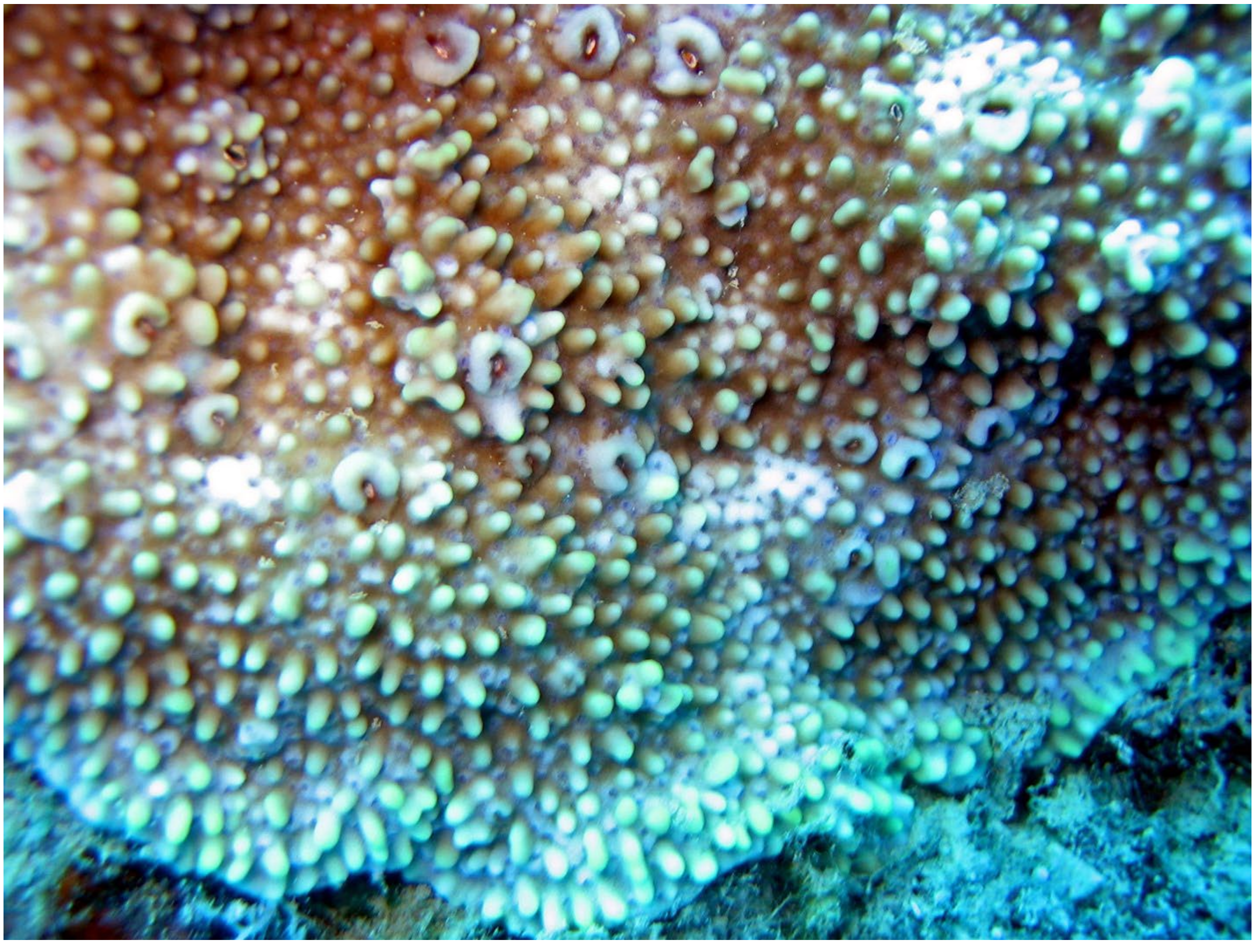
A colony of *Montipora tuberculosa*.



A close-up photo of *Montipora tuberculosa*.

Montipora capitata

Colonies are often encrusting, but may have plate edges and may have columns or branches growing up from the surface. Surfaces have small verrucae (smooth bumps) on them that are about 2 mm tall and wide and which are not compacted together. The verrucae are larger than on *Montipora tuberculosa* but smaller than on *Montipora verrucosa* and larger than the corallites or papillae (spines) and they are more widely spaced than on *Montipora verrucosa*.

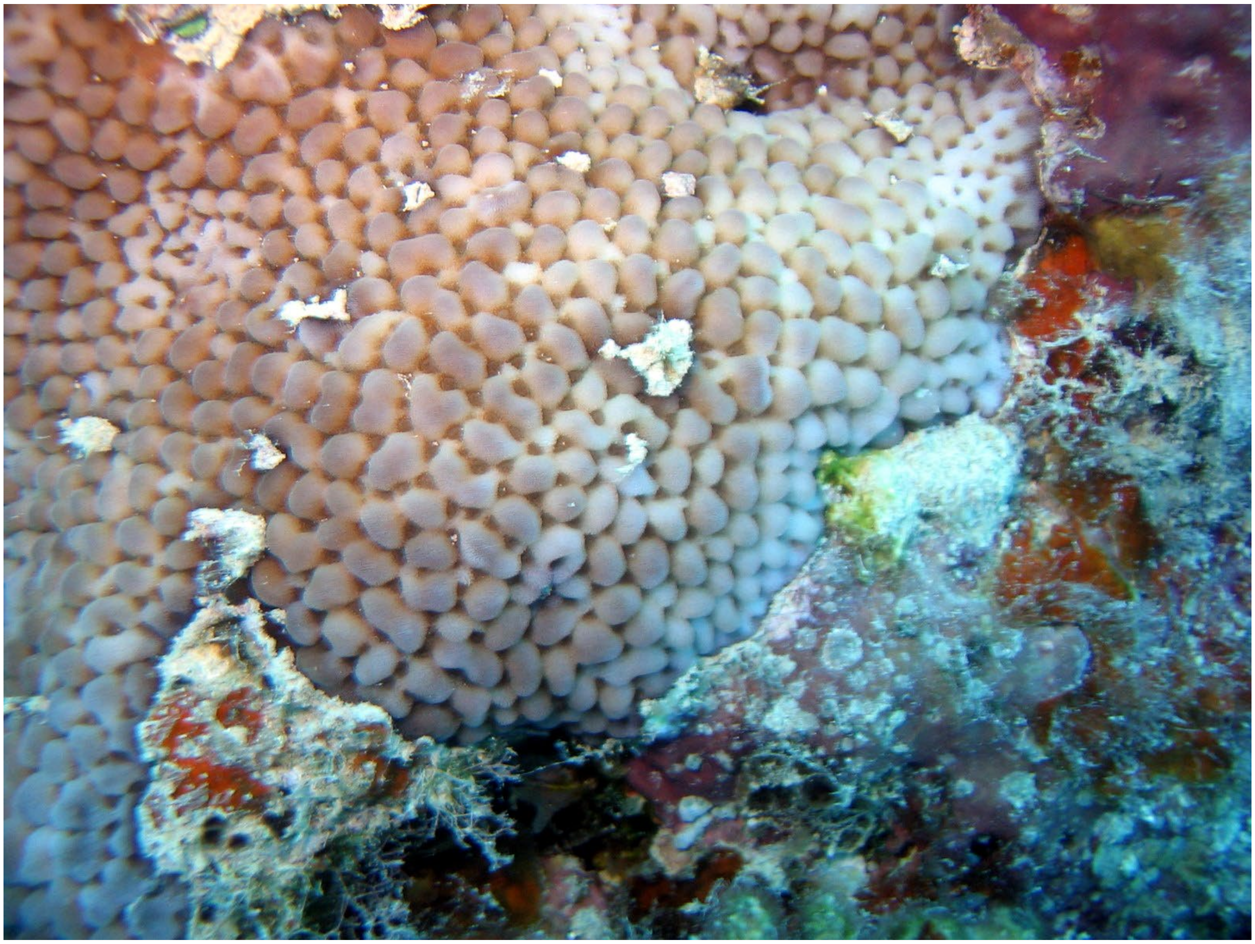


A colony of *Montipora capitata*.

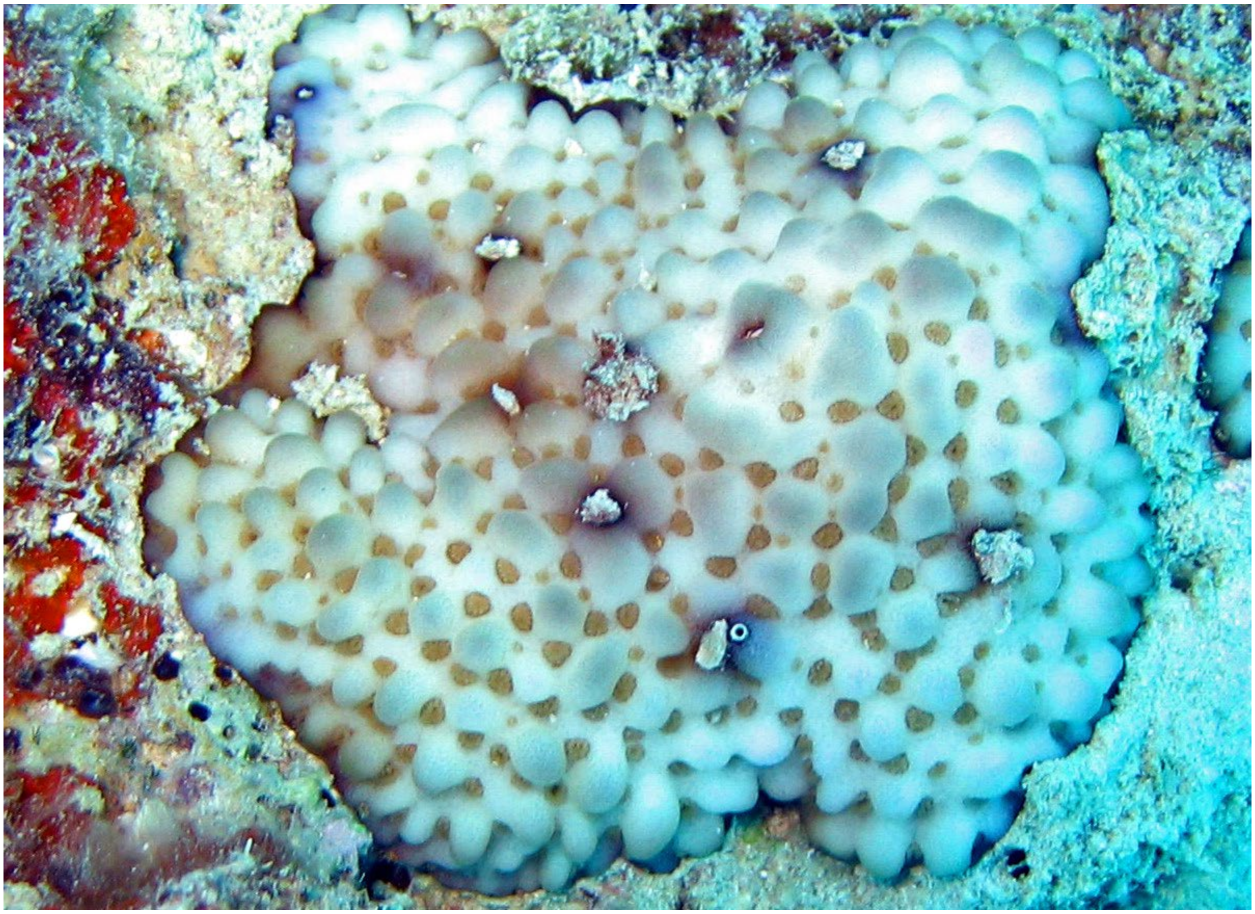
A colony of *Montipora capitata* with projections. The projections have a barnacle at the end which apparently stimulates the branch growth.

Montipora verrucosa

Colonies are encrusting and usually small. The surfaces have large verrucae on them, which are usually wider than they are tall. The verrucae are usually crowded together. The verrucae are wider and more closely compacted together than on *Montipora capitata,* and more uniform than on *Montipora undata.*



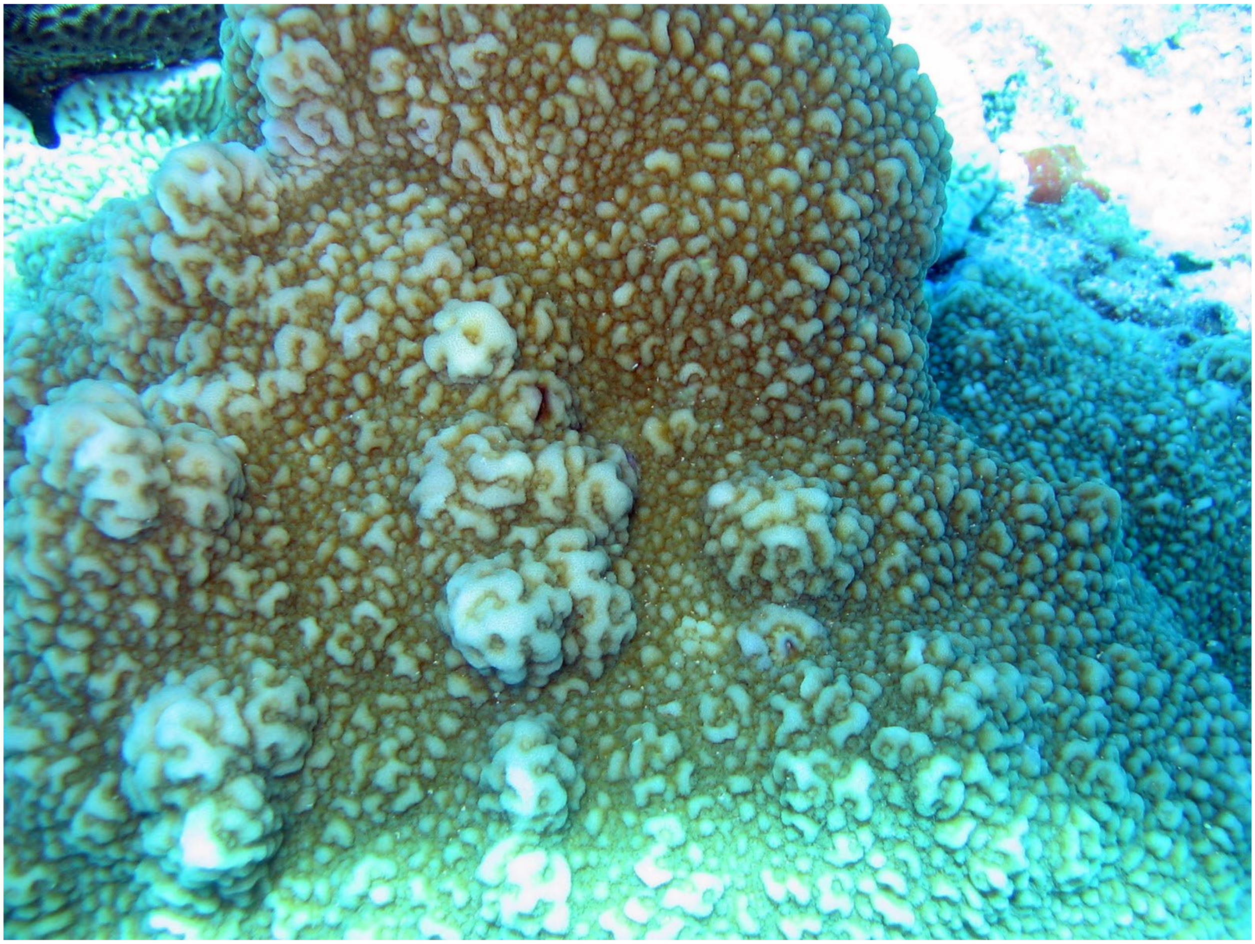
A colony of *Montipora verrucosa*.



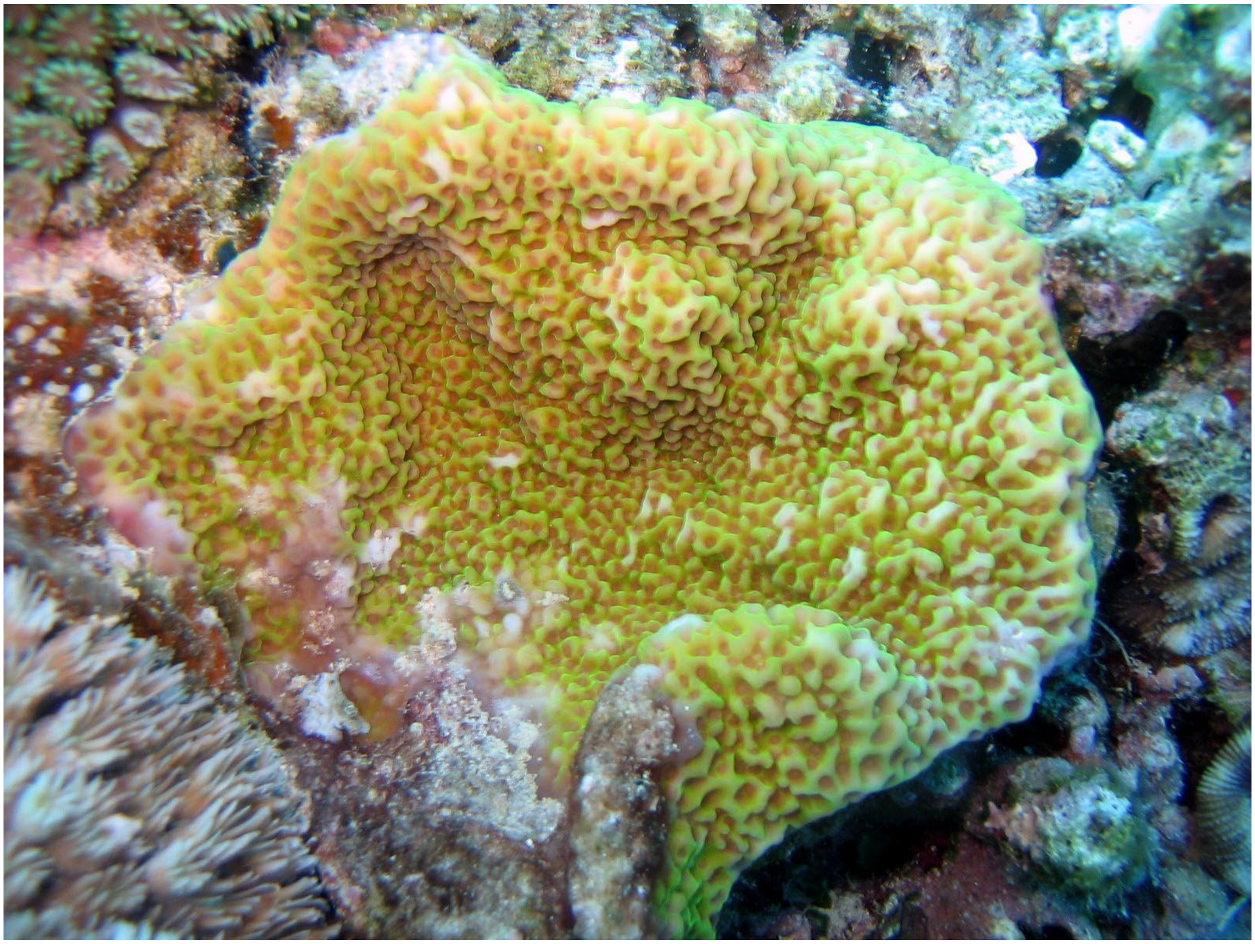
A close-up photo of *Montipora verrucosa*. The polyps are brown on this colony and easy to see.

Montipora undata

Colonies have verrucae that vary in size and shape with some or many verrucae fused into oval, elongated, curving and dividing shapes. The verrucae are more irregular in shape than on *Montipora verrucosa.*



A colony of *Montipora undata*.

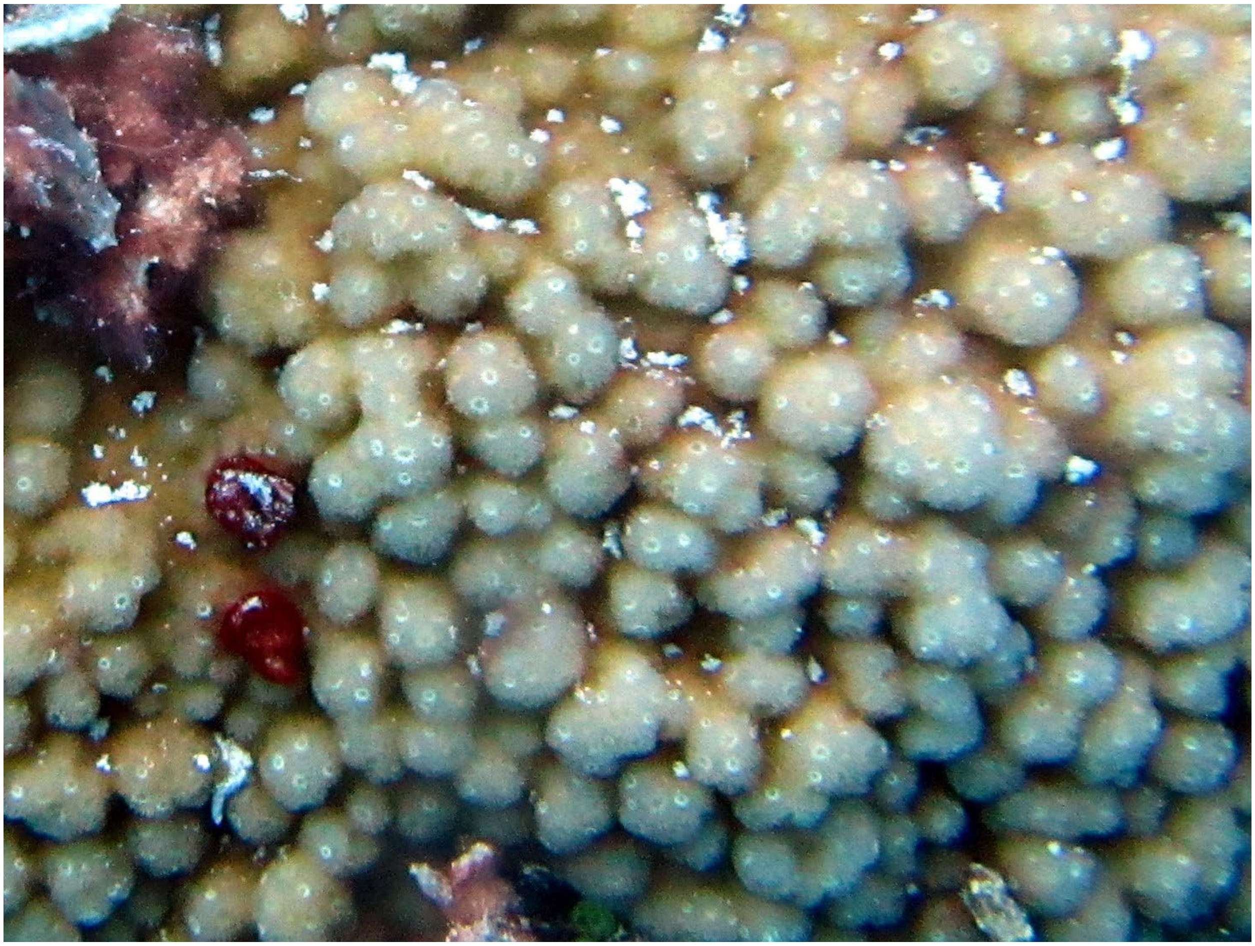


A colony of *Montipora undata*.

Montipora turgescens

Colonies have bumps of various sizes and shapes on them but no papillae, tuberculae or verrucae. There are corallites on the bumps. Also, the lumps are often larger than verrucae.

A colony of *Montipora turgescens*.



A close-up photo of *Montipora turgescens*.

Isopora *This used to be a sub-genus of Acropora*

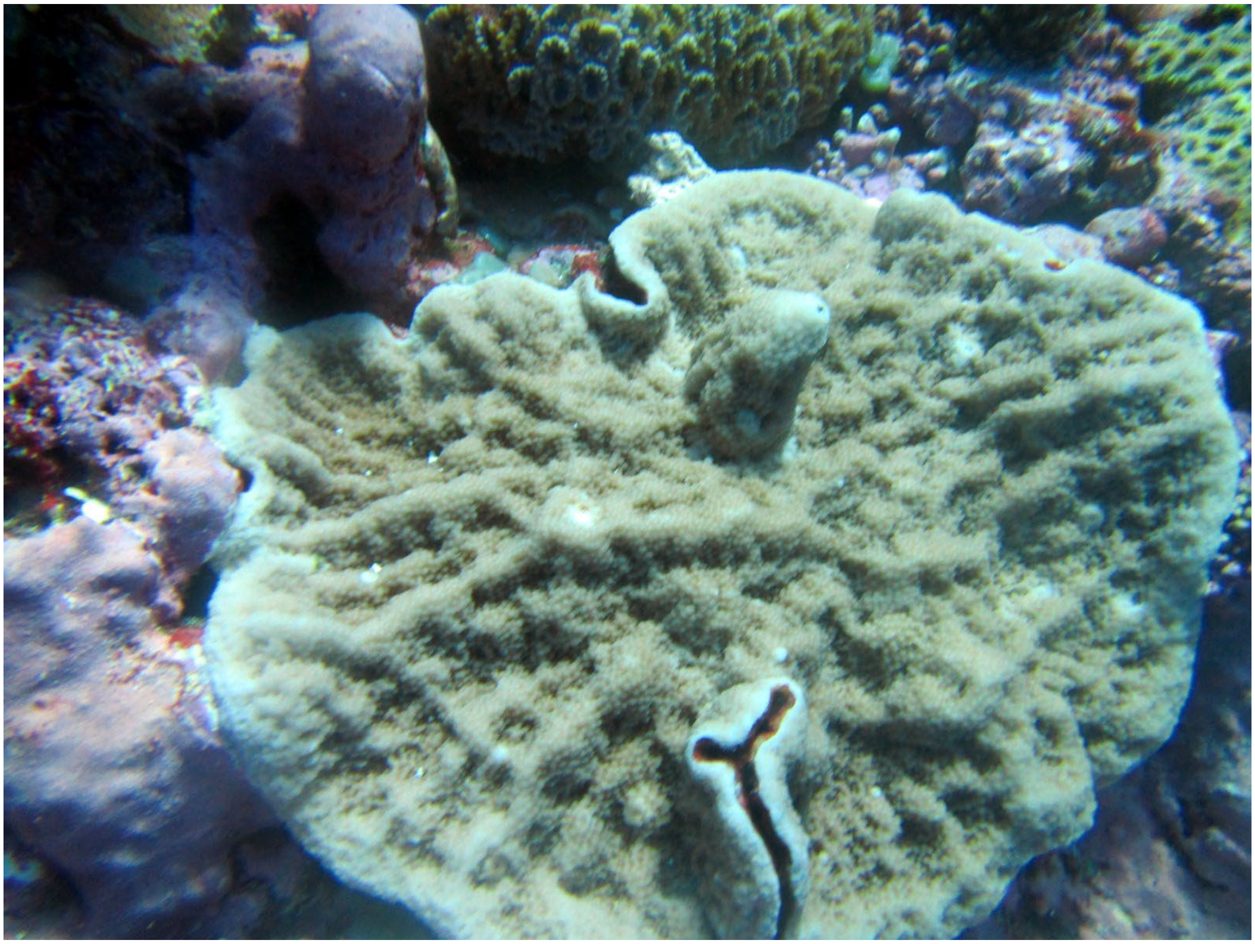
Colonies are encrusting, branching, or form wall-like structures called “cuneate”. Most branching colonies have thick branches, about the diameter of a wrist. Corallites are cylindrical and project. There are many corallites at the ends of thick branches, which are all the same. “Iso” means same. This used to be considered a sub-genus of *Acropora* but several features led to its elevation to its own genus. Not only does it have many equal corallites on the ends of branches, but all *Isopora* species are brooders while all *Acropora* species are broadcast spawners.

Isopora crateriformis Vulnerable Threatened

Colonies are encrusting, but may have raised edges. Colonies can reach nearly 50 cm diameter and often have rippled surfaces. Corallites project at 90 degrees from the surface, and are cylindrical with thick walls and rounded ends. Colonies are usually tan to rust colored, but may have green polyps. It is most common on upper reef slopes and absent from protected habitats. Other species of *Isopora* are usually branching, but may also be encrusting. *Isopora crateriformis* never has branches. *Isopora palifera* has larger corallites, but *Isopora cuneata* has the same size corallites. No feature other than colony shape distinguish *Isopora crateriformis* and *Isopora cuneata*, and intermediate colonies with bumps or stubby branches do exist some places. Wallace (1999) accepts this species tentatively, saying it and *Isopora cuneata* may be just one species.

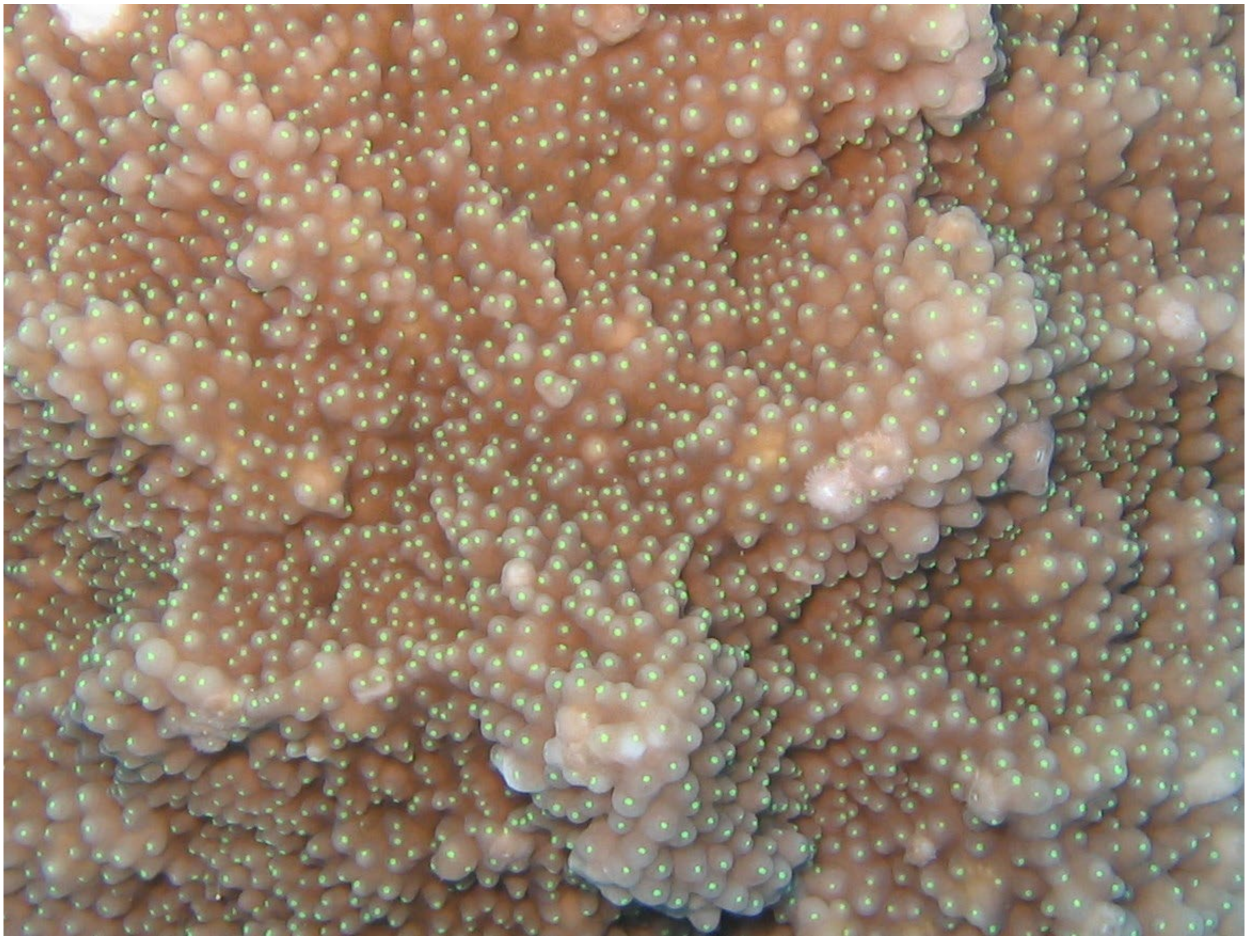
A colony of *Isopora crateriformis*.

A colony of *Isopora crateriformis*.



This colony of *Isopora crateriformis* has thick, rounded ridges.

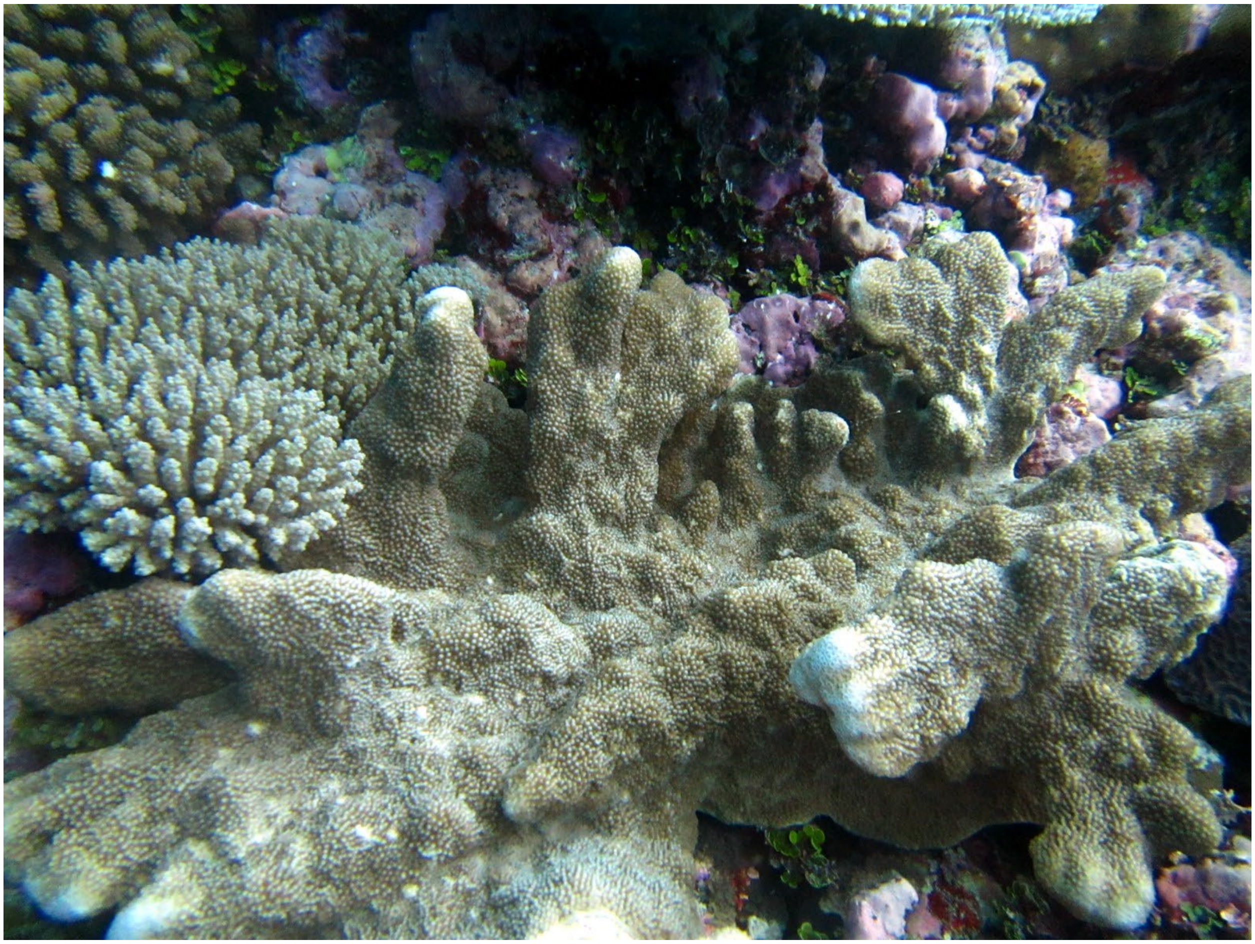
A colony of *Isopora crateriformis*.



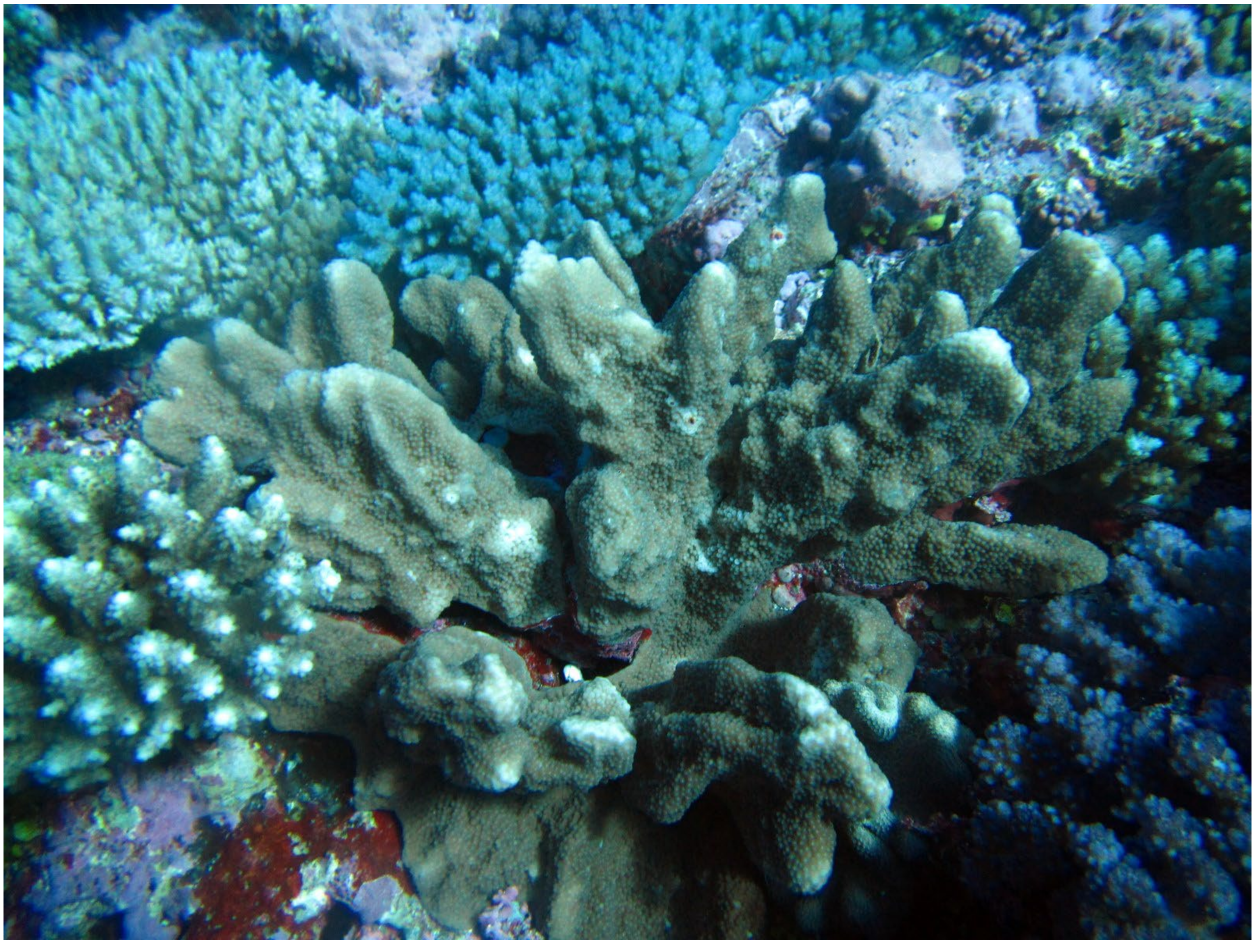
A close-up photo of a colony of *Isopora crateriformis* with green polyps.

Isopora cuneata or Isopora palifera I. cuneata is Vulnerable

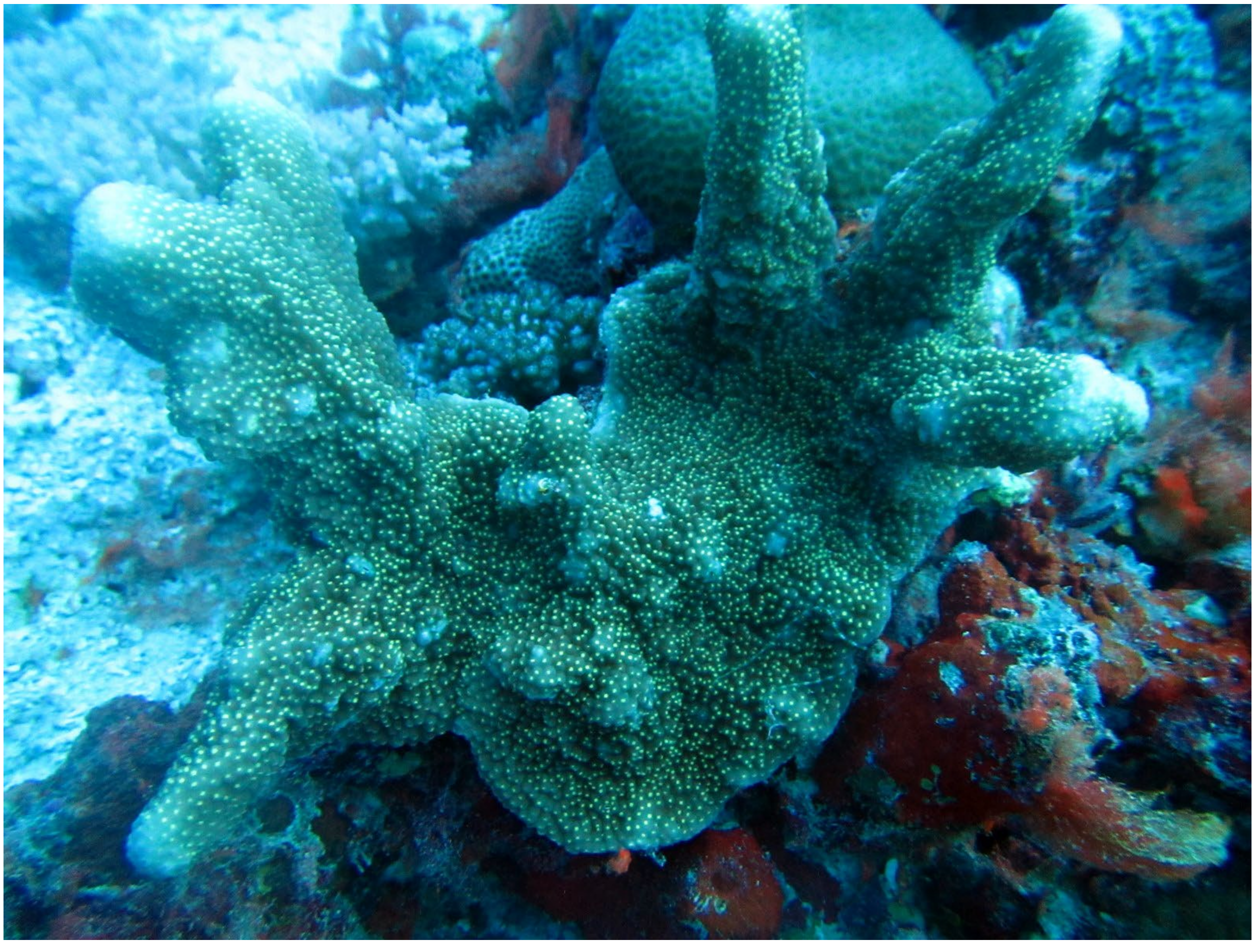
Branching colonies can be either species, but vertical wall-shapped colonies are only *Isopora cuneata*. Branches have thick oval or irregular cross sections and rounded ends. The corallites are slightly larger on *Isopora palifera* than on *Isopora cuneata*, which may be most noticabe on branch ends. This difference is difficult to detect unless the two species are side by side. Corallites on branch sides of *Isopora palifera* are inclined towards the branch end, but they are not inclined on *Isopora cuneata*. Branches may be smoother and more regular on *Isopora palifera* than *Isopora cuneata*, but that may not be a reliable cue. Colonies can have an encrusting base. The corallites of *Isopora crateriformis* are identical to those of *Isopora cuneata*.



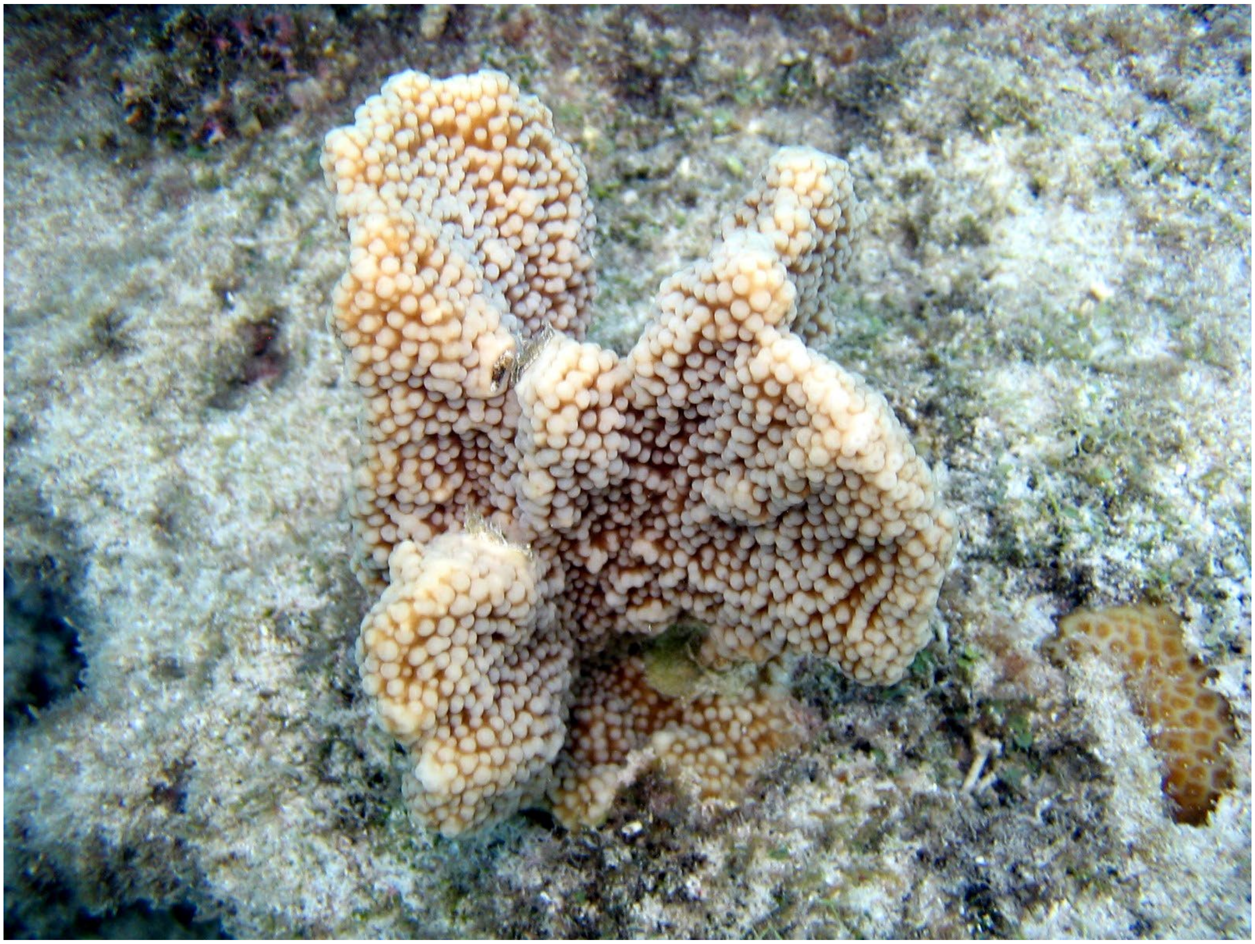
A photo of a colony of *Isopora cuneata* or *Isopora palifera*.



A photo of a colony of *Isopora cuneata* or *Isopora palifera*.



A photo of a colony of *Isopora cuneata* or *Isopora palifera*.



A photo of a wall-shaped colony that is probably *Isopora cuneata*.

A photo of a branch tip that has larger corallites, and thus may be *Isopora palifera*.

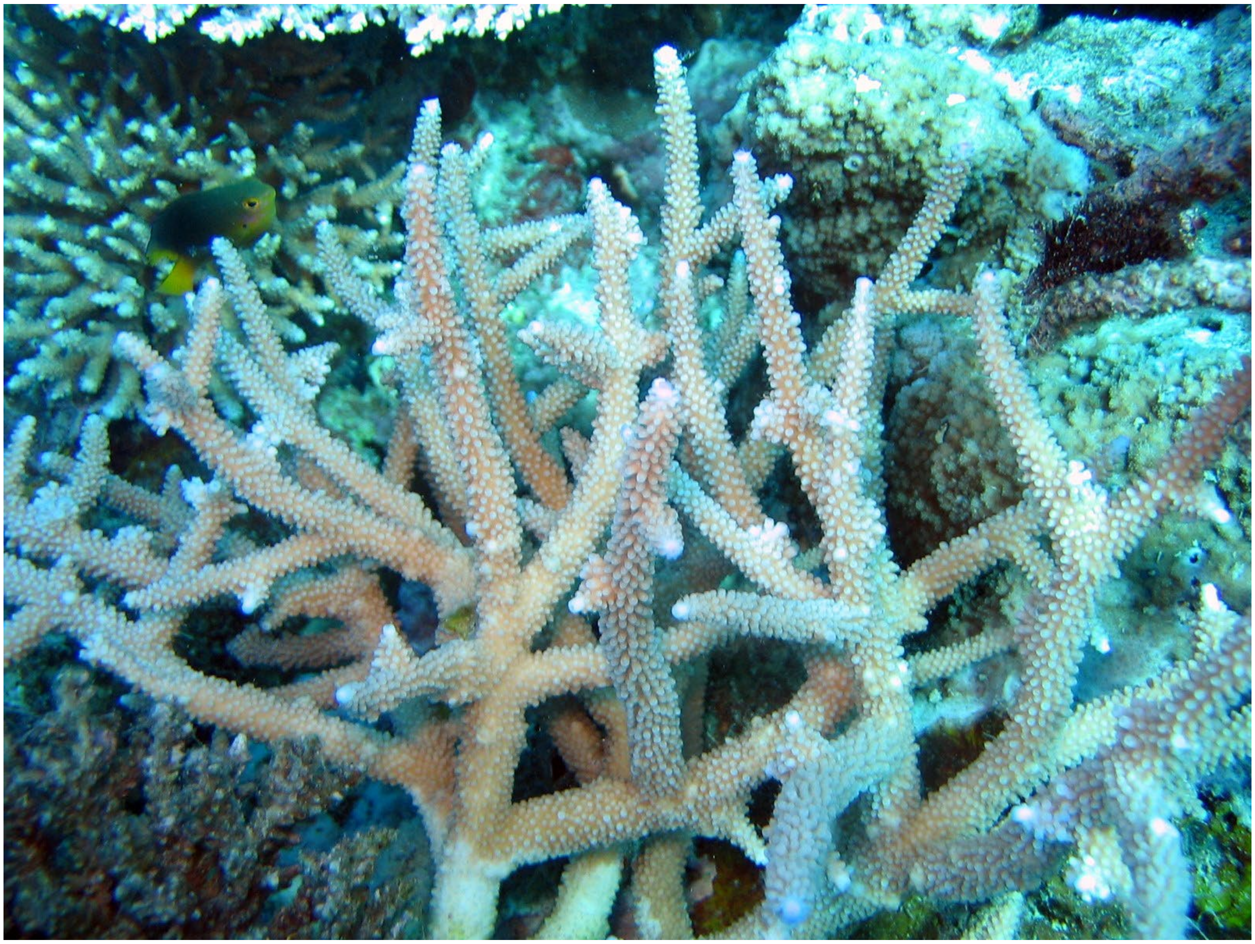
Acropora

Corals are always branching, and always have just one corallite on the end of each branch called an "axial" corallite, and many corallites on the sides of branches, called "radial" corallites. Axial and radial corallites are usually different. The two most helpful things for identifying *Acropora* species are the colony shape and the shapes of the radial corallites. The radial corallites are always tiny. They are typically about 2 mm wide on the outside and 1 mm wide on the inside (the calice of the corallite). So that is often hard to see. The main shapes of colonies are staghorns, which are deer antler-shaped, digitate which is like vertical fingers, corymbose which has a small base and spreads with vertical thin branchlets on top, table which has a column that holds a flat thin table-top up, the table top having tiny branchlets, bottlebrush ("hispidose"), and bushy which has branches of different sizes going in all directions. *Acropora* is the largest genus with 165 species currently known, and it often dominates some reefs, so it is very important. *Isopora* has many corallites on branch ends, no other genus has just one corallite on branch tips. *Isopora* used to be a sub-genus of Acropora, but no longer is.

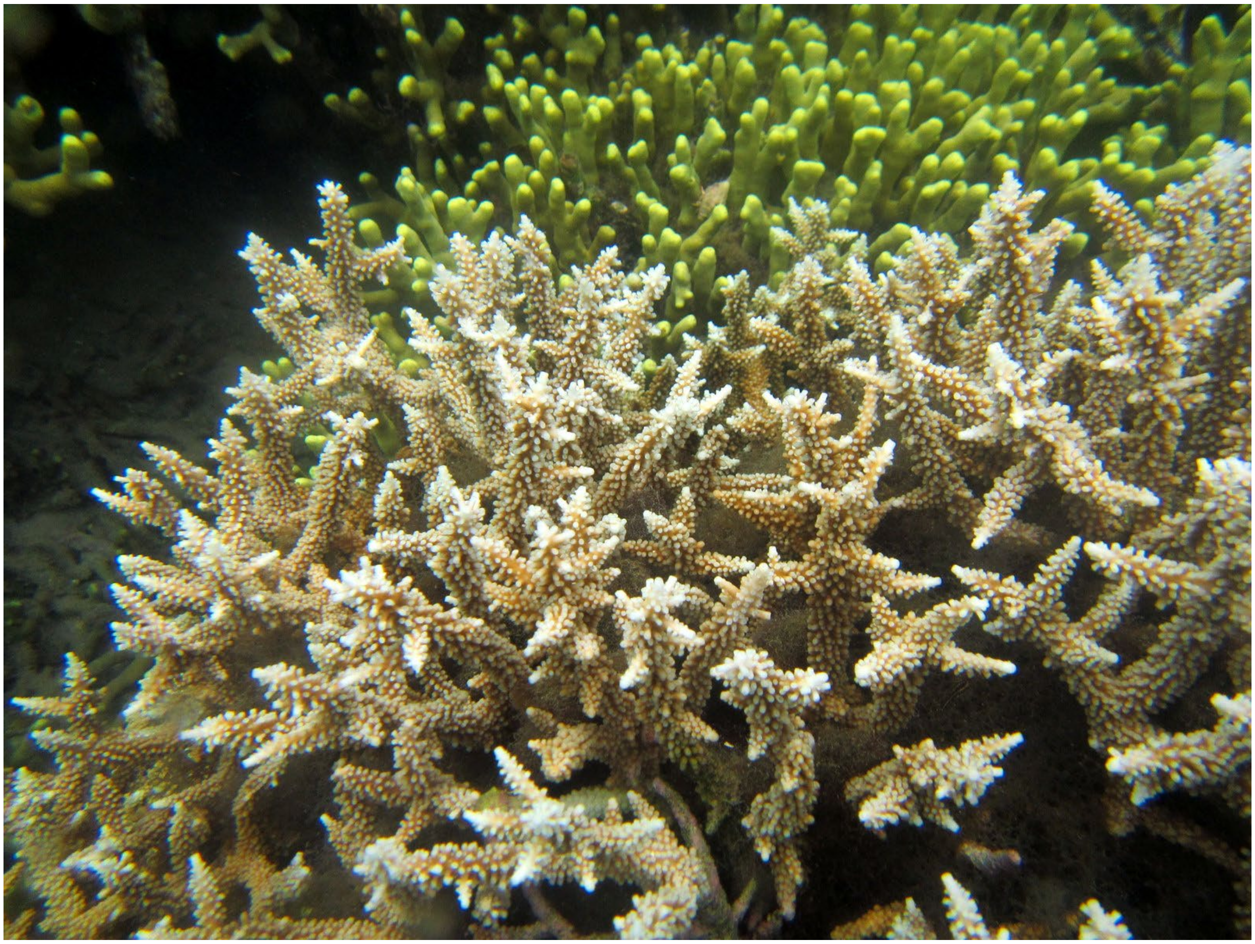
Staghorns: corals that look like deer antlers, with cylindrical branches that taper to a sharp tip.

Acropora muricata Formerly called Acropora formosa

Colonies are staghorn, with middle-size diameter branches. Radial corallites are tubular and fairly long, with tubular openings. Only one size of radial corallite can be seen. *Acropora intermedia* has larger basal branches and two sizes of radial corallites, with openings tilted towards the branch tip. *Acropora pectinatus* has tubular radial corallites with the opening a thin slit cut at an angle pointing towards the branch tip. *Acropora microphthalma* is similar but branches are smaller and it is usually white.



Branches of *Acropora muricata*.

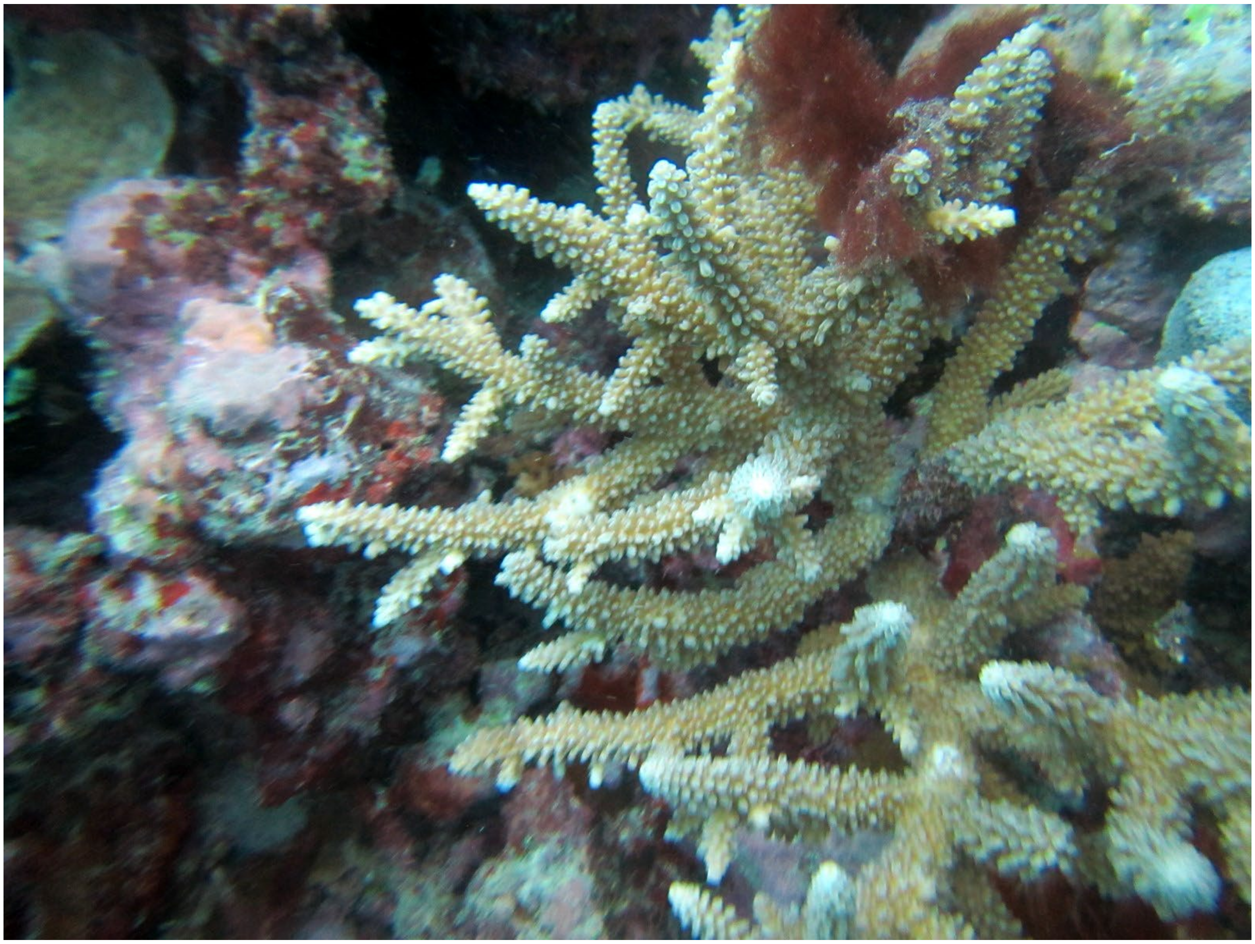


A photo of a thicket of *Acropora muricata*.

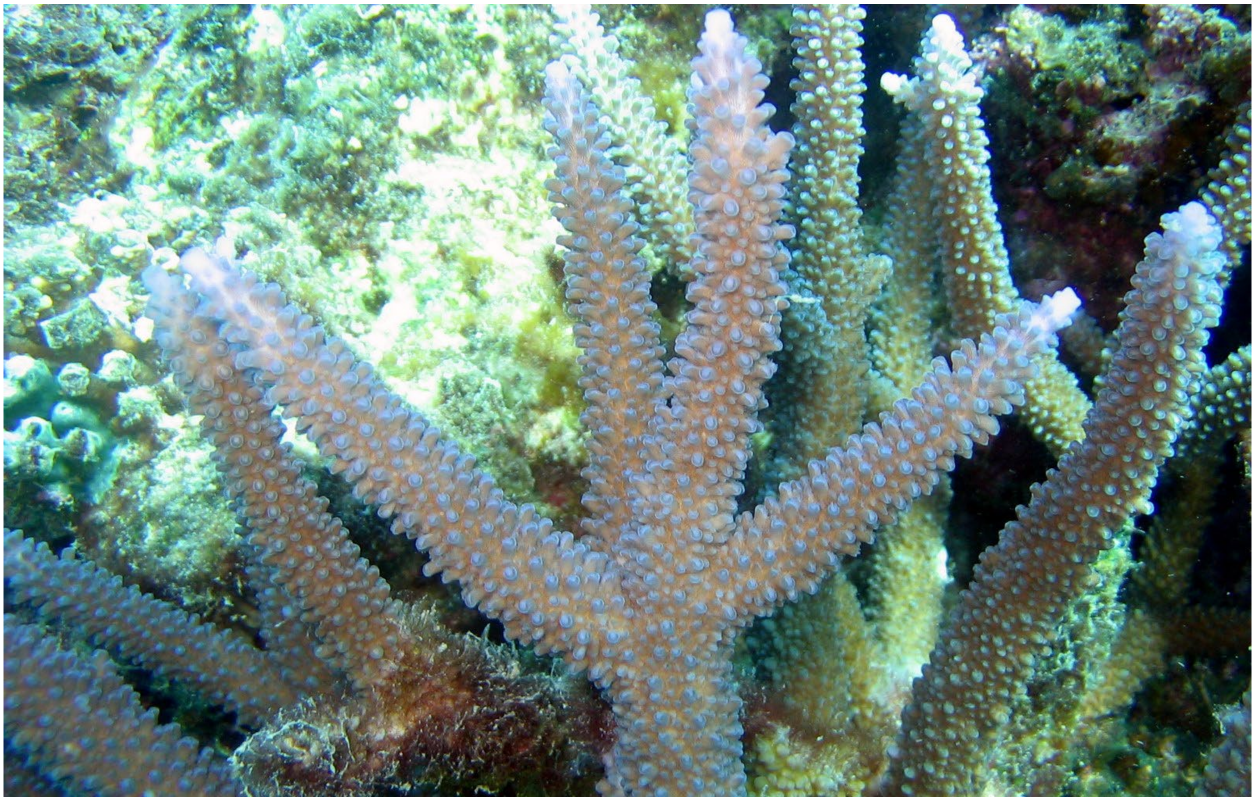
A closer photo of *Acropora muricata*.

Acopora intermedia   Formerly called *Acropora nobilis*

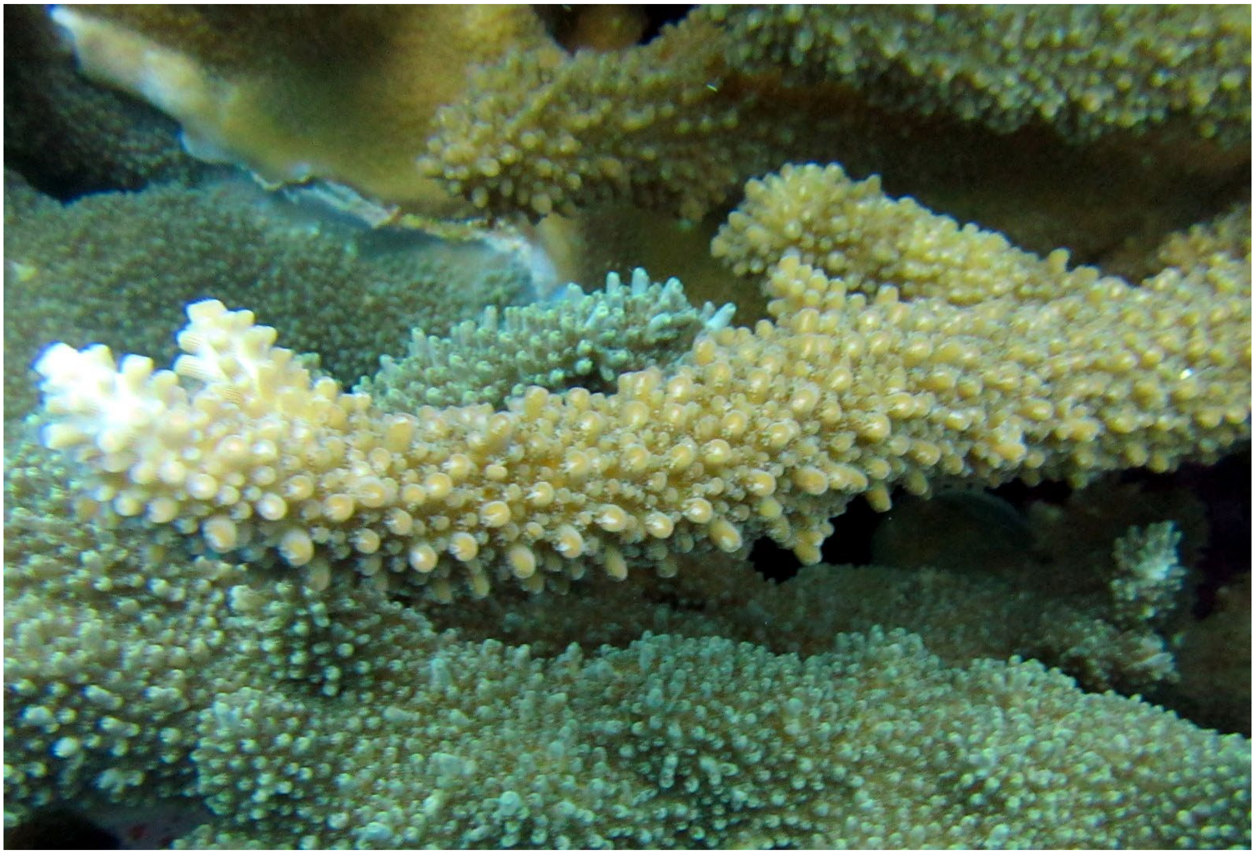
Colonies form fairly long branches that are cylindrical and taper to a sharp point. Corallites on the sides of the branches (radial corallites) are two sizes, larger and smaller and are usually close together. Radial corallites project from the branch, are tubular, and have openings cut at an angle so the opening points towards the branch tip. Branches and radial corallites are thicker than on *Acropora muricata* and *Acropora myriophthalma*, there are two sizes of radial corallites, and radial corallites are tilted more obviously towards the branch tip. *Acropora pectinatus* has only one size radial corallites (long) and radials are not so close together.



A photo of *Acropora intermedia*.



A closer photo of a colony of *Acropora intermedia*

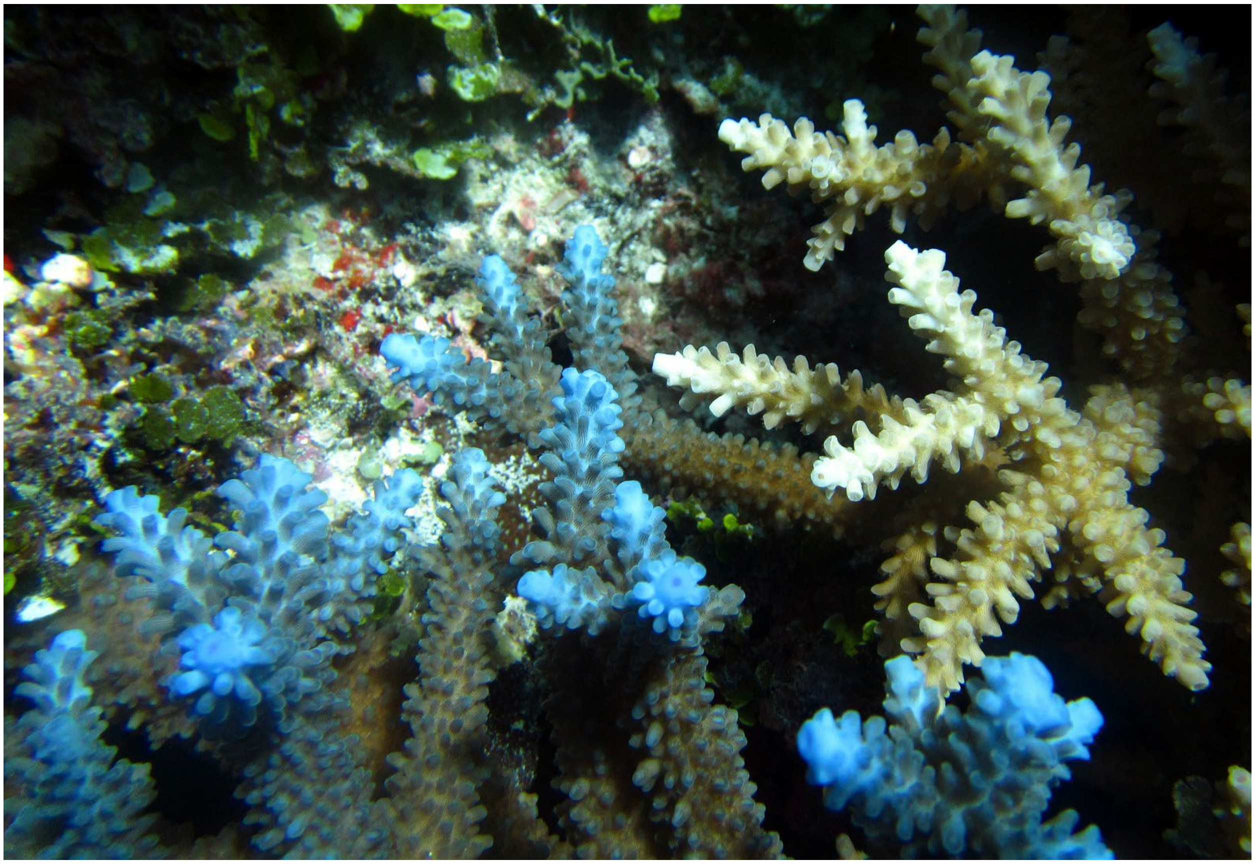


A close-up photo of *Acropora intermedia*.

Acropora pectinatus

Colonies are staghorn shaped. The radial corallites are uniform, long and tubular and may have space between them and be in rows down branches. The openings are cut at an angle with a slit opening facing towards the branch tip. *Acropora intermedia* has two sizes of radial corallites which are usually close together, shorter, and not in rows.

A small thicket of *Acropora pectinatus*. This colony has blue tips while other colonies are brown or yellow.

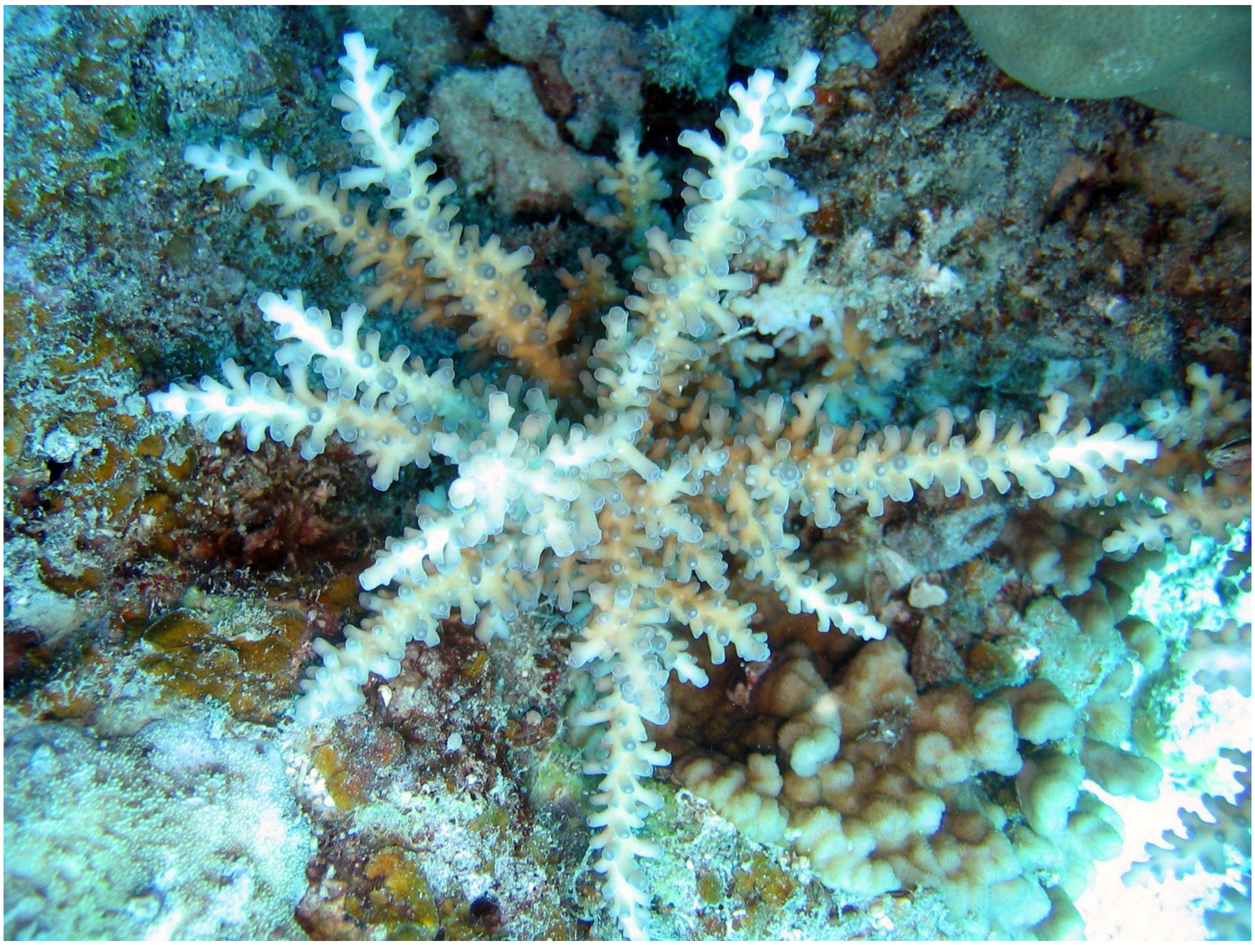


A closer photo showing both blue and tan colonies of *Acropora pectinatus*.

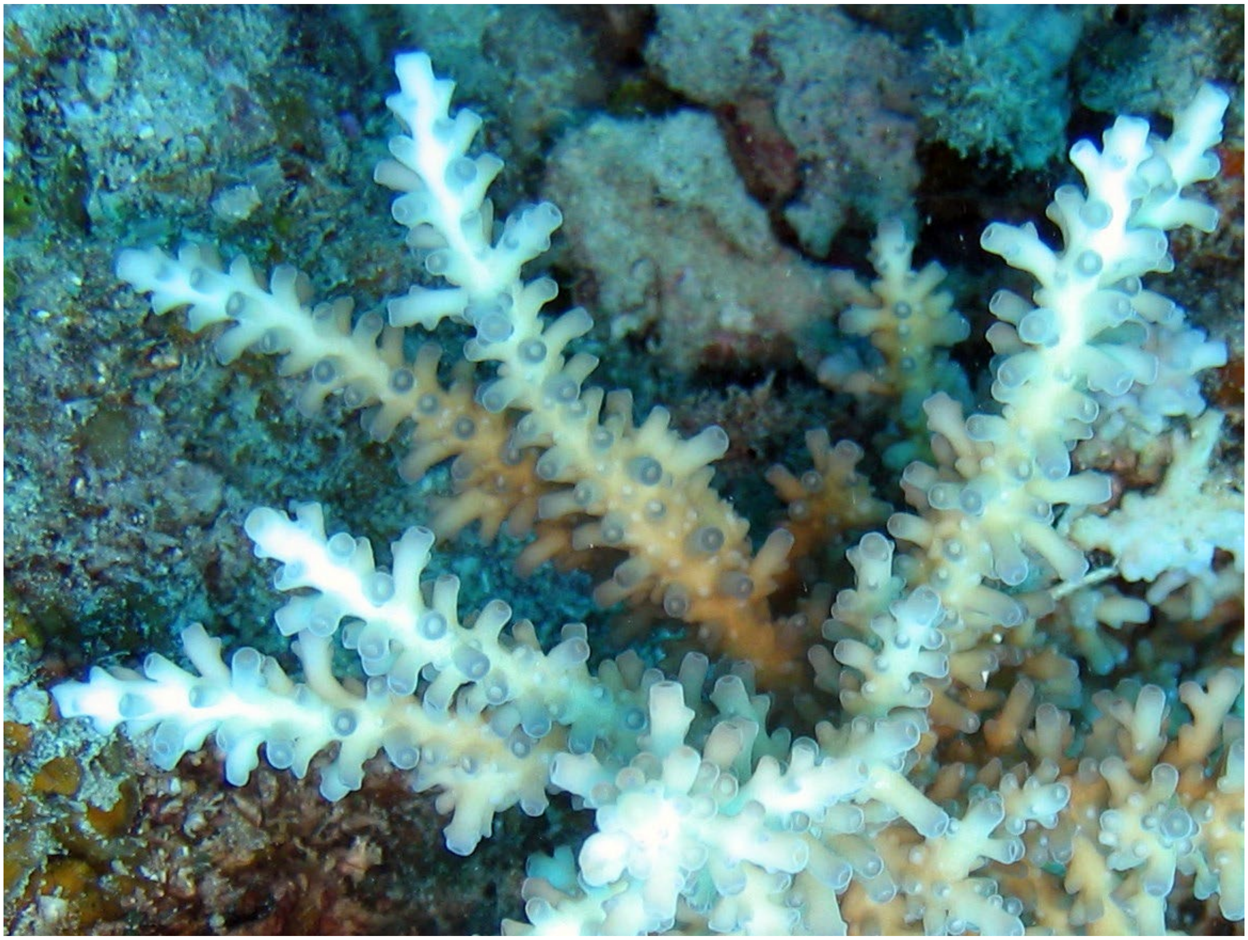
A close-up photo of *Acropora pectinatus*.

Acropora gomezi

Colonies have branches that are surrounded by near-uniform radial corallites that project nearly at right angles to the branch. The radial corallites have thick walls and tubular openings that are not slanted to point towards the branch tip. Some radial corallites are longer and are incipient axials, and even longer incipient axials have a few radials of their own. Radial corallites on *Acropora pectinatu* are thinner and their openings are slanted towards that branch tip. Some bottlebrush species look like this species, especially *Acropora longicyathus*, but have longer, thinner radials on thicker branches. Wallace calls this *Acropora abroholsensis* and Veron has adopted that, but that species is clearly different, with shorter radial corallites.



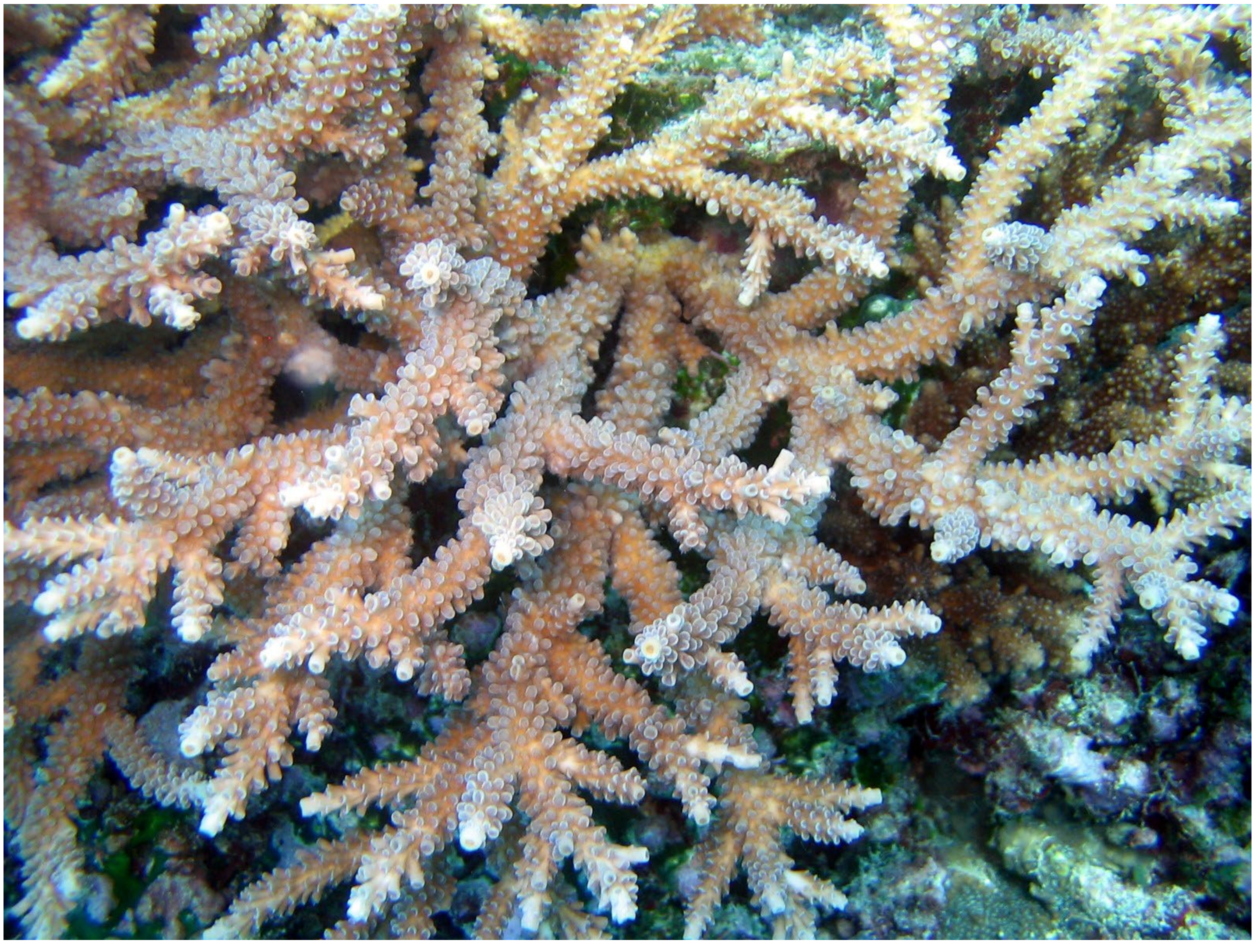
A colony of *Acropora gomezi*.



A close-up photo of *Acropora gomezi*.

Acropora yongei

Colonies are staghorn-shaped, but branch often. The axial corallite is tubular and medium size. Radial corallites have large, expanding openings that are cut at an angle pointing towards the branch tip. Radial corallites are cut at and angle with thiin walls forming a lower lip unlike on most staghorns.

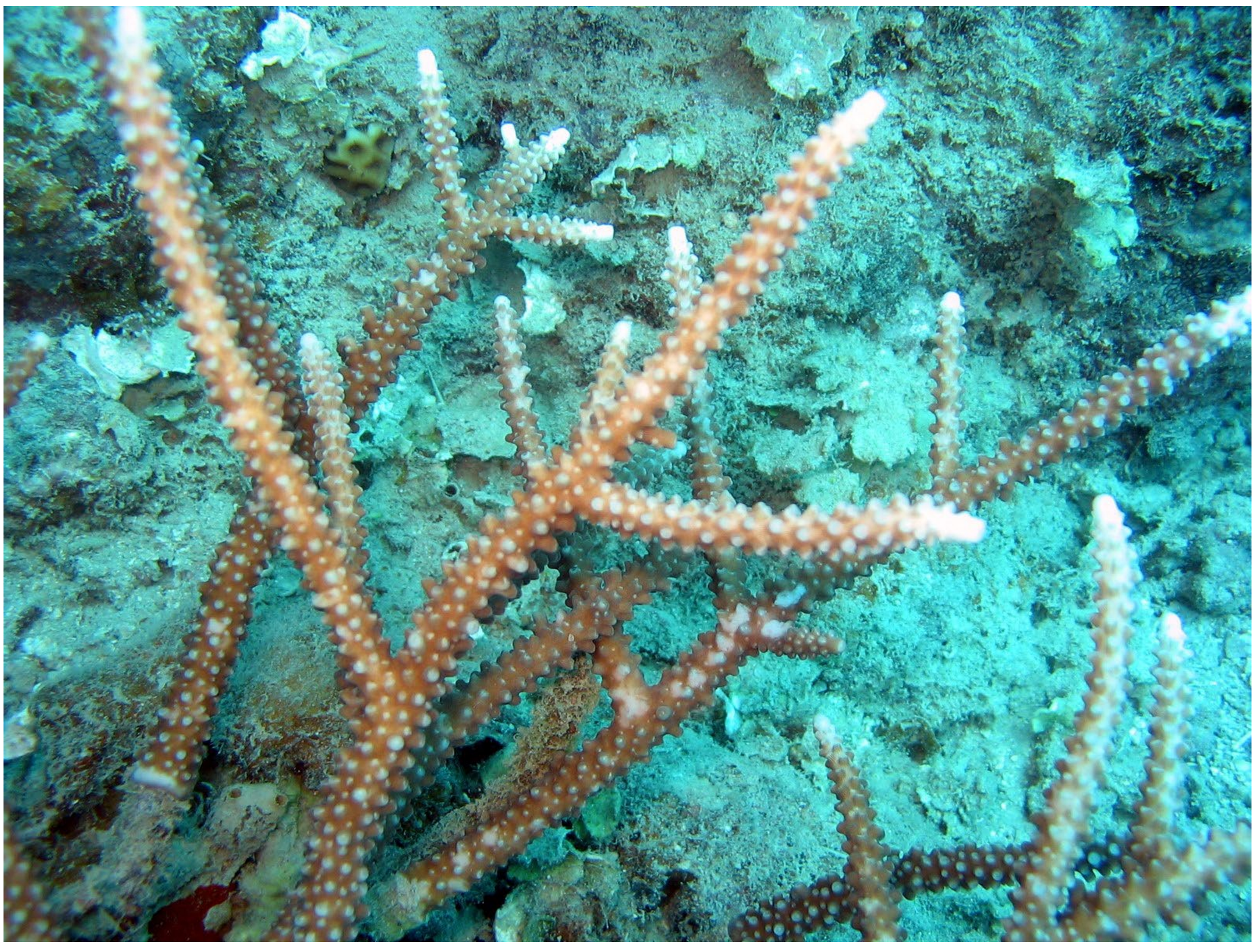


A photo of a thicket of *Acropora yongei*.

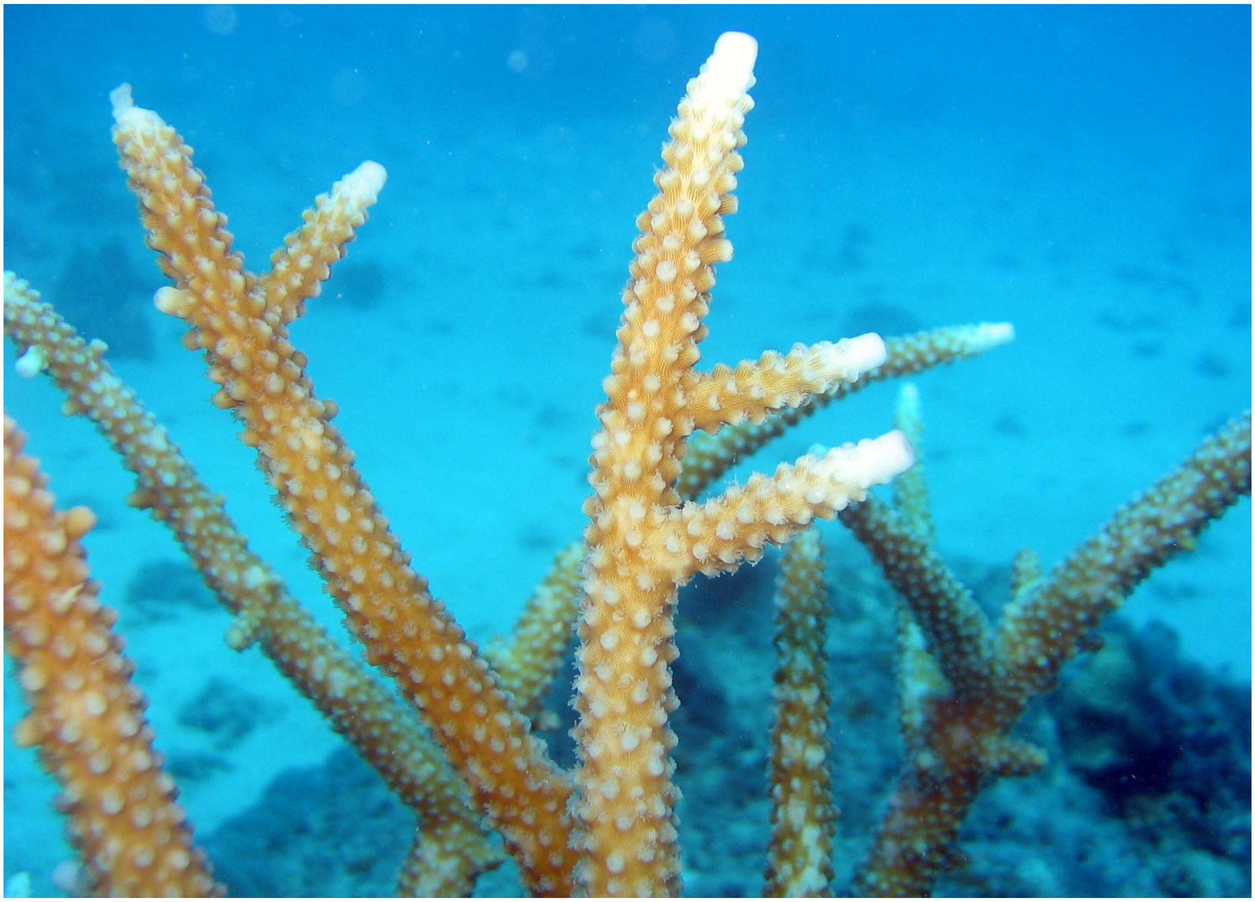
A close-up photo of *Acropora yongei*.

Acropora cf. *teres* Vulnerable

Colonies have staghorn shaped branches that may be quite long, thin near branch tips and thicker nearer to bases. The axial corallites are large, long, tubular and blunt ending, so branches have relatively blunt tips. Most radial corallites are tubular, small, short, inclined towards that branch tip, and widely spaced. In some spots two lengths of radial corallites can be distinguished but on most of the branches there is only one size. Down the branches the radials become immersed. *Acropora lovelli* has many more side branches and the axial corallite is short and dome shaped, plus the branch tapers more towards the tip. Radial corallites are shorter than other *Acropora.*



A photo of branches of *Acropora* cf. *teres*.


A closer photo of branches of *Acropora* cf. *teres.*

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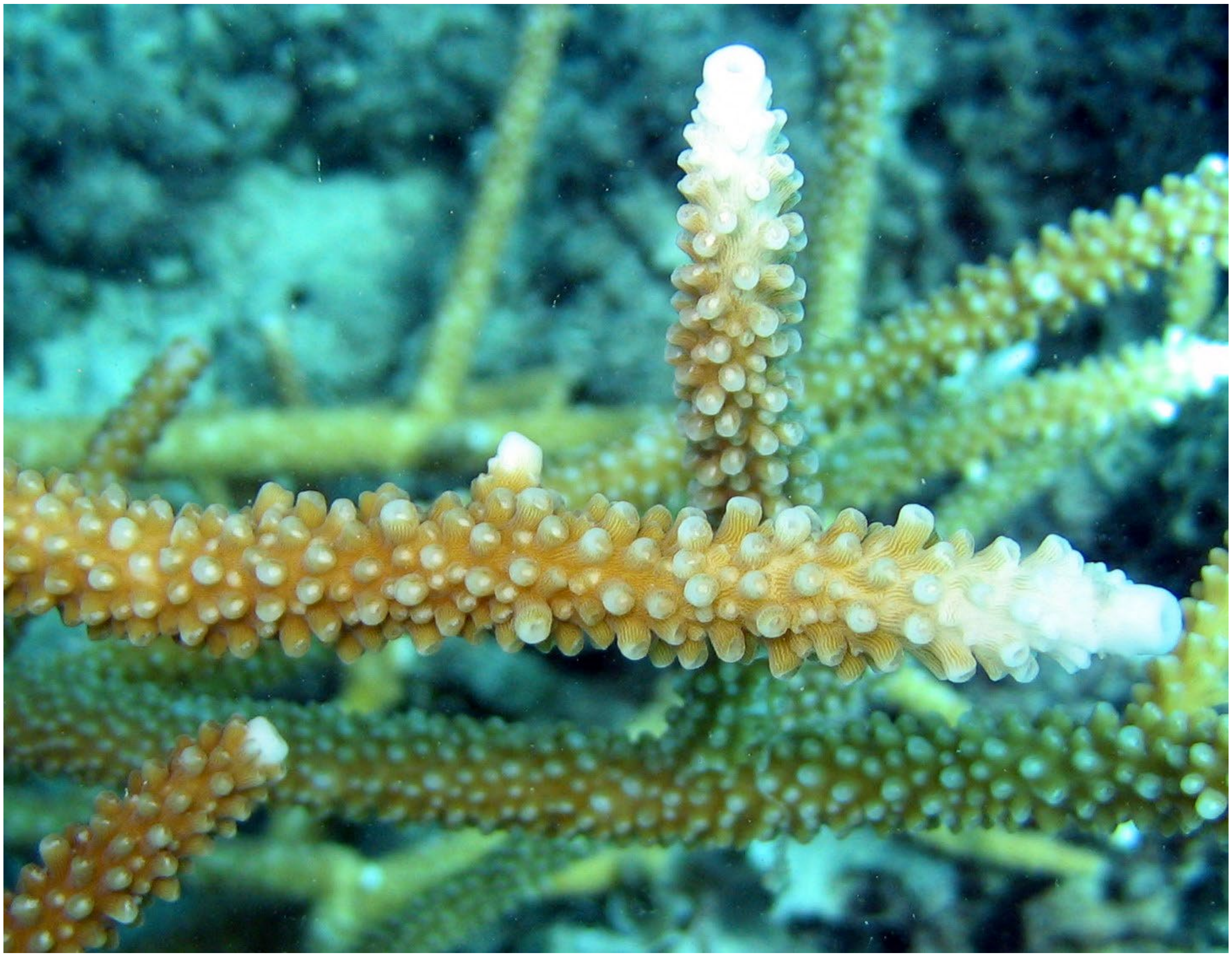
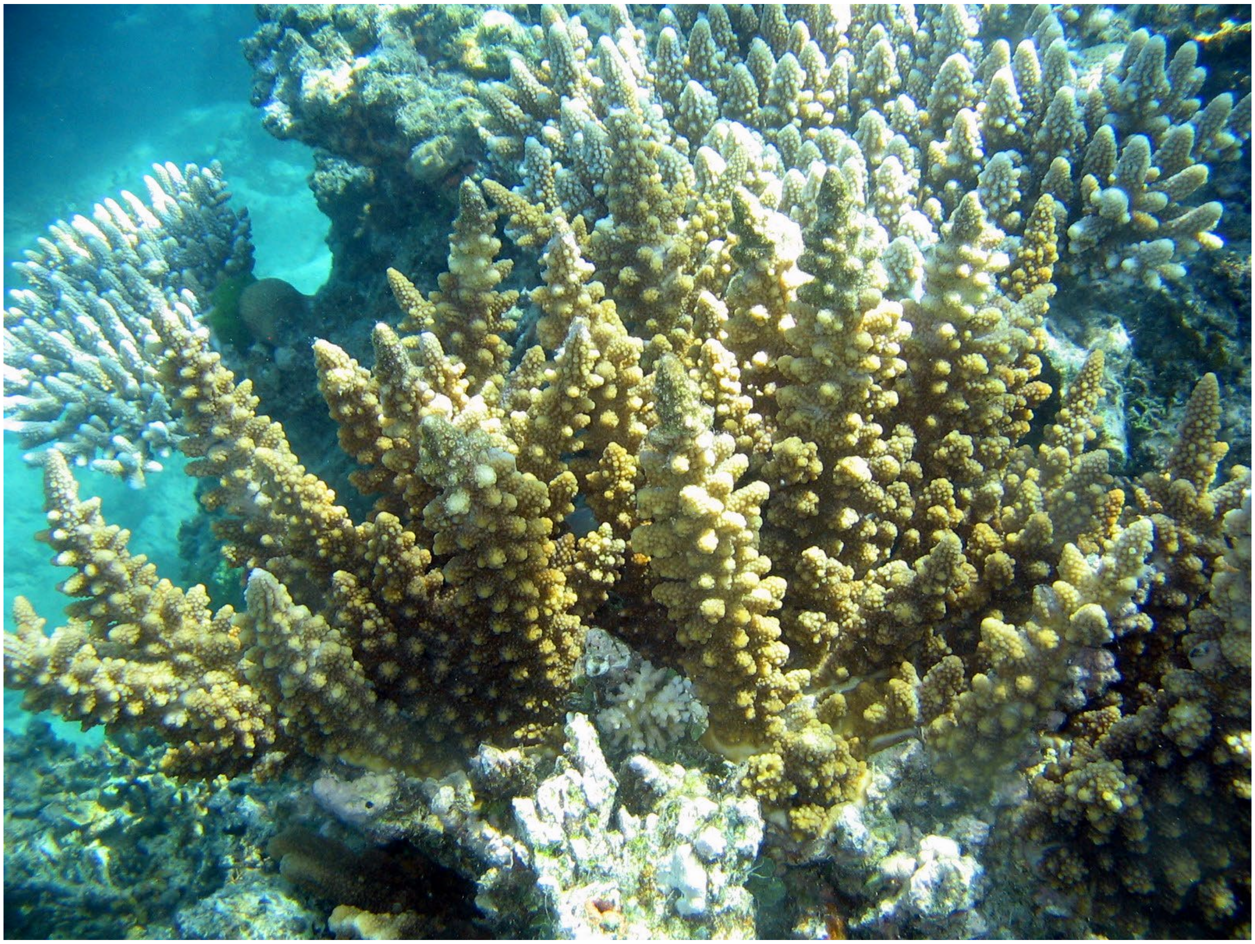
A photo of far down the branch of *Acropora* cf. *teres.*



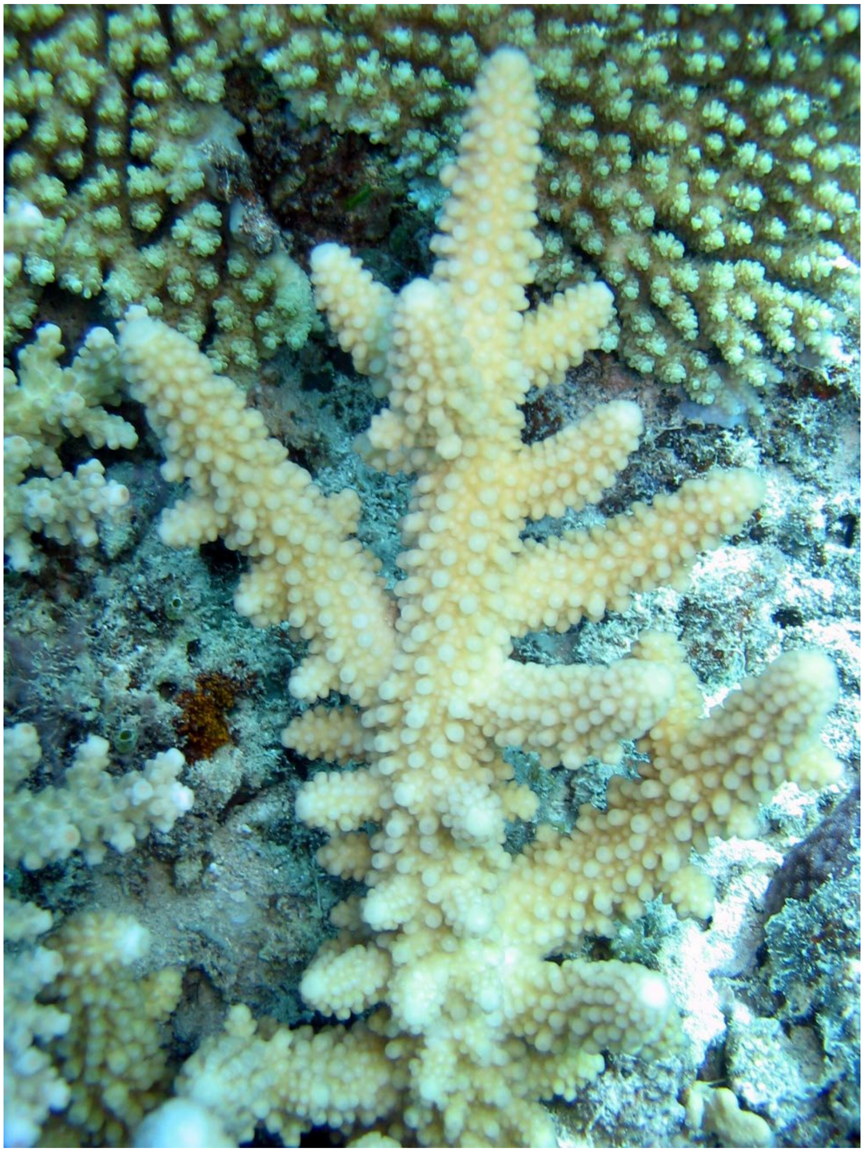
A close-up photo of *Acropora* cf. *teres*.

Acropora wallaceae

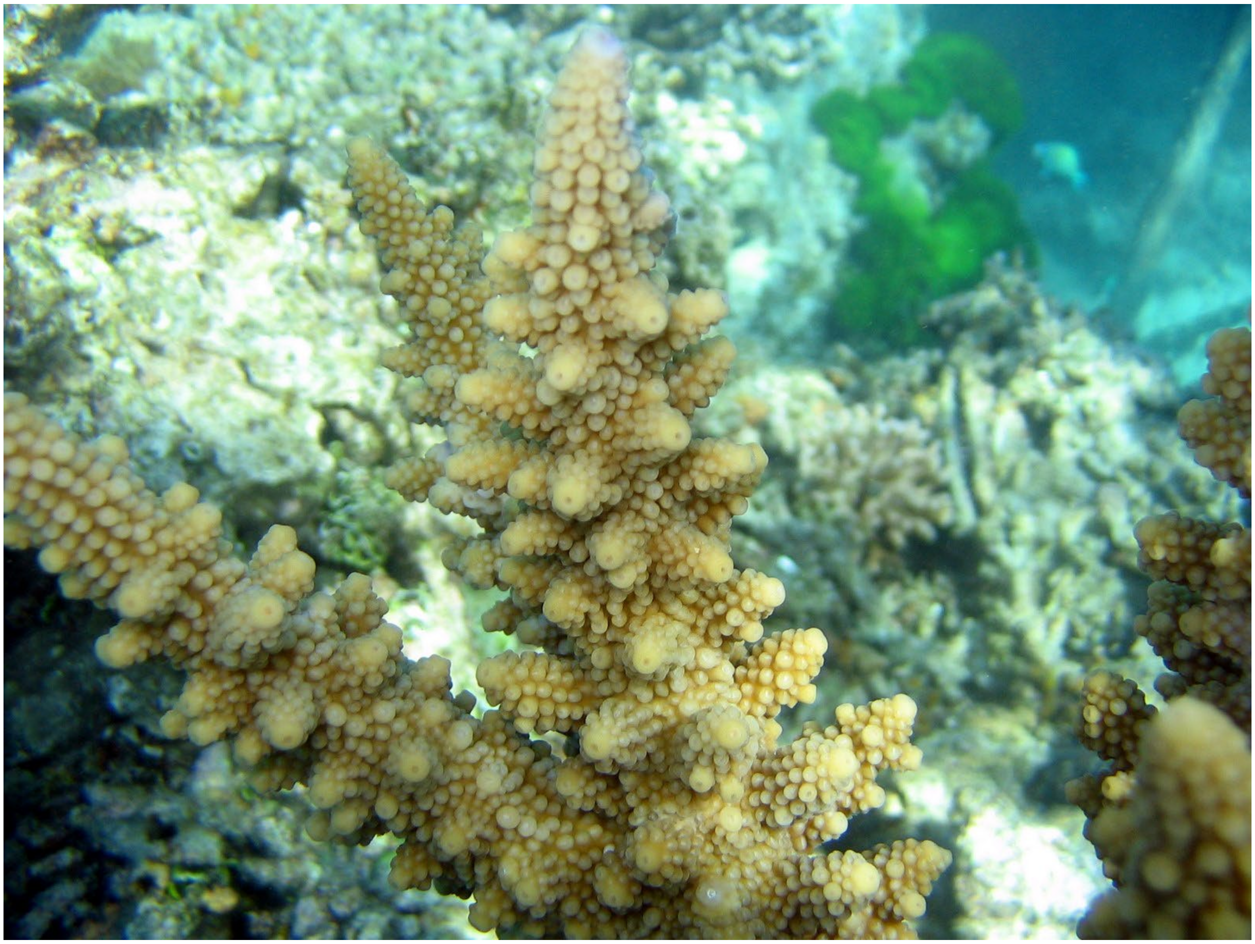
Colonies are branching and can vary between having a very thick tapering main branch to more arborescent. There are often small stubby side branches, which often have sub-branches. The axial corallites are large and branch ends rounded looking. Side branches are larger and more numerous than on *Acropora lutkeni* and usually have sub-branches. Side branches are not as uniform as on *Acropora florida*.



A photo of a colony of *Acropora wallaceae* with any thick tapering branches with many stubby side branches.



A photo of a branching colony of *Acropora wallaceae*.

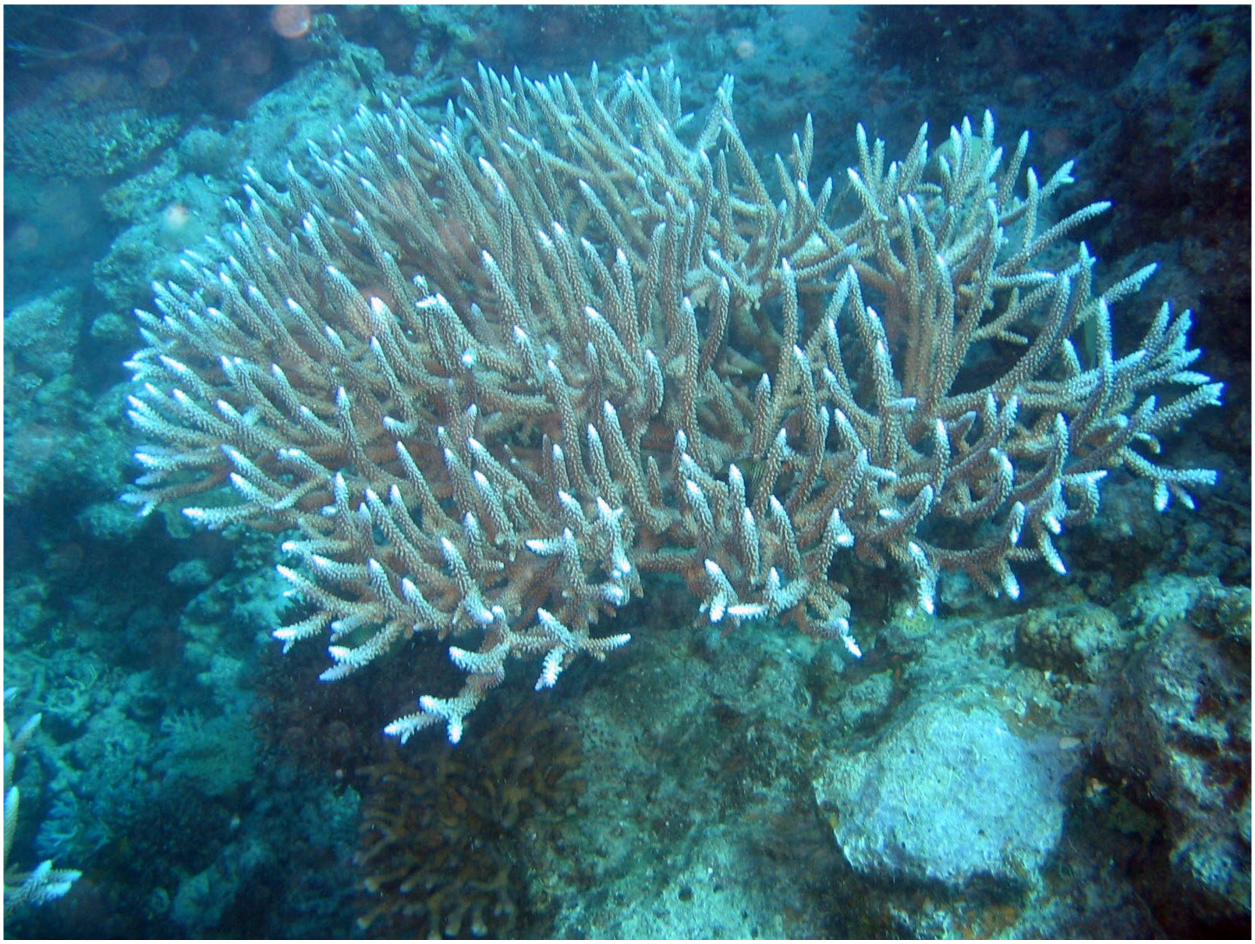


A close photo of a branching colony of *Acropora wallaceae* with many stubby side branches.

A close-up photo of *Acropora wallaceae*.

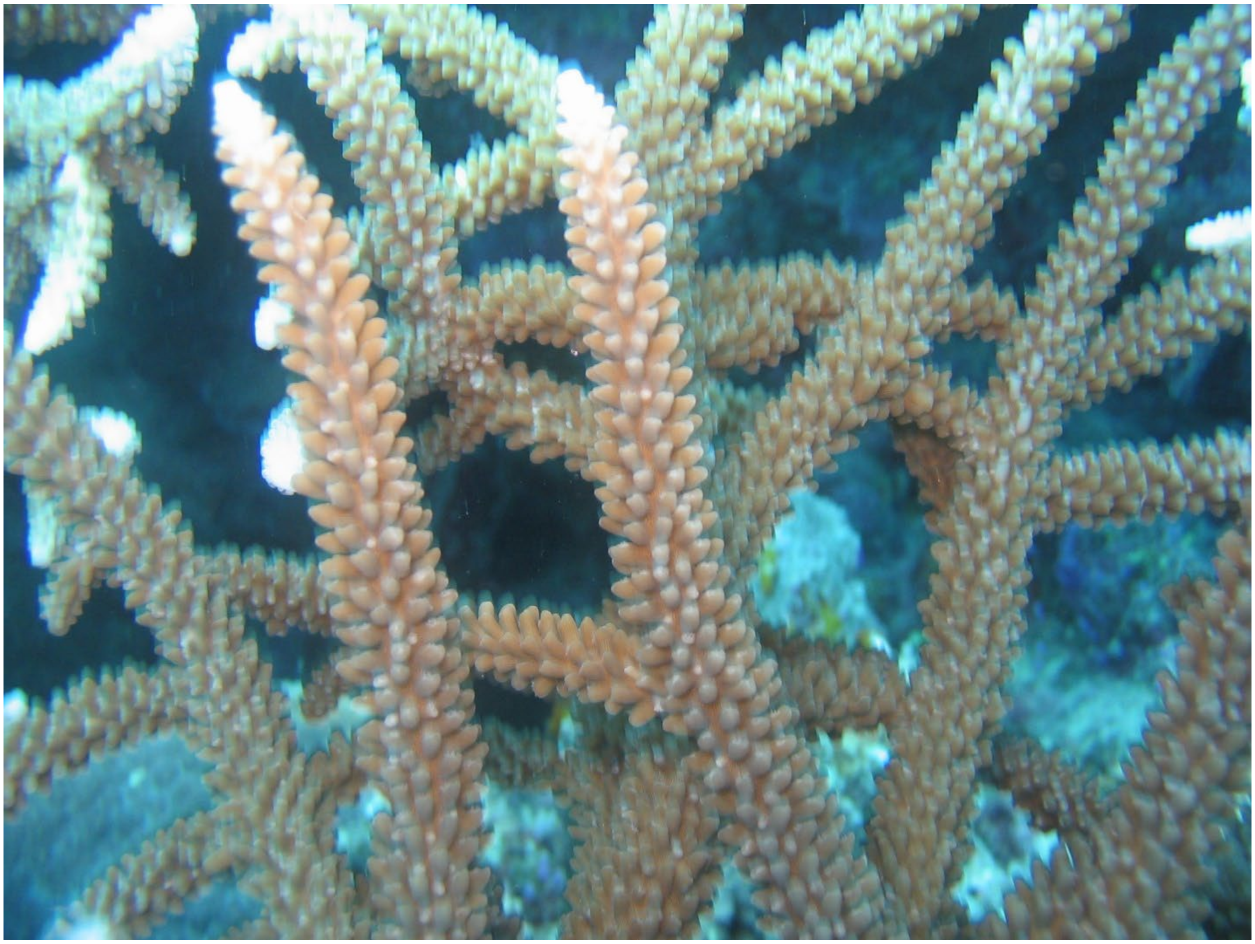
Acropora valenciennesi

Colonies are discrete and branches are like staghorn but with relatively little side branching. Branches in the middle of the colony grow nearly vertically and parallel, while at the edges of the colony, branches grow outward and then curve upward. Branches taper to a sharp tip that has a small tubular axial corallite. Radial corallites are tubular and uniform and have upward pointing openings. *Acropora robusta* has thicker branches that usually are shorter, shorter radial corallites with larger openings, and prefers shallow areas nearer the reef crest.



A photo of a colony of *Acropora valenciennesi*.

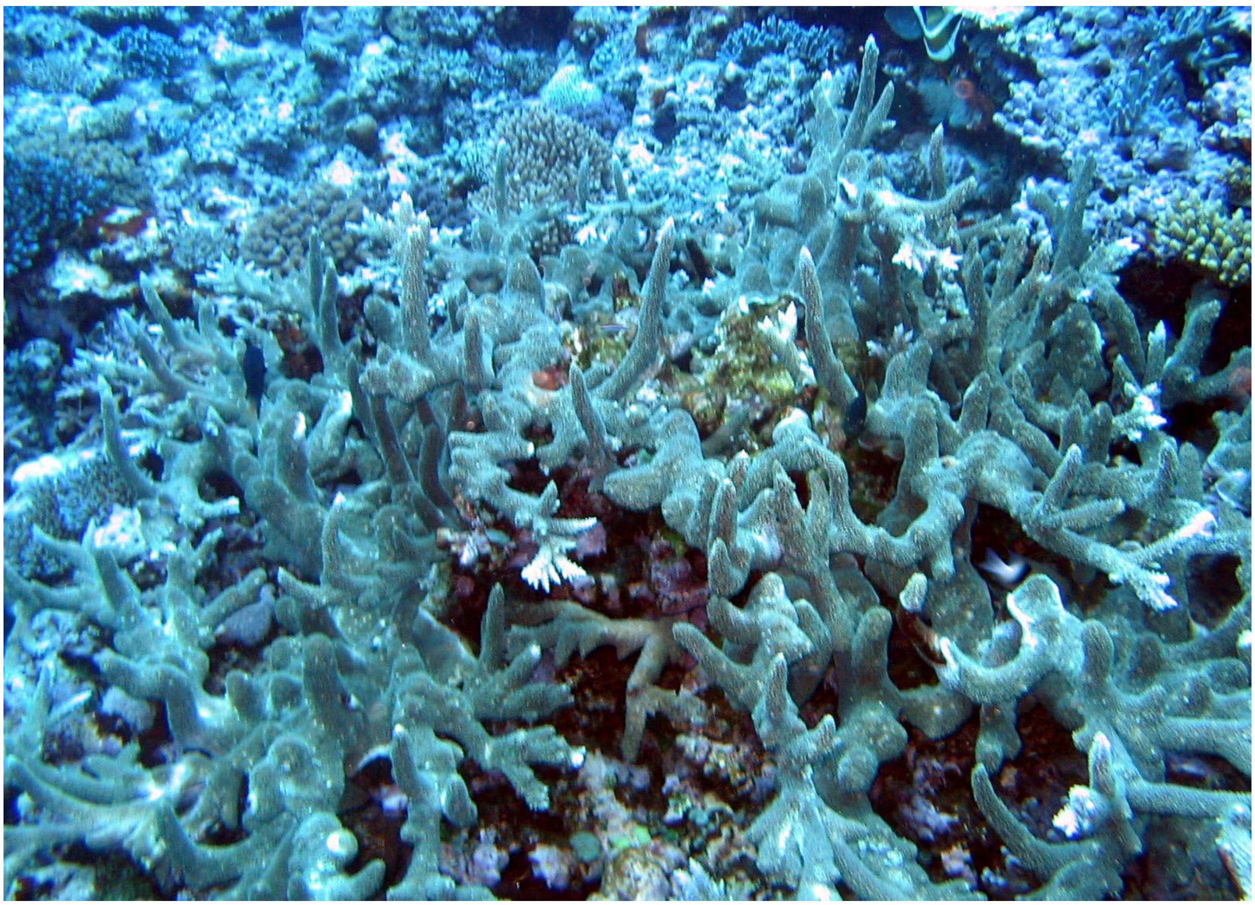
A closer photo of *Acropora valenciennesi*.



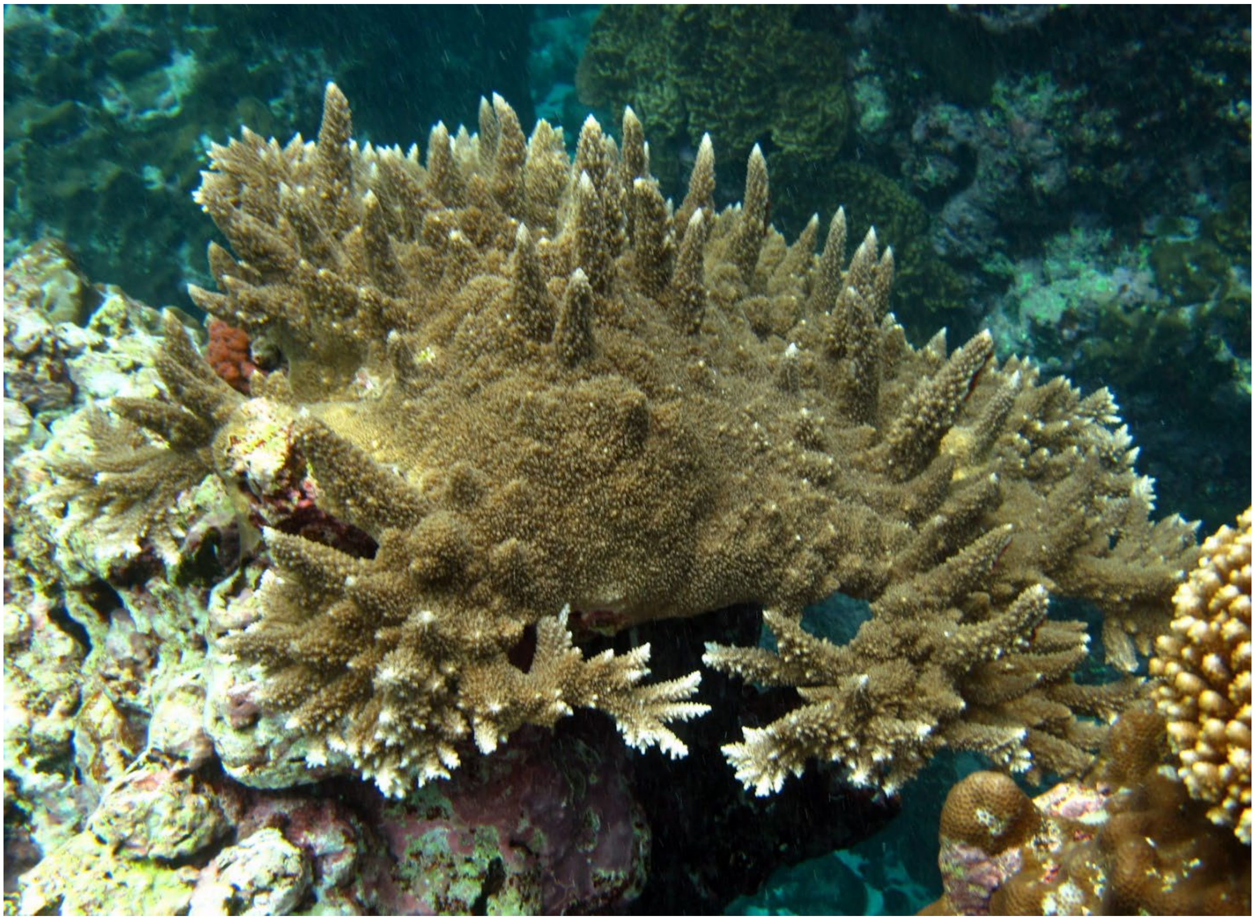
A close-up photo of *Acropora valenciennesi*.

Acropora abrotanoides Formerly called Acropora danae

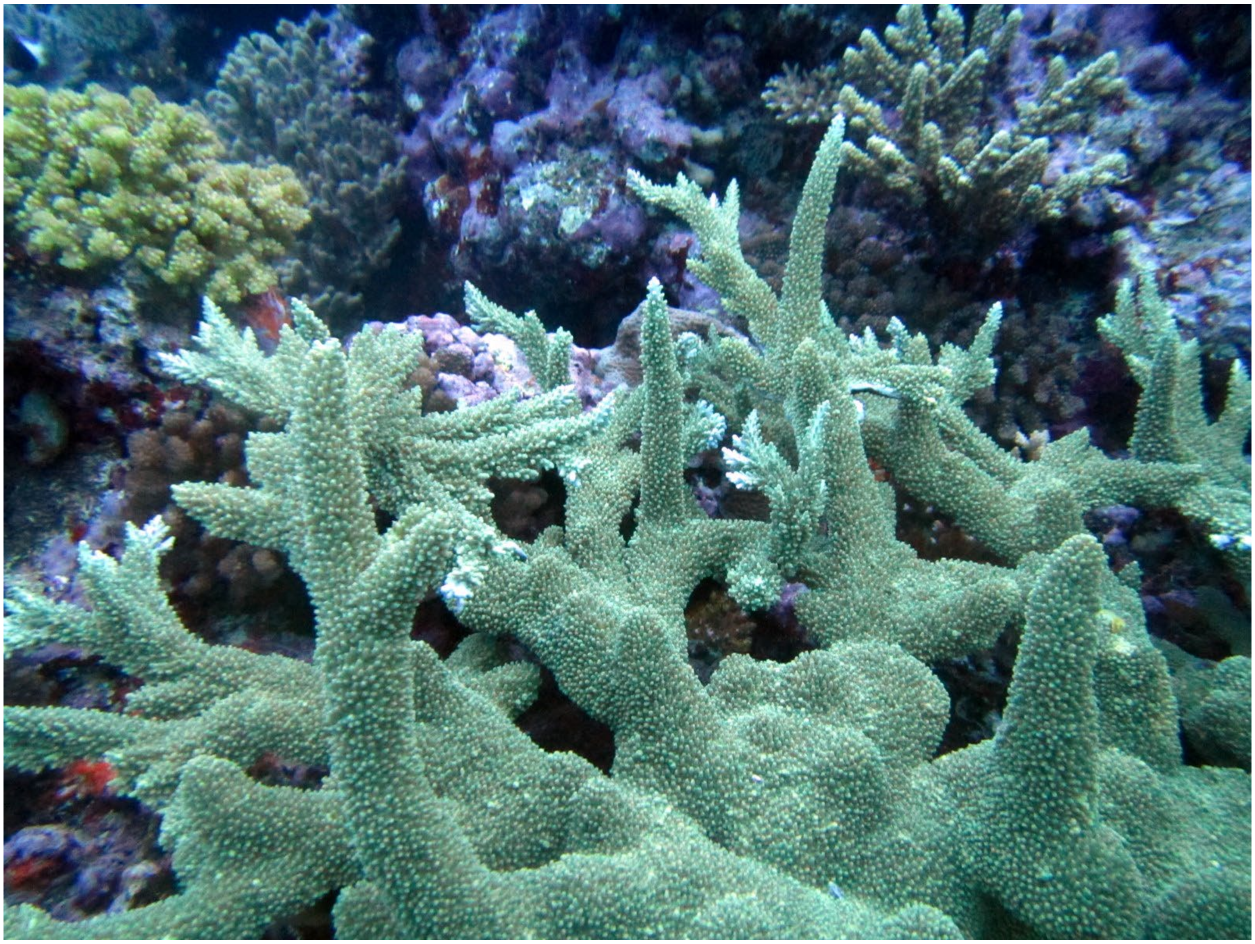
Colonies are discrete, with some branches similar to staghorn. Branches are variable but most often are either nearly vertical and tapering like staghorn, or horizontal with a variable degree of fusing of branches and horizontal fans of branch tips. Vertical branches can grow up from horizontal branches at any location, and horizontal branches can grow out of vertical branches at any location as well. Axial corallites are tubular and radial corallites are mostly short with openings cut and an angle facing towards the branch tip. Near branch ends, radial corallites become long and tubular. Colonies differ in what proportion they have of different types of branches. Branches are much more variable than on *Acropora valenciennesi* and *Acropora robusta*, which don't have two distinct kinds of branches, fused branches, or long tubular radials near branch tips.



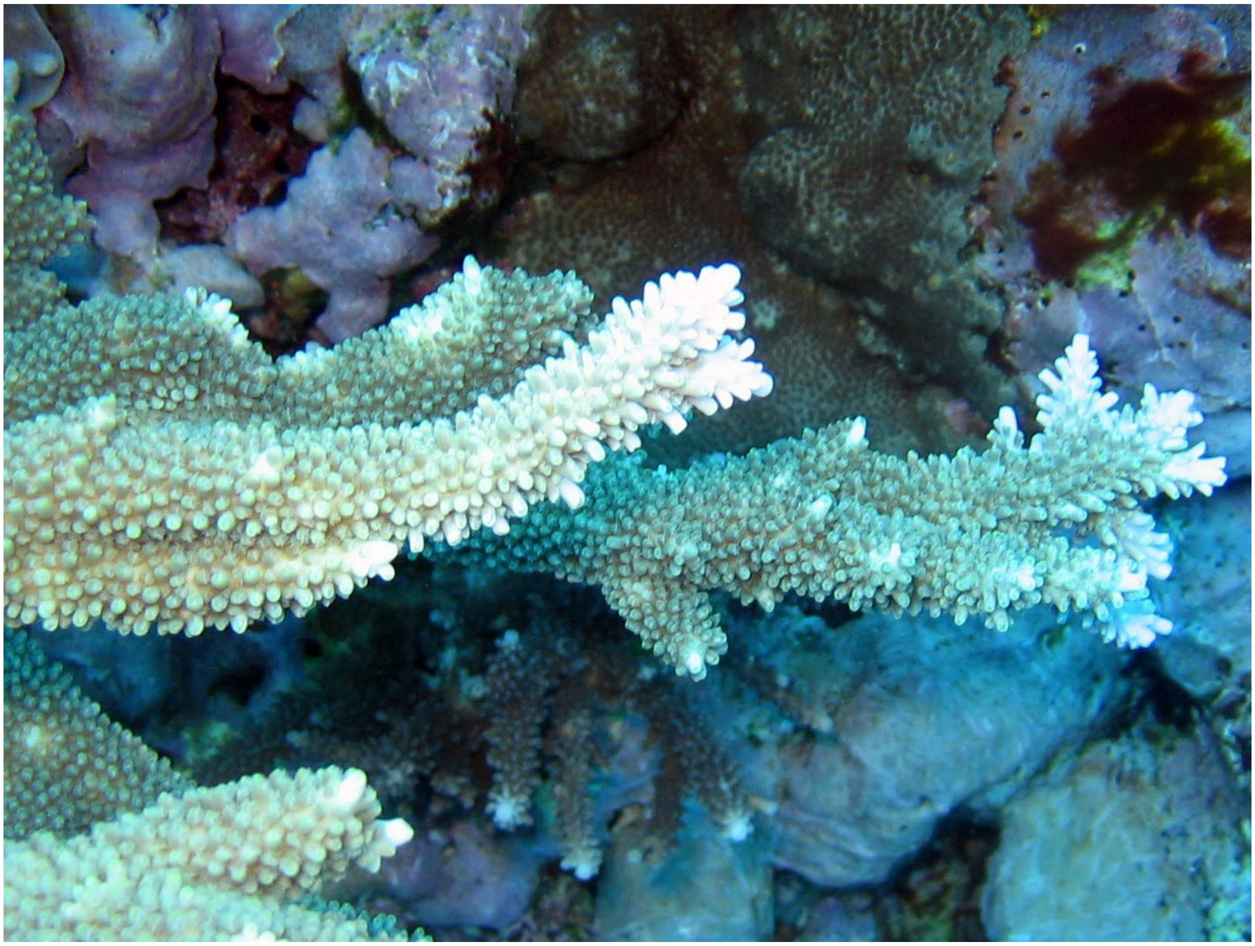
A photo of a colony of *Acropora abrotanoides* that has more vertical branches than horizontal.



A photo of a colony of *Acropora abrotanoides* that has lots of fused horizontal branching and some branch tip fans as well as some vertical branches.



A closer photo of *Acropora abrotanoides*.

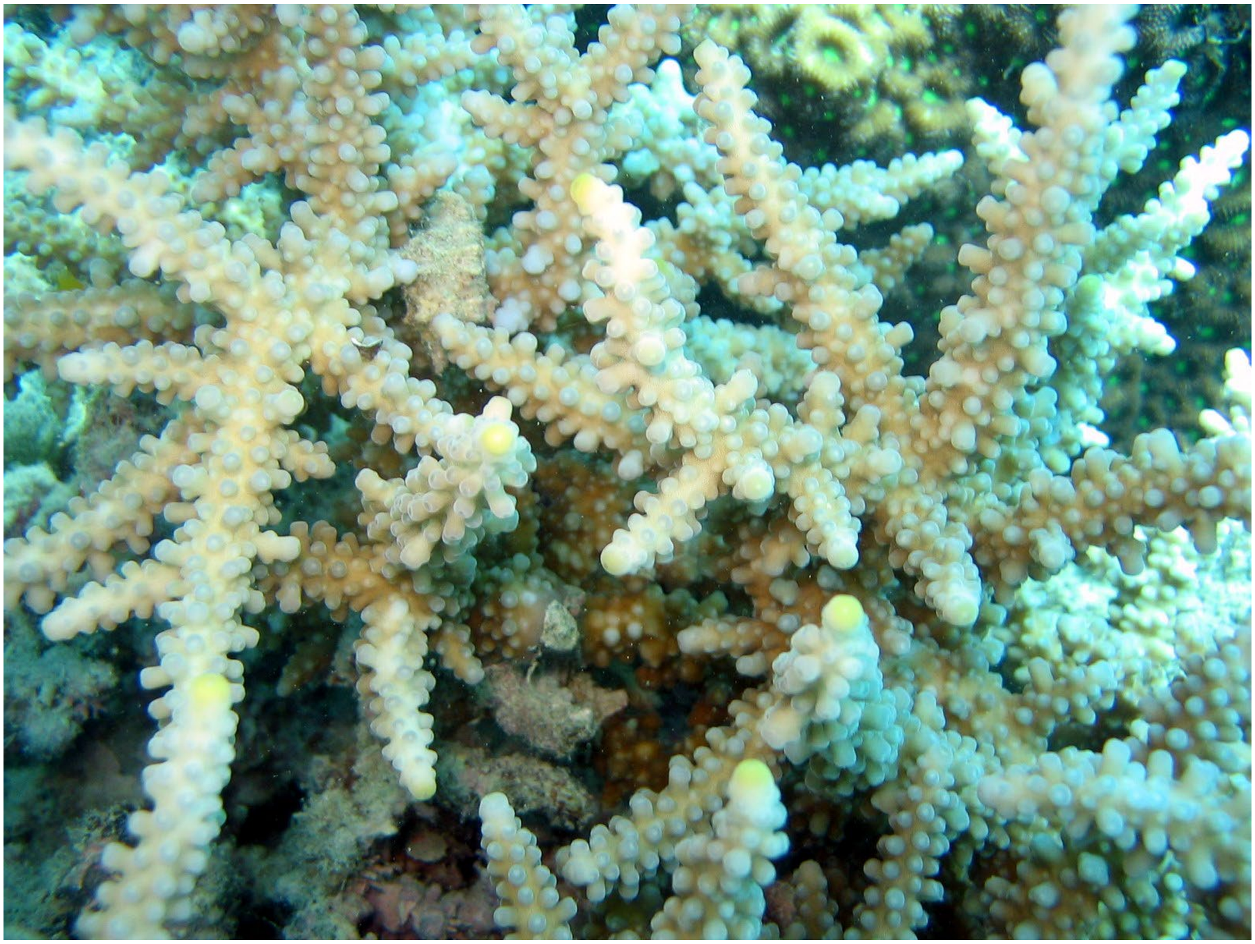


A closer photo of *Acropora abrotanoides* showing longer radial corallites near branch tips.

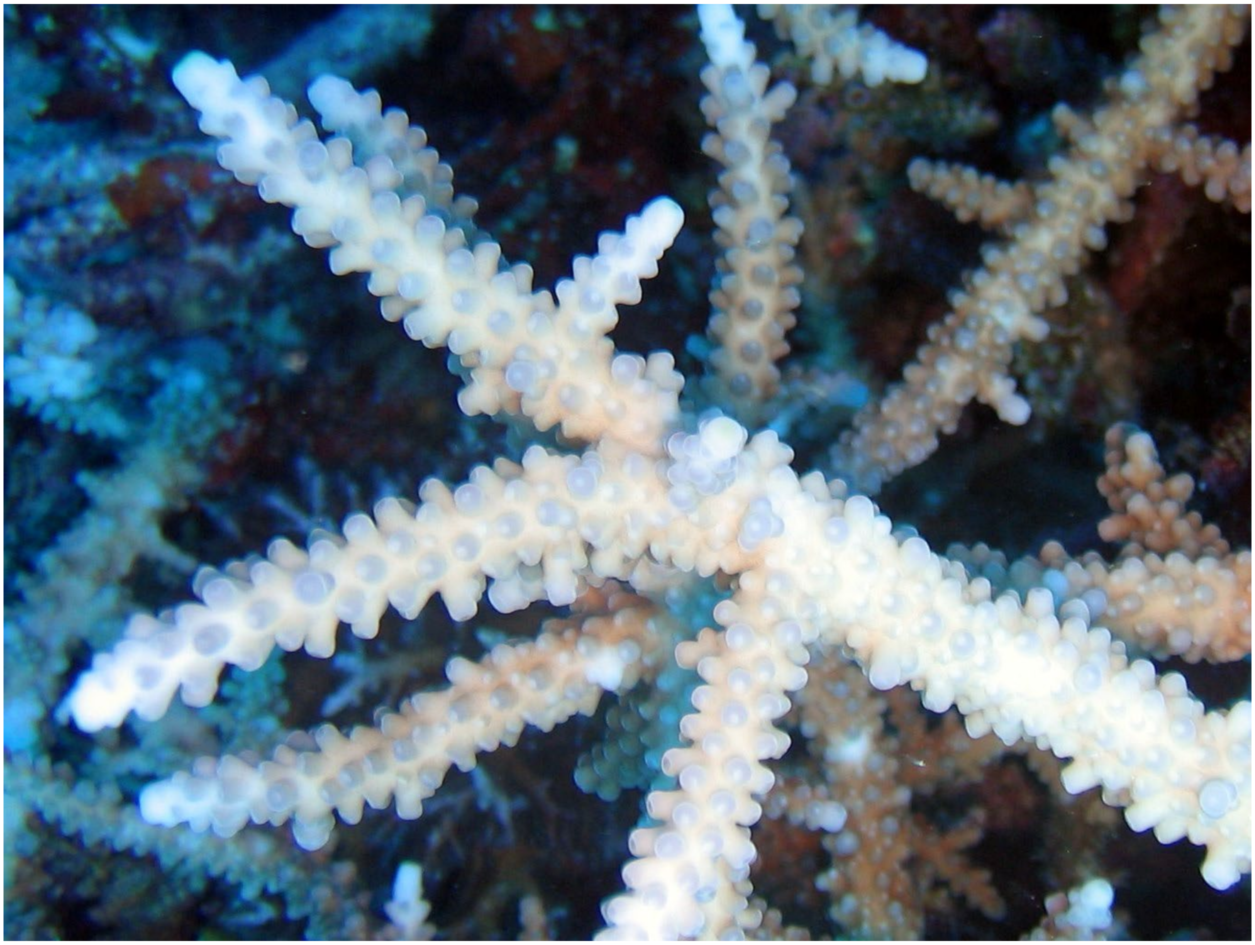
Bushy: colonies have branches going in many directions, and which may sub-branch frequently. Branches may be thinner than on staghorns, but do not have the uniform staghorn-like shape.

Acropora vaughani Vulnerable

Colonies have branches going many directions and branching fairly often. Axial corallites are large. Radial corallites are thick and variable in length, which aren't close enough to touch each other. *Acropora gomezi* has longer radial corallites. *Acropora austera* branches are more irregular in shape and may be fused to each other.



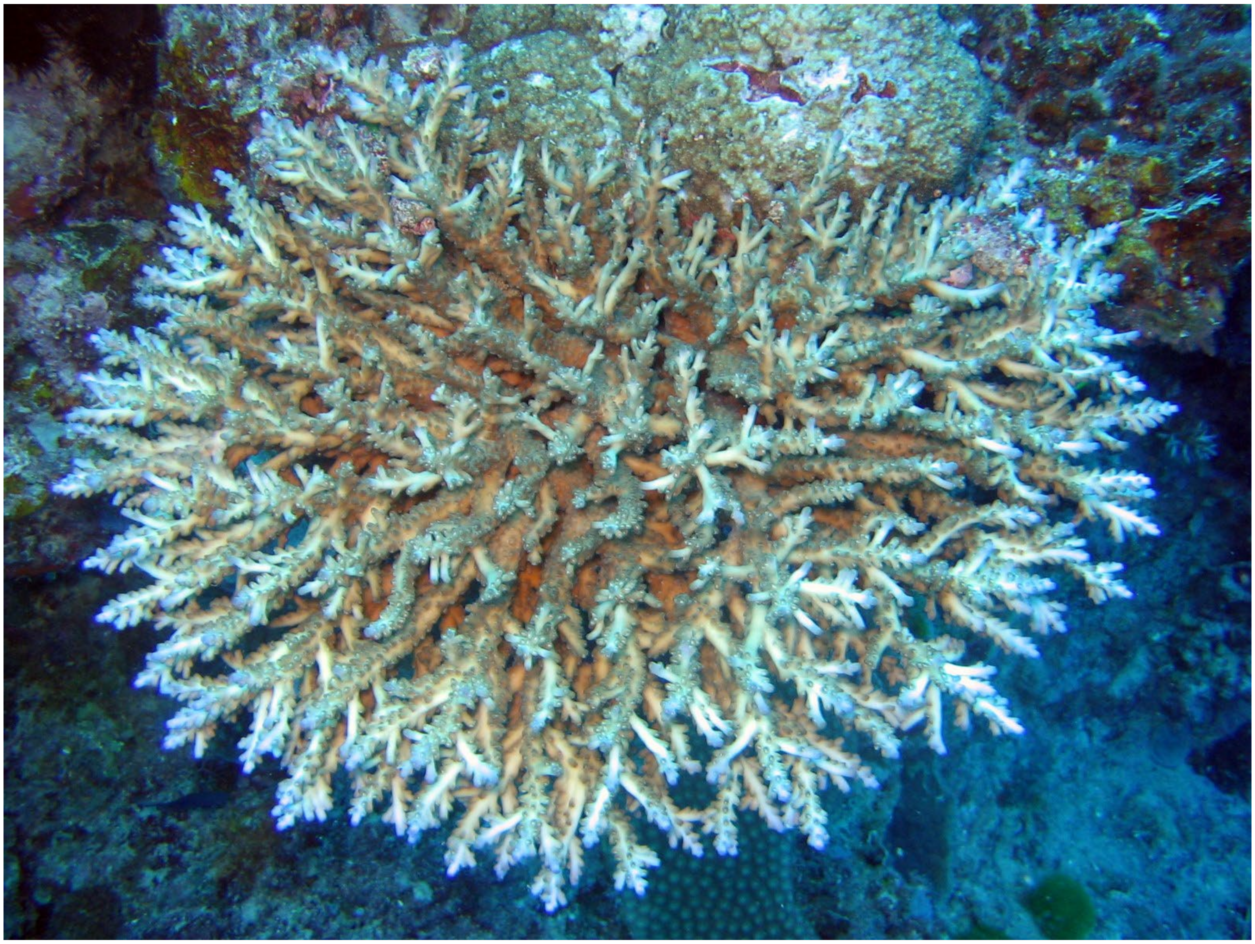
A photo of a thicket of *Acropora vaughani*.



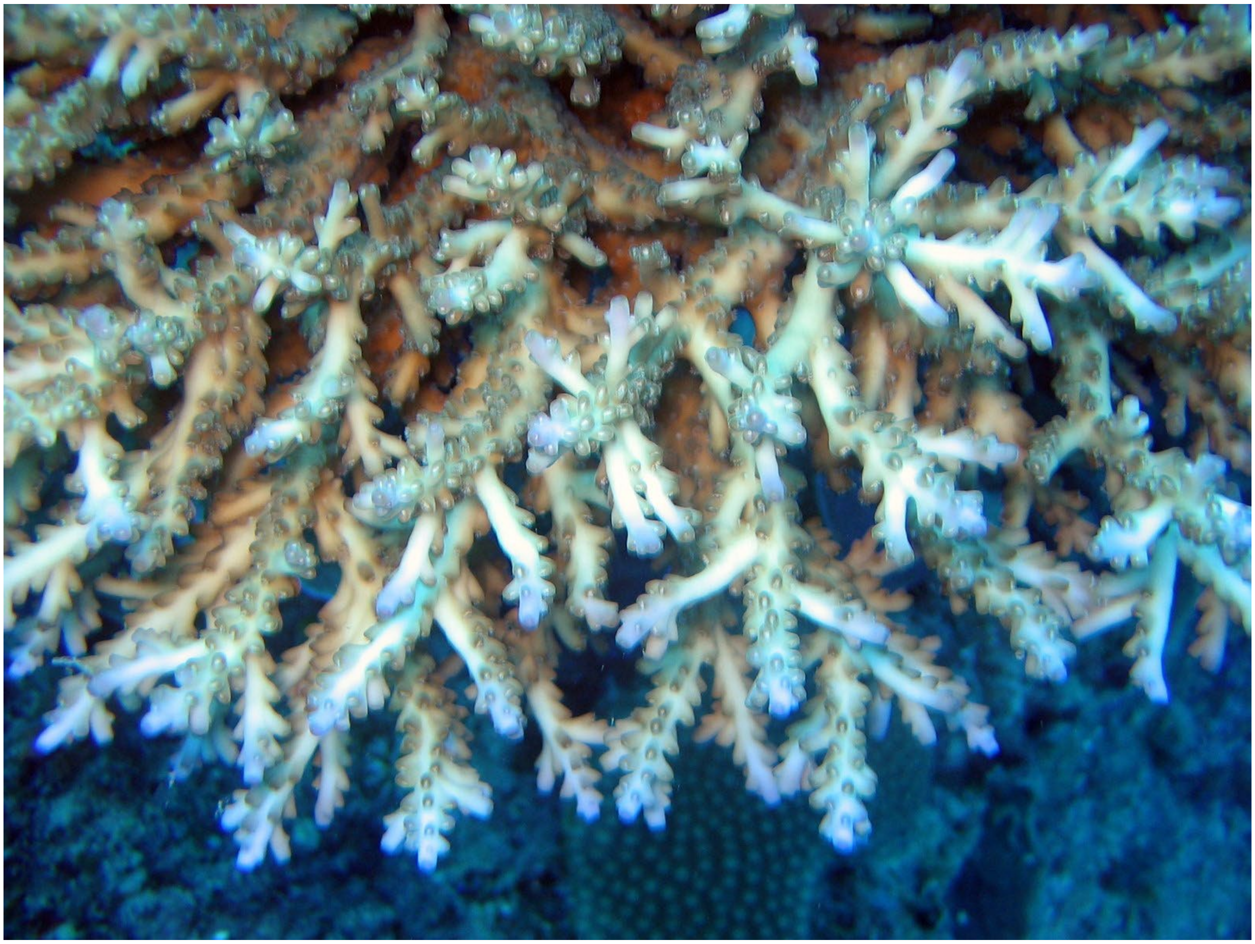
A close-up photo of *Acropora vaughani*.

Acropora loripes

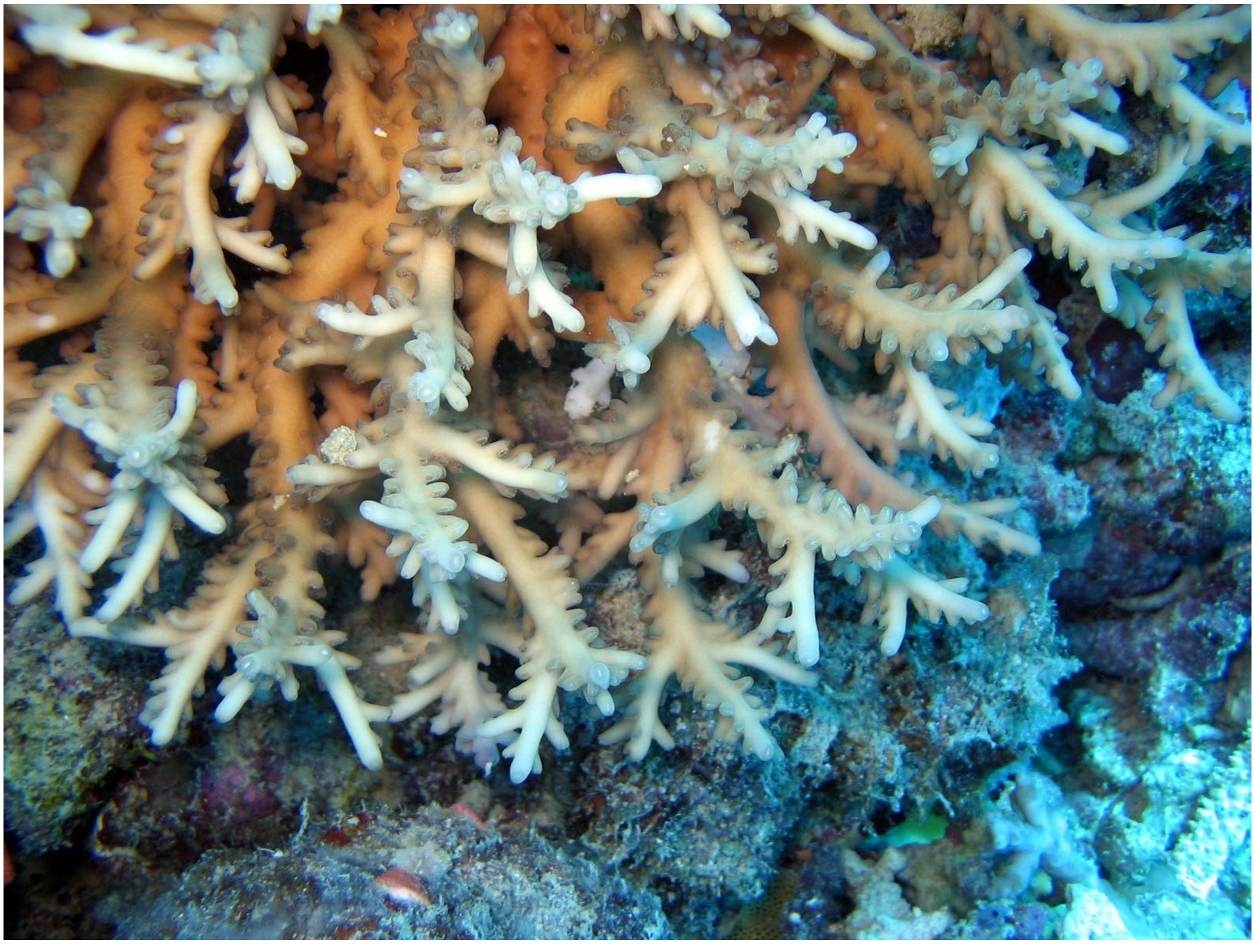
Colonies are bushy and discrete. Small branches go in many directions. Radiating branches near branch tips may have upper surfaces that do not have any corallites on them. That feature is unique to this species.



A colony of *Acropora loripes*.



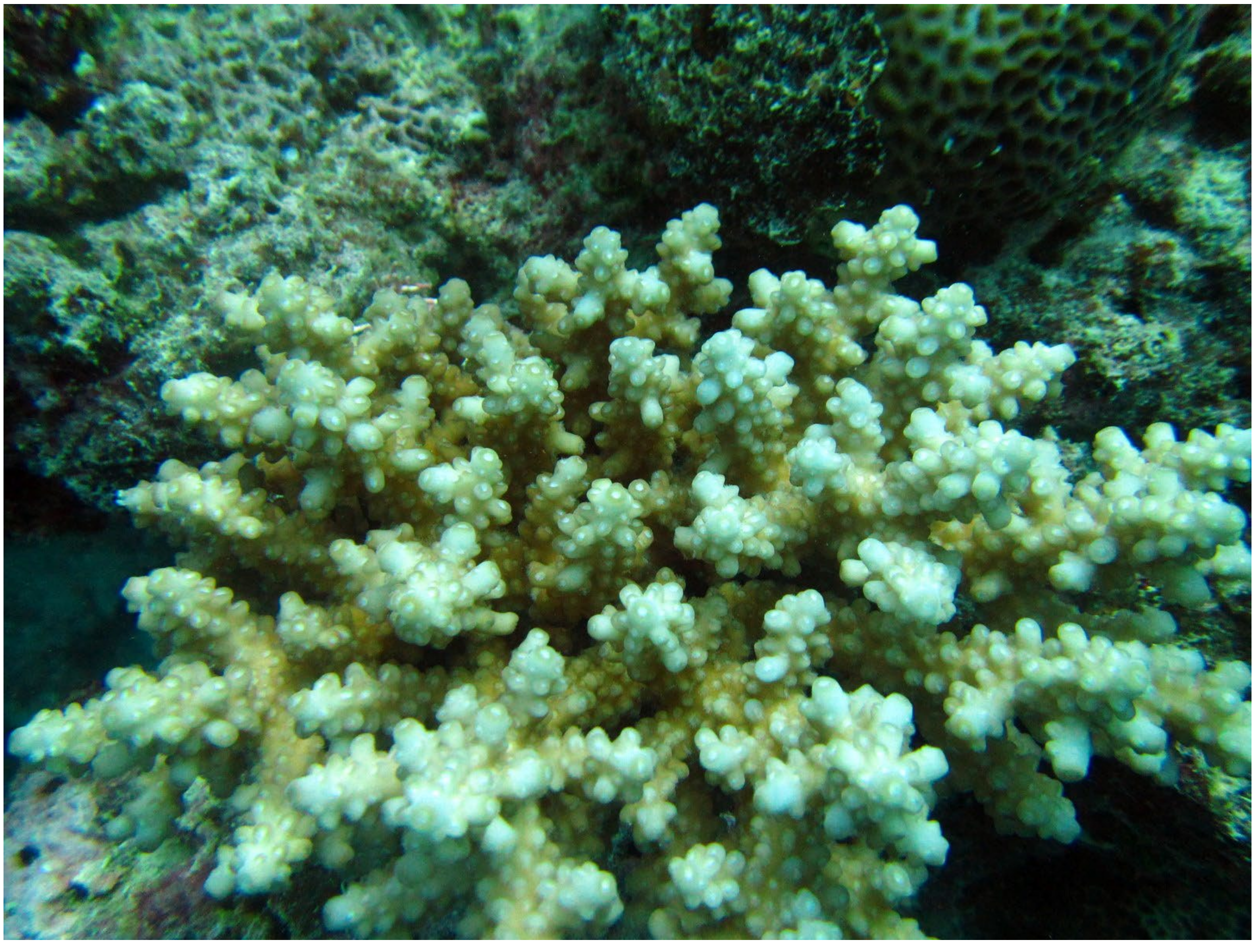
A close-up of *Acropora loripes*.



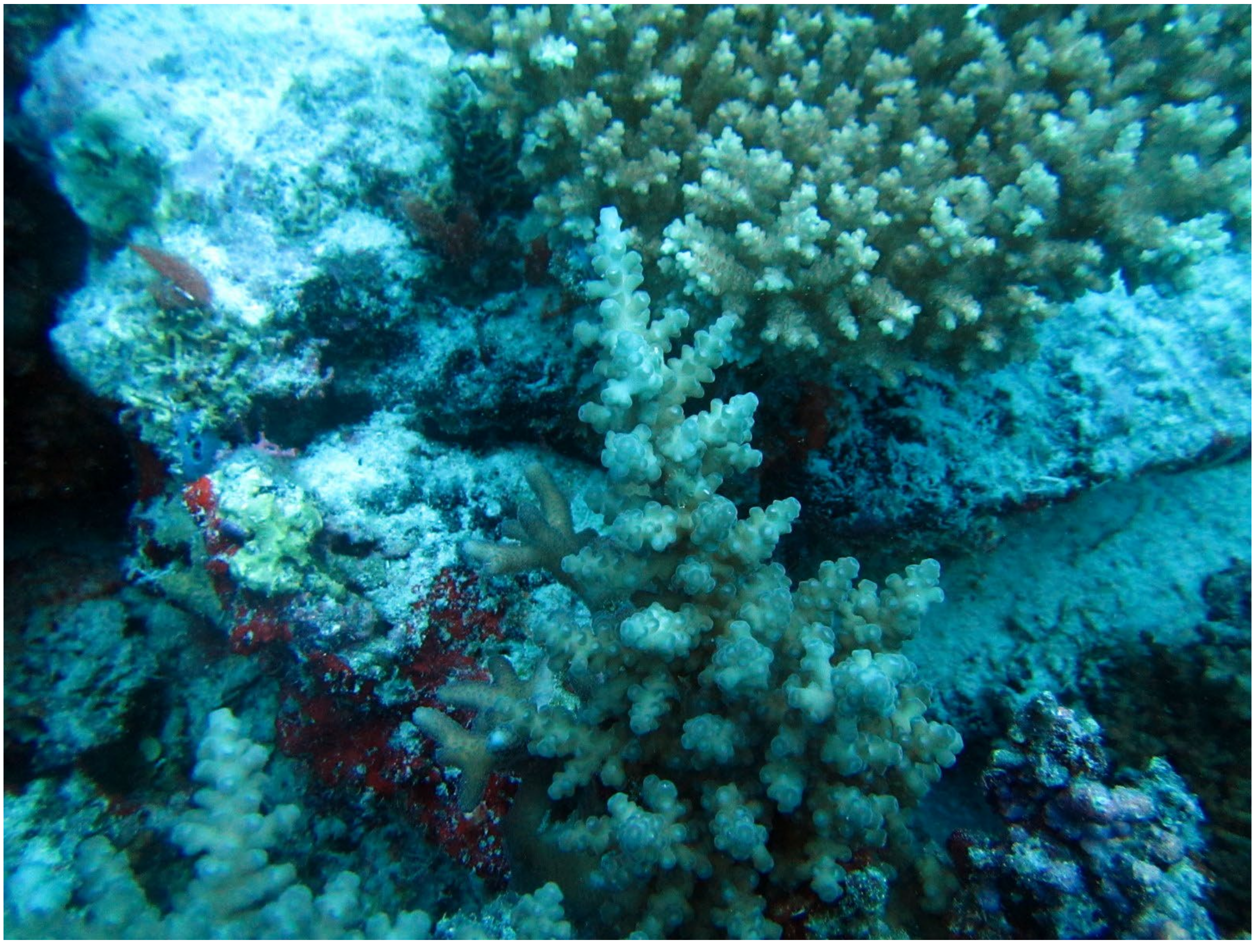
A close-up of a colony of *Acropora loripes*.

Acropora rosaria

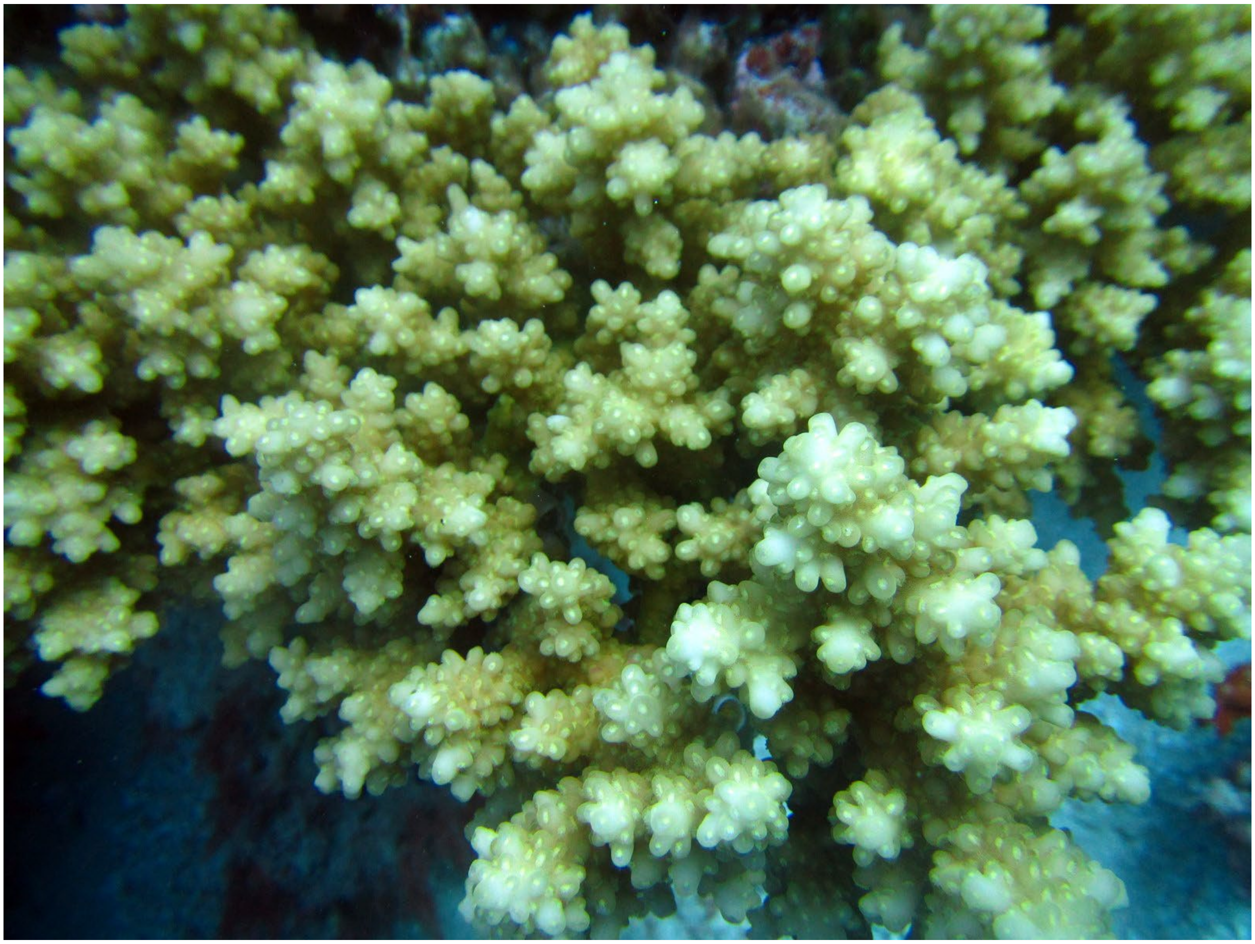
Colonies branch and sub-branch over short distances forming colonies that are usually more like clumps than branching. Sometimes one branch grows faster than others, producing a Christmas-tree shaped colony. Axial coralltias are big and radial corallites are short and thick, bead-like. Branches are shorter than on *Acropora loripes* and corallite are thick.



A photo of a colony of *Acropora rosaria*.



A photo of a colony of *Acropora rosaria* with a Christmas-tree like shape.

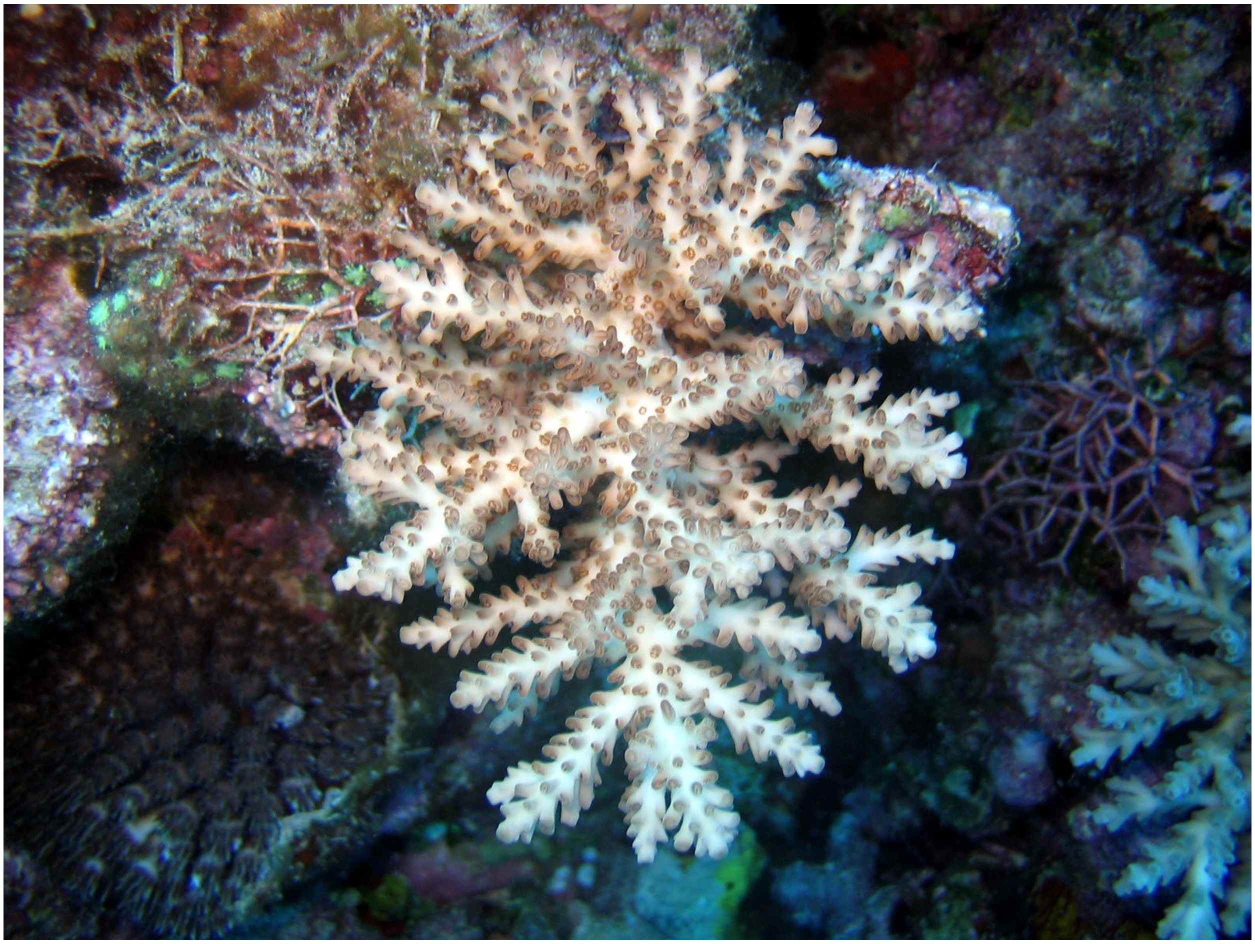


A close photo of *Acropora rosaria*.

Acropora cf. insignis

Colonies are small and bushy, with branches going in different directions. Branches are about pencil width and do not taper. Branches are uniform. Axial corallites are small. Radial corallites are small, short, and fused sideways with the branch, pointing towards the branch tip. Radial corallites are not close together. Radial corallites are brown while the branch is white. The coloration of this species is different from other species.

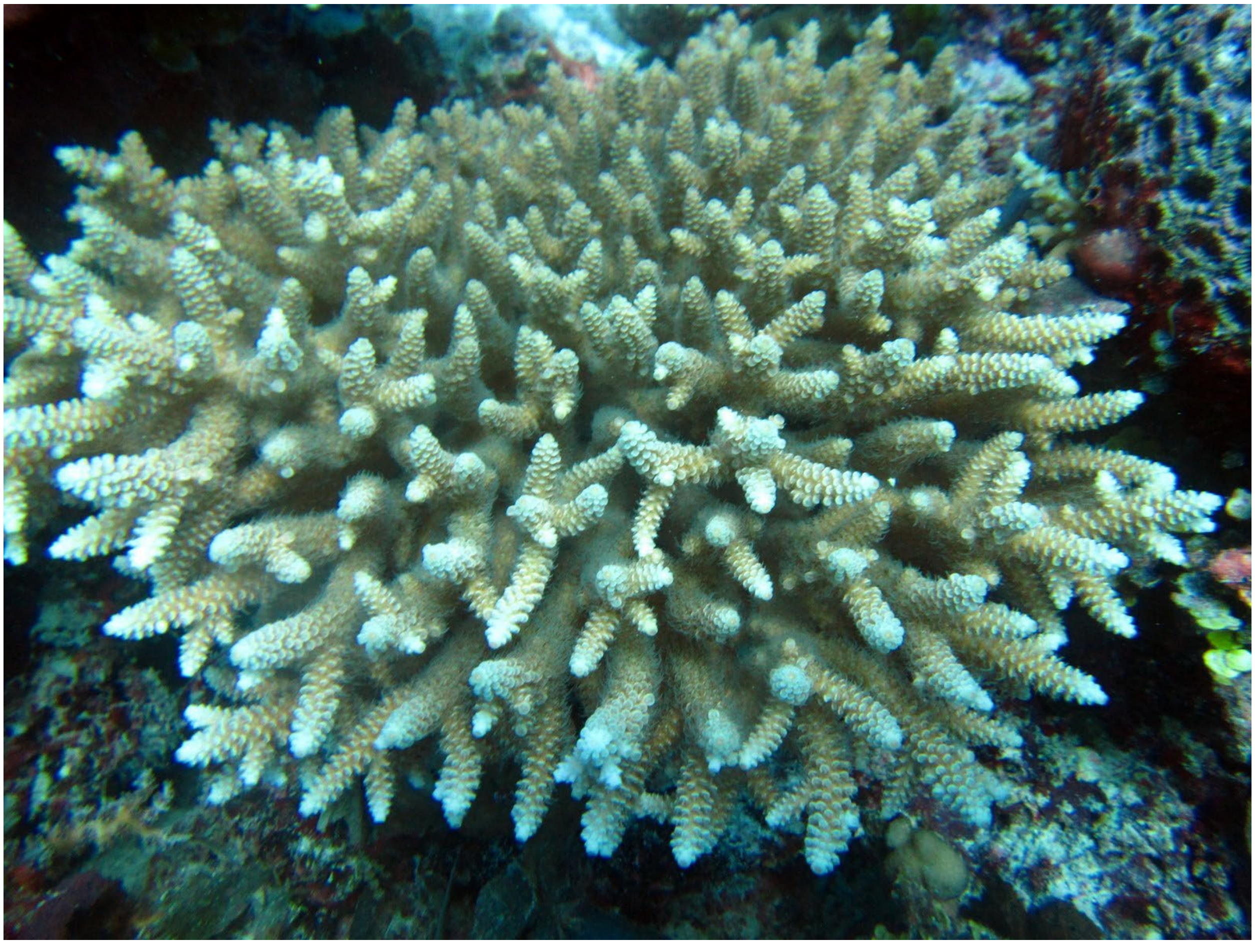
A close photo of a colony of *Acropora insignis*.



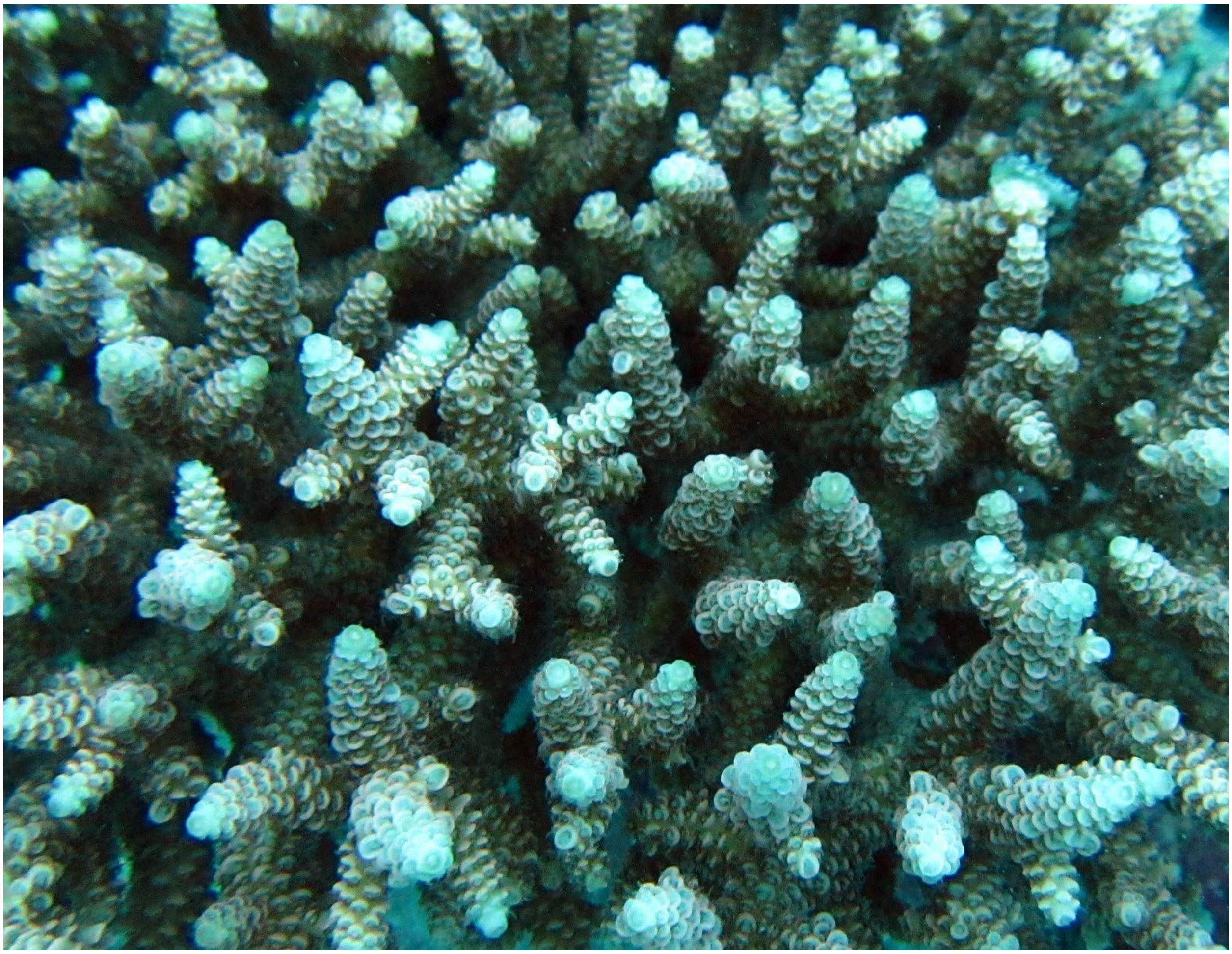
A close photo of *Acropora insignis*.

Acropora prostrata sensu Veron, 2000

Colonies have fairly thin but uniform branchets that go in many directions but do not taper. Axial corallites are small. Radial corallites have extended, nearly flat lower lips. *Acropora millepora* is similar but has branchlets that are all vertical or nearly so. Veron et al (2020) write that this species is actually a new species that needs a new name. "Sensu Veron, 2000" means that this is the species indicated in Veron, 2000.



A colony of *Acropora prostrata sensu* Veron, 2000.

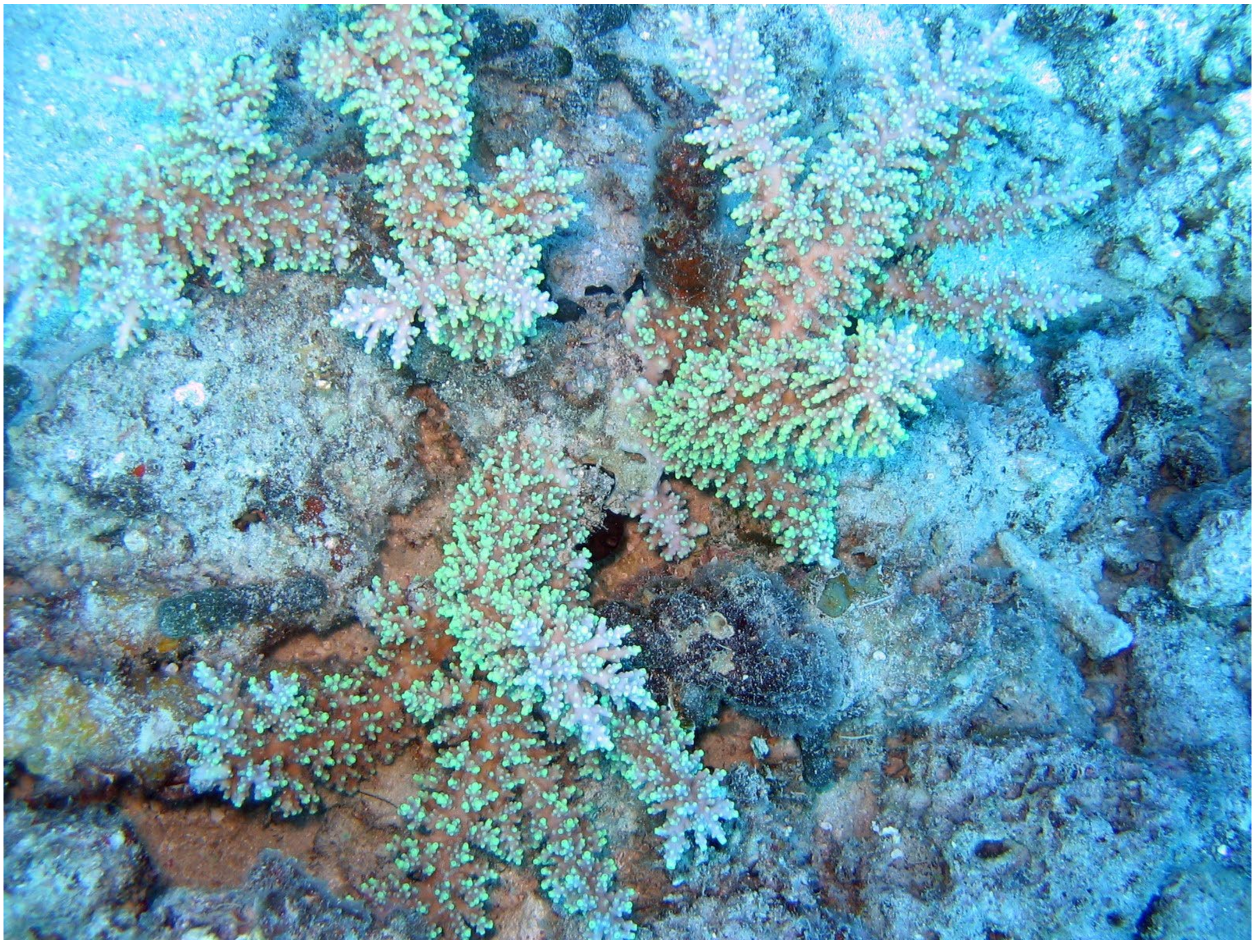


A close-up photo of *Acropora prostrata sensu* Veron, 2000.

Bottlebrush (hispidose): colonies can be similar to a bottlebrush, with many small corallite extending from a centeral stem. In some species colonies have a bushier form than in others.

Acropora echinata Vulnerable

Colonies are branching, with relatively long branches and relatively few major side branches. Branches are surrounded by and even cover of branchlets, which can have side branches and have tubular axial and incipient axial corallites. Colonies look very much like bottle brushes. Most other hipidose species do not have the long branches. Acropora longicyathus has thicker incipient axials.

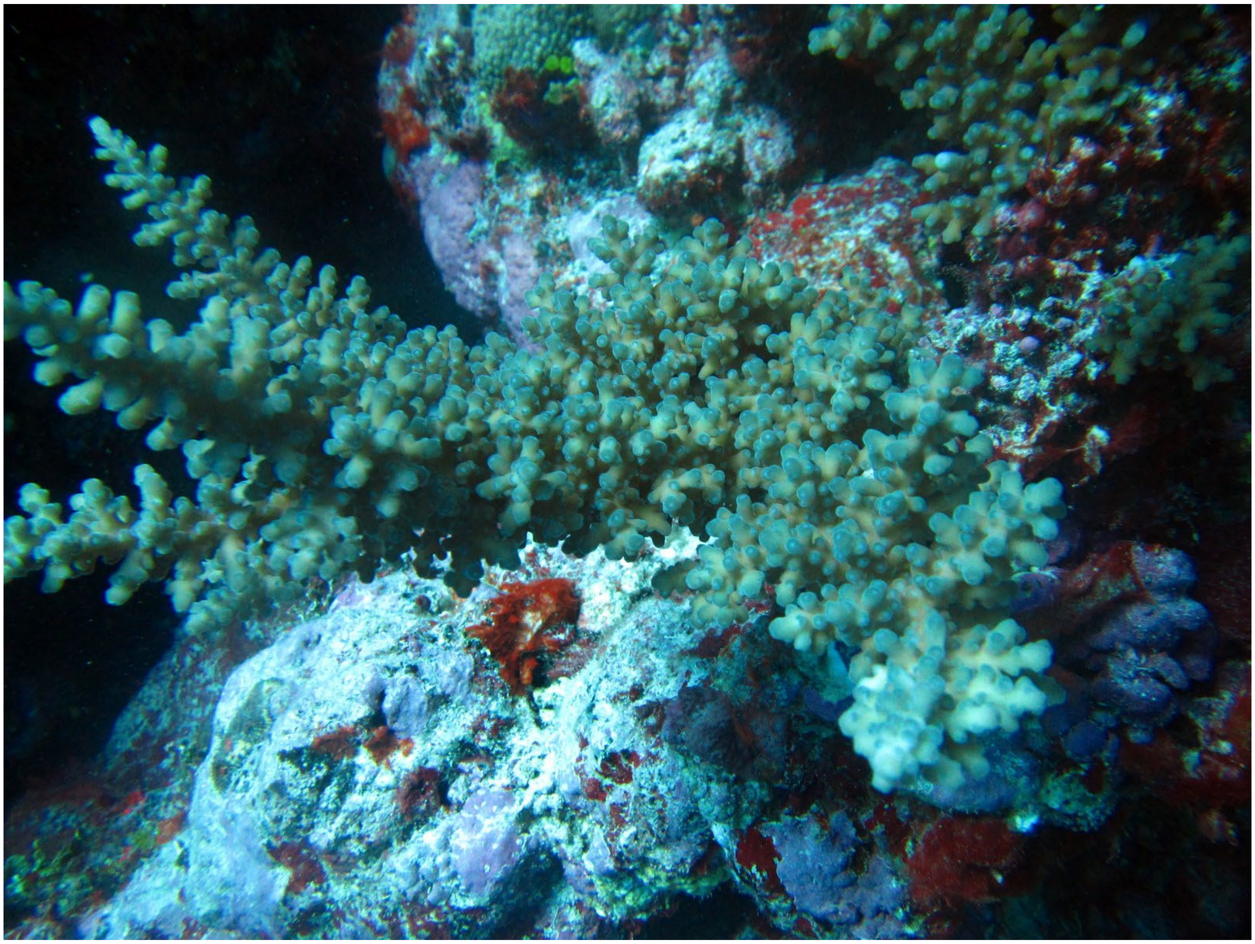


Colonies of *Acropora echinata*.

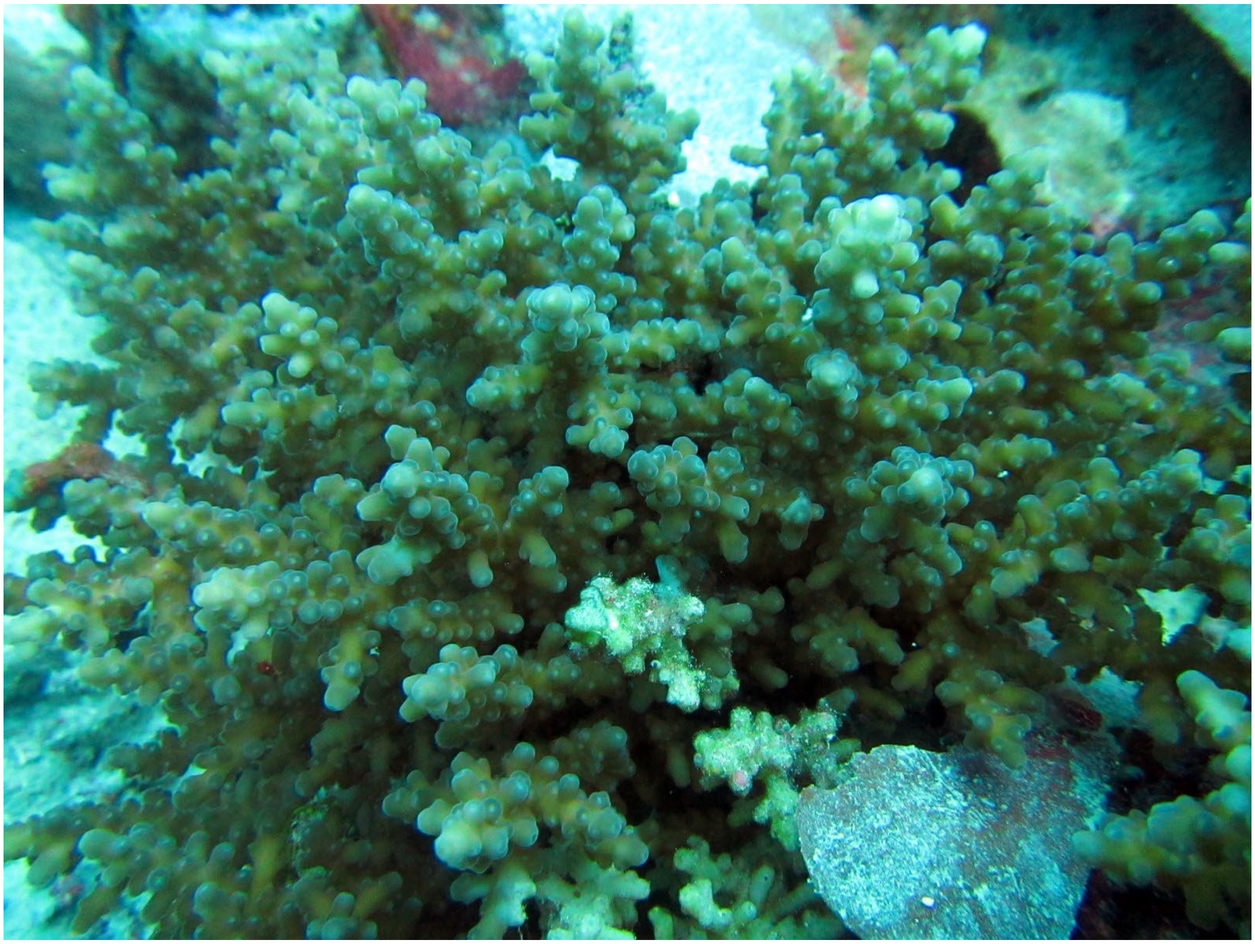
A close-up photo of *Acropora echinata*.

Acropora navini

Colonies are branching and may be bushy. There are many branchlets on all sides of the branches with many sub-branchlets. Branchlets may get longer farther from branch tips. Corallites are thick and stubby. Other hispidose species have longer corallites.



A colony of *Acropora navini*.

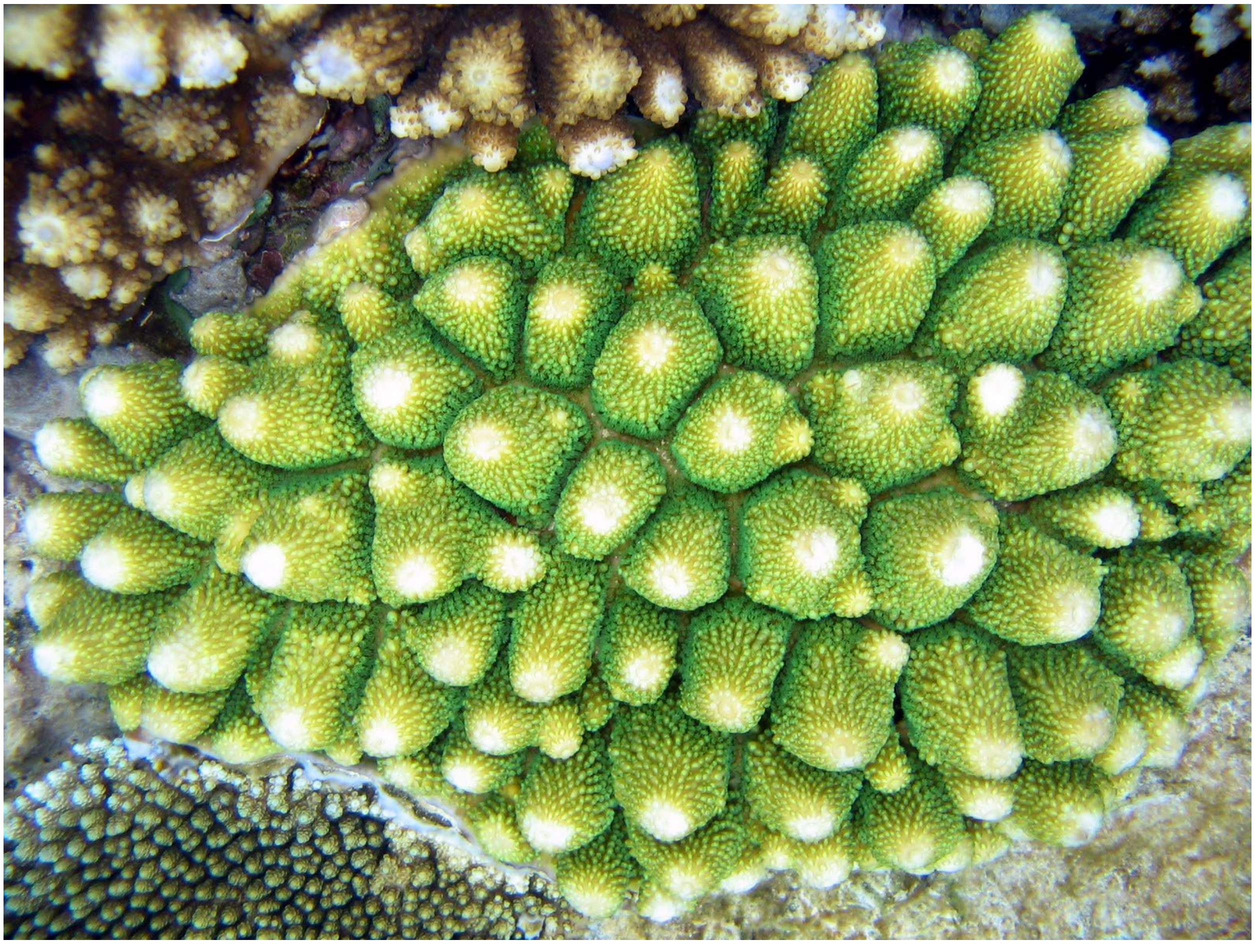


A close-up photo of *Acropora navini*.

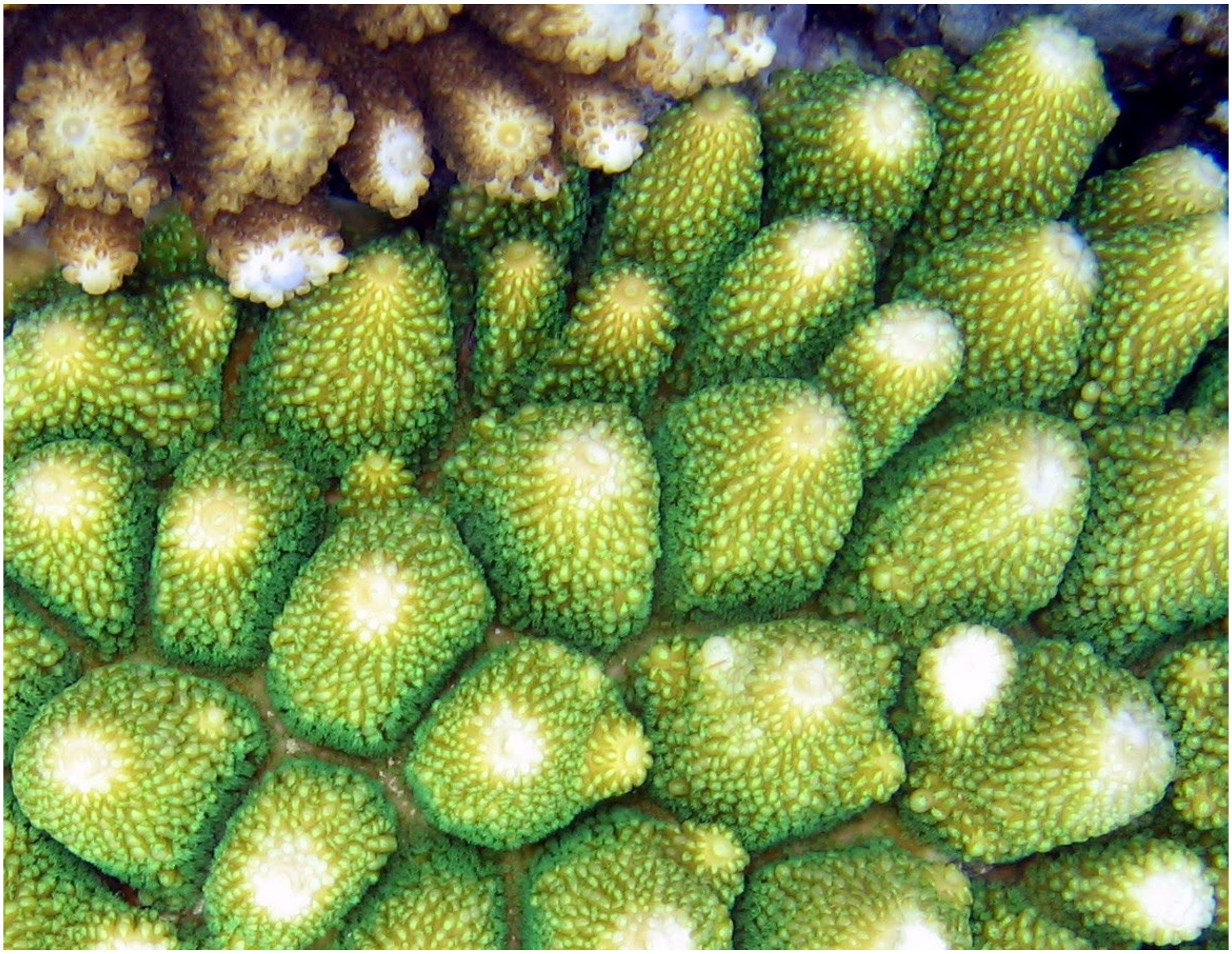
Digitate: colonies are encrusting and have finger-like branches growing up from the base.

Acropora monticulosa

Colonies have short, very strongy tapering branches. The axial corallite and radial corallites are small. No other species has such strongly tapering branches. This species is similar to Acropora globiceps, which has less tapering branches.



A photo of *Acropora monticulosa*.

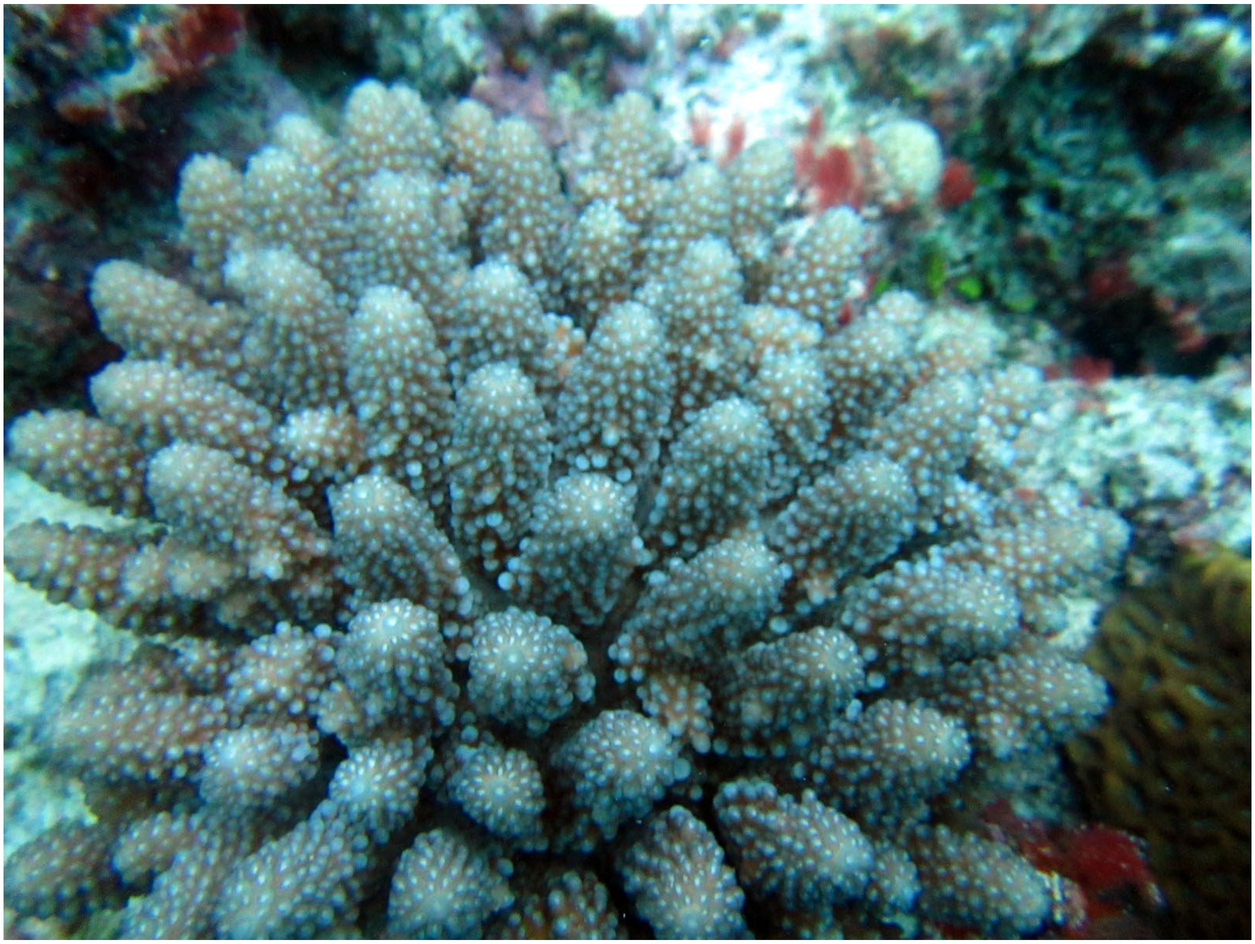


A close photo of *Acropora monticulosa*.

Acropora globiceps Vulnerable Threatened

Colonies have finger-like branches that are vertical, parallel, uniform, branch little. The branches may taper little and have rounded tips or taper on the half of the branch that is nearer the tip. Axial corallites are small and very short. Radial corallites are small and often are in rows down the branch side. There are a few colonies that have one or more of these features changed, such as more side branches or branches farther apart. *Acropora humilis* has thinner branches which radiate and are widely spaced, more side branches, more irregular length branches, and axial corallites that range from slightly larger to much larger than *Acropora globiceps*.

A colony of *Acropora globiceps*.



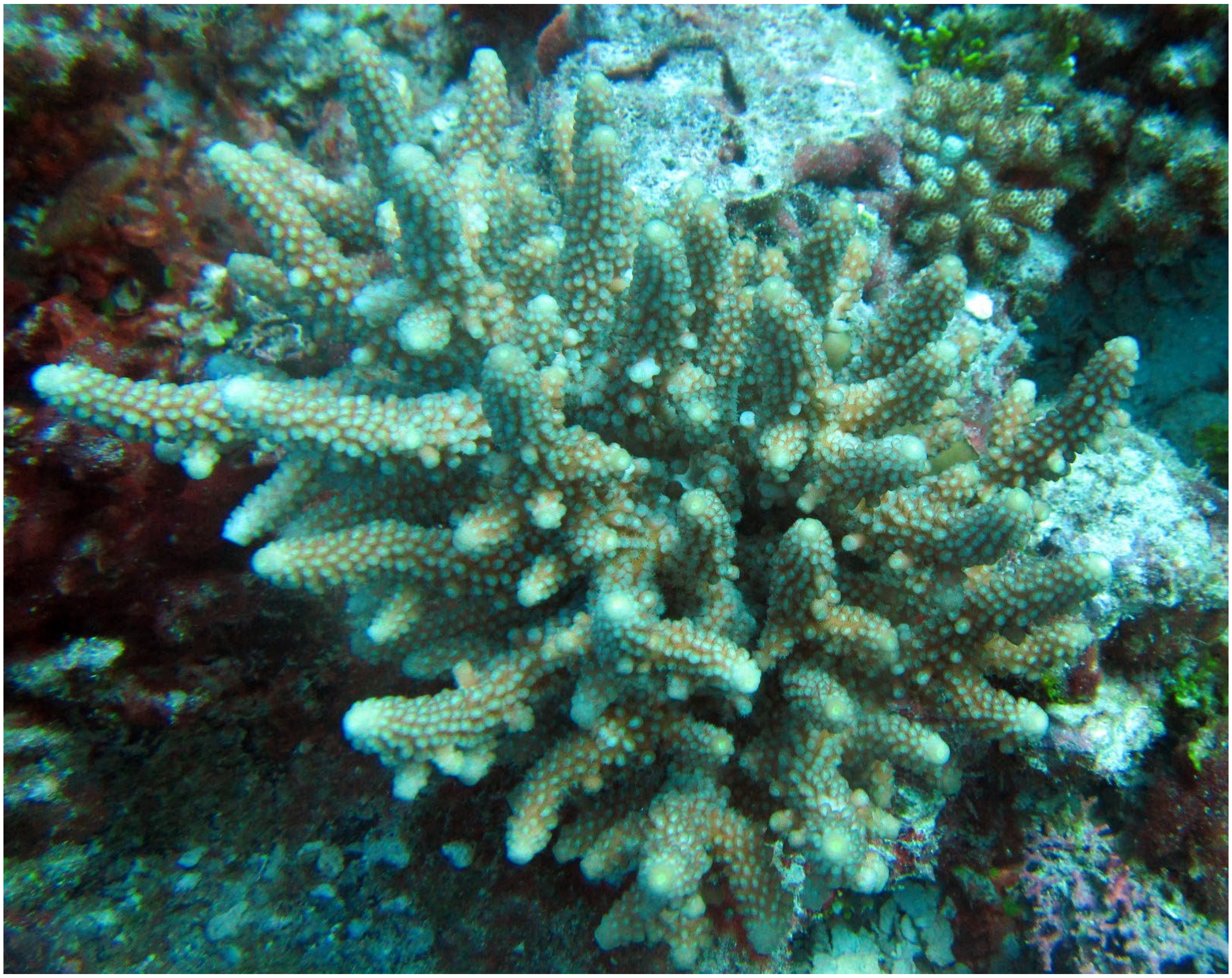
A photo of a colony of *Acropora globiceps* with branches that do not taper until the rounded end.

A photo of *Acropora globiceps*.

A close-up photo of *Acropora globiceps*.

Acropora humilis

Colonies have branches that are about finger to little finger diameter, which are widely spaced and diverge, are variable in length, do not taper, and may have short side branches near their base. The axial corallites are tubular but short and range in size from medium to very large diameter. Some colonies only have some of these features. Branches are thinner, farther apart, diverge more, are more variable in length and have at least slightly wider axial corallites than *Acropora globiceps*.



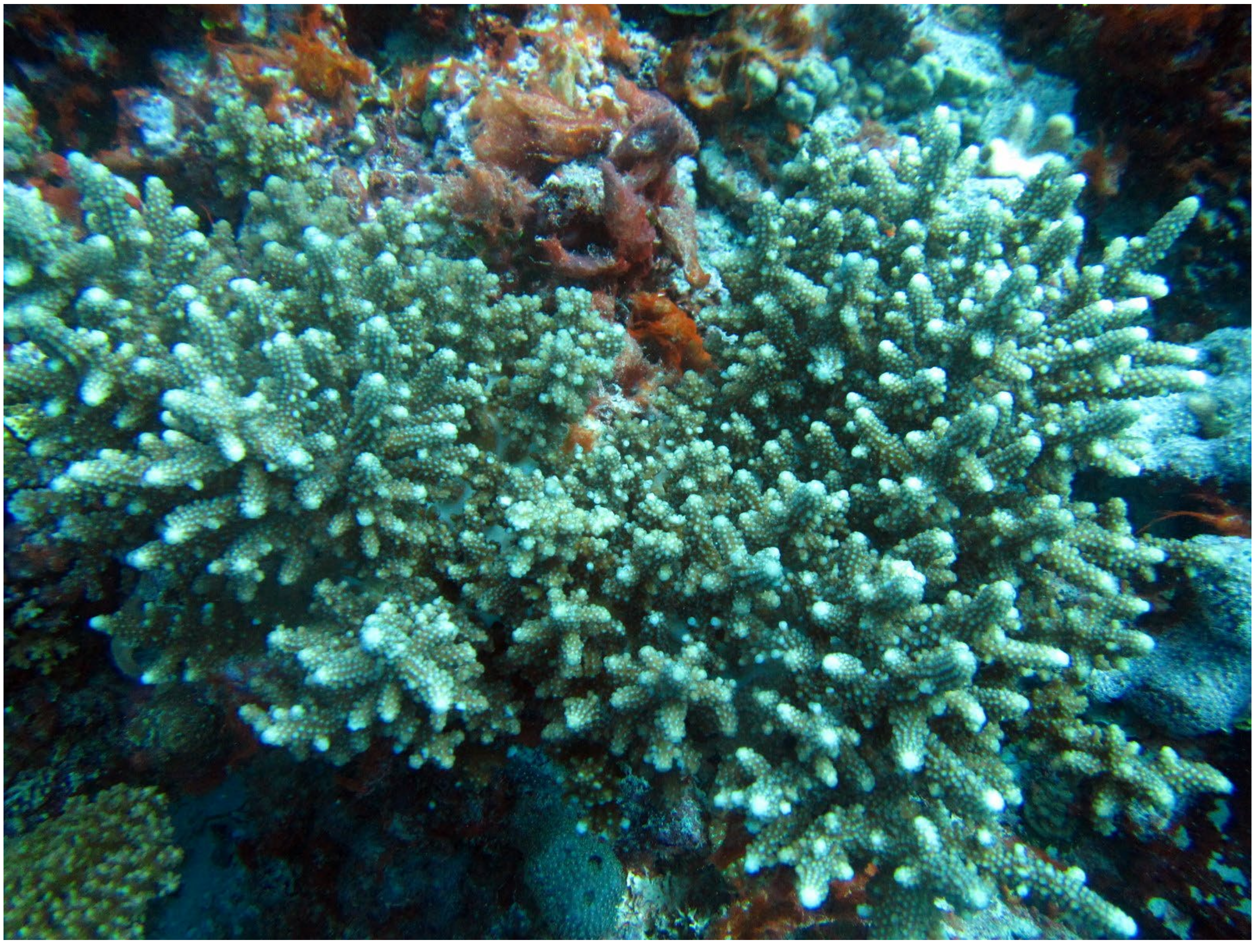
A colony of *Acropora humilis*.

A close-up photo of *Acropora humilis*, showing the medium width axial corallites.

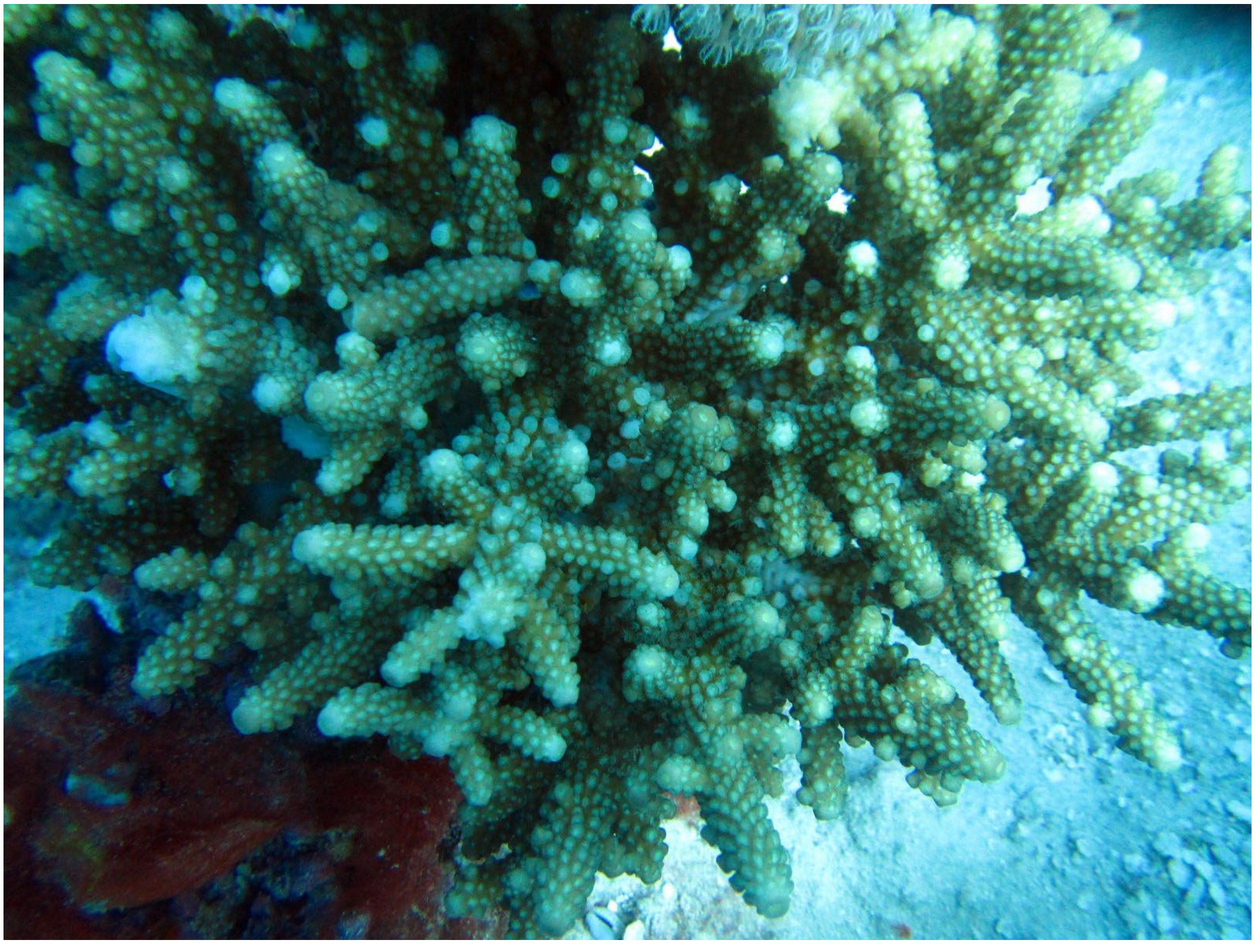
A close-up photo of *Acropora humilis* showing larger axial corallites.

Acropora samoensis

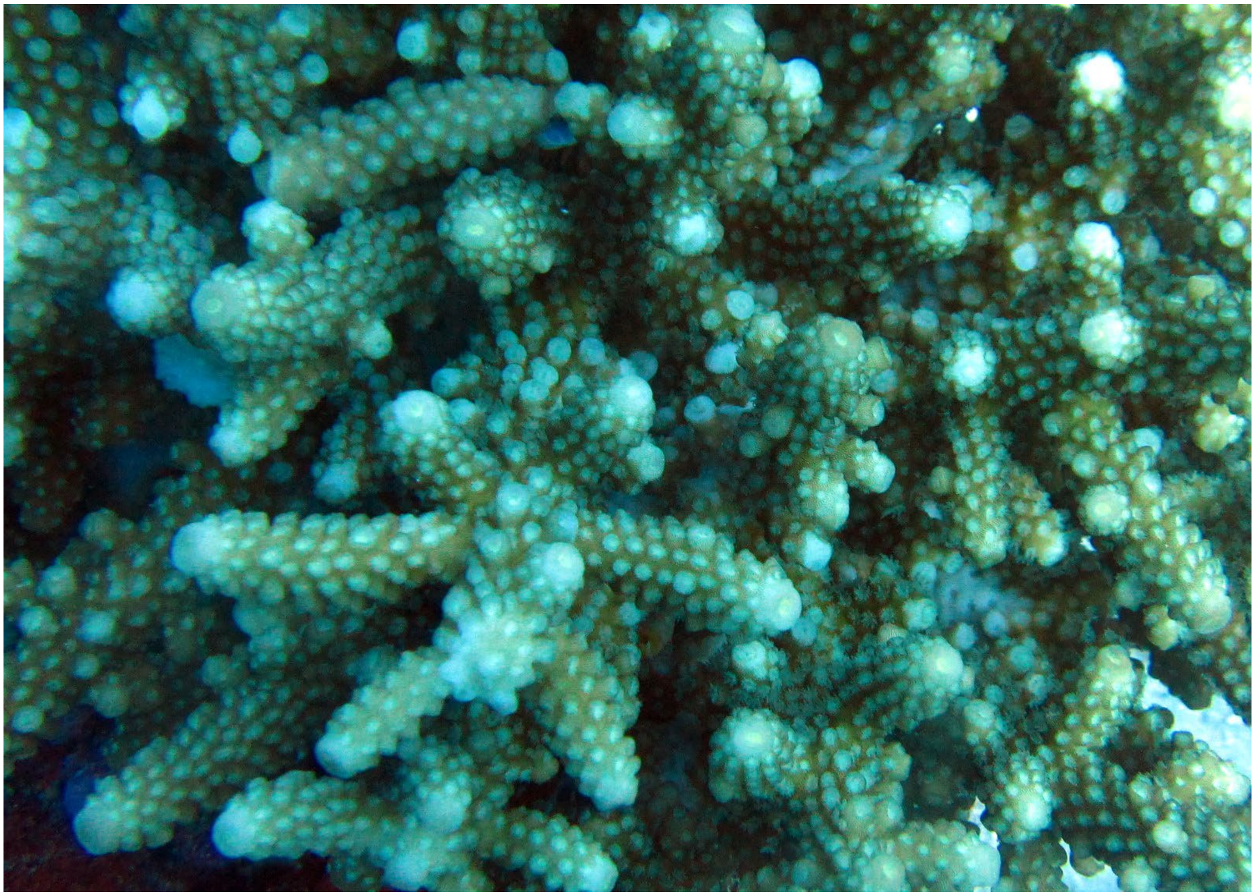
Colonies have thin, small branches which diverge, do not taper, vary in length, and have some small side branches. Axial corallites are medium to large. This species is virtually a miniature of *Acropora humilis*.



A photo of *Acropora samoensis*.



A closer photo of *Acropora samoensis*.



A close-up photo of *Acropora samoensis*.

Acropora gemmifera

Colonies have branches that taper evenly to a rounded tip. Branches are most often uniform in length within a colony and be parallel, but may be variable in length and/or diverge. The axial corallite is not large. Radial corallites are short, wide, have thick walls, and point towards the branch tip. Radial corallites get larger as you go down the branch from the tip. *Acropora globiceps* has smaller radial corallites, *Acropora humilis* has thinner branches and smaller radial corallites, *Acropora samoensis* has smaller branches.

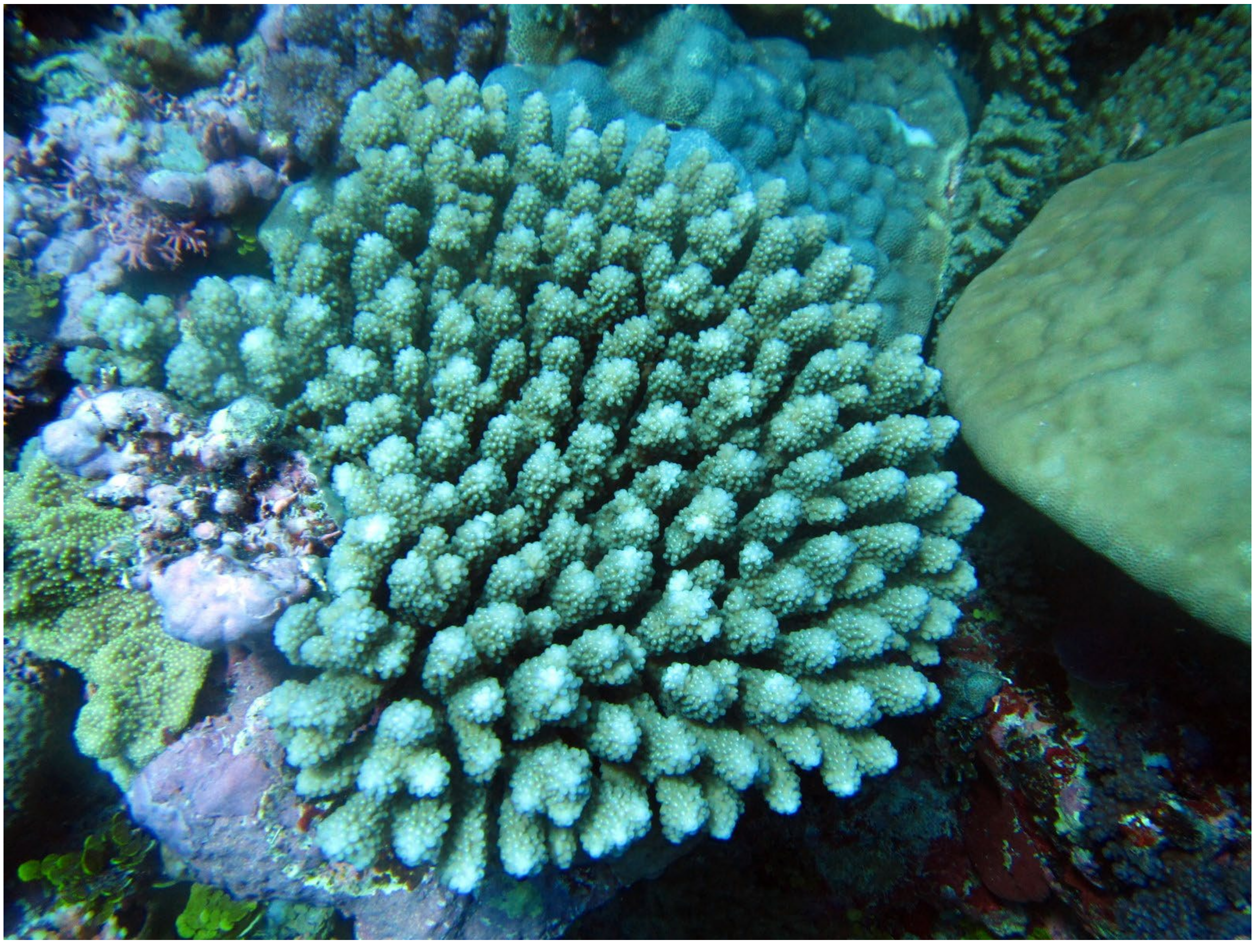
A photo of *Acropora gemmifera*.

A closer photo of a colony of *Acropora gemmifera* with white radial corallites.

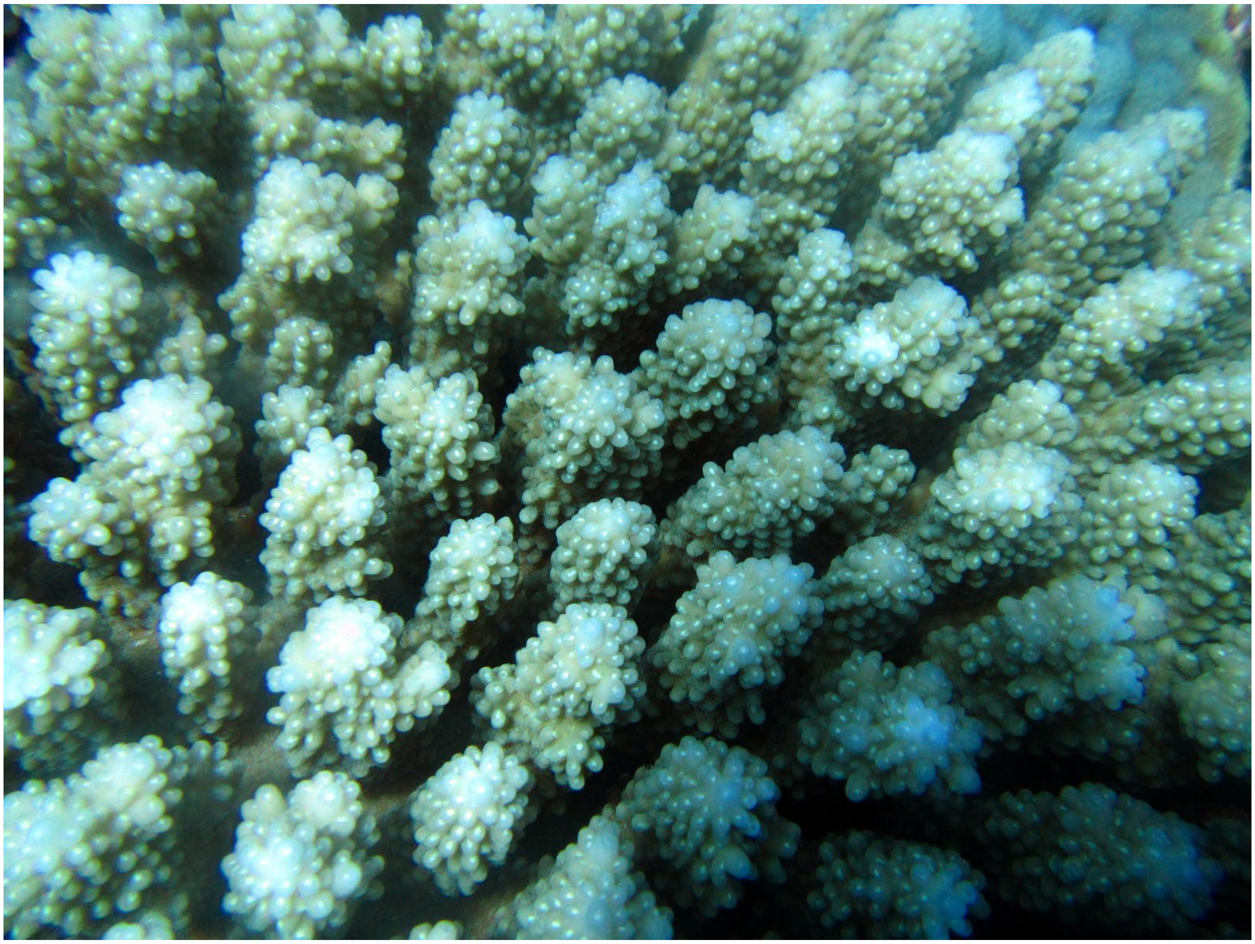
A close-up photo of *Acropora gemmifera*.

Acropora retusa Vulnerable Threatened

Colonies usually have short, thick branches. Both axial and radial corallites have thick walls. The axial corallite is about the size of the radial corallites. The radial corallites vary in length, which can give the branches a spiny or prickly look. The radial corallites are tubular with thick walls. Colonies vary in how much variation there is in radial corallite length. Colonies have more variable radial lengths than other species.



A colony of *Acropora retusa*.

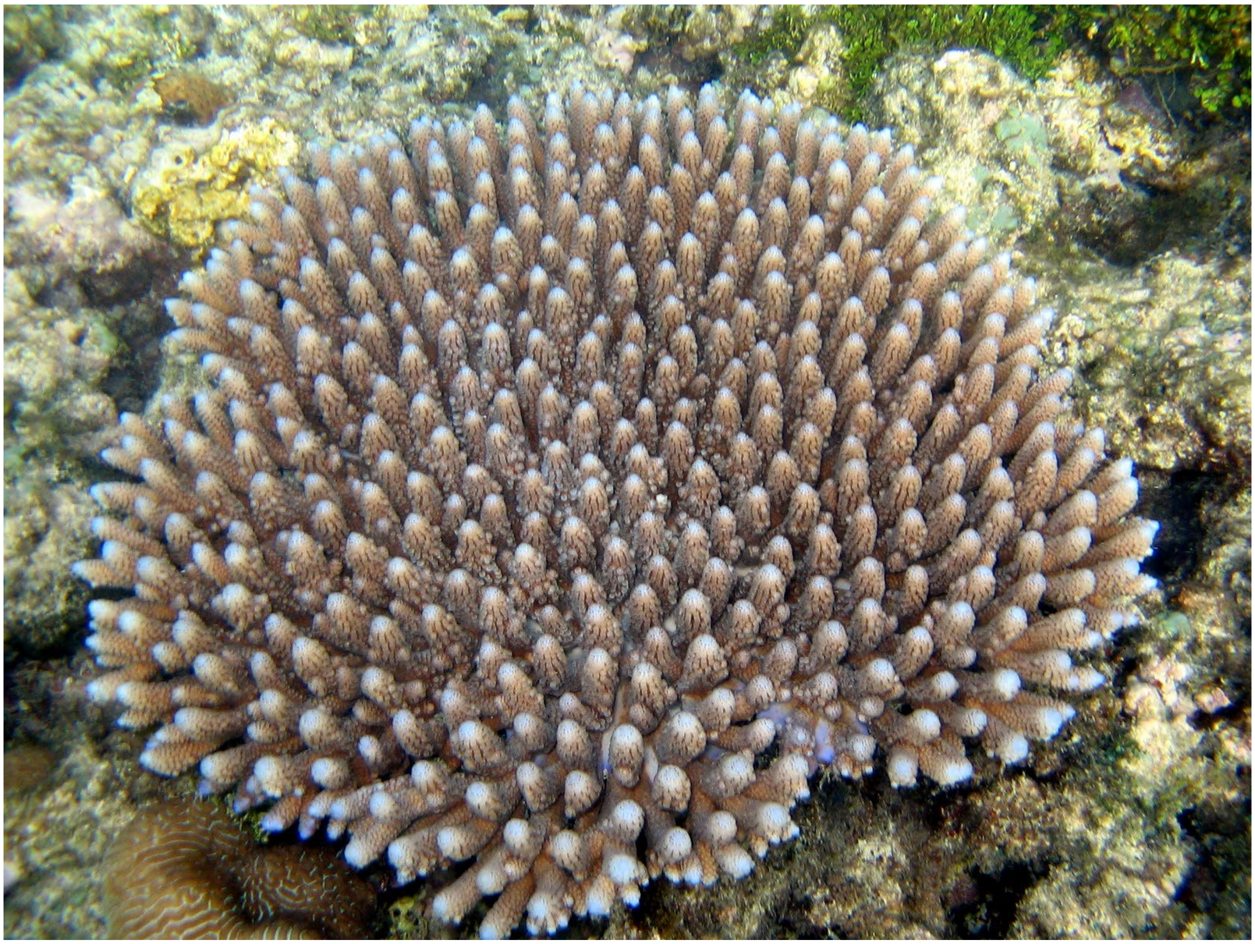


A closer photo of *Acropora retusa*.

A close-up picture of *Acropora retusa*.

Acropora digitifera

Colonies can reach about 1 m diameter and have small branches. The small branches may not taper until near the tip. The axial corallite is medium size. Radial corallites are leafy looking when looking down from above. Branch tips can be blue. This species is only in shallow water, usually near the reef crest. Branches are smaller than most other digitate species, and closer together and more parallel than on Acropora samoensis. Radial corallites are leafier than on other digitate species, but more similar to corymbose species, which usually have smaller branches.



A photo of a *colony* of *Acropora digitifera*.

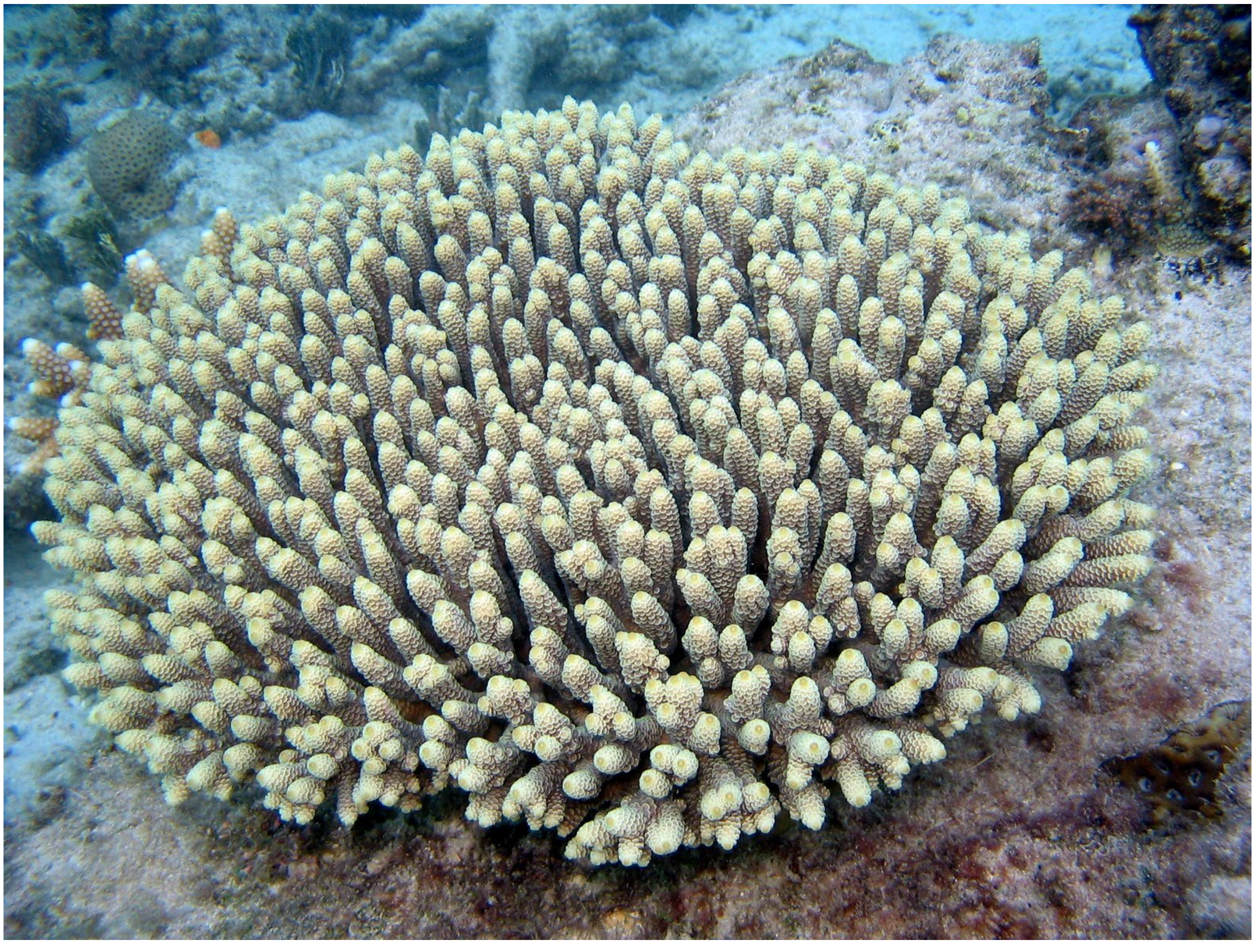
A close photo of a colony of *Acropora digitifera* that has some radial corallites that are larger than others.

A close-up photo of *Acropora digitifera* showing the shelf-like radial corallites.

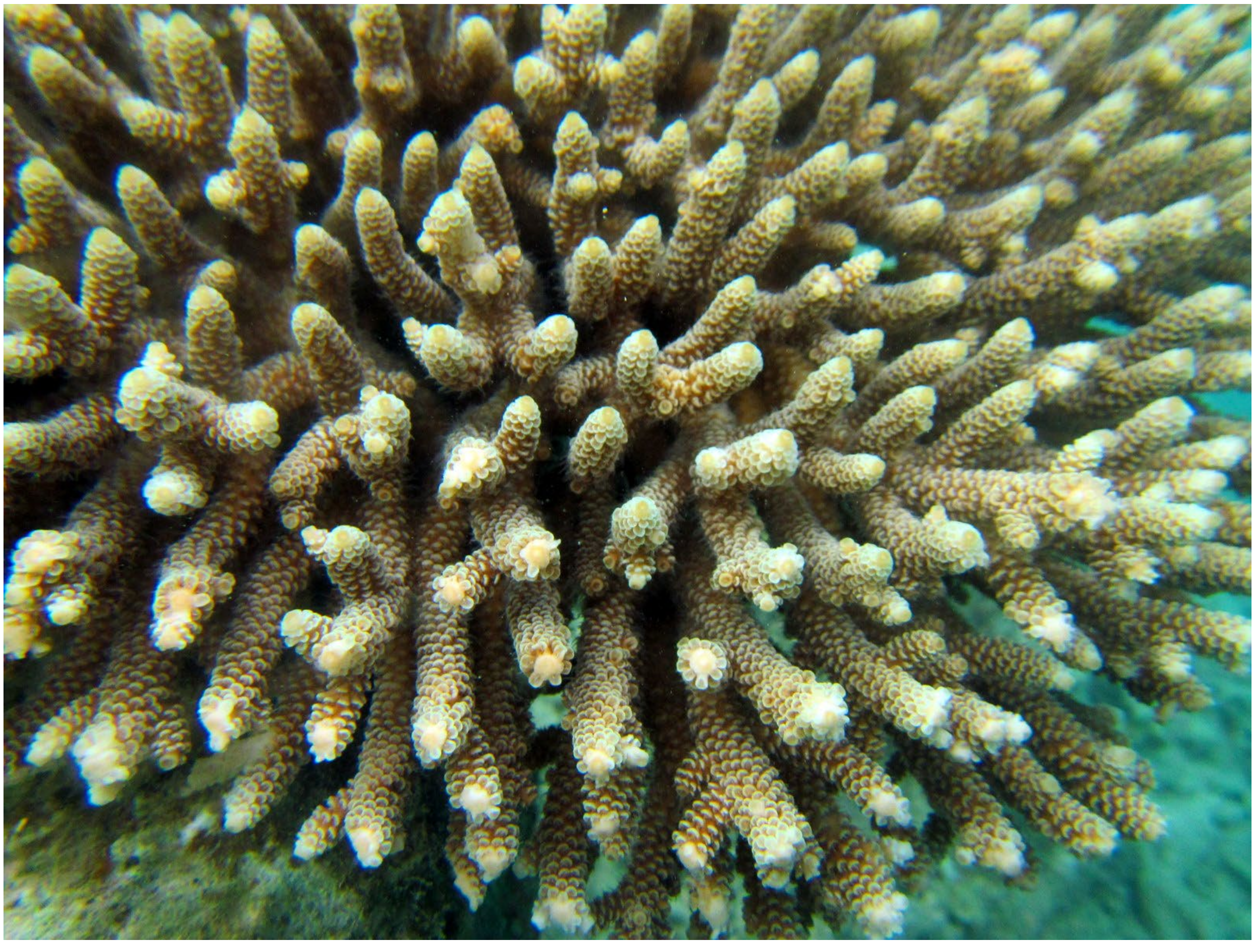
Corymbose: colonies have a central attachment point from which branches grow outward and then upward. The upper surface has small branchlets that grow vertically, with only a little side branching.

Acropora millepora

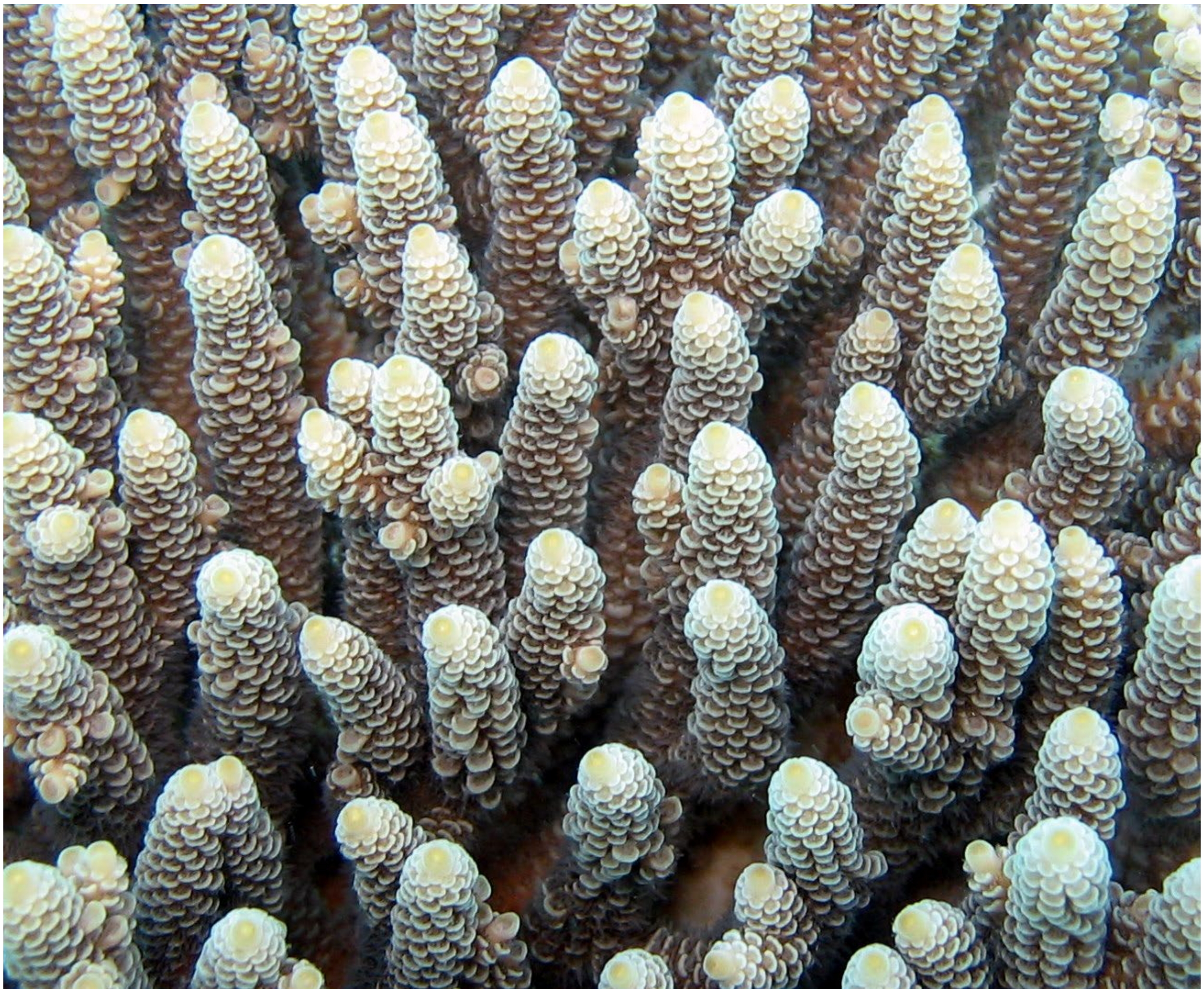
Colonies have uniform, pencil-thin vertical branchlets with a few side branches. Axial corallites are small and radial corallites are close together and have a flat-looking thin lower lip. Branches are thinner than on *Acropora digitifera*, radial corallites are closer together and have thinner lower lips, and branch tips are not blue. *Acropora tenuis* has radial corallites that are less flat and farther apart.



A photo of a colony of *Acropora millepora*.



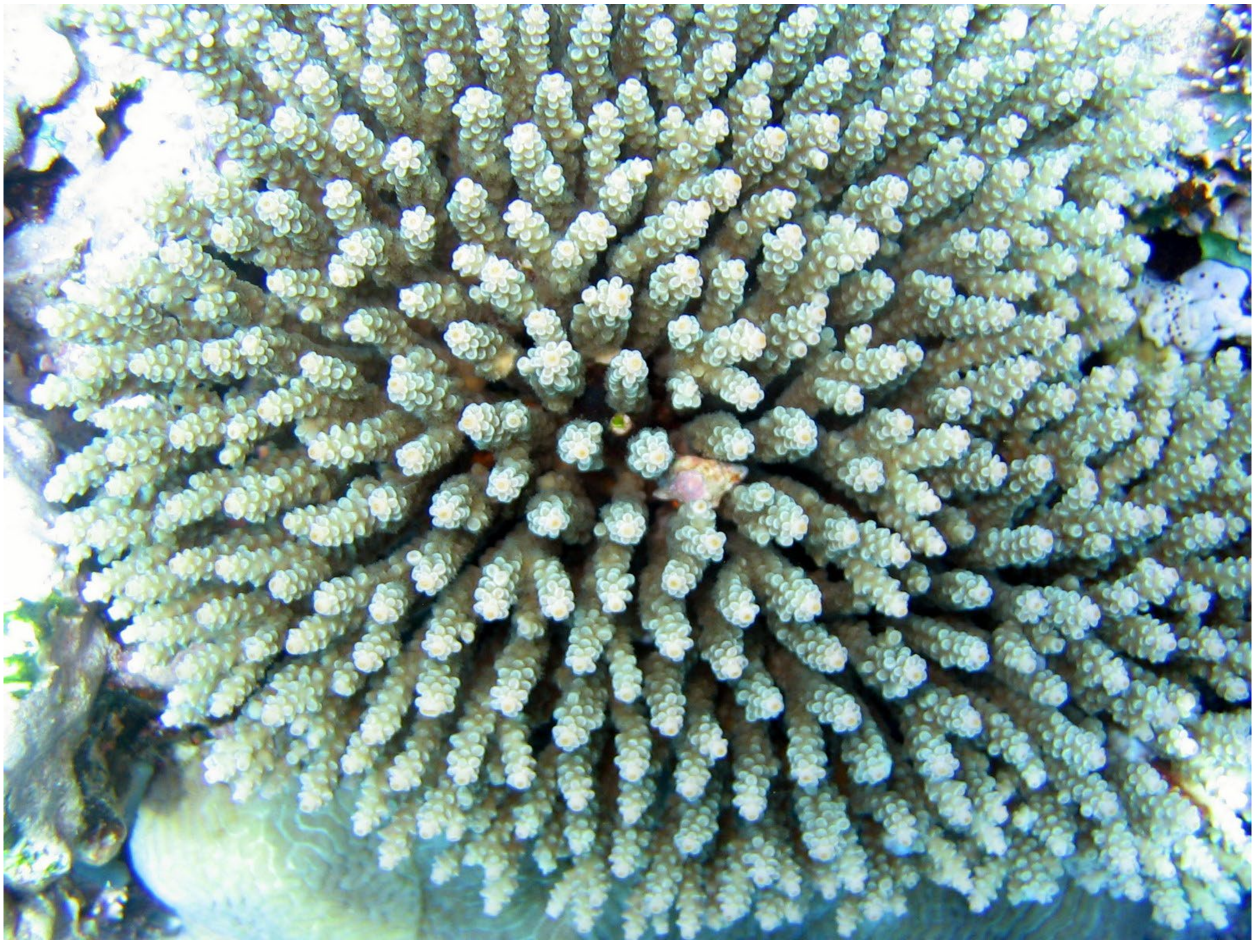
A closer photo of *Acropora millepora*.



A close-up photo of *Acropora millepora*.

Acropora tenuis

Colonies have branchlets about the diameter of a pencil. The axial corallite is small. Radial corallites are short, thin walled, and point upwards, having a rounded lower lip. Radial corallite lower lips are not as close together or flat as on *Acropora millepora*.

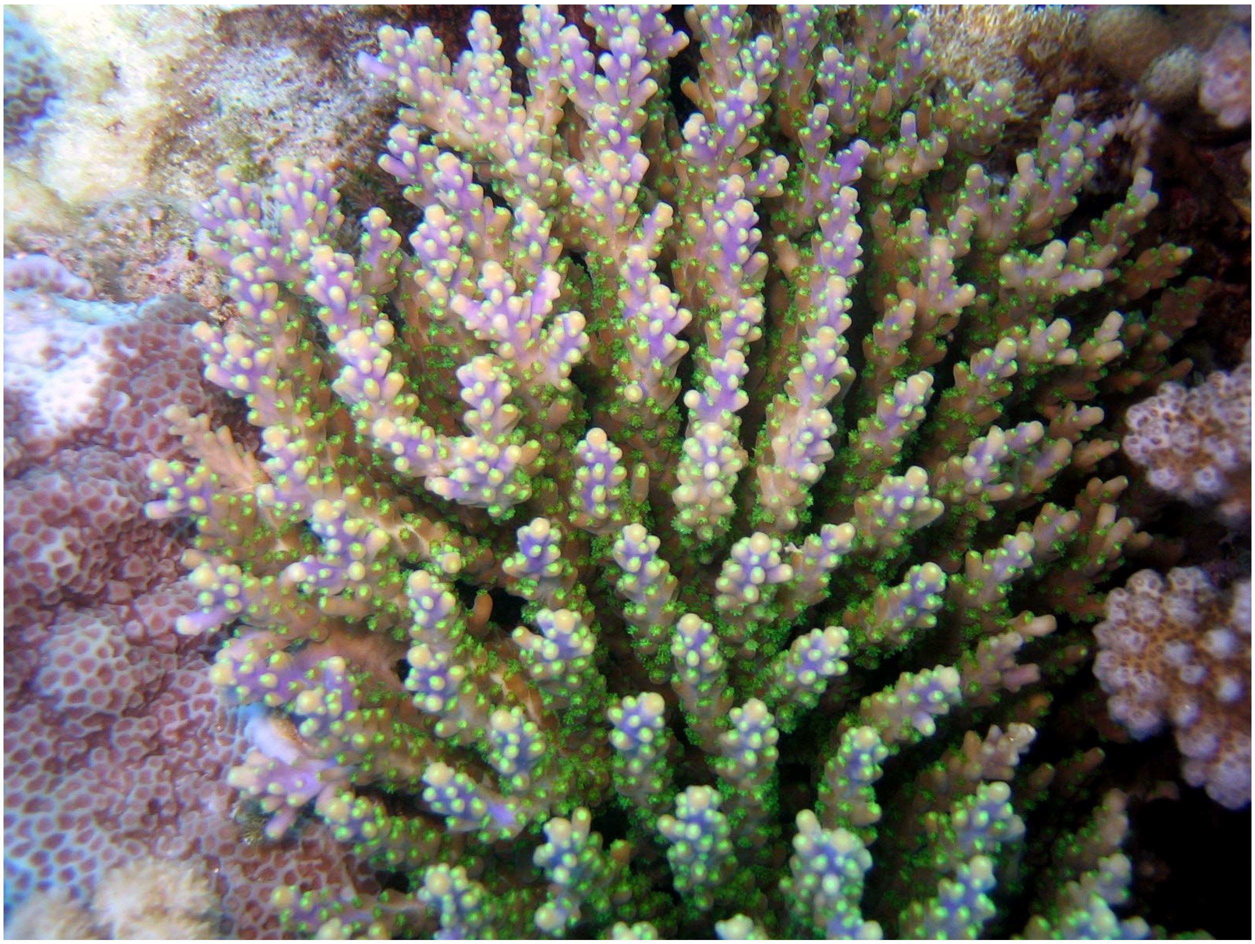


A photo of a colony of *Acropora tenuis*.

A close-up photo of *Acropora tenuis*.

Acropora valida

Colonies have thin vertical branchlets. Axial corallites are small. Radial corallites are tubular, and most are fused sideways to the branch, with the opening pointing towards the branch tip. A few radial corallites near branch tips may extend at an upward angle from the branch side. Colonies often have blue or purple at the end of the branches. *Acropora nana* can have similar color but usually has thinner branches and radial corallites. *Acropora secale* can have similar color but the radial corallites extend from the branch.



A photo of a colony of *Acropora valida*.

A photo of a colony of *Acropora valida* with thick branches.

A close-up photo of *Acropora valida*.

Acropora nana

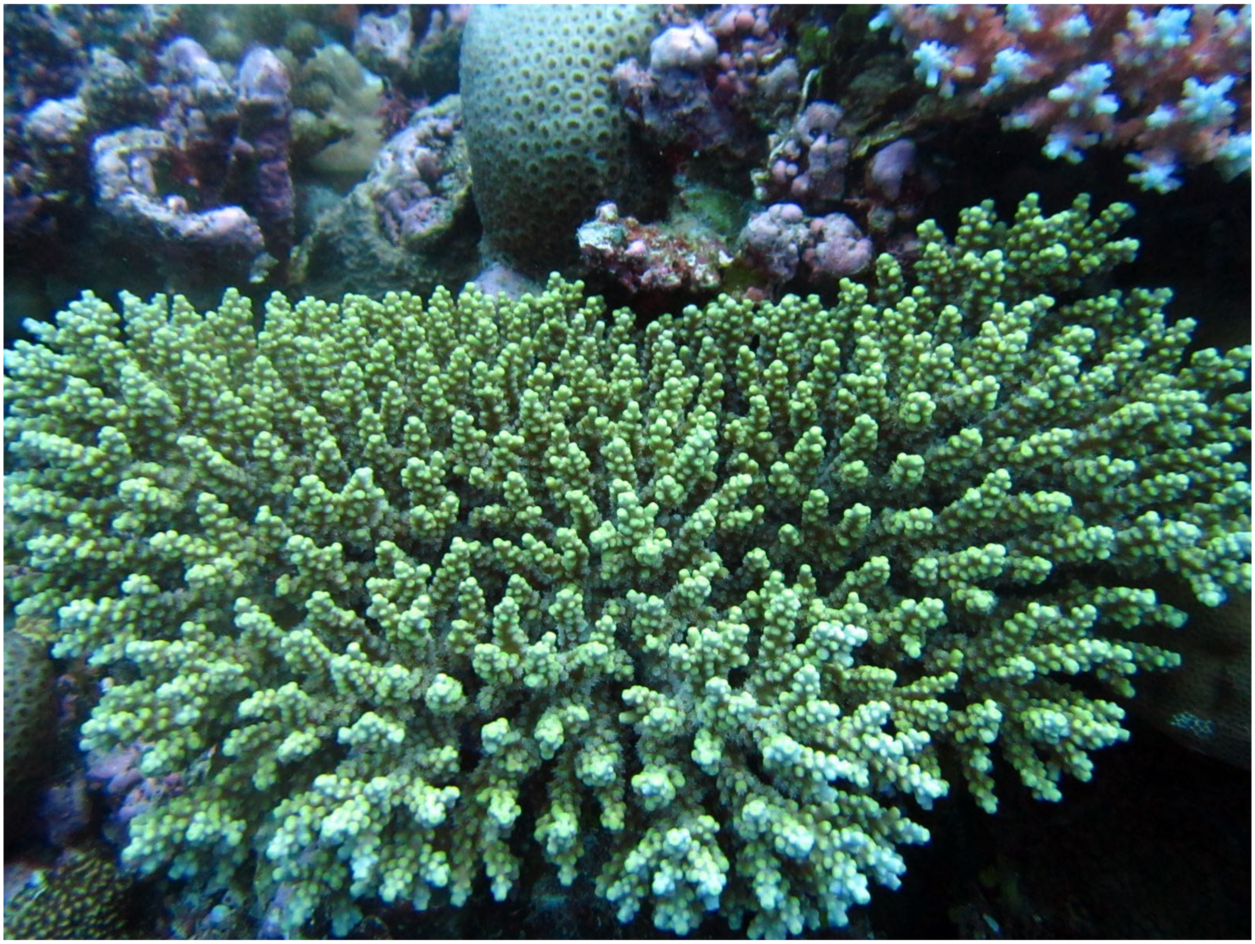
Colonies have thin branches. The axial corallite is small. The radial corallites are fused to the side of the branch with their openings pointing towards the branch tip. The openings of the radial corallites are not small. This species is most common on reef crests. *Acropora azurea* has radial corallites that curve back towards the branch and have smaller openings. *Acropora valida* usually has thicker branches and radial corallites which hug the branch more closely.

A photo of a colony of *Acropora nana*.

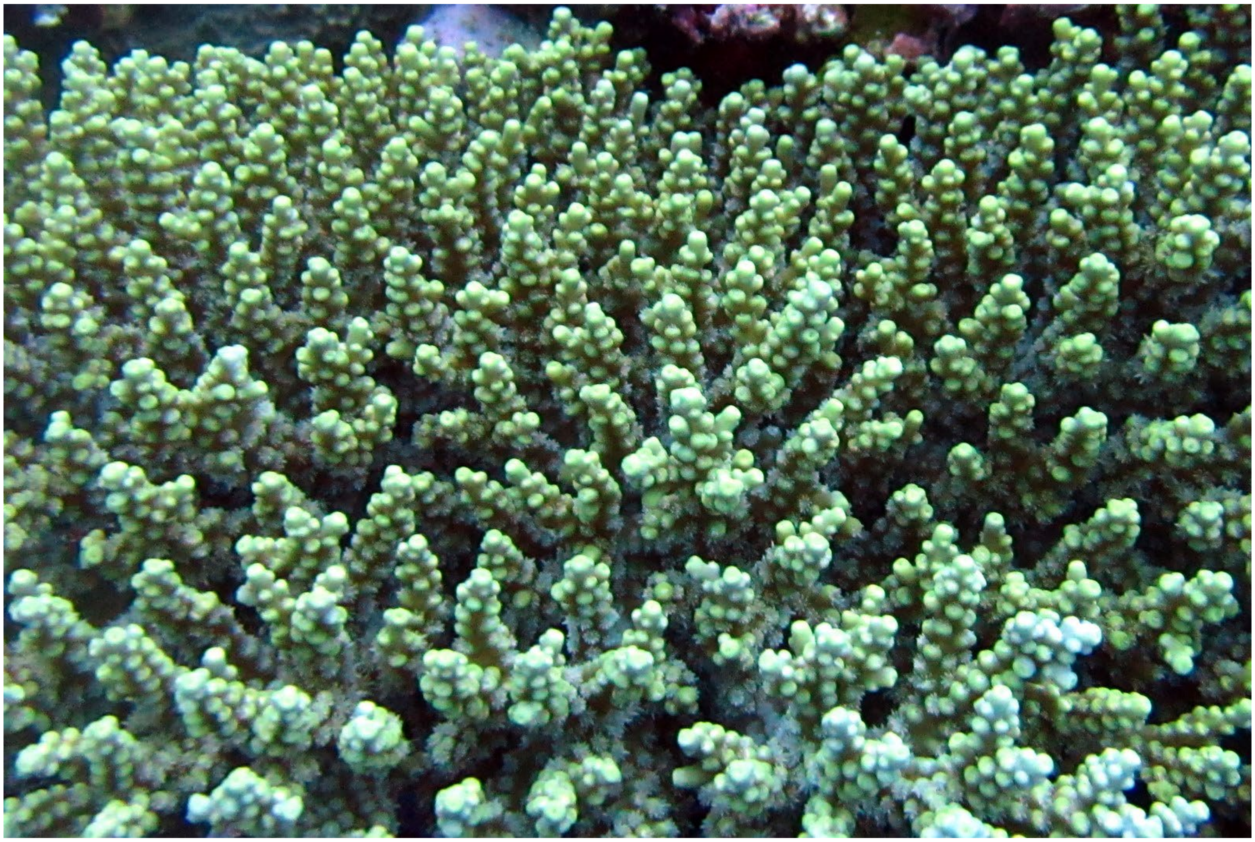
A close-up photo of *Acropora nana*.

Acropora chesterfieldensis

Colonies have small vertical branchlets that are about the diameter of a small finger or slightly less. Axial corallites are medium to large for the size of the branch. Radial corallites are uniform, short, fused to the side of the branch, and point towards the branch tip. *Acropora latistella* usually has thinner branches and a smaller axial corallite, but the size ranges for the two species overlap. Thus, these photos might be *Acropora latistella*.



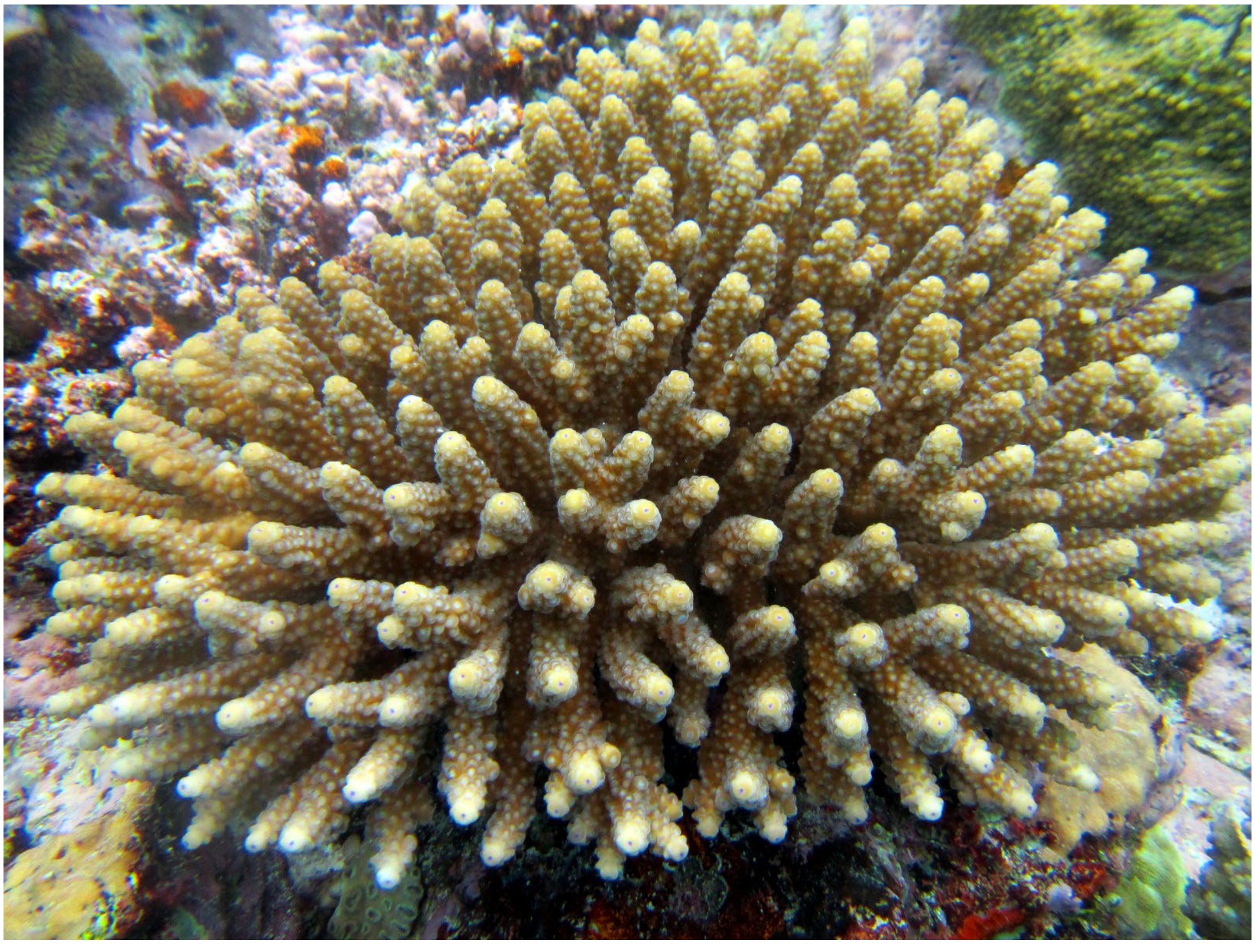
A colony of *Acropora chesterfieldensis*.



A close-up photo of *Acropora chesterfieldensis*.

Acropora verweyi Vulnerable

Colonies are usually corymbose, but can be bushy. Branches are uniform and there is usually little side branching in corymbose colonies. Axial corallites are large, project, and have blunt tops. Axials have extremely thick walls with only a tiny calice in the center. Axials are often yellow, with a tiny purple dot in the center which is the polyp. Radial corallits are very uniform, short, have thick walls, and point towards the branch tips, so they look like thick shelves. Colonies are usually a rusty brown. The axial corallites are larger than on *Acropora chesterfieldensis* and the colors different.

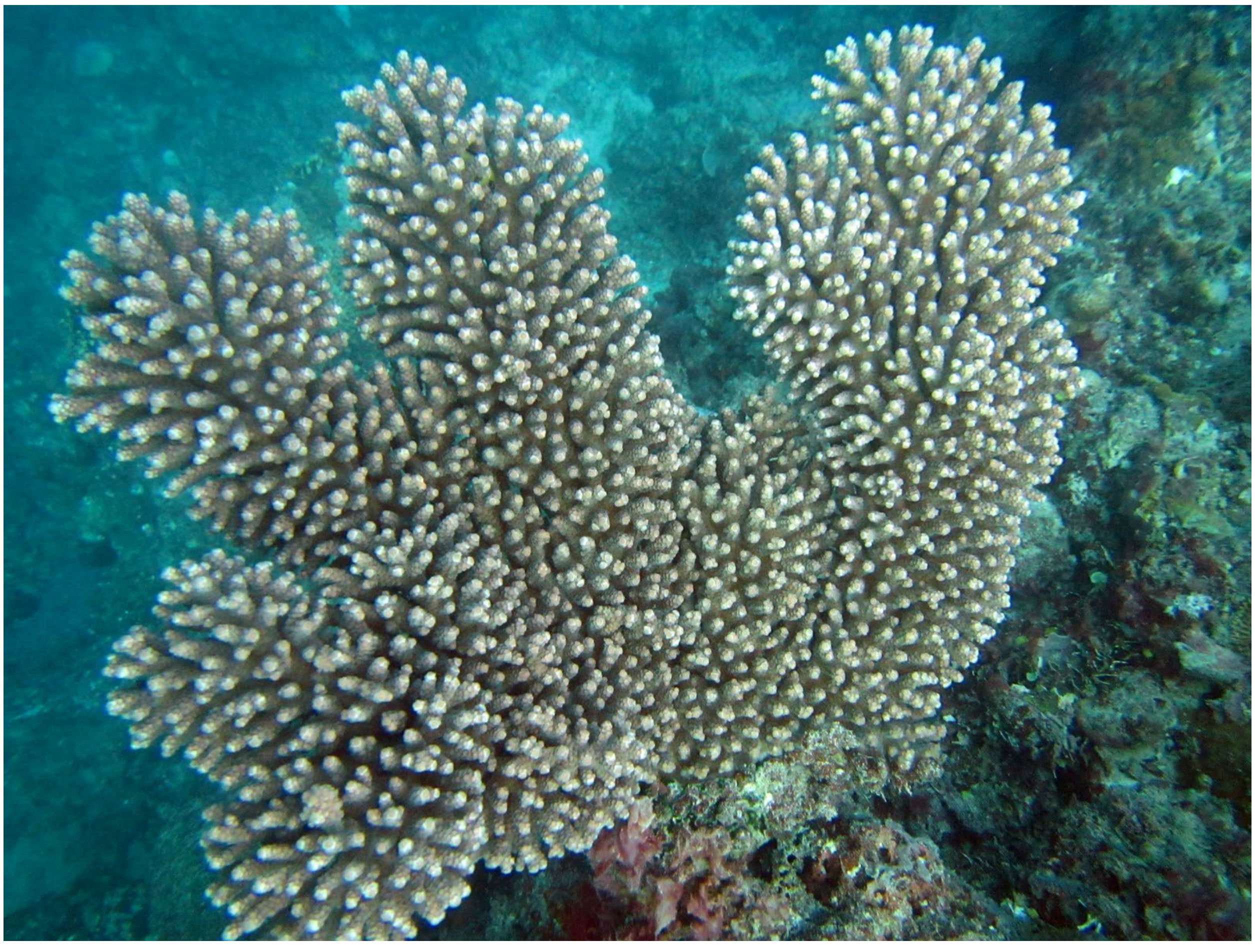


A photo of *Acropora verweyi*.

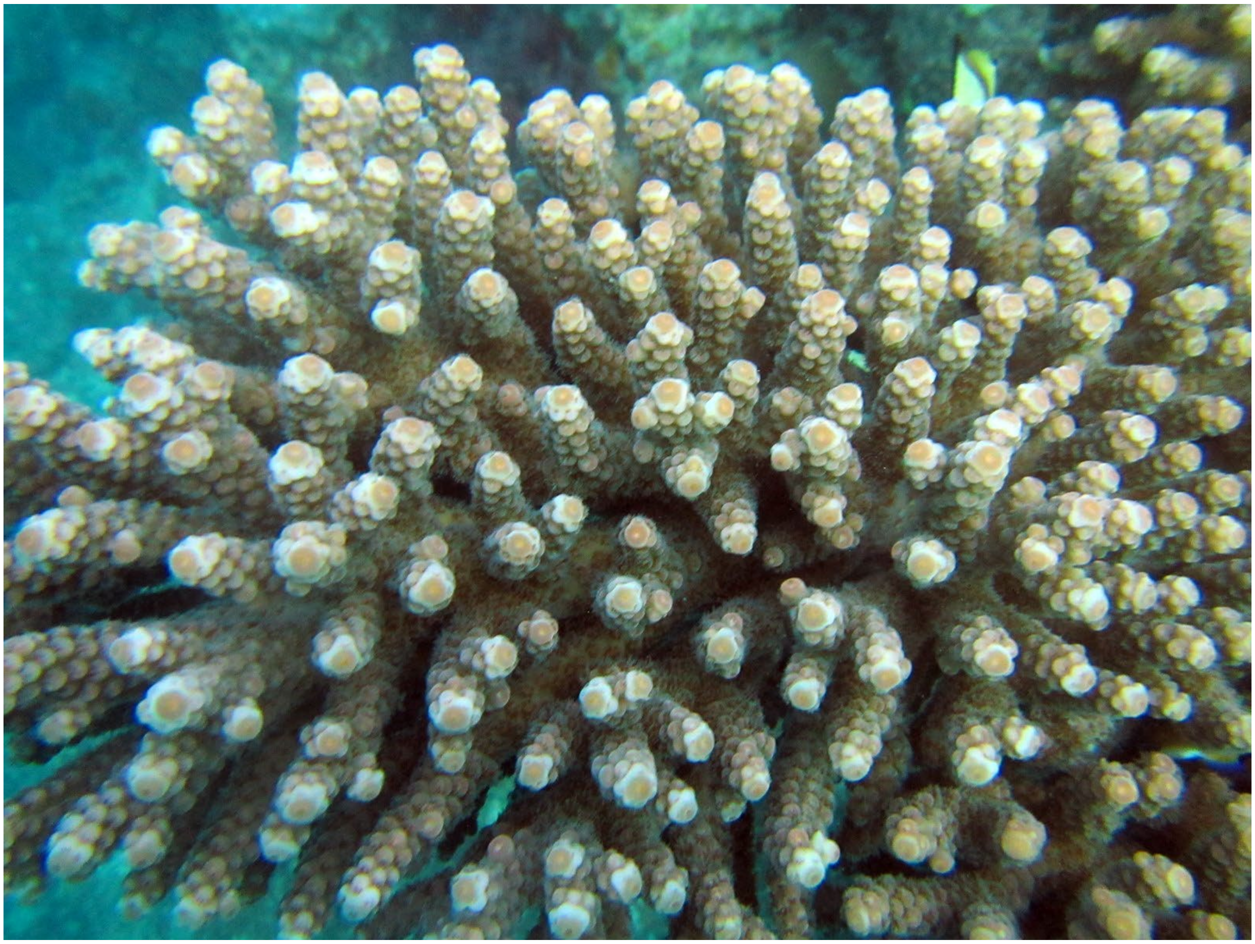
A close-up photo of *Acropora verweyi*.

Acropora sarmentosa

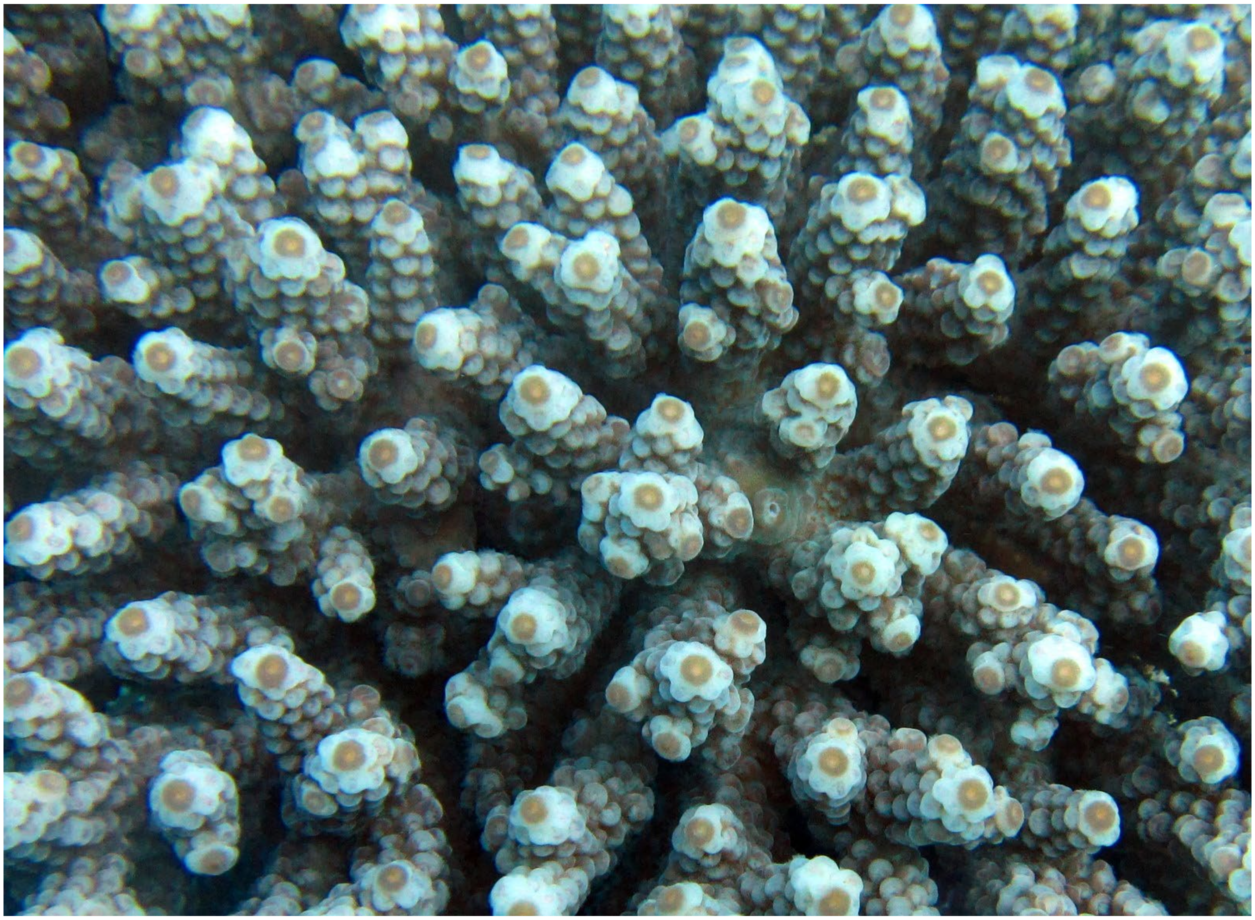
Colonies are corymbose plates. Branchlets are uniform in length and thickness, and about the thickness of a pencil. The axial corallite is very wide but flat and may be a contrasting color (such as brown) to the rest of the colony. The axial corallite may not look circular due to radial corallites on the side of it. There may be a white ring around the axial corallite. Radial corallites are short, with thick walls, and face the branch tip, and so look like shelves. The axial corallites on *Acropora verweyi* are taller and more cylindrical, and have different coloration. *Acropora florida* can be very similar looking but is branching, branchlets may be very similar or may be much smaller, has larger more circular appearing axial corallites that project farther, and is often green.



A photo of a colony of *Acropora sarmentosa*.



A close photo of a colony of *Acropora sarmentosa*.

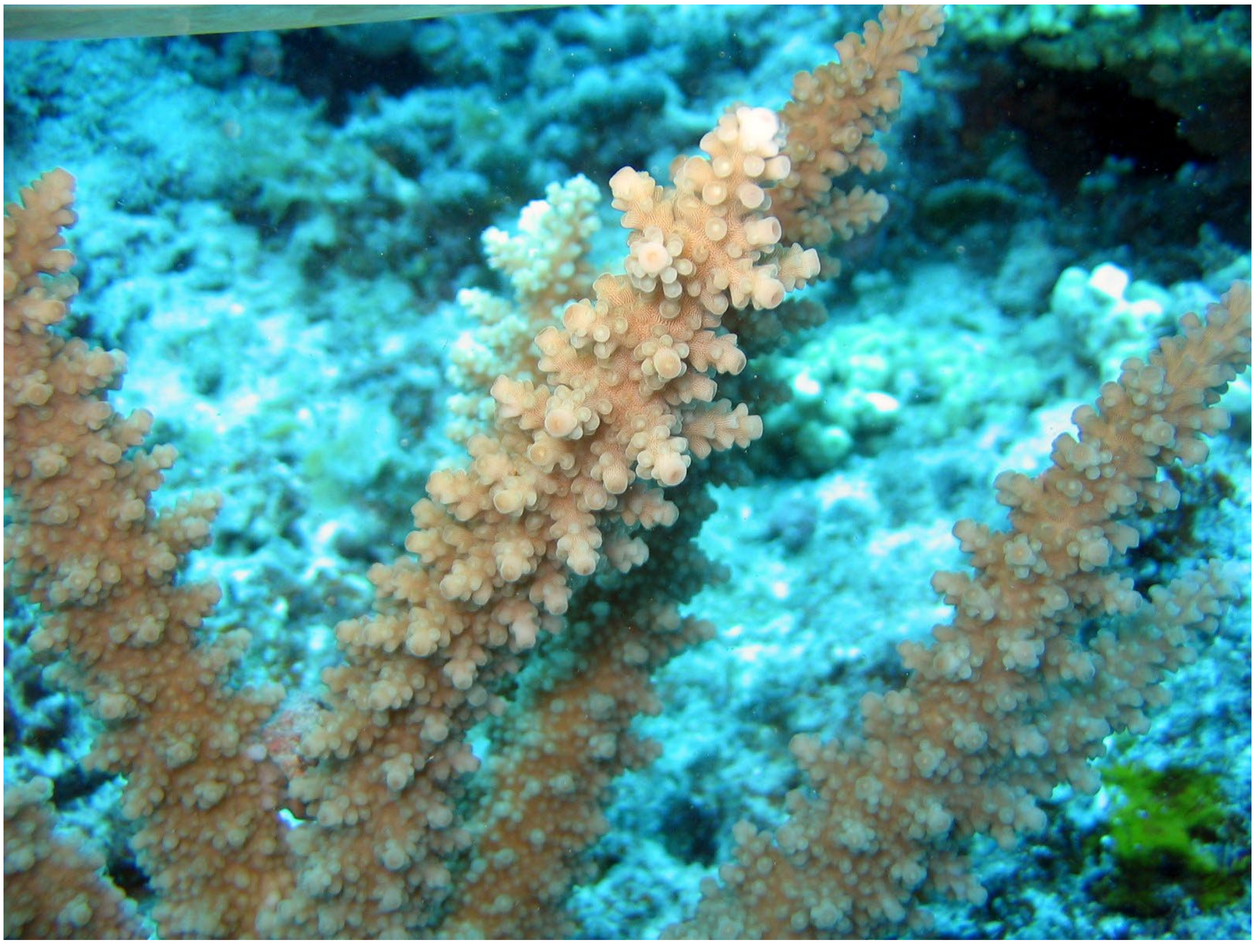


A close-up photo of *Acropora sarmentosa*.

A close-up photo of *Acropora sarmentosa*.

Acropora florida

Colonies are branching, with large branches that can be cylindrical or oval in cross section. The upper surfaces of oval branches and all sides of cylindrical branches have branchlets that are uniform in shape and size. On cylindrical branches the branchlets are small and wide spread, while on oval branches they are larger and closer together. Axial corallites are small on the small branchlets on cylindrical branches and large on the large branchlets of oval branches. *Acropora sarmentosa* is very similar to the oval branching colonies, but has much larger branchlets than the cylindrical branches.

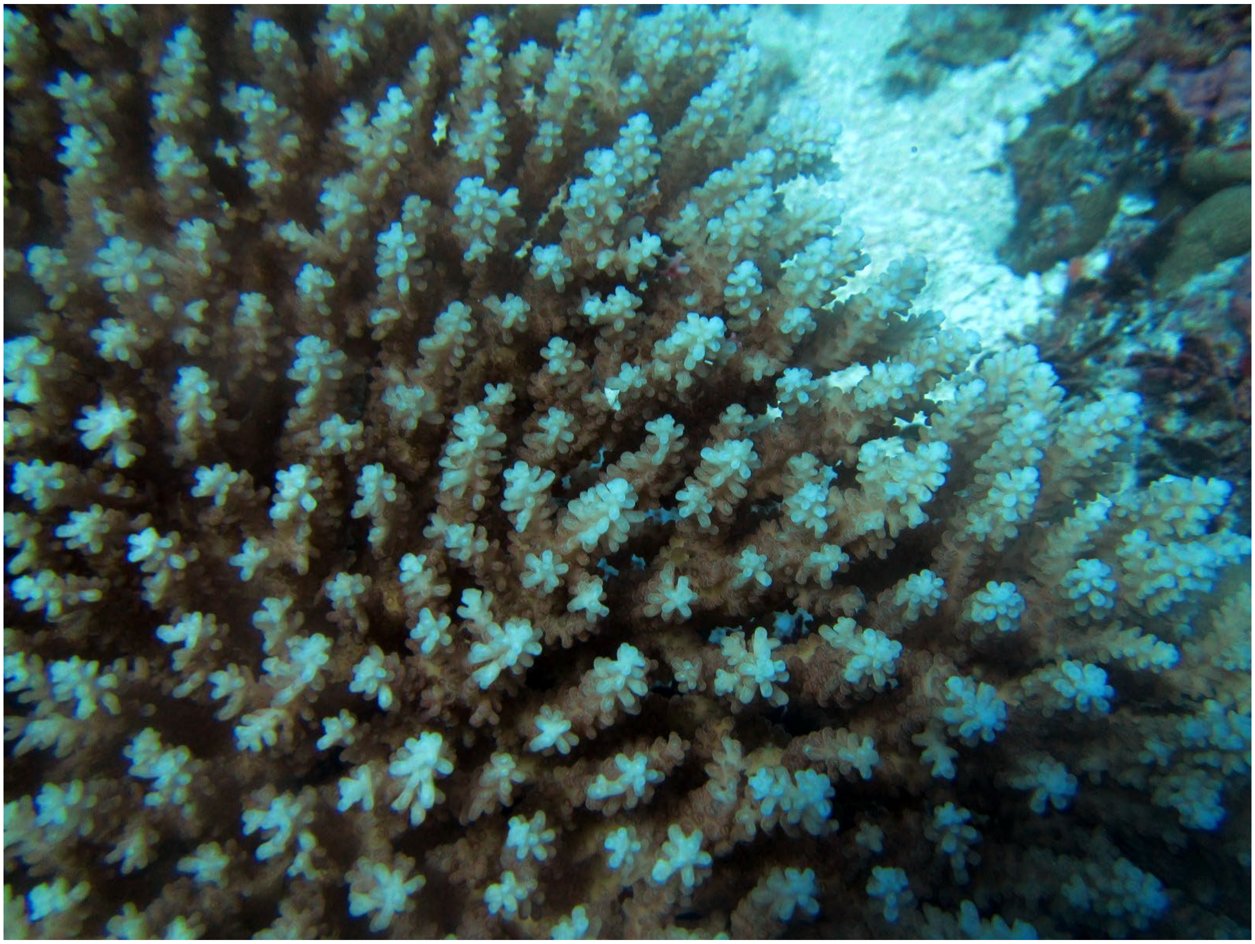


A photo of a colony of *Acropora florida* with cylindrical branches and small branchlets that are widely spaced.

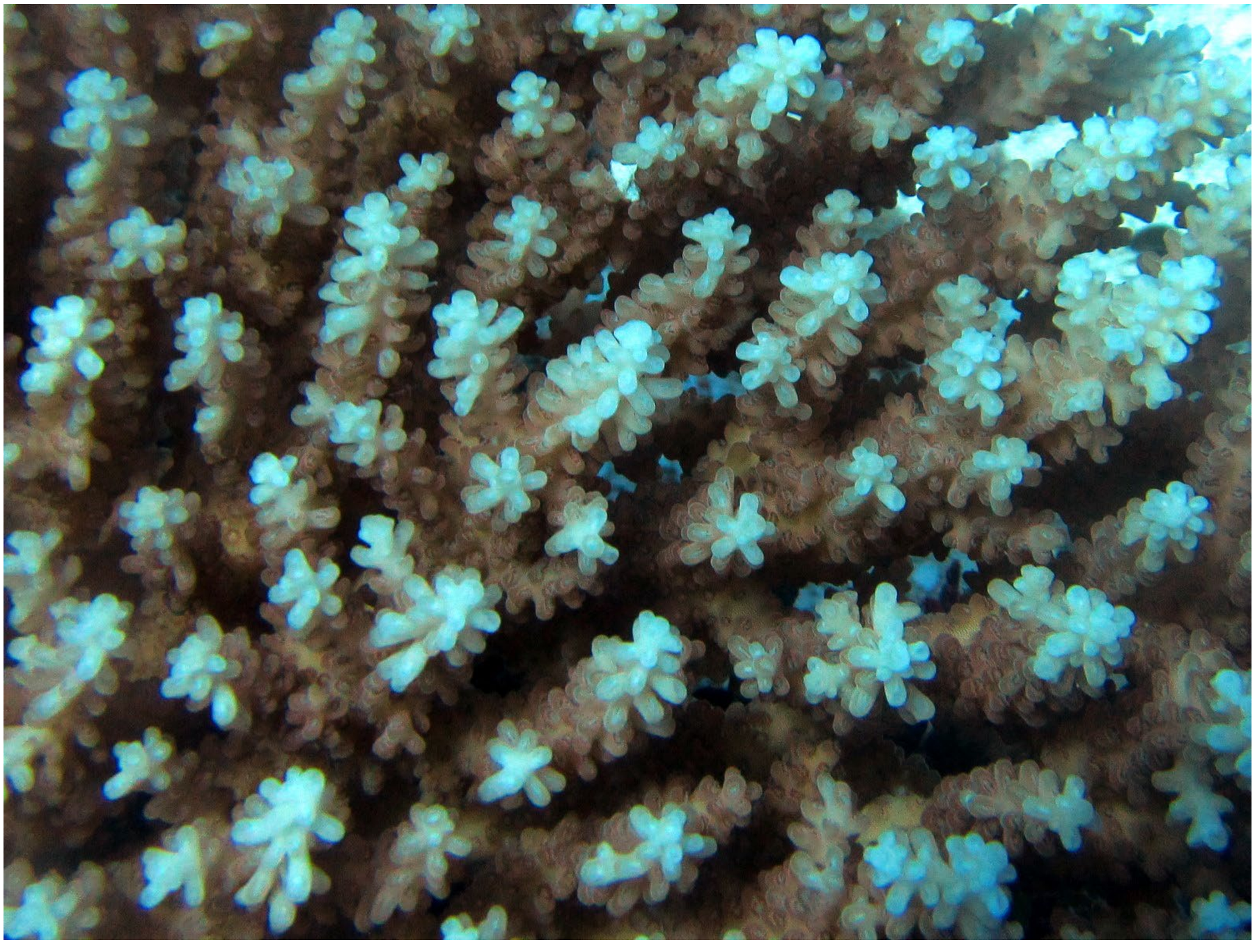
A close up photo of a cylindrical branch of *Acropora florida*.

Acropora cerealis

Colonies have thin vertical branches. Axial corallites are small. Radial corallites are tubular and extend relatively far from the branch. The openings of the radial corallites point towards the branch tip and many are slit-like. Radial corallites are a large part of the total diameter of the branch. The radial coralltes are a smaller part of the diameter of the branch, which is larger, on *Acropora nasuta*.



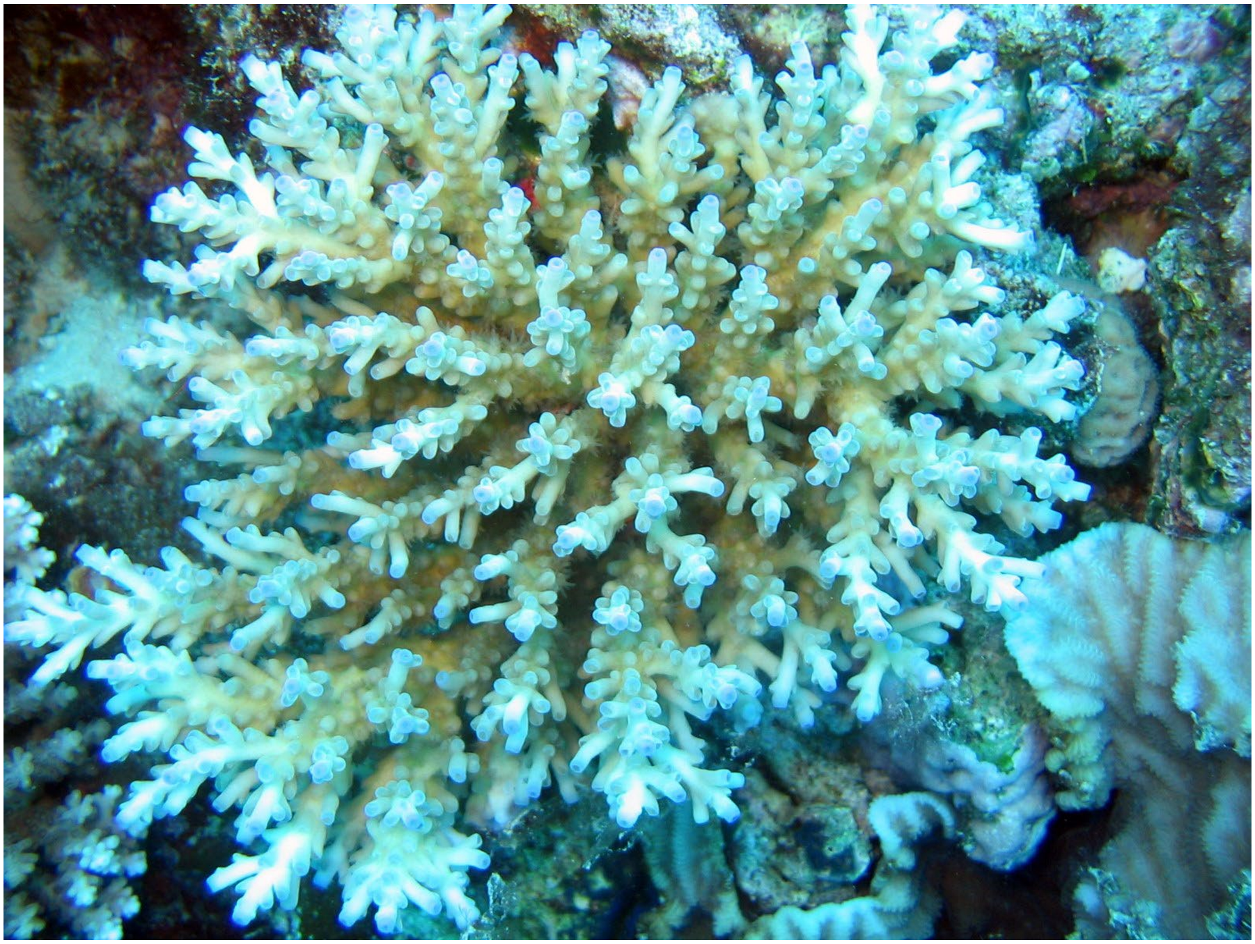
A photo of *Acropora cerealis*.



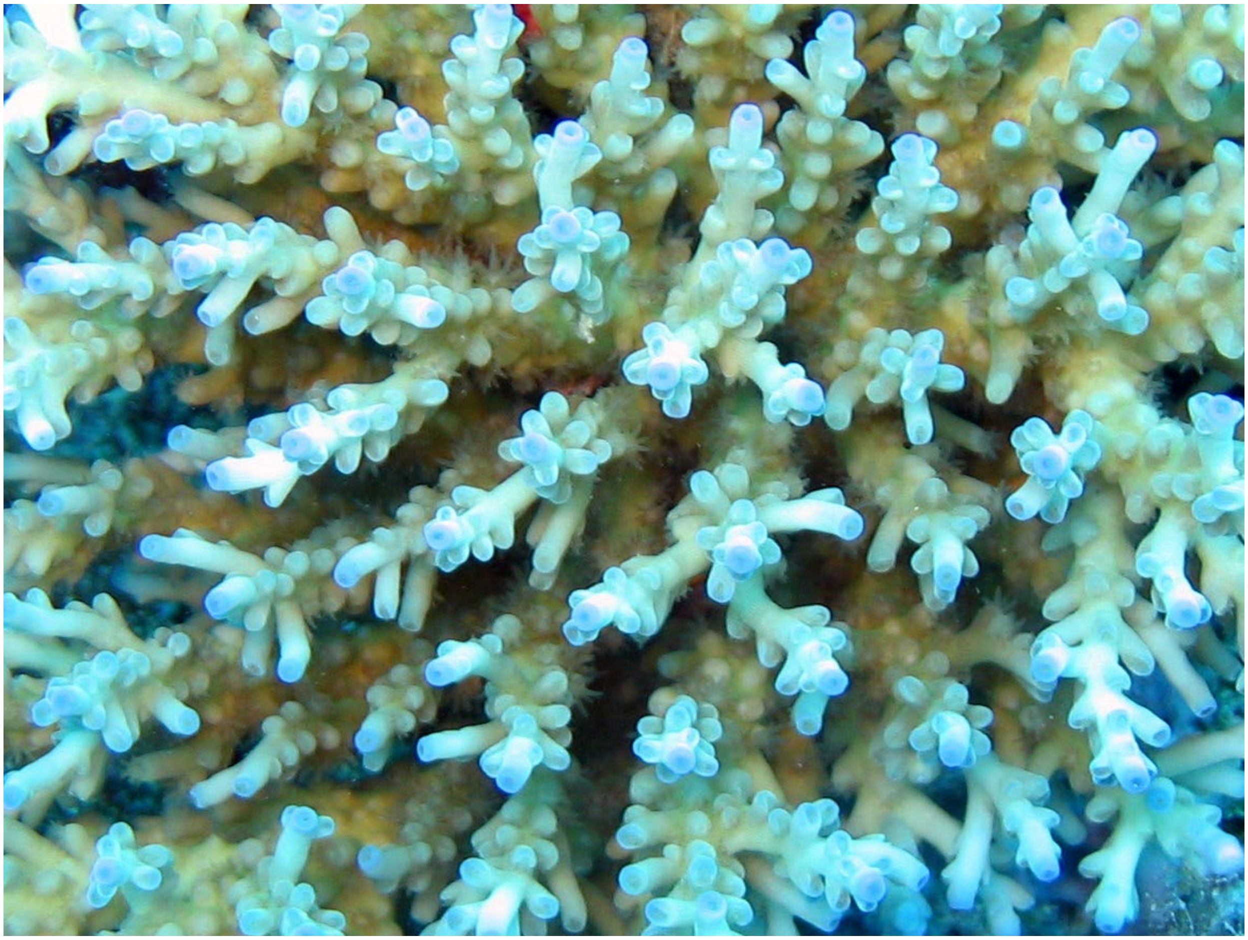
A close-up photo of *Acropora cerealis*.

Acropora cf. kimbeensis Vulnerable

Colonies are corymbose with thin branches. Axial and incipient axial corallites are tubular and can be long. Radial corallites are short and nariform. *Acropora cerealis* is similar but has much more uniform radial corallites. *Acropora nasuta* has thicker branches and uniform length radial corallites.



A close photo of *Acropora kimbeensis*.

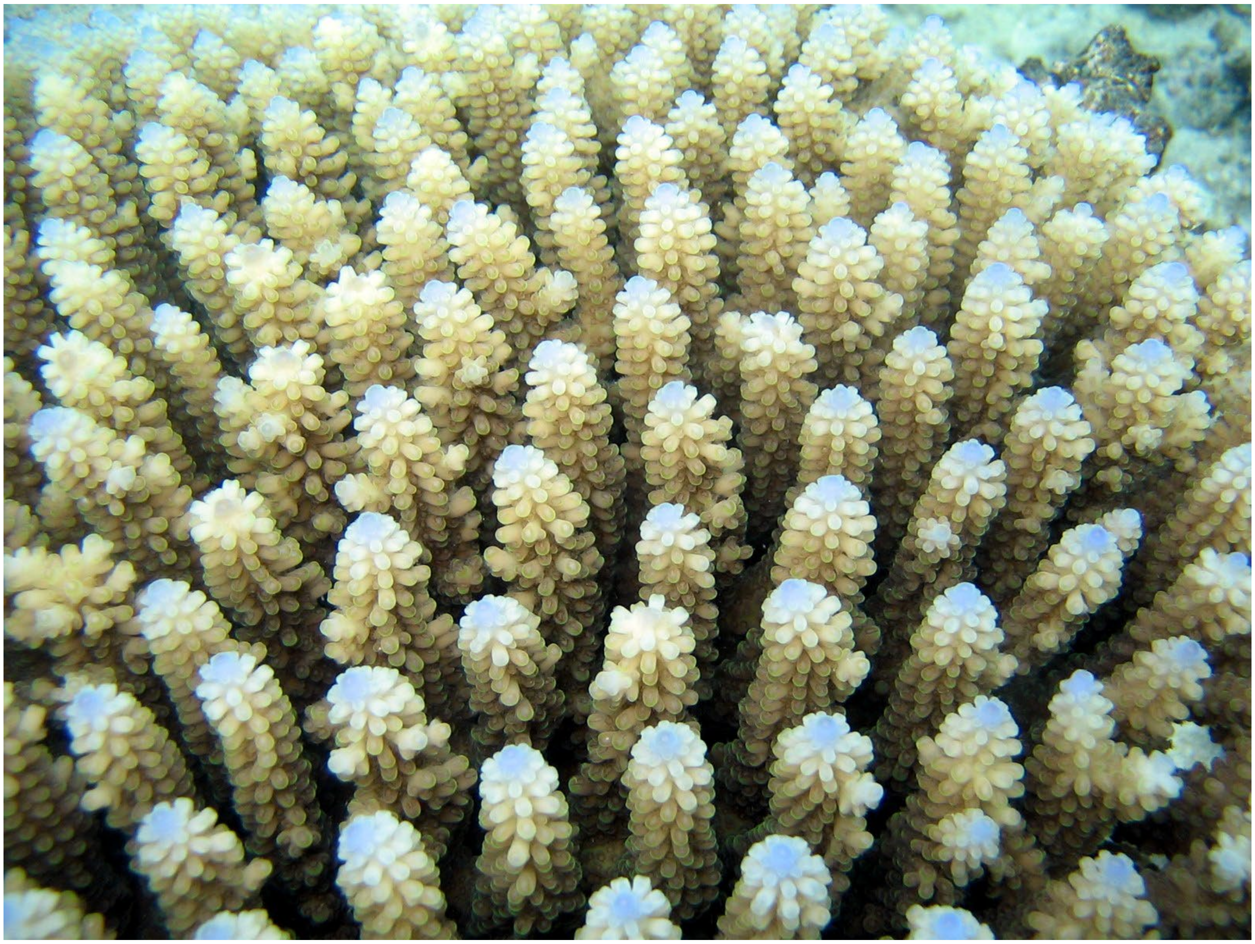


A close-up photo of *Acroproa kimbeensis*.

Acropora nasuta

Colonies have branchlets about the diameter of a finger or little finger. The axial corallites are small. Radial corallites are tubular and project from the branch sides. The radial corallites are not a large part of the diameter of the branch. The openings of the radial corallites point upward towards the branch tip. On *Acropora cerealis*, the branches are thinner and radial corallites are a larger part of the branch diameter.

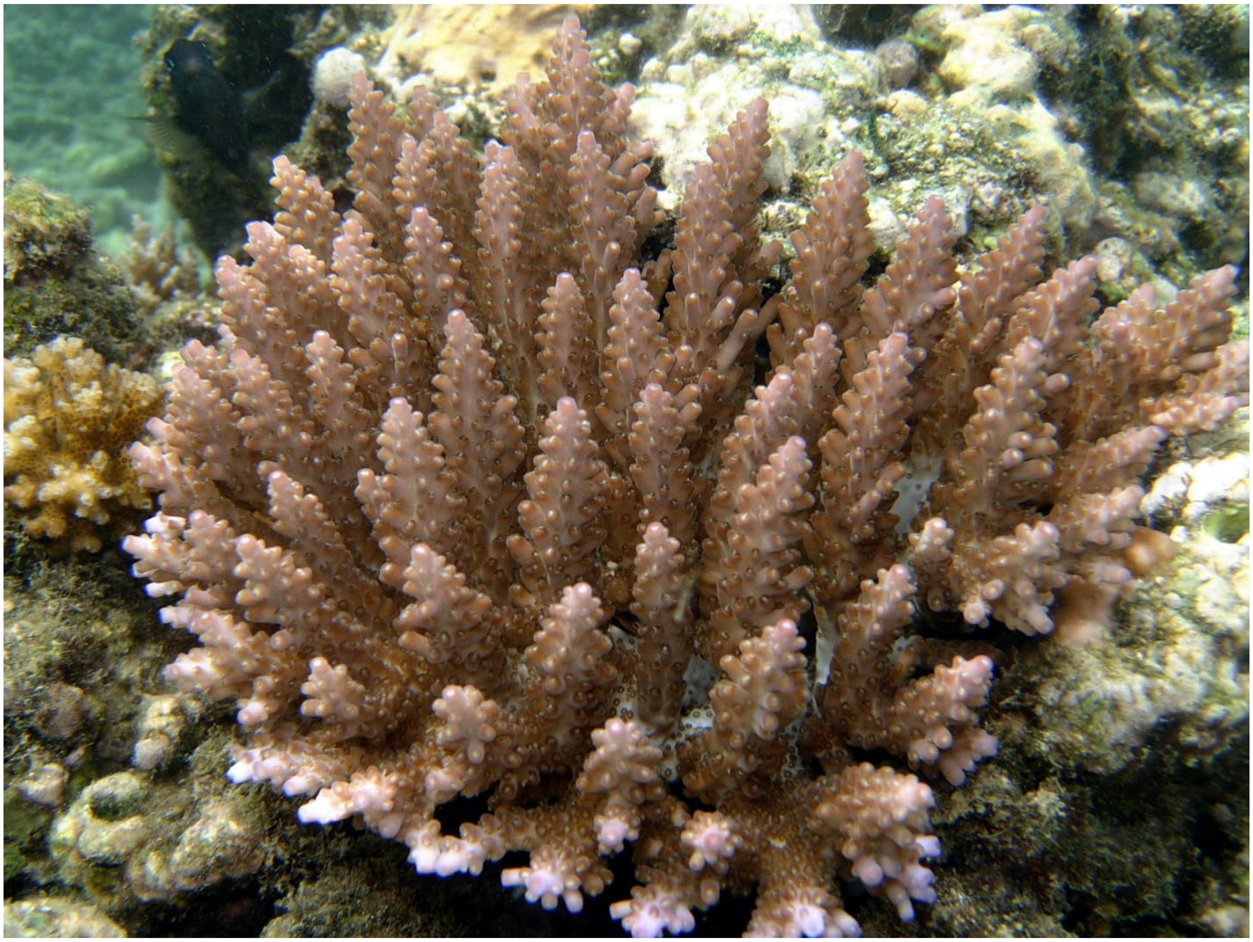
A photo of a large colony of *Acropora nasuta*.



A close-up photo of *Acropora nasuta*.

Acropora secale

Colonies are corymbose, with branches that taper and can be thick at the base. The axial corallite is small. Radial corallites extend at an upward angle from branches, are tubular and often thick, and vary in length. Colonies can have blue or purple near branch ends like *Acropora valida* and *Acropora nana*. Branches on *Acropora nasuta* do not taper and the radial corallites are thin. *Acropora polystoma* has thicker, tapering branches and the uniform, long radial corallites have upward pointing openings.

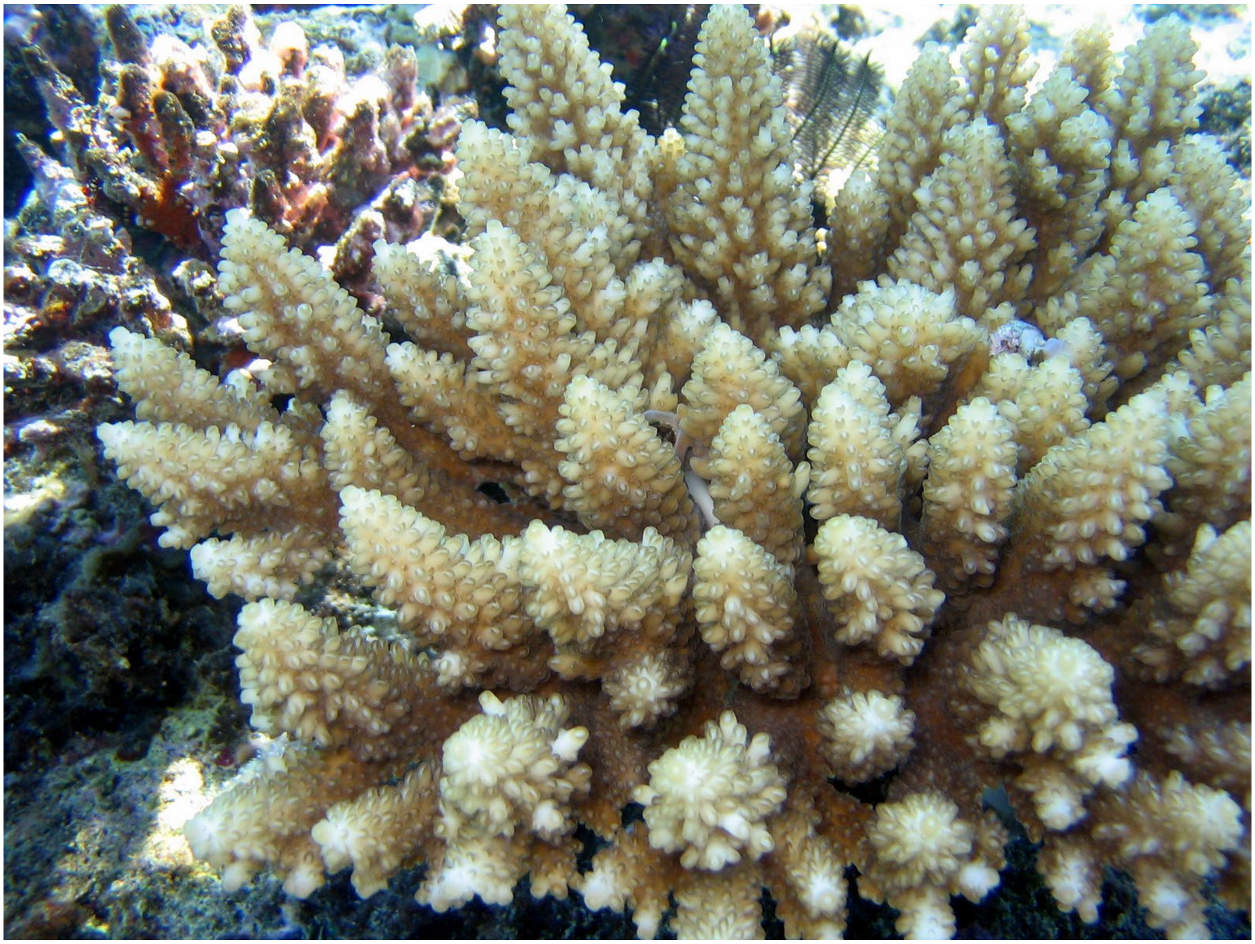


A photo of a colony of *Acropora secale*.

A closeup photo of Acropora secale.

Acropora polystoma Vulnerable

Colonies have relatively thick branches which have many long, tubular radial corallites. The radial corallites have upward slanted or pointing openings which often are oval. The branches are usually larger than on *Acropora secale* which has tubular openings on long radial corallites. Also, *Acropora polystoma* does not have the purple coloration.

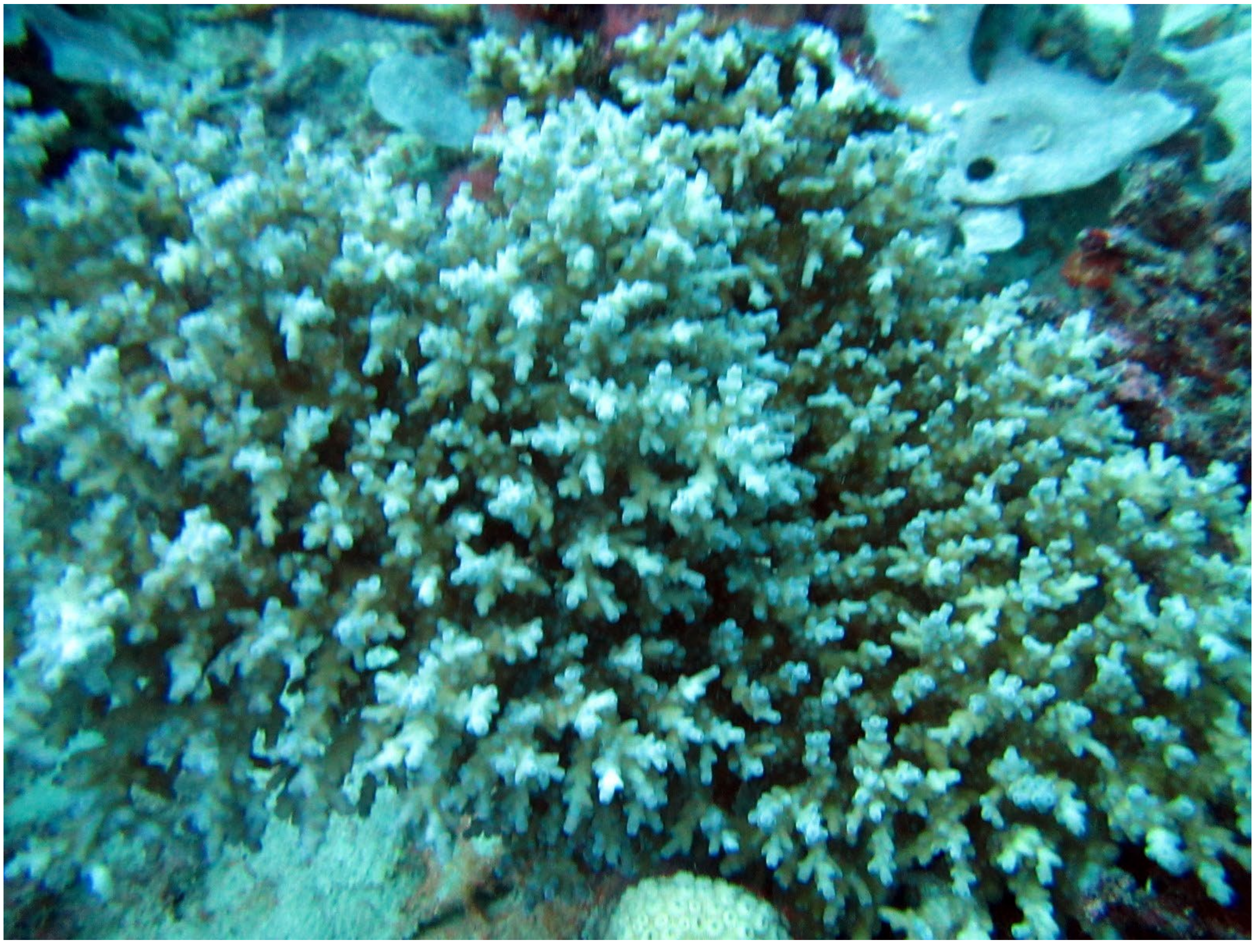


A photo of *Acropora polypstoma*.

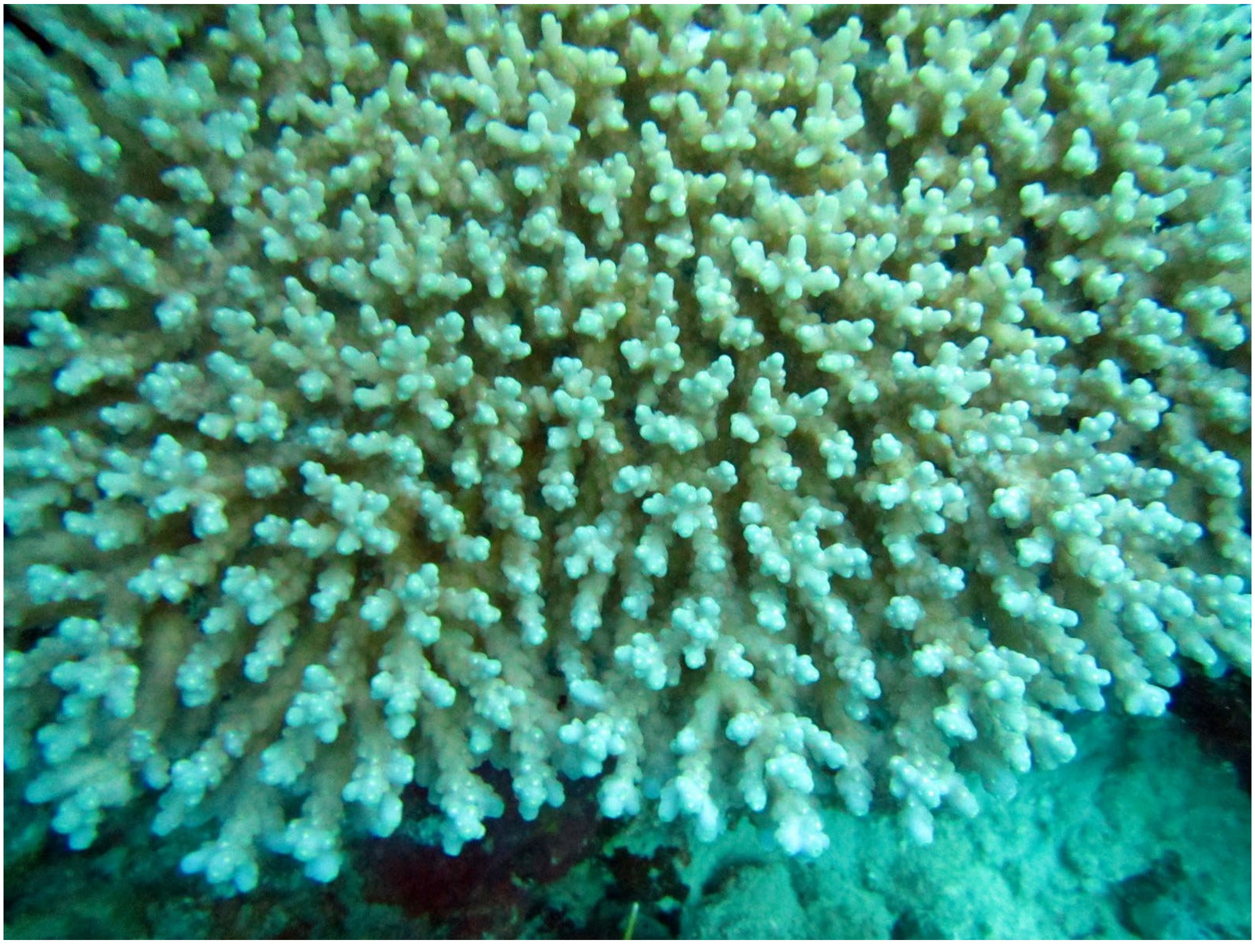
A close-up photo of *Acropora polystoma*.

Acropora aculeus Vulnerable

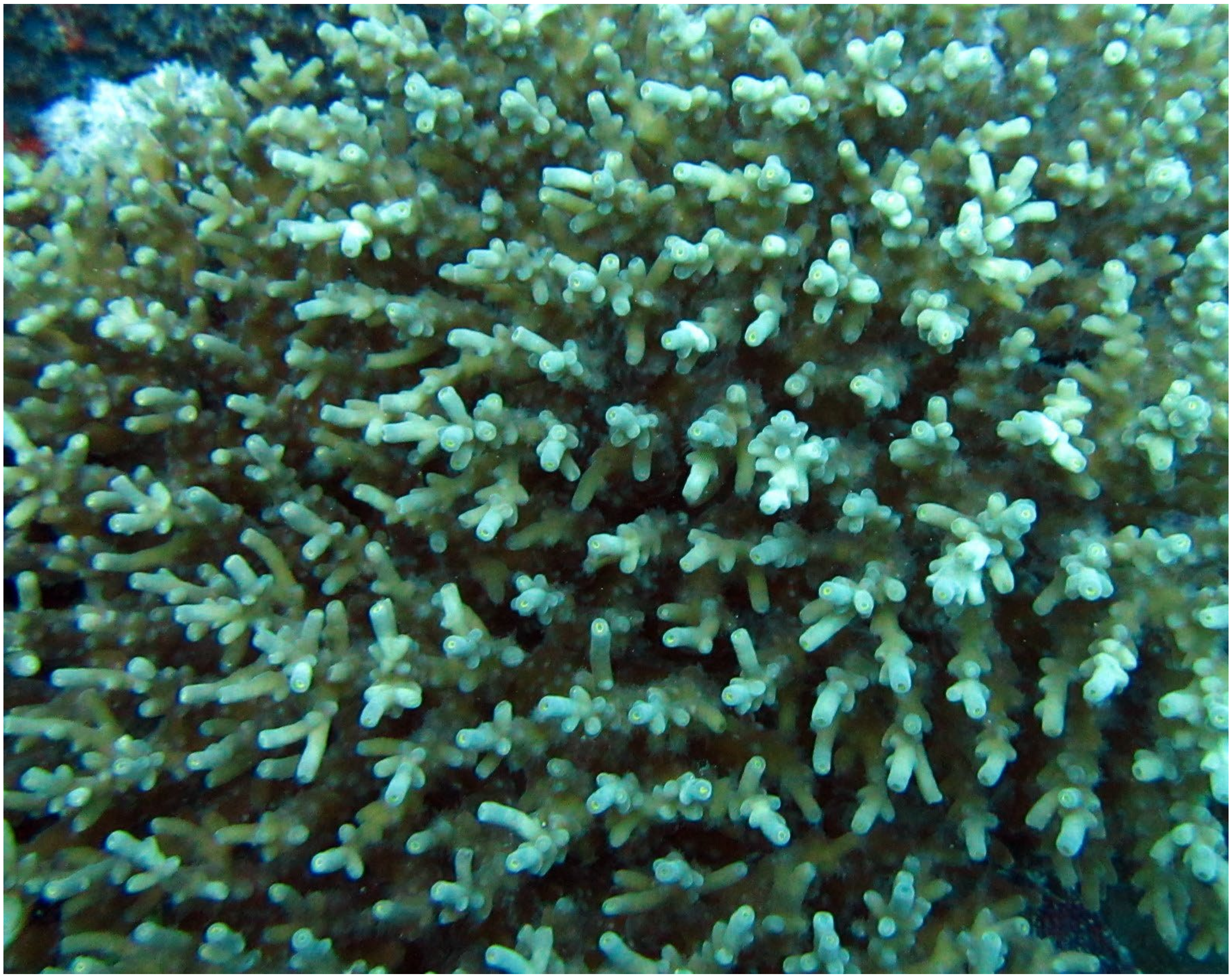
Colonies are cushion-shaped, with branchlets growing upward and in various directions. Branchlets are thin, taper and are irregular. Axial and incipient axial corallites are small and tubular, and radial corallites are short and angled towards the branch tip. Radial corallites are common. On *Acropora granulosa*, *Acropora speciosa*, and similar species, there are very few radial corallites.



A photo of a colony of *Acropora aculeus*.



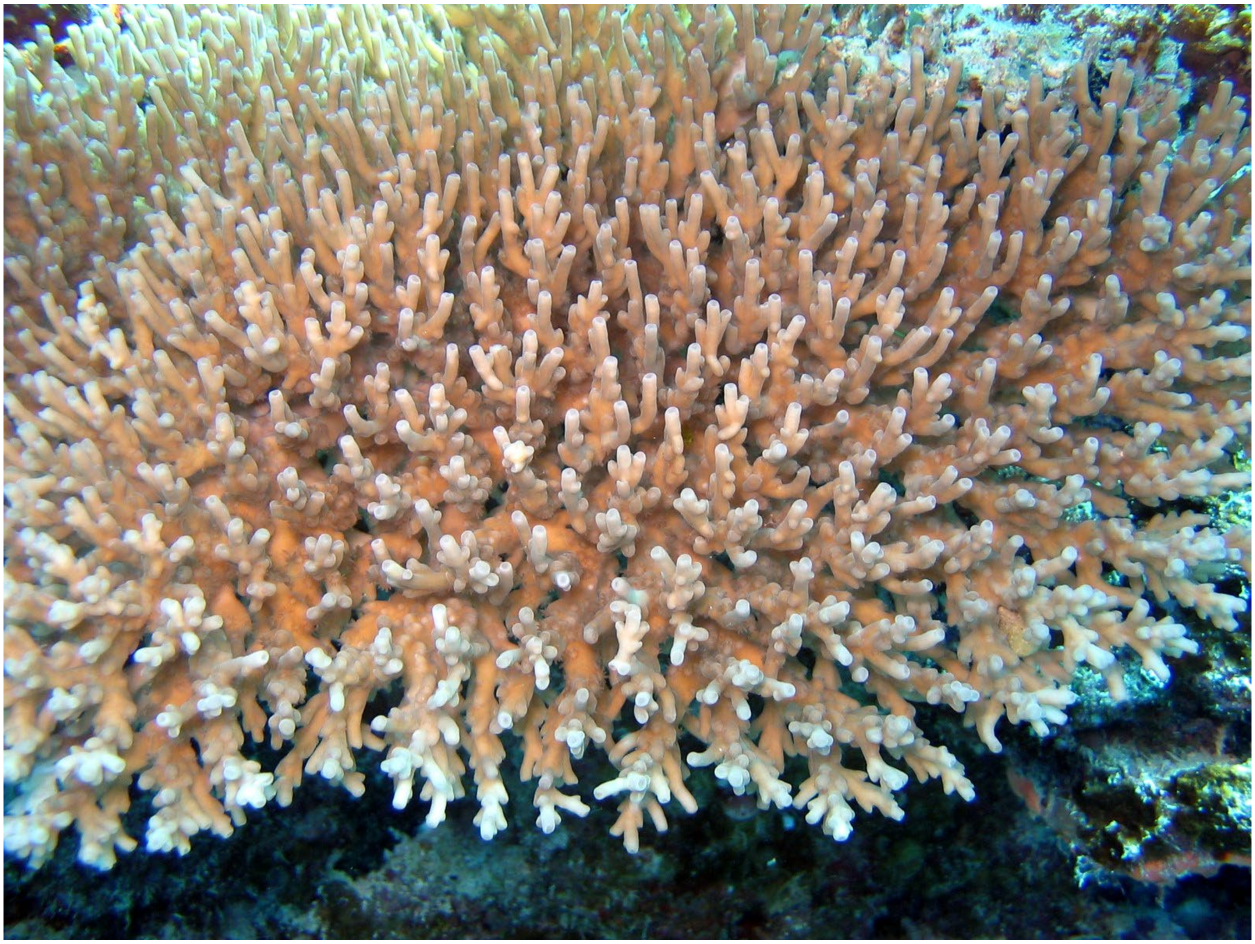
A photo of a colony of *Acropora aculeus* with relatively short axial corallites.



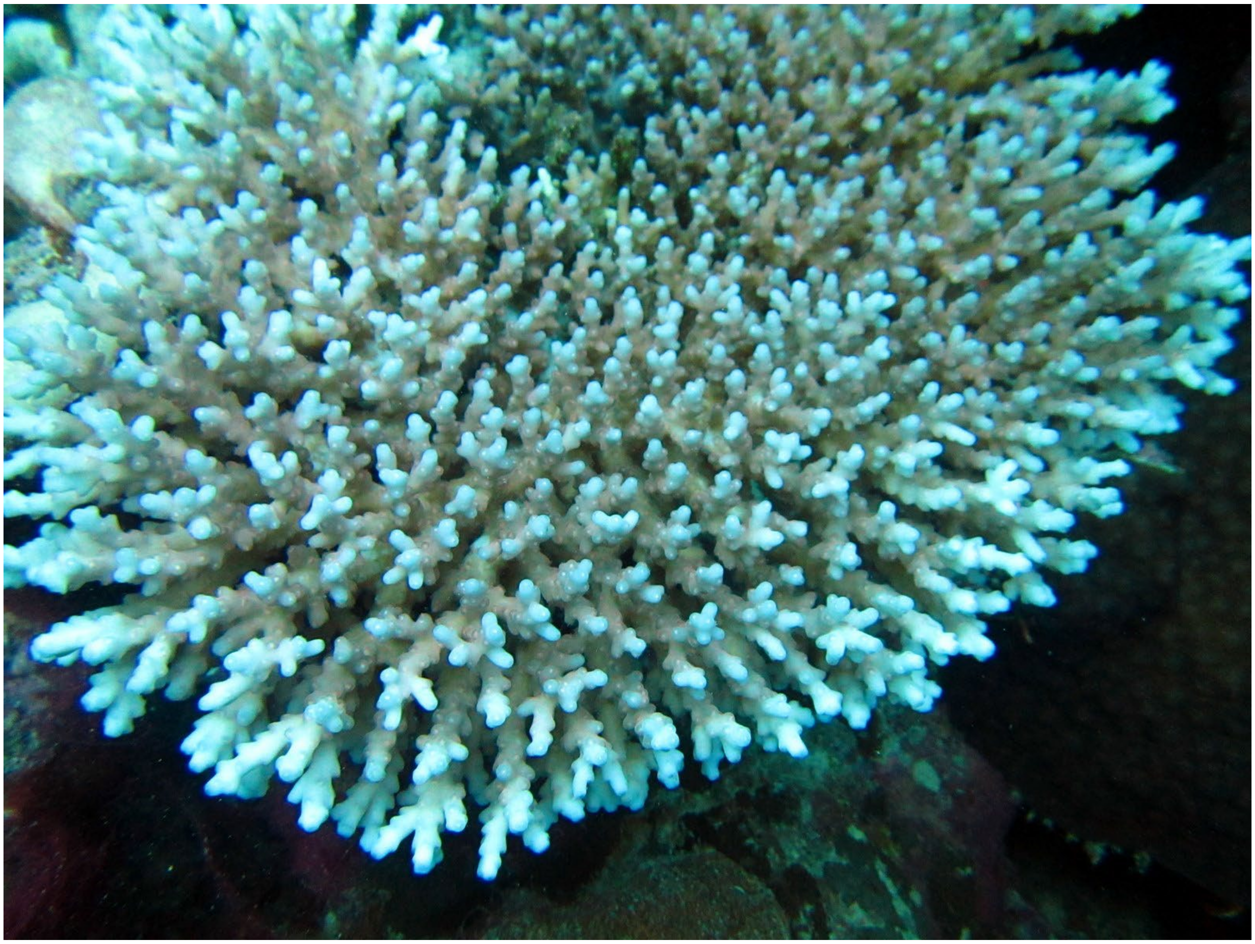
A close-up photo of *Acropora aculeus*.

Acropora granulosa

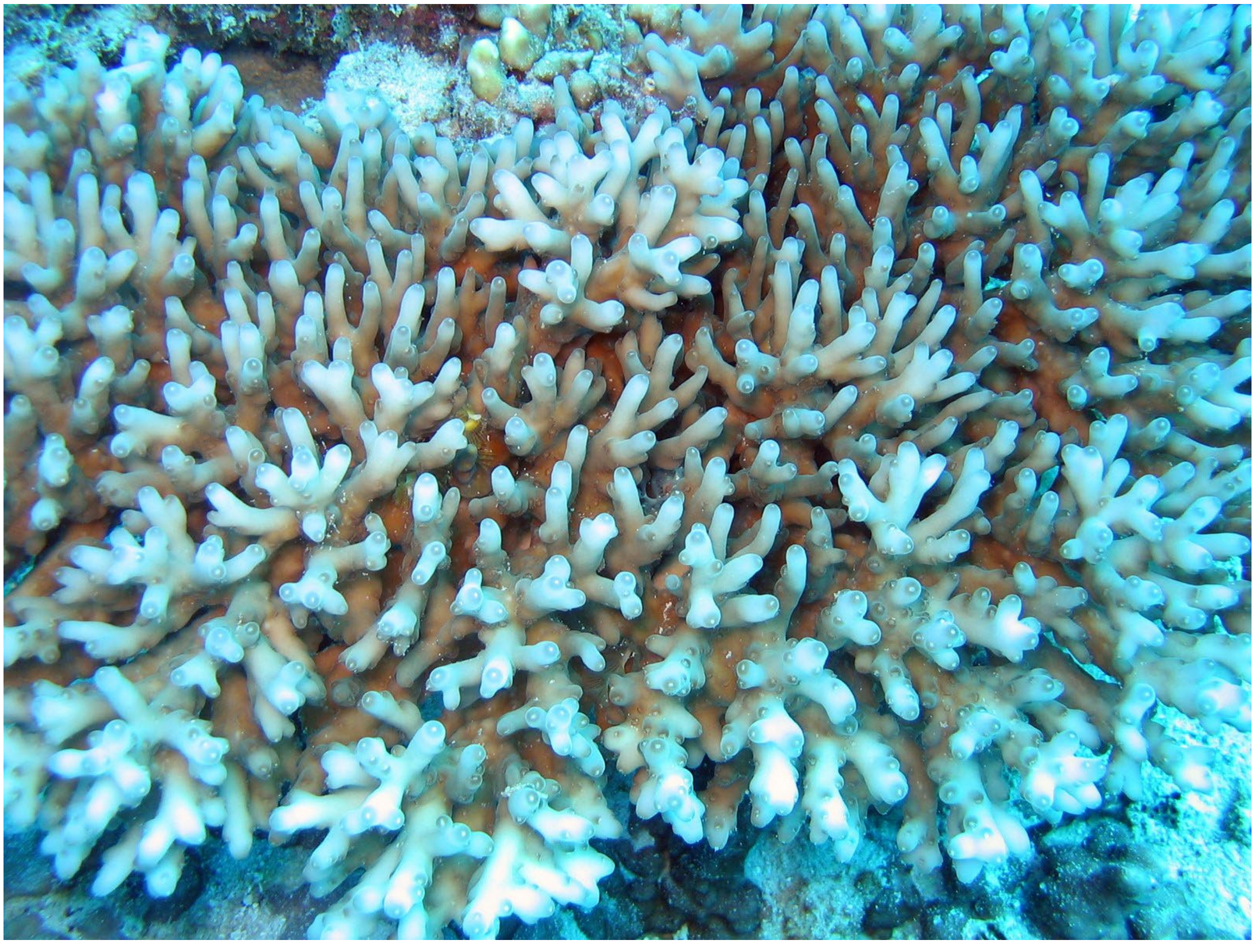
Colonies are cushion-shaped. Axial and incipient axial corallites are tubular, not thin and are usually fairly long. They only rarely have radial corallites. Branchlets bearing axial and incipient axial corallites do have radial corallites. Colonies are similar to *Acropora speciosa* and *Acropora jacquelineae*, but the axial and incipient axial corallites are thicker.



A photo of a colony of *Acropora granulosa*.



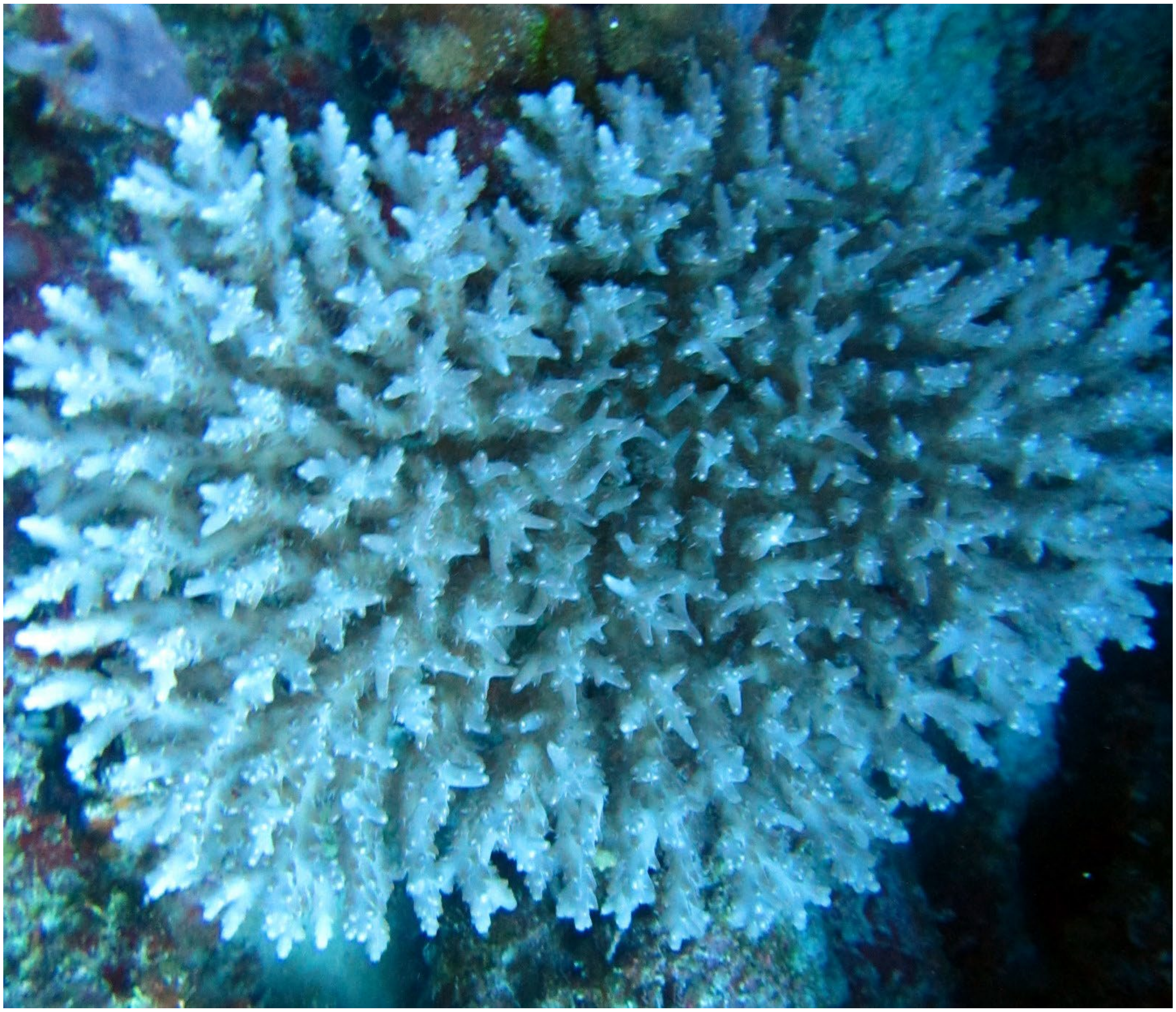
A photo to *Acropora granulosa*. The axial and insipient axial corallites here are relatively short.



A close photo of *Acropora granulosa*.

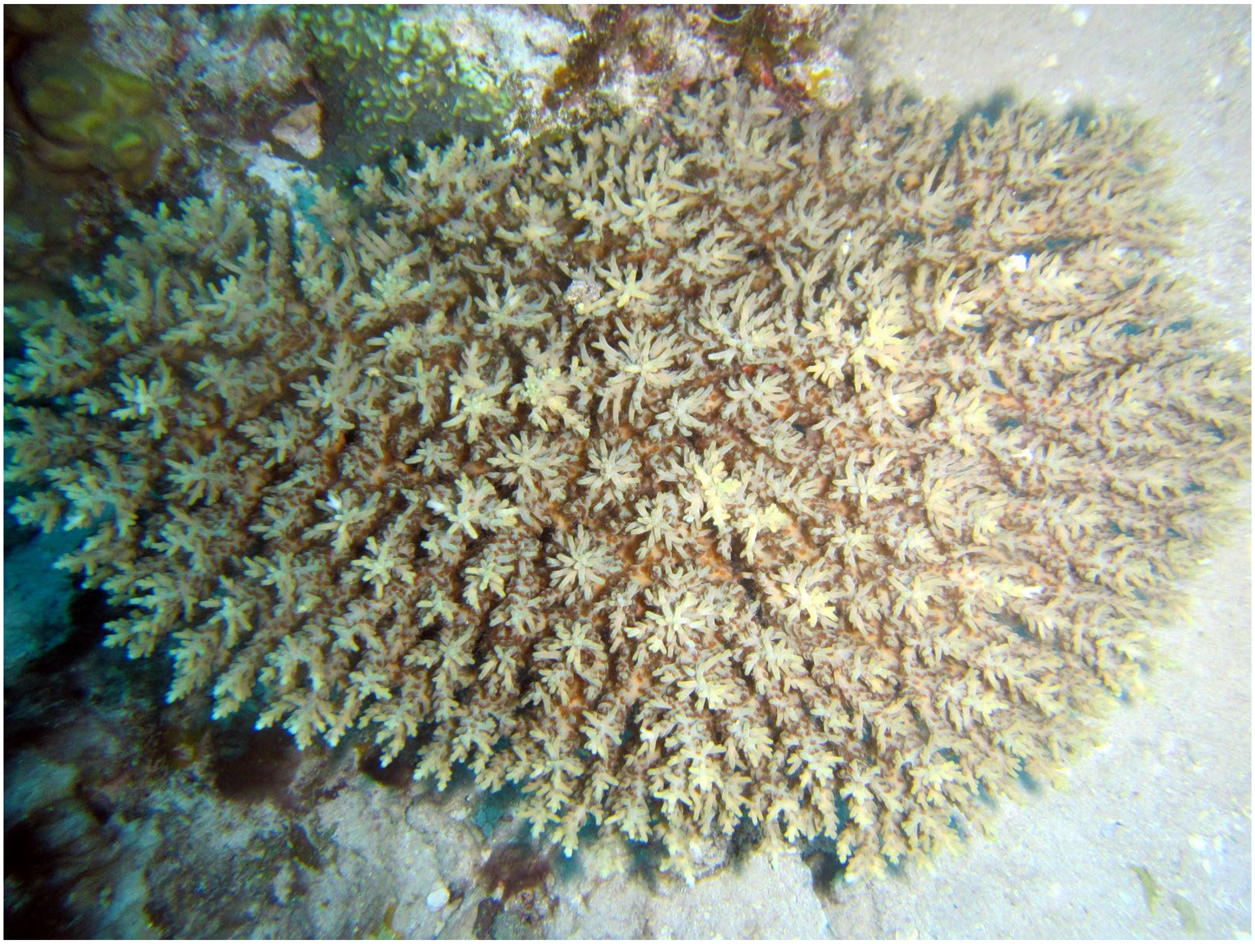
Acropora caroliniana Vulnerable

Colonies are cushion-shaped, with branchlets having many axial and incipient axial corallites with few if any radial corallites. Colonies have tapering axial and incipient axials, and/or incipient axials that radiate from an axial like branches on a Christmas tree. The type specimen apparently has both, but many colonies have one or the other. Other species have neither.



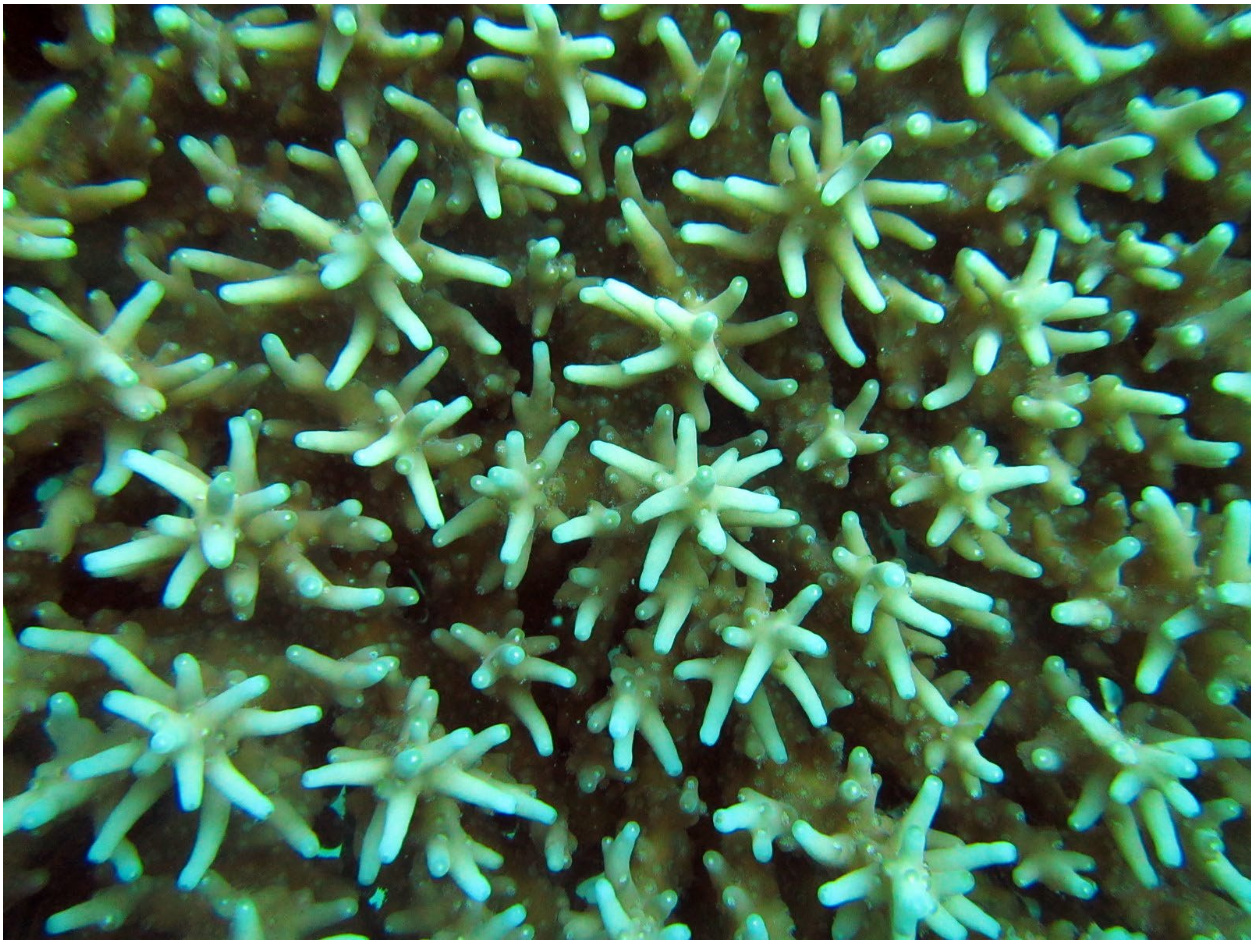
A photo of a colony of *Acropora carolineana* with tapering axial and incipient axial corallites.

A close-up photo of a colony of *Acropora carolineana* with tapering axial and incipient axial corallites.



A photo of a colony of *Acropora carolineana* that has radiating incipient axial corallites.

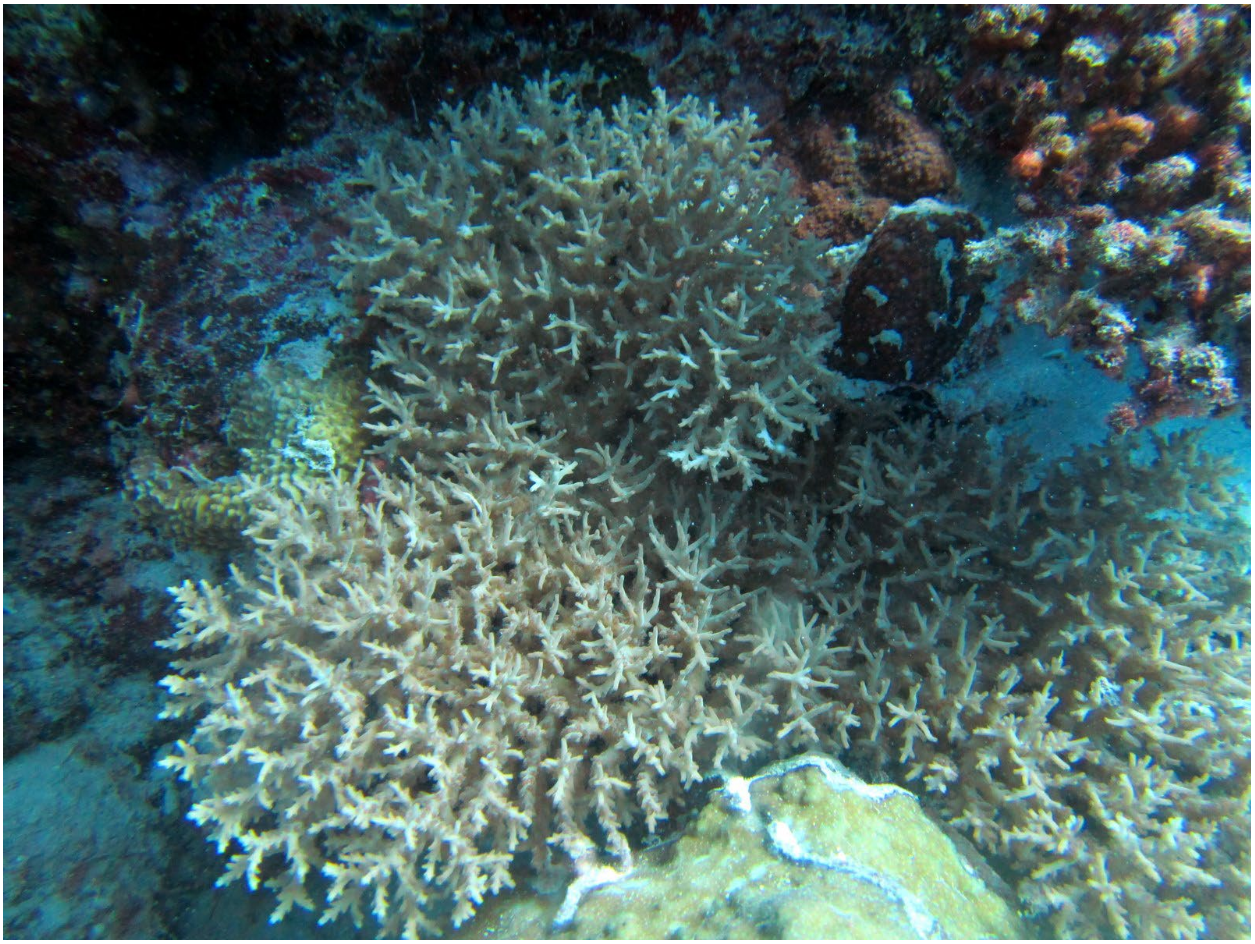
A close picture of *Acropora carolineana*.



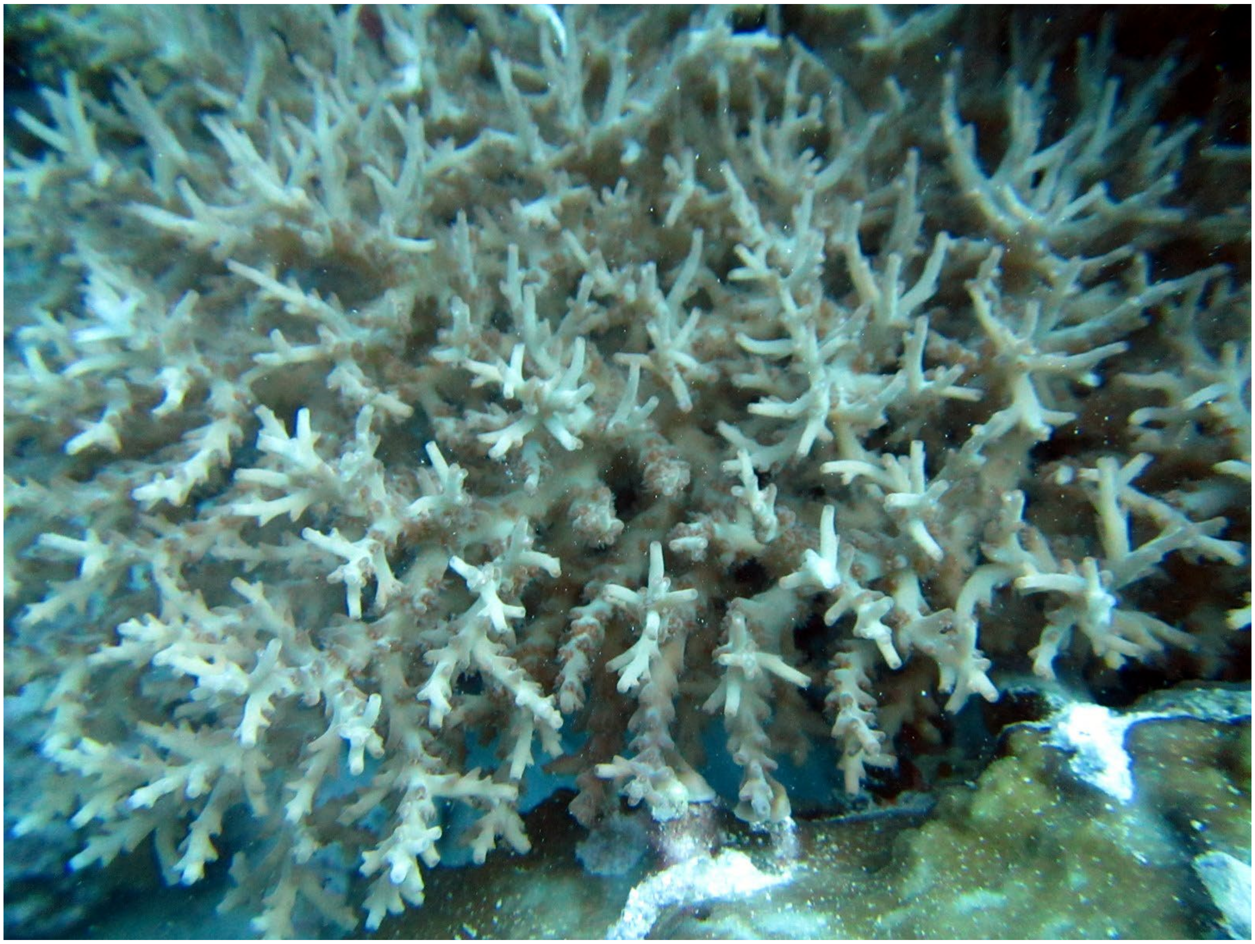
A close-up photo of a colony of *Acropora carolineana* that has radiating incipient corallites like on a Christmas tree.

Acropora speciosa or jacquelineae Vulnerable Threatened

Colonies are cushion shaped with flat tops. Axial and incipient axial corallites are long, tubular, and thin, only about 1 mm thick. There are few radial corallites except near the edge of the colony, where there are many. These two species cannot be reliably distinguished underwater, microscopic examination of skeleton is necessary to distinguish them. Both species live below about 20 m on the reef slope. The axial and incipient axial corallites are thinner than on *Acropora granulosa* and *Acropora carolineana*. Both species are listed as vulnerable and threatened.



A photo of a colony of *Acropora speciosa* or *Acropora jacquelineae*.

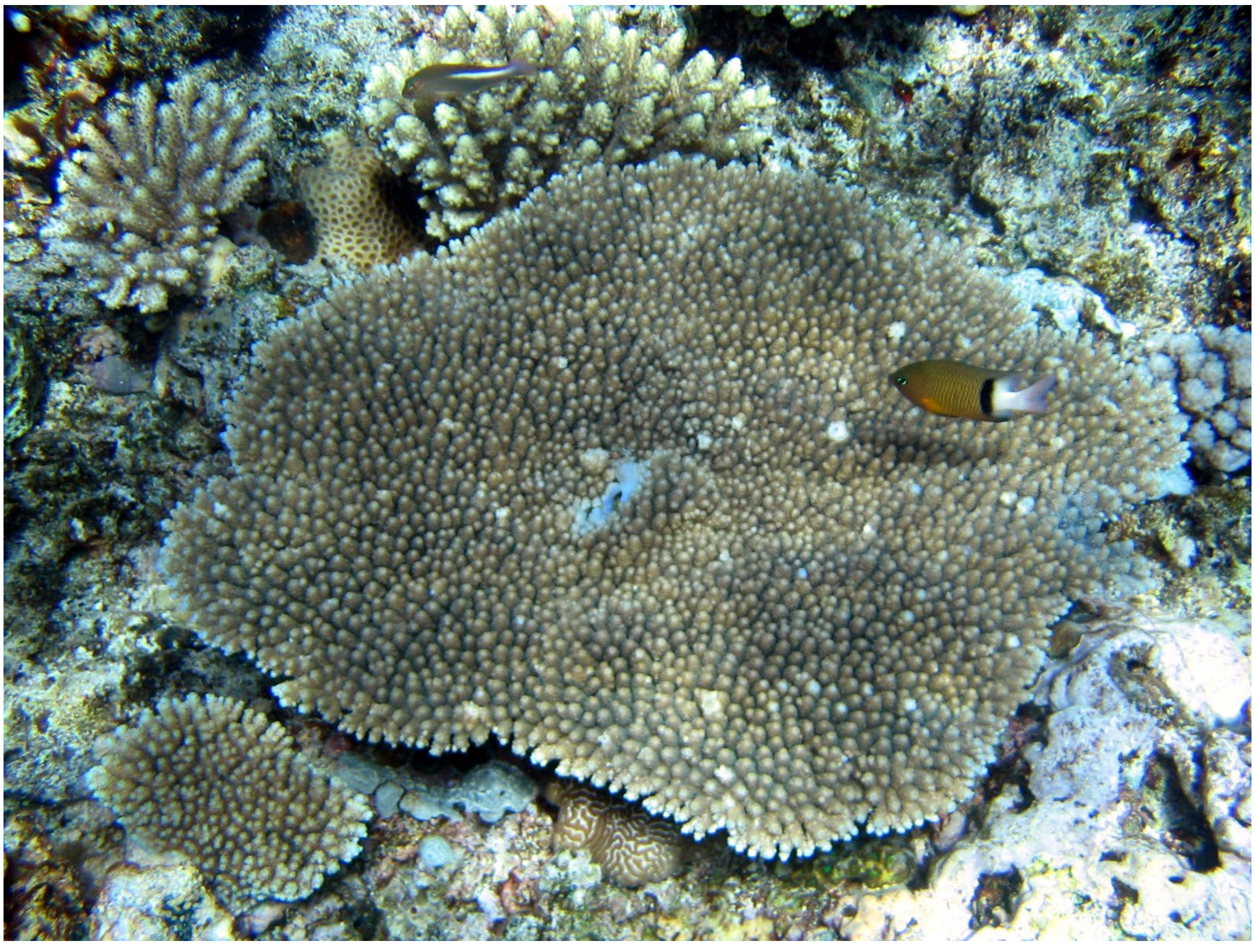


A close-up photo of *Acropora speciosa* or *Acropora jacquelineae*.

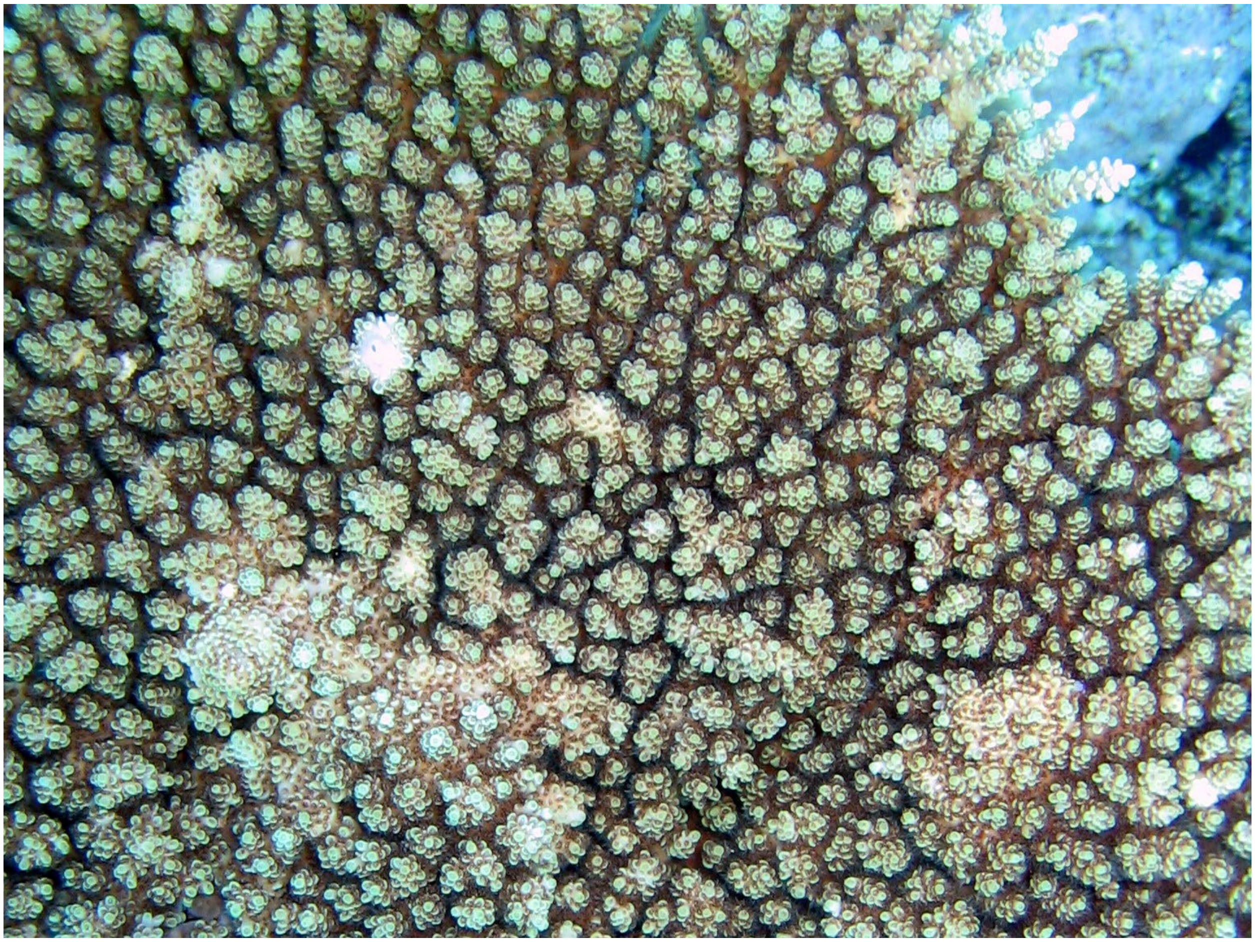
Tabular or Table Coral: corals that form a table-like structure with a column that holds up a nearly flat table top.

Acropora hyacinthus

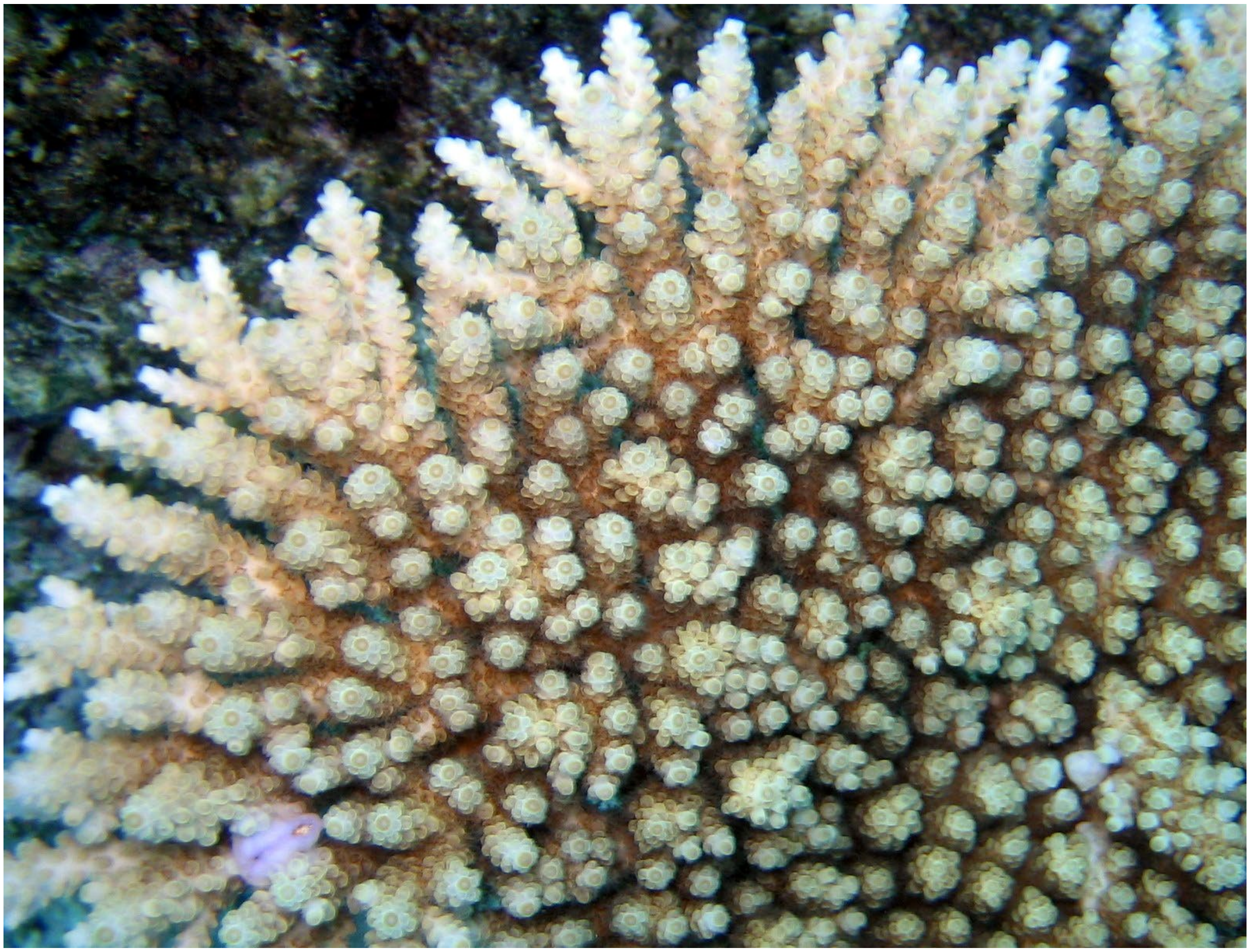
Colonies are held up by a central column, and have a thin, nearly-flat table top. Colonies can reach several meters in diameter, but most colonies are usually smaller than that. Most colonies only have one layer, but some have more than one, especially where they are crowded together. Colonies are usually circular in shape unless they have been damaged or are competing with other colonies for space. The upper surface is covered with little vertical branchlets which are fairly uniform, up to pencil thickness, and usually have rounded tips. The axial corallites are small tubes, and the radial corallites have extended lower lips. *Acropora cytherea* looks very similar from a distance but has thinner branchlets that taper to a sharper tip with long thin tubular axial corallites. *Acropora clathrata* has only radiating branches, no vertical branchlets.



A photo of a colony of *Acropora hyacinthus*.



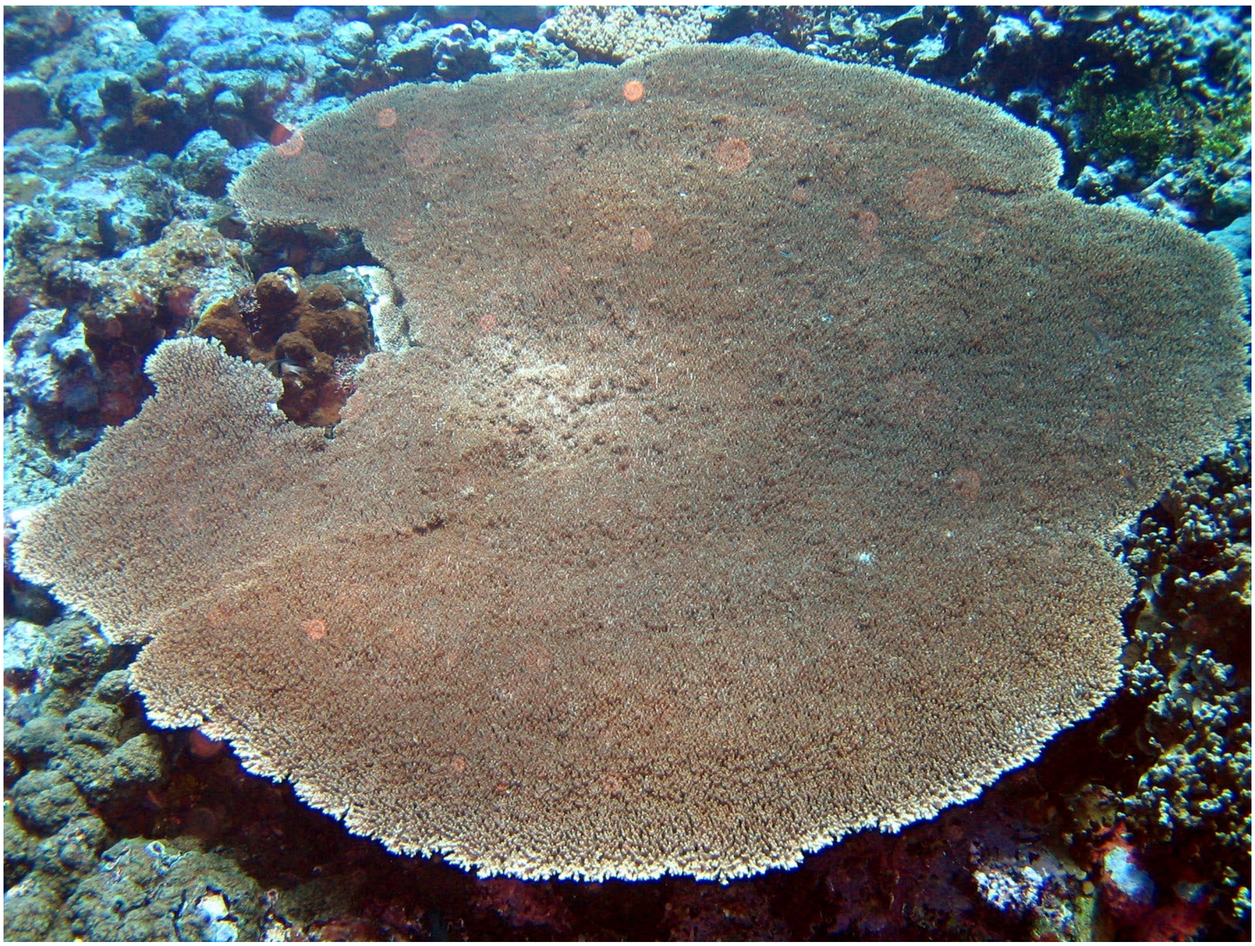
A close photo of *Acropora hyacinthus*. There are several “growth anomalies” on this colony, they are not normal.



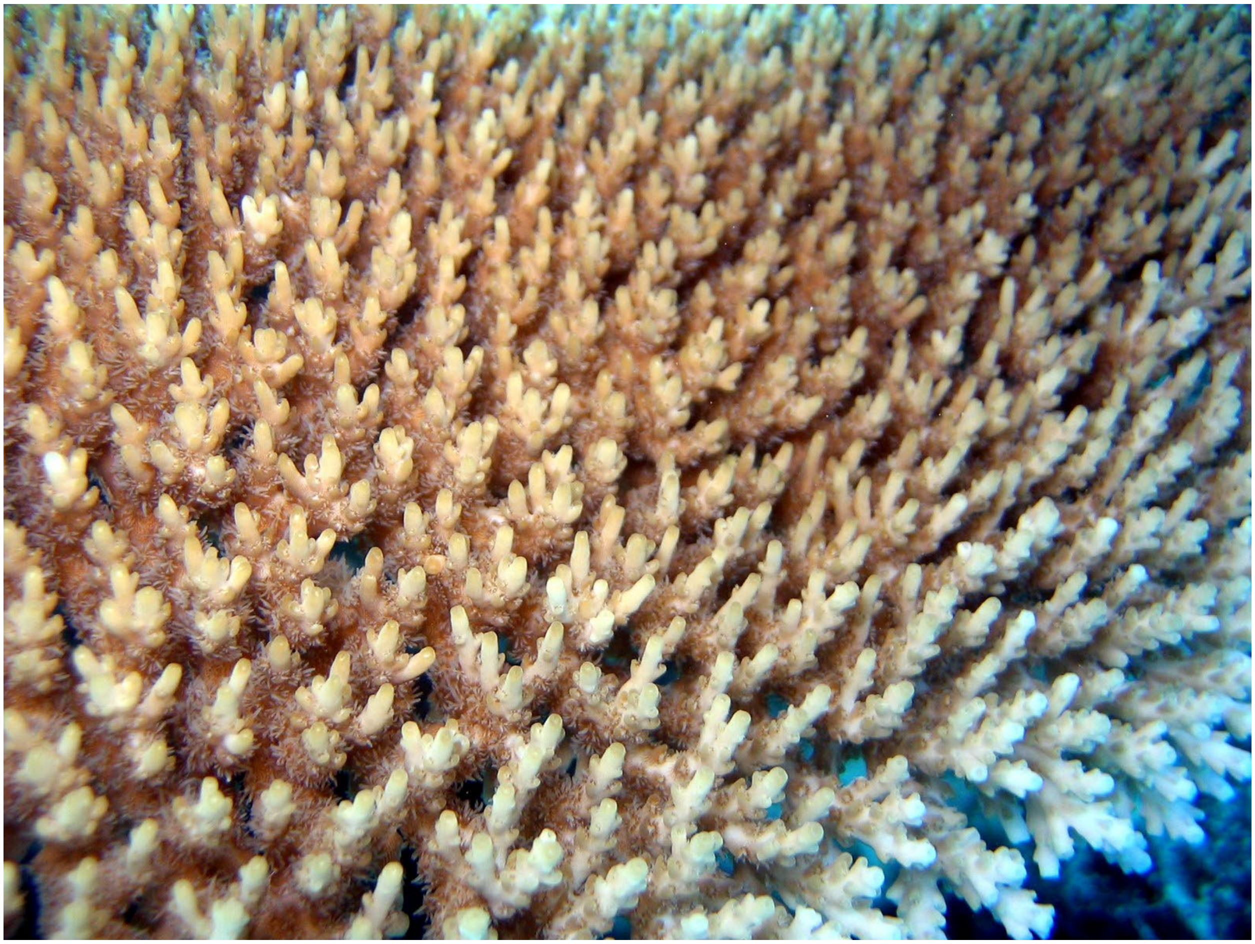
A close-up photo of *Acropora hyacinthus*. The places where branchlets are grouped together appear to be “growth anomalies”, they are not normal.

Acropora cytherea

Colonies are held up by a central column, and have a thin, nearly-flat table top. Colonies can reach several meters in diameter, but some colonies are smaller than that. Most colonies only have one layer, but some have more than one. Colonies are usually circular in shape unless they have been damaged or are competing with other colonies for space. The upper surface is covered with little vertical branchlets which are fairly uniform. The branchlets are thin and taper to a long, thin, tubular axial corallite. Colonies are not limited to shallow water. From a distance *Acropora hyacinthus* looks very similar, but is often smaller, is most common in shallow water, and has branchlets that are thicker, particularly near the tip where they are rounded. *Acropora clathrata* does not have vertical branchlets, only horizontal branches.



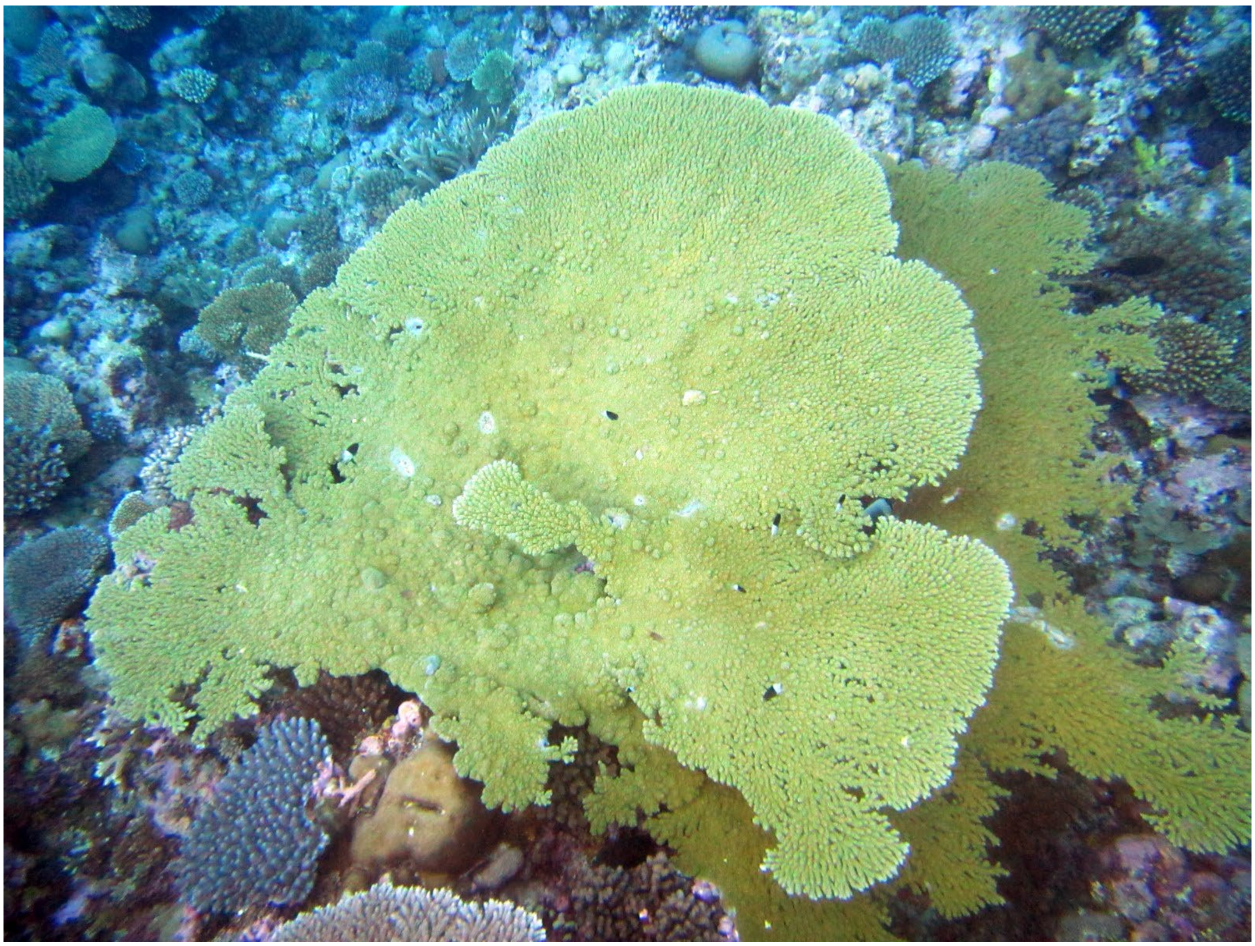
A photo of an *Acropora cytherea* colony taken in American Samoa.



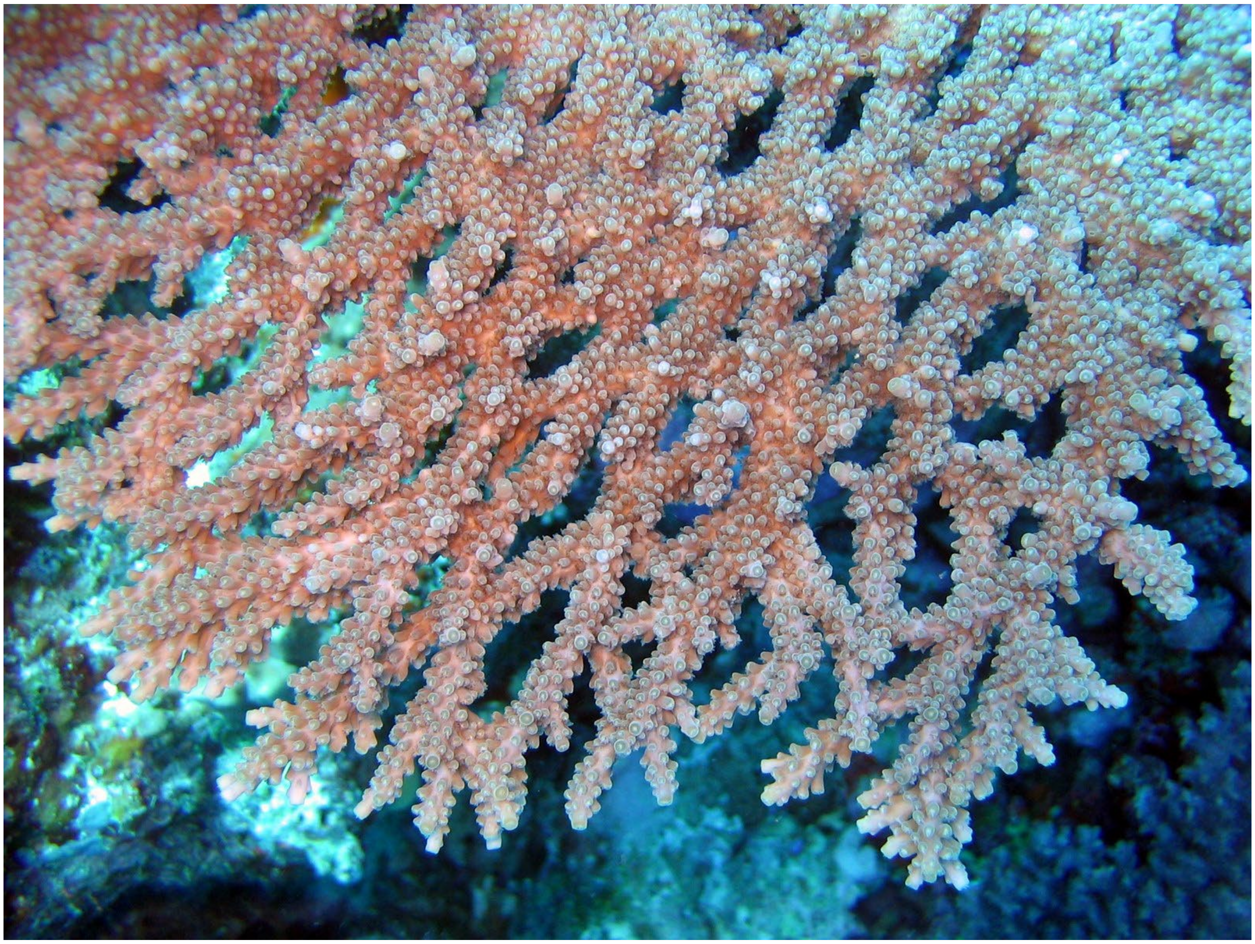
A close-up photo of *Acropora cytherea*.

Acropora clathrata

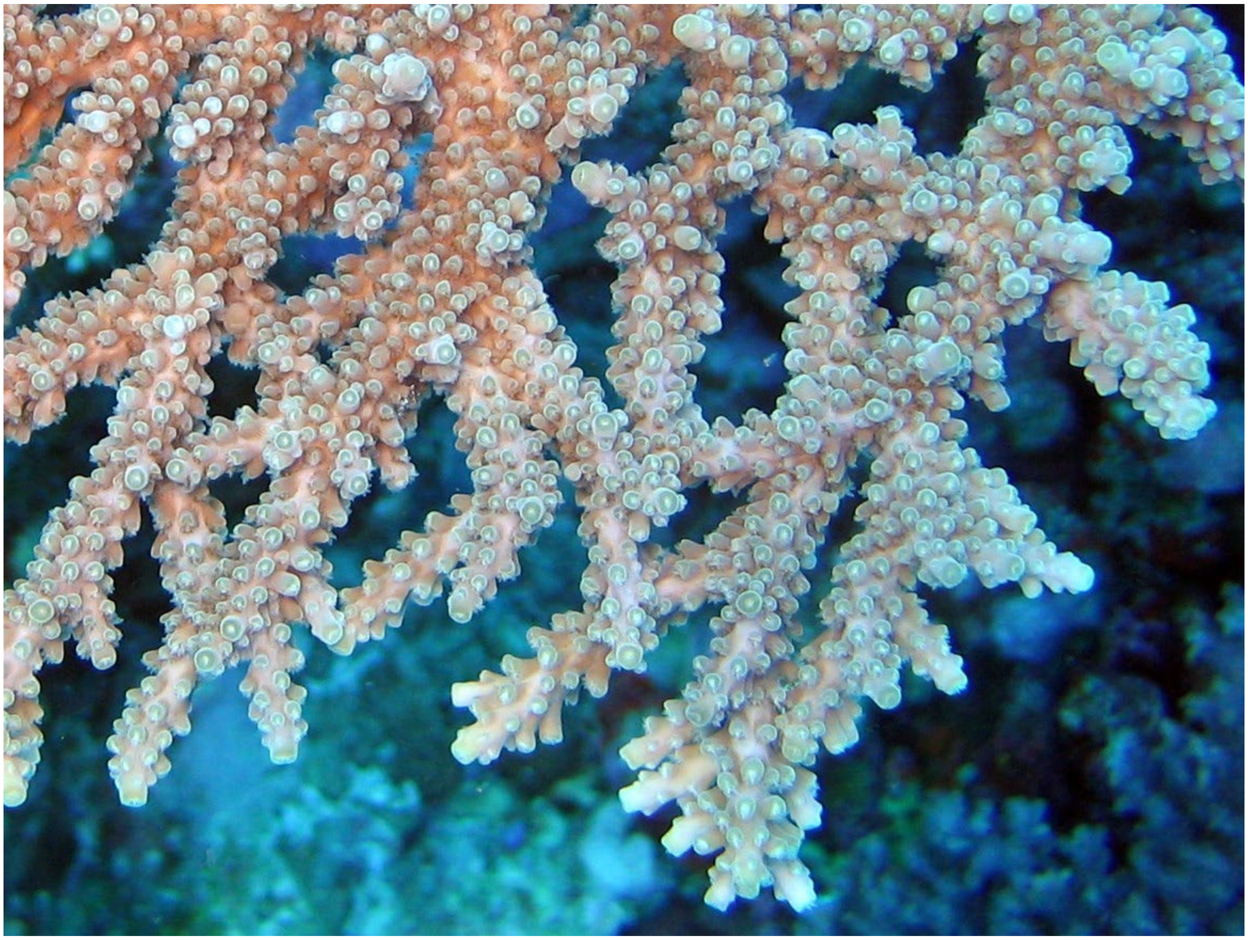
Colonies are held up by a central column, and have a thin, nearly-flat table top. Colonies can reach several meters in diameter, but some colonies are smaller than that. Almost all colonies only have one layer, but rarely they may have a second layer. Colonies are usually circular in shape unless they have been damaged or are competing with other colonies for space. The table top consists of uniform branches the size of a small finger or finger that radiate from the center. The radiating branches that form the table do not taper and range from being fused to adjacent branches on both sides to having relatively wide spaces between branches. There are no vertical branchlets, but the radiating branches commonly have slightly raised branch tips that point towards the colony edge. *Acropora hyacinthus* and *Acropora cytherea* both have small vertical branchlets.



A colony of *Acropora clathrata* that has little spacing between branches.



A close photo of *Acropora clathrata* showing anastomosing branches and spaces between branches.



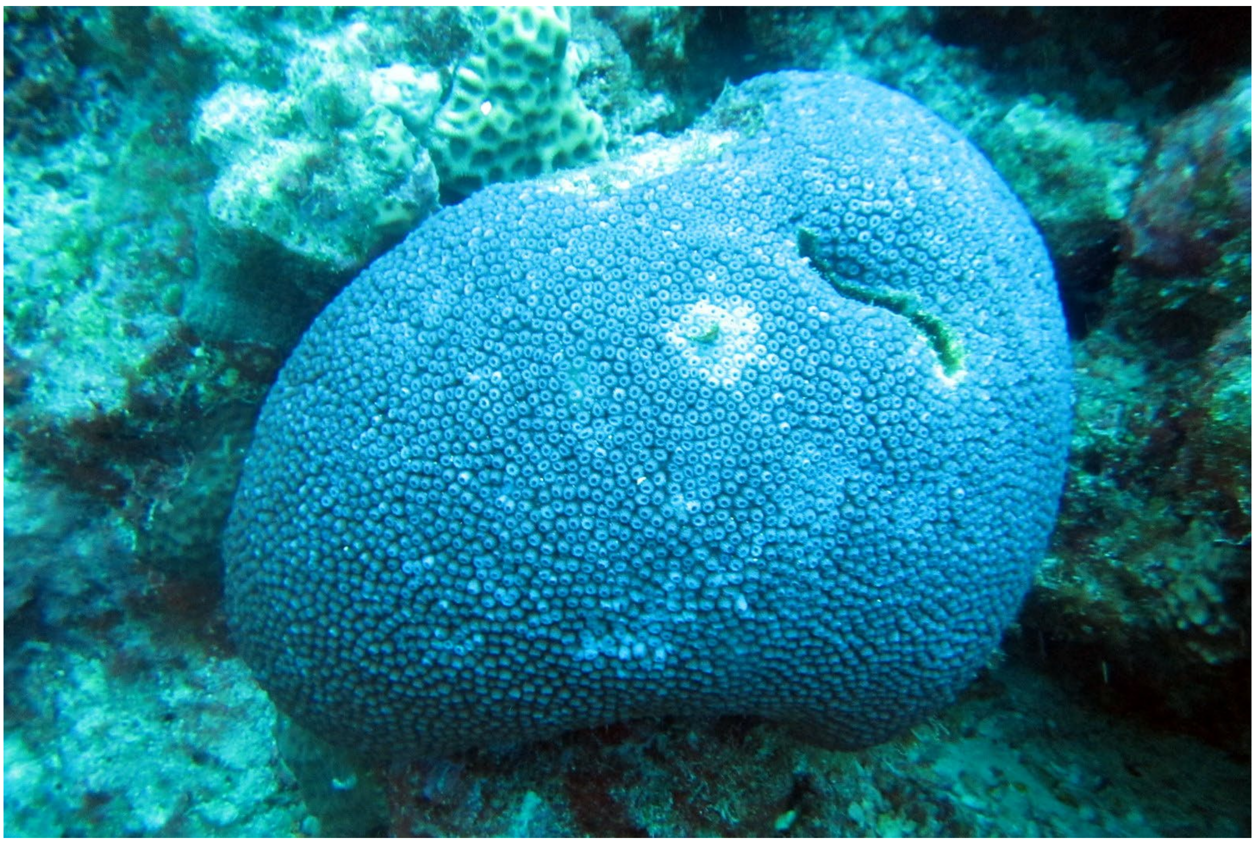
A close-up photo of *Acropora clathrata*.

Astreopora

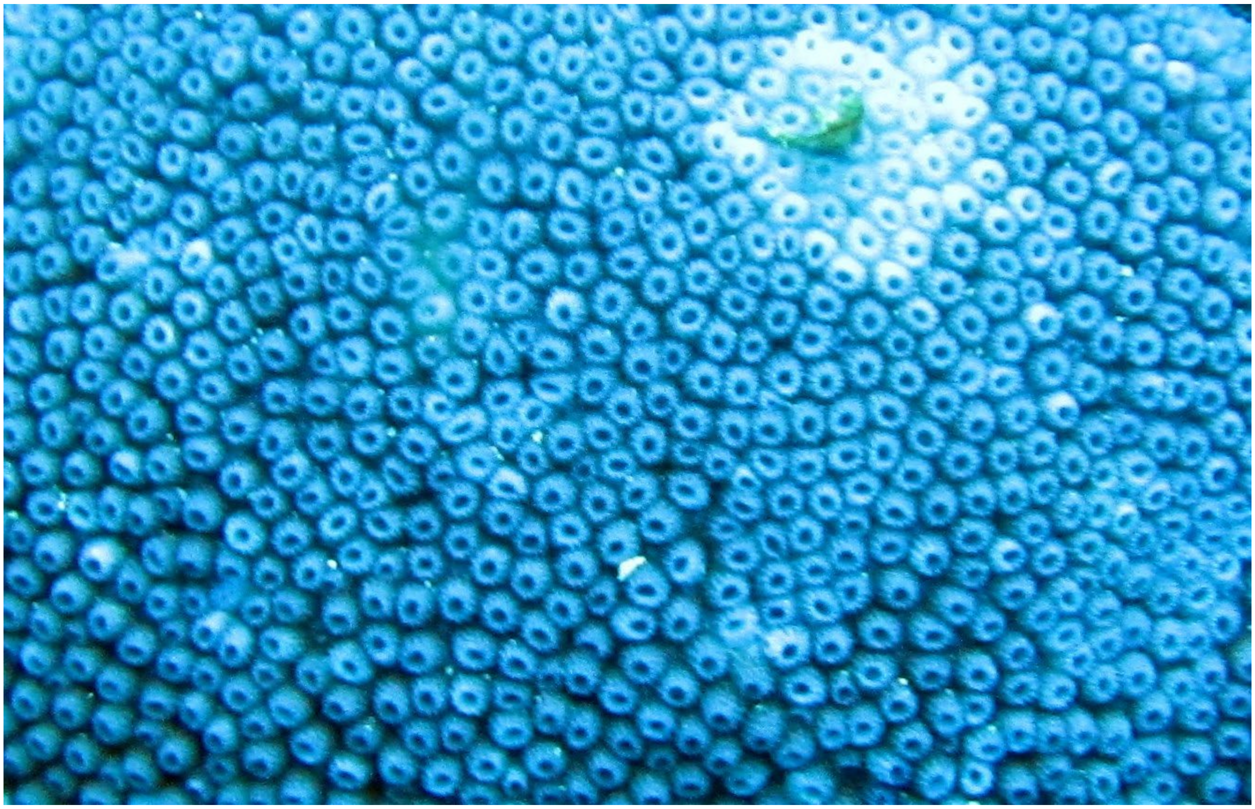
Colonies are usually massive, but a few species form plates. Surfaces are covered with little corallites that project and look a little like volcanoes. Corallites are about 3 mm at the base but the opening at the top is only about 1 mm diameter in most species. Surfaces have fine spines. *Isopora* is plating or branching, and surfaces are smoother.

Astreopora myriophthalma

Colonies are massive and are covered with very uniform corallites that are close together. Corallites and calices (the openings) are circular and point at right angles to the colony surface. The corallites are similar on *Astreopora cucullata* but point downward on the sides. Corallites are short on *Astreopora listeri* and have oval or slit-like openings on *Astreopora eliptica*. Corallites are variable in size and orientation on *Astreopora gracilis*.



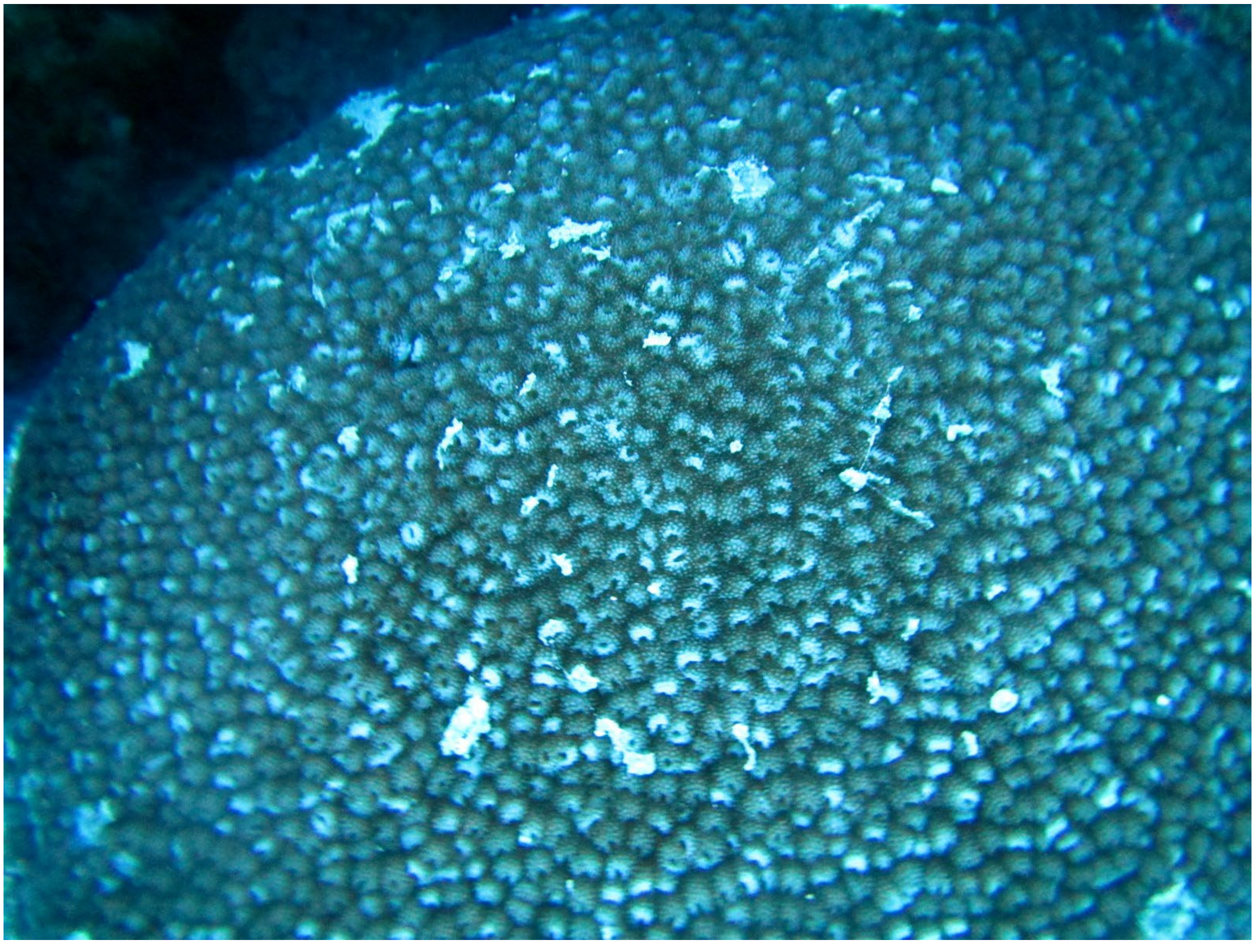
A colony of *Astreopora myriophthalma*.



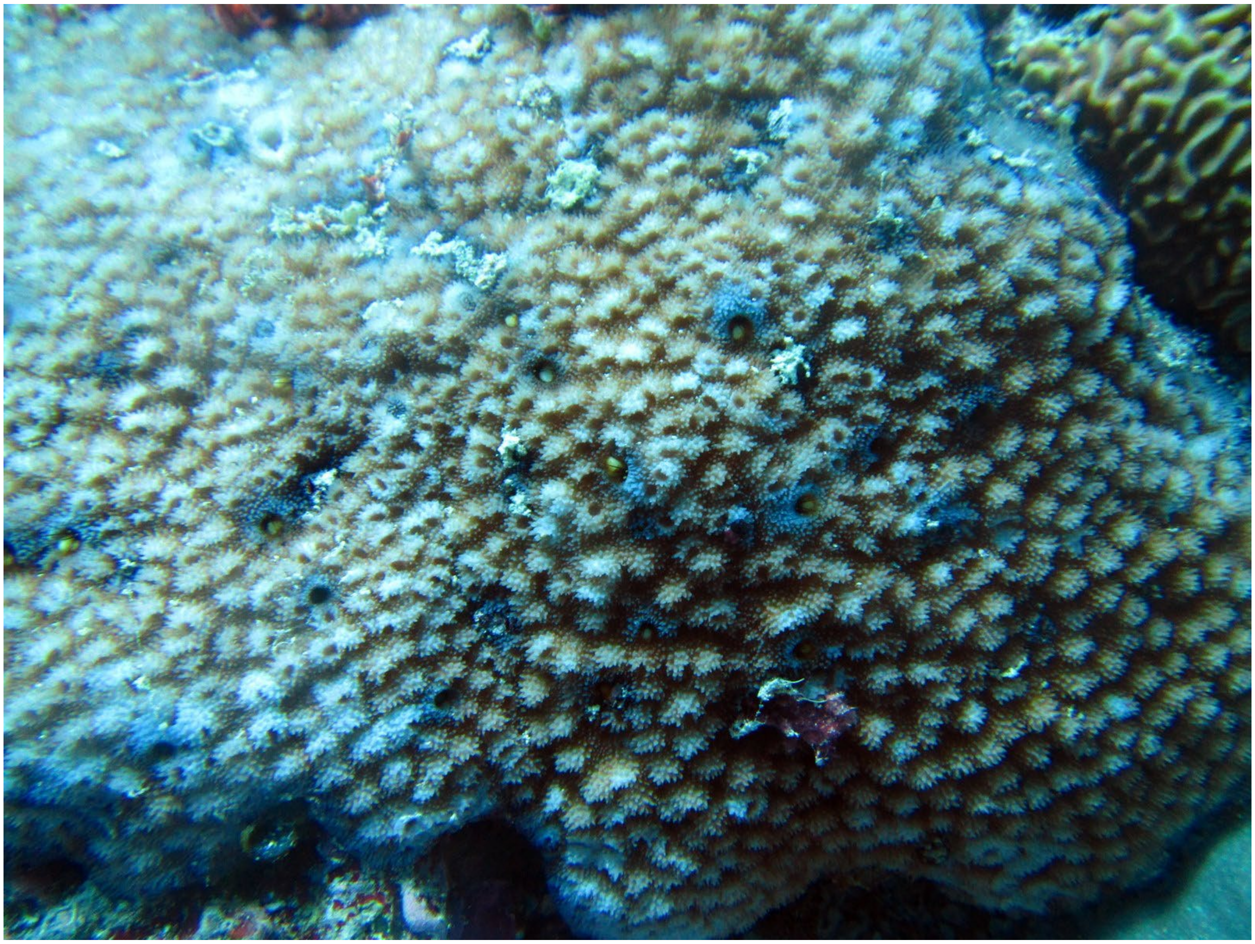
A close-up photo of *Astreopora myriophthalma*.

Astreopora cucullata Vulnerable

Colonies are massive and are covered with very uniform corallites that are close together. Corallites and calices (the openings) are circular and point downward on the sides of the colony (but at right angles to the surface on top). The corallites are similar on *Astreopora myriophthalma* but point at right angles to the surface on all surfaces. Corallites are short on *Astreopora listeri* and have oval or slit-like openings on *Astreopora eliptica*. Corallites are variable in size and orientation on *Astreopora gracilis*.



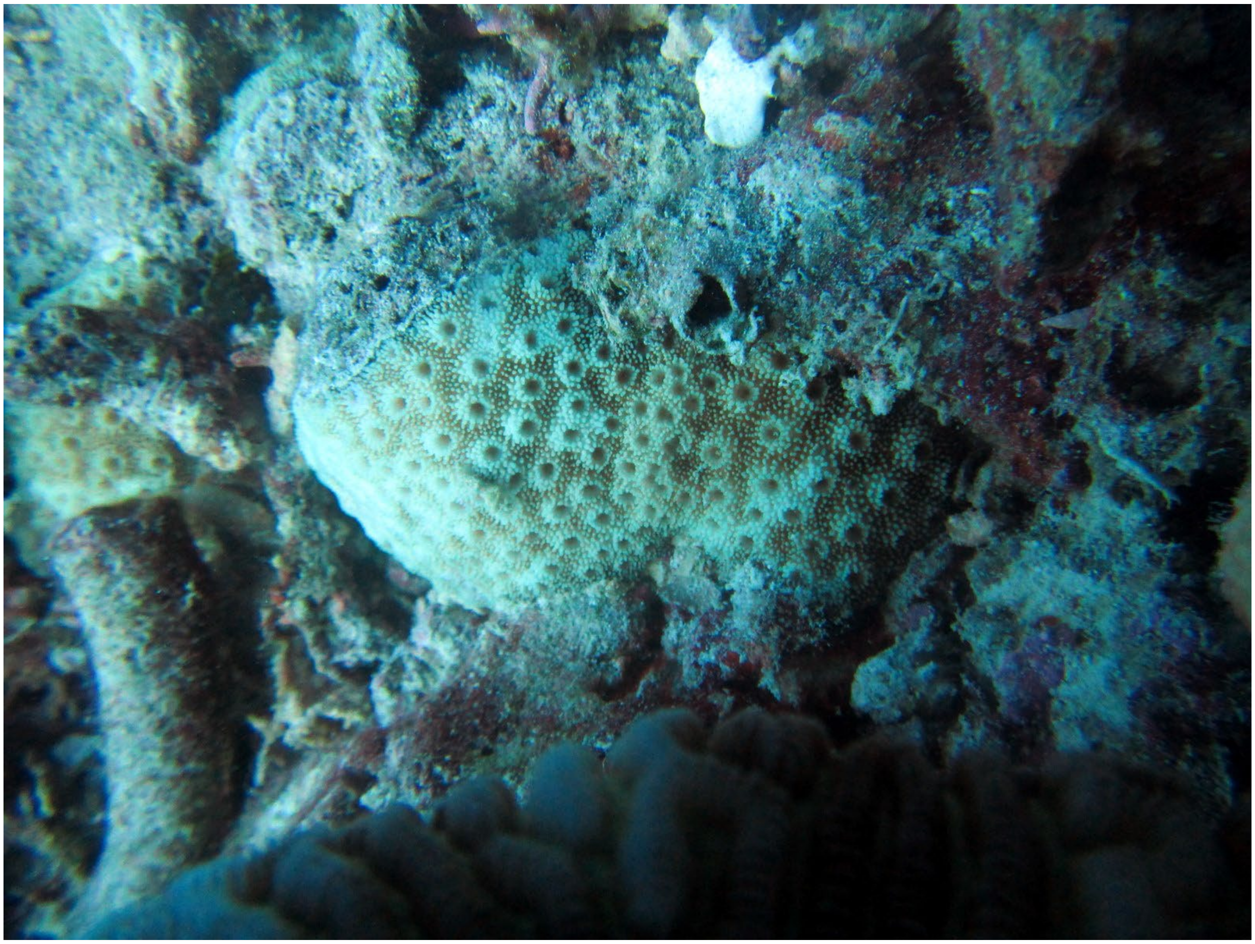
A colony of *Astreopora cucullata*.



A close-up photo of *Astreopora cucullata*.

Astreopora listeri

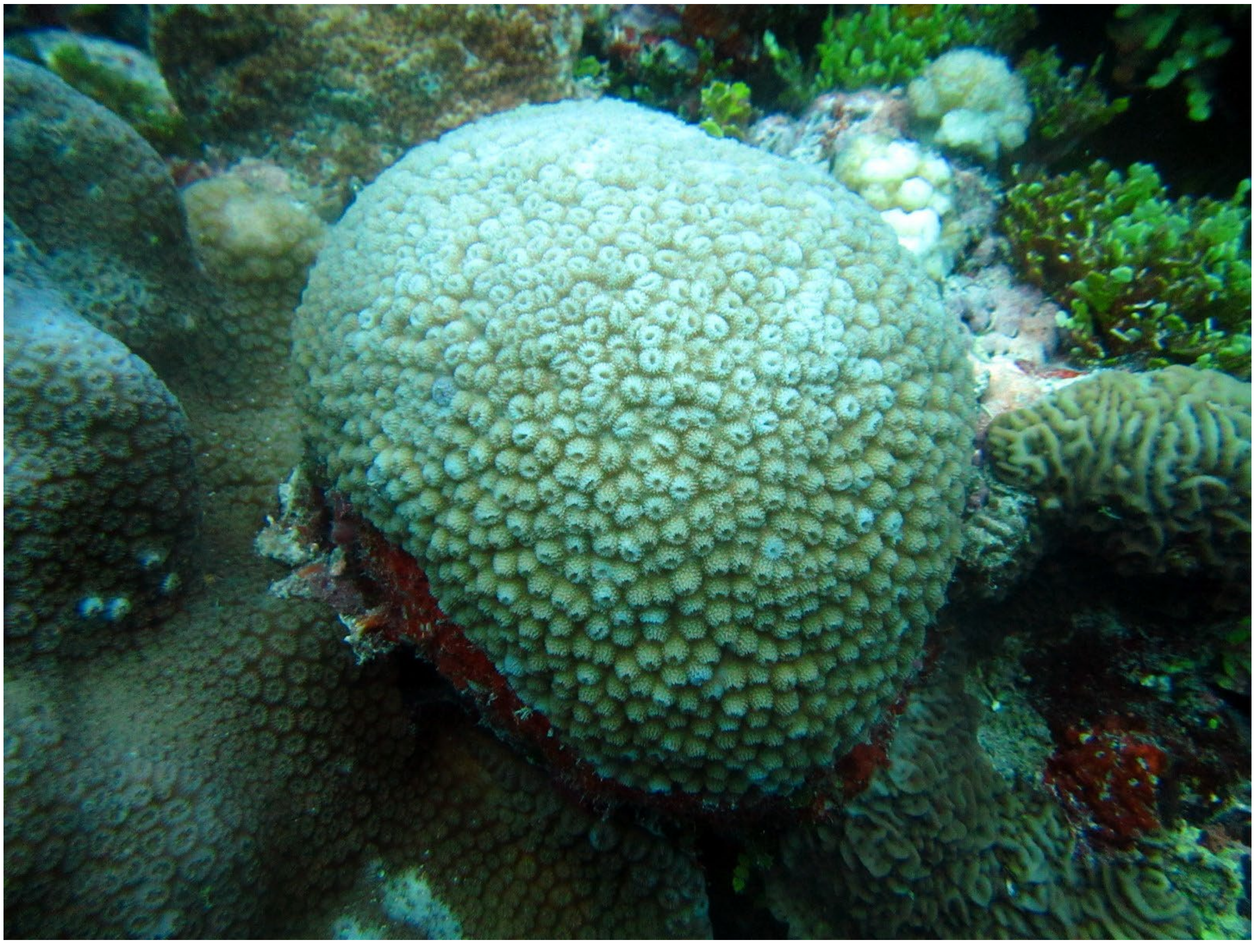
Colonies are massive. Corallites are very short, projecting only slightly. The corallites are relatively uniform, not tilted or pinches or variable. Corallites of other species project farther.



A close-up photo of a colony of *Astreopora listeri*.

Astreopora elliptica

Colonies are massive. Corallites project and taper. Some corallites have oval or slit-like openings, others have circular openings. Other *Astreopora* species do not have oval or slit-like openings.

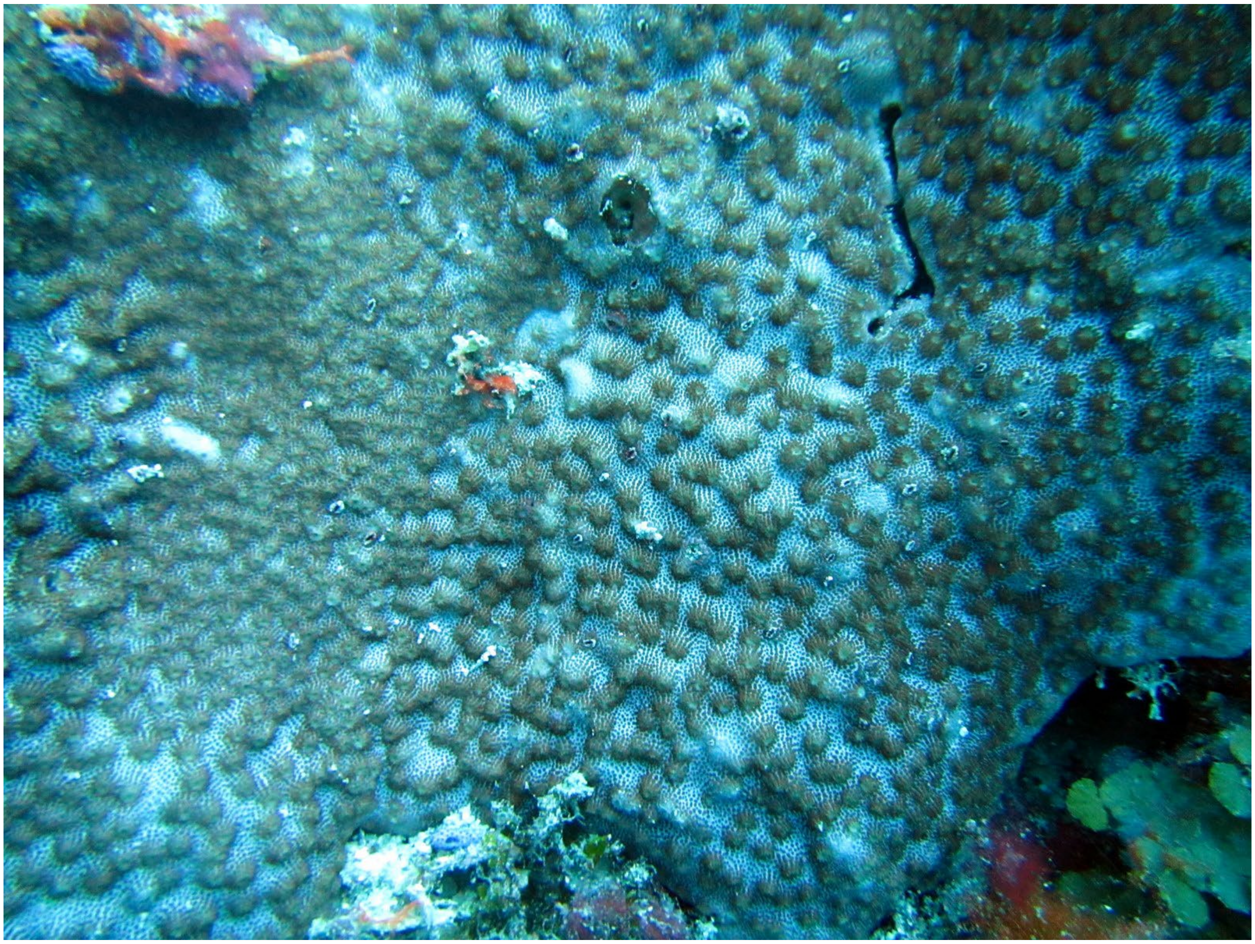


A colony of *Astreopora elliptica*.

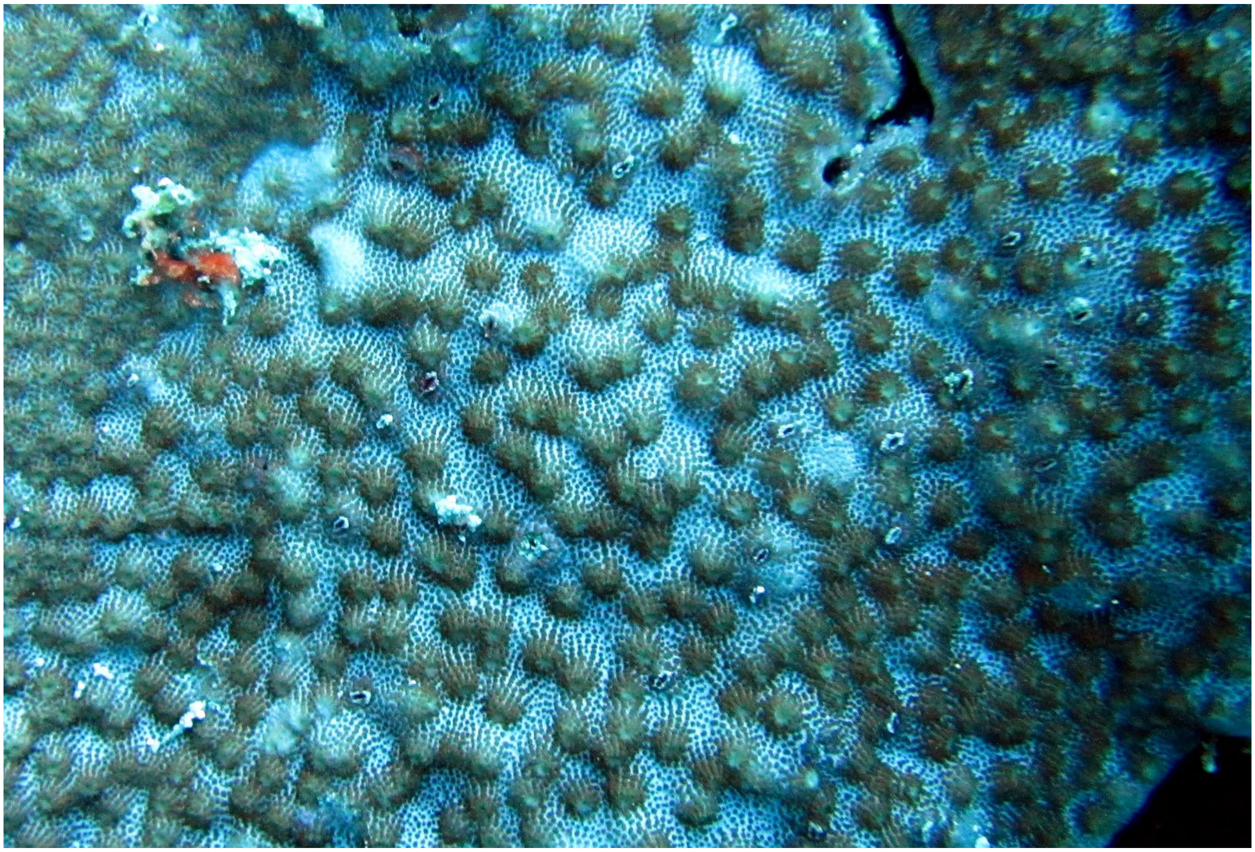
A close-up photo of *Astreopora elliptica*.

Astreopora randalli

Colonies are usually encrusting, and if on a steep slope the lower edge may be lifted as a plate. Corallites are small and may be spaced out. Spines on the corallites and in between them may be in rows. Usually the polyps are green and sometimes the whole colony is green. Other *Astreopora* do not form encrusting colonies with lifted lower edges, nor are they green.



A colony of *Astreopora randalli*.



A close-up photo of *Astreopora randalli*.

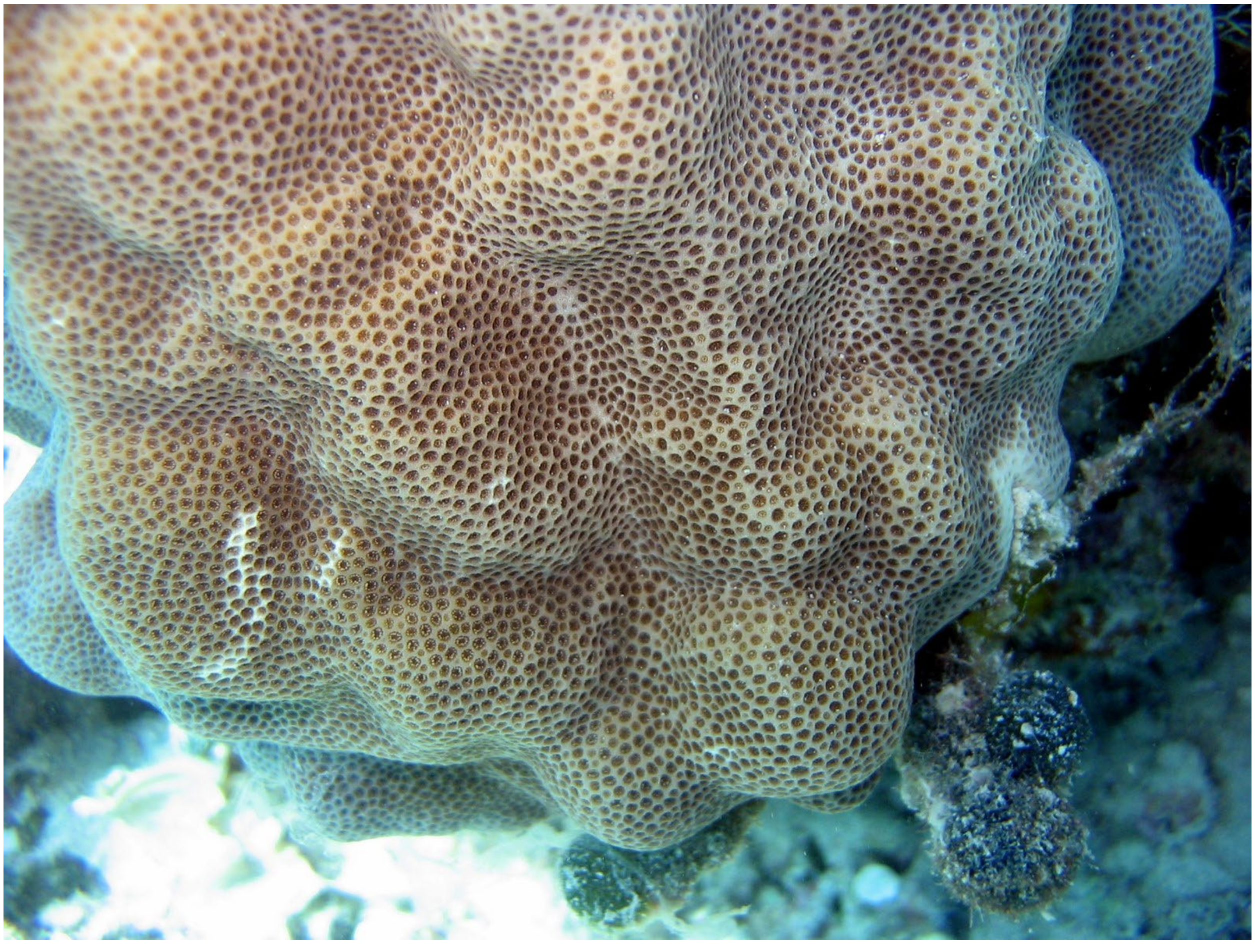
Porites

Colonies can be massive, encrusting, foliose, or branching. The corallites are tiny, about 1 mm diameter and usually close together, but not always. Most large massive colonies cannot presently be identified to species in the water. They are the most difficult of all species to identify, and require examination of the pattern of septa within the corallites under a dissecting microscope. *Porites* is the third largest genus of reef building corals, with about 65 species presently known. Porites colonies can look similar to *Montipora* sometimes, but in most situations they are easily separated because *Montipora* usually has some kind of spines, ridges or verrucae on the surface, but *Porites* usually does not, plus corallites are usually close together in *Porites* but not in *Montipora*. But there are exceptions in both genera, some *Montipora* have no spines, ridges or verrucae and some *Porites* do have tiny bumps. But most of the time they can be distinguished pretty easily.

Porites "massive"

There are a group of about 6 species which are massive and can grow large. Most of the species cannot be identified in the water at this time. Because we can't ID them in the water to species, we call the group "*Porites* massive." Often their surface has many bumps on it, but not always. They can come in a variety of colors, and may have tentacles retracted or extended. Colonies and species can be any size.

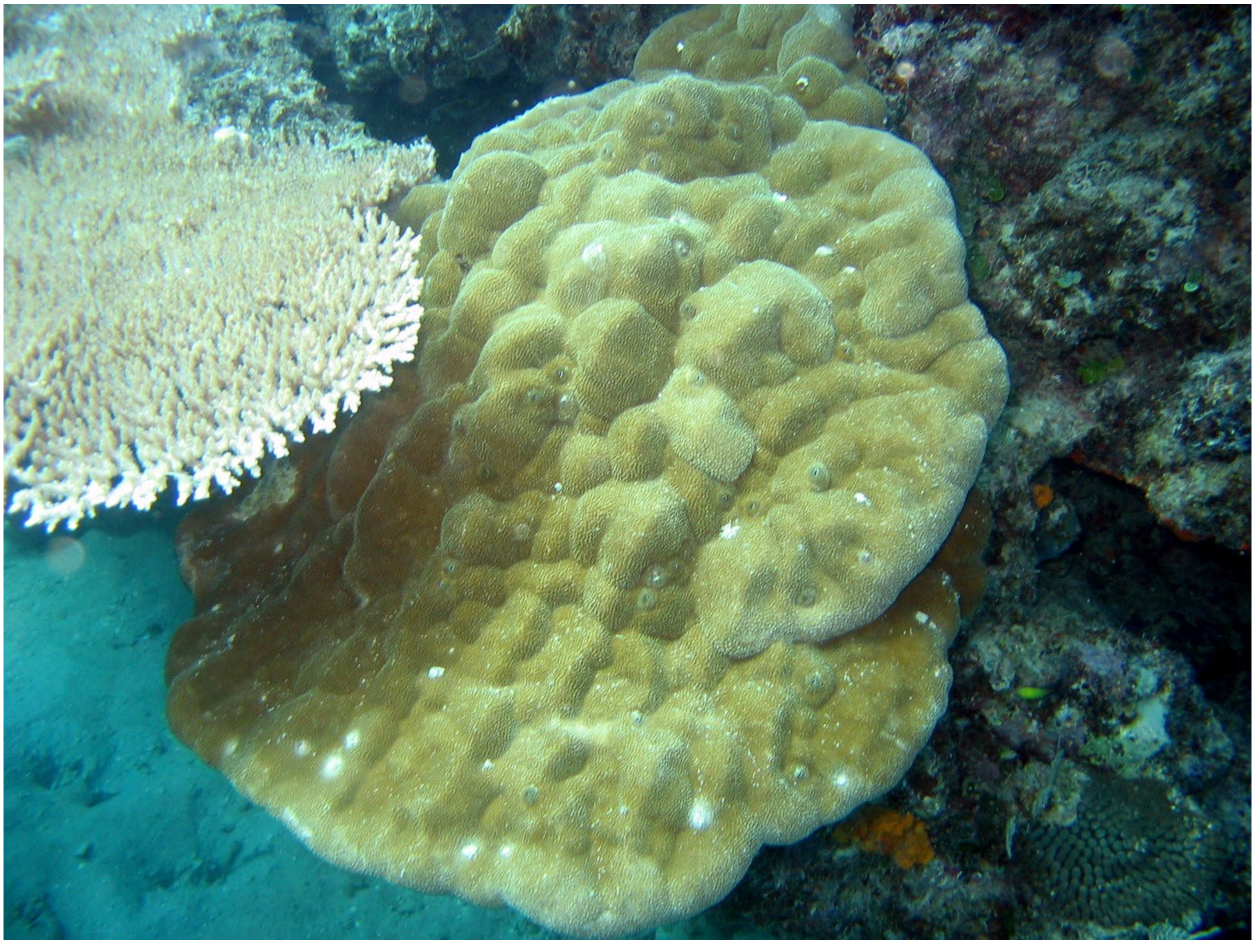
A large massive colony of *Porites*.



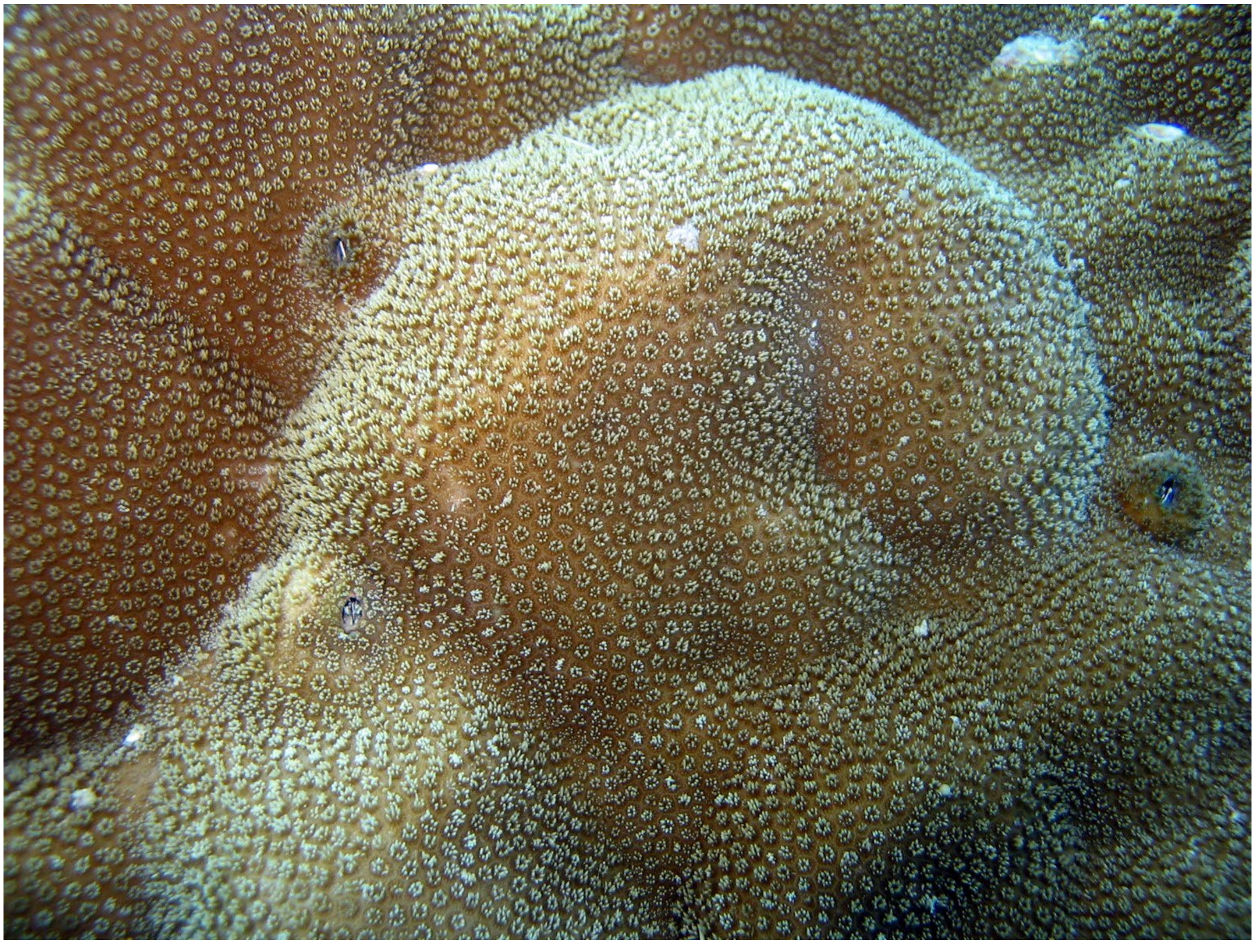
A close-up photo of a massive colony of *Porites*.

Porites evermanni

One large massive species that can be identified to species is this one. Colonies are massive and can get large. Usually they have nearly uniform rounded bumps around 2-3 cm wide and tall. Sometimes there are parallel rows of lumps across the colony surface. The corallites always have their tentacles out in a tuft or tiny ring in the center of the corallites. The color is usually dark brown, but sometimes they can be tan. *Porites annae* also has tentacles extended in this fashion, but the colony shape is small knobby columns so it is easily distinguished. The lumps are smaller and more uniformly rounded than on other large massive *Porites* and the tentacles are always extended in a tuft near the center of the corallites.



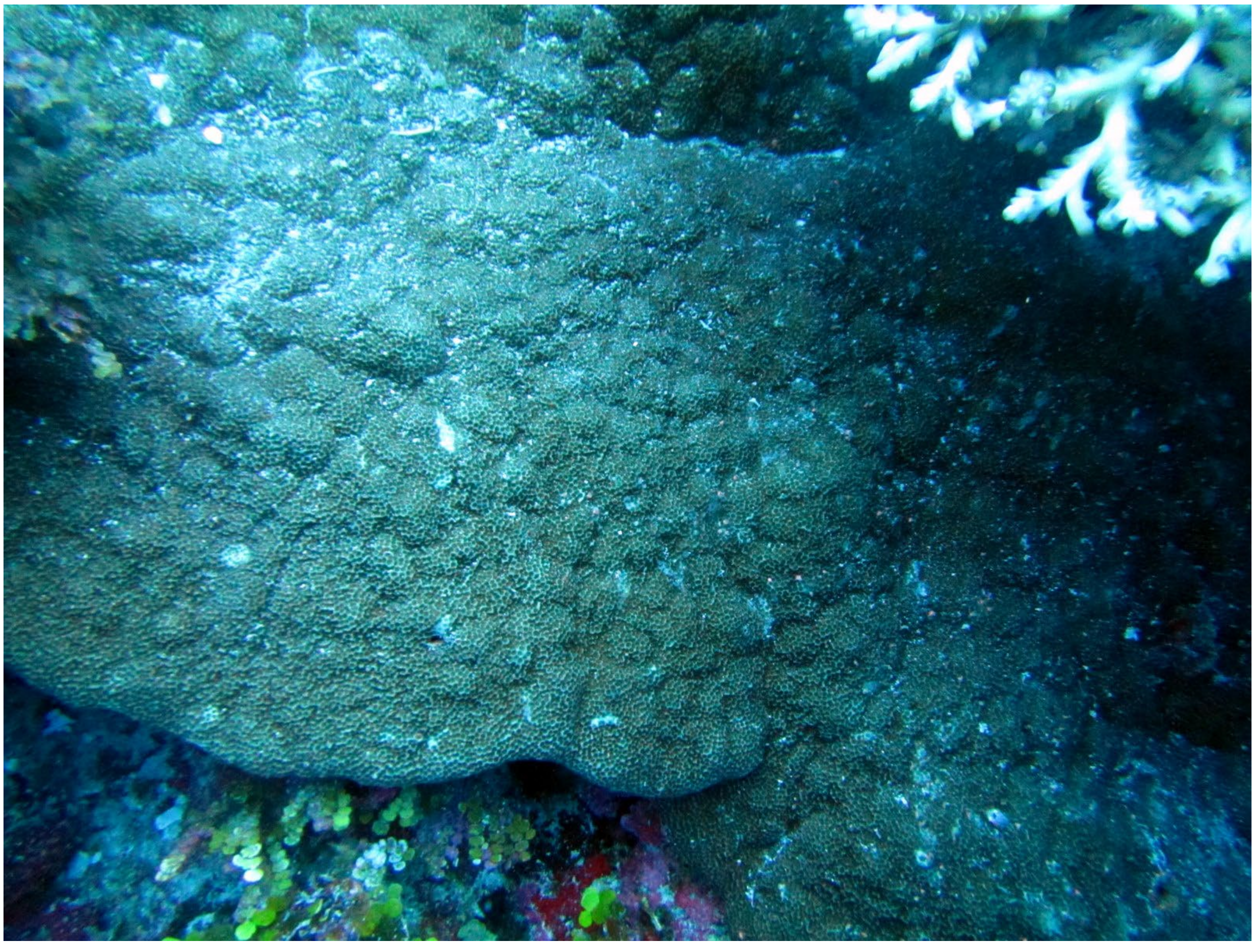
This colony of *Porites evermanni* is unusual in that the lumps and color look like on other massive *Porites*.



A close-up photo of *Porites evermanni*.

Porites arnaudi

Colonies are often massive or low massive and usually don't exceed about 2 m diameter. They tend to be on sloping areas, and the lower edge is raised. The lower edge has a rounded edge about an inch thick and becomes thicker quickly with distance from the edge. The colony commonly has low, rounded irregular bumps on it. The corallites have tiny raised ridges between them that make the surface look rough. Other massive *Porites* are usually not on slopes with a raised thick lower edge and the sharp edges between corallites.

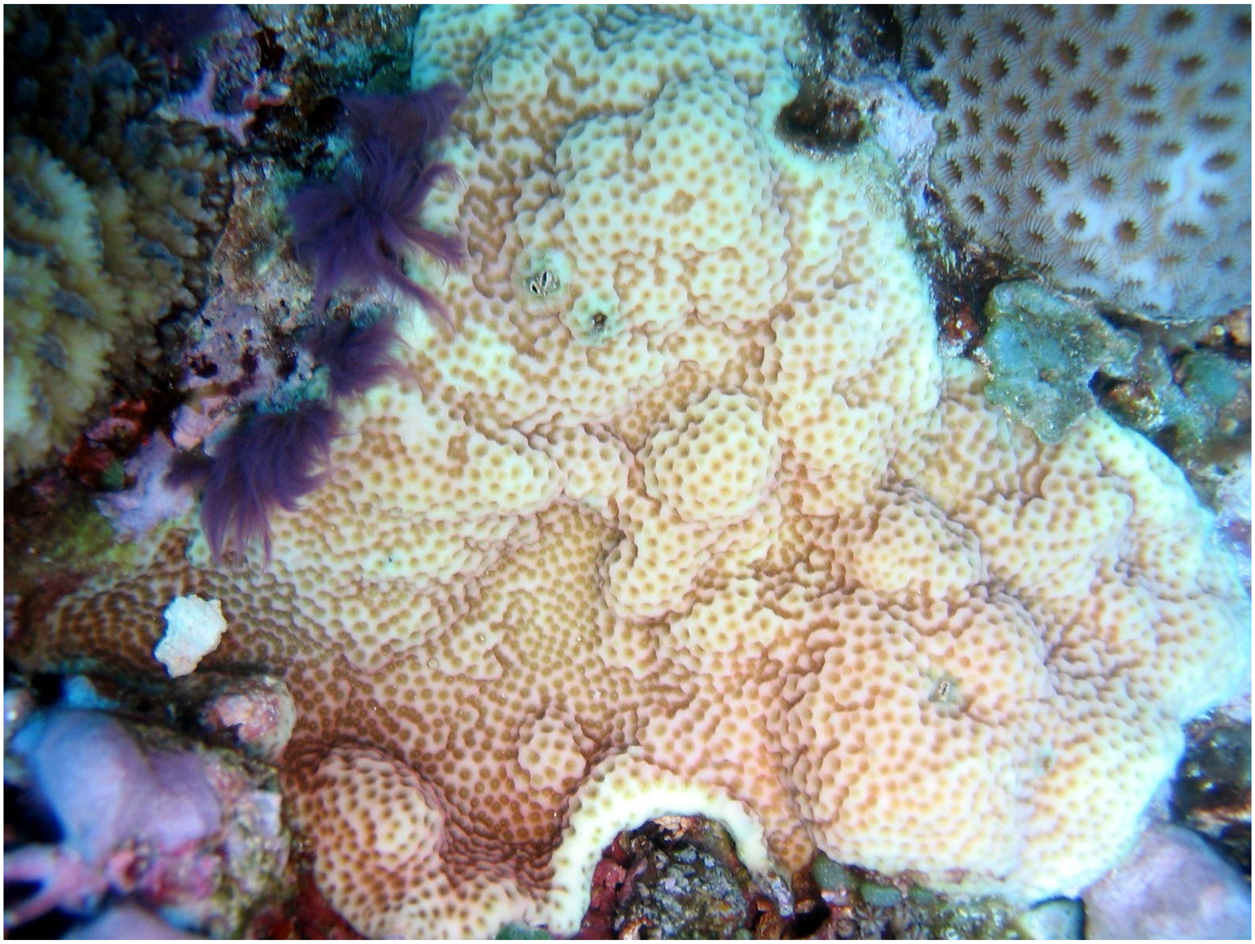


A colony of *Porites arnaud*i.

A close-up photo of *Porites arnaudi*.

Porites myrmidonensis

Colonies are usually massive and are small, usually 20 cm diameter or less. In Australia, colonies get quite large. Colonies are lumpy. Corallites are deep, separated, and in places are in rows. Other massive *Porites* do not have the small rounded lumps close together, deeply recessed corallites that are widely spaced (for *Porites)* and corallites in rows.

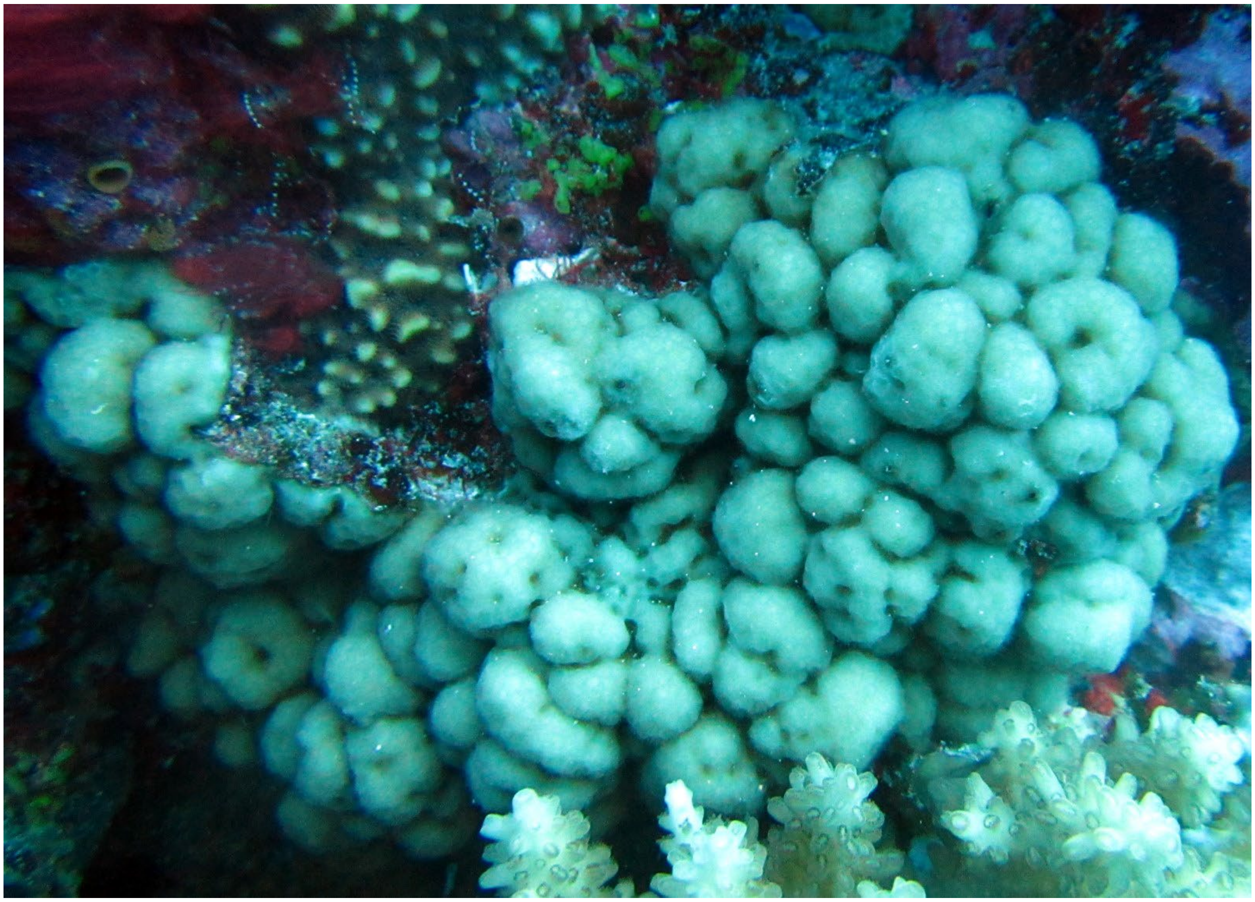


A colony of *Porites myrmidonensis*.

Porites cf. superfusa

Colonies are clusters of nodules with very narrow, deep cracks between them. The nodules are around the width of a thumb. The cluster of nodules is apparently unique to this species. The Corals of the World website shows the type specimen and several other skeletons (but no live corals). These photos appear to be within the range of variation of this species. However, the corallites need to be checked under a microscope to confirm. The knobs in the Corals of the World website show the knobs range from about 5 mm diameter to 20 mm. *Porites myrmidonensis* has more irregular lumps and deeply recessed corallites with some corallites in rows which this coral doesn't have.

A colony of *Porites* cf. *superfusa*.

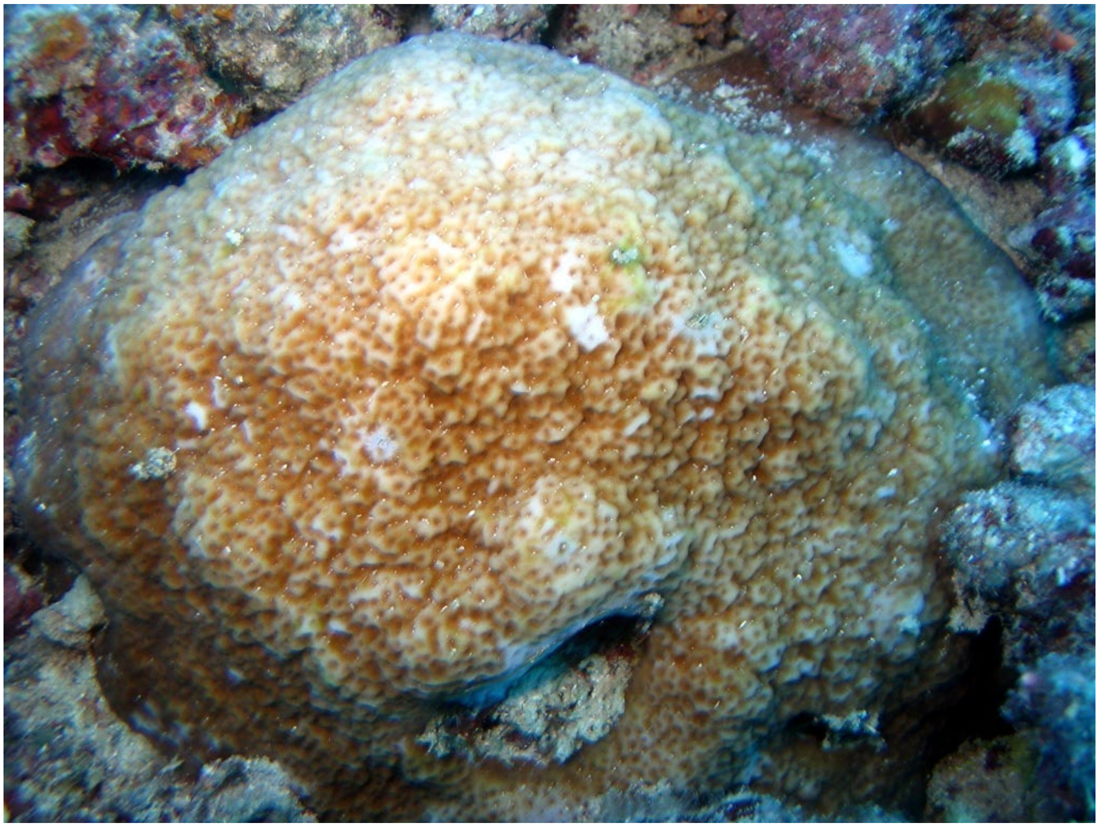


A colony of *Porites* cf. *superfusa*. The light green color is because of the camera. It may have been a cream color.

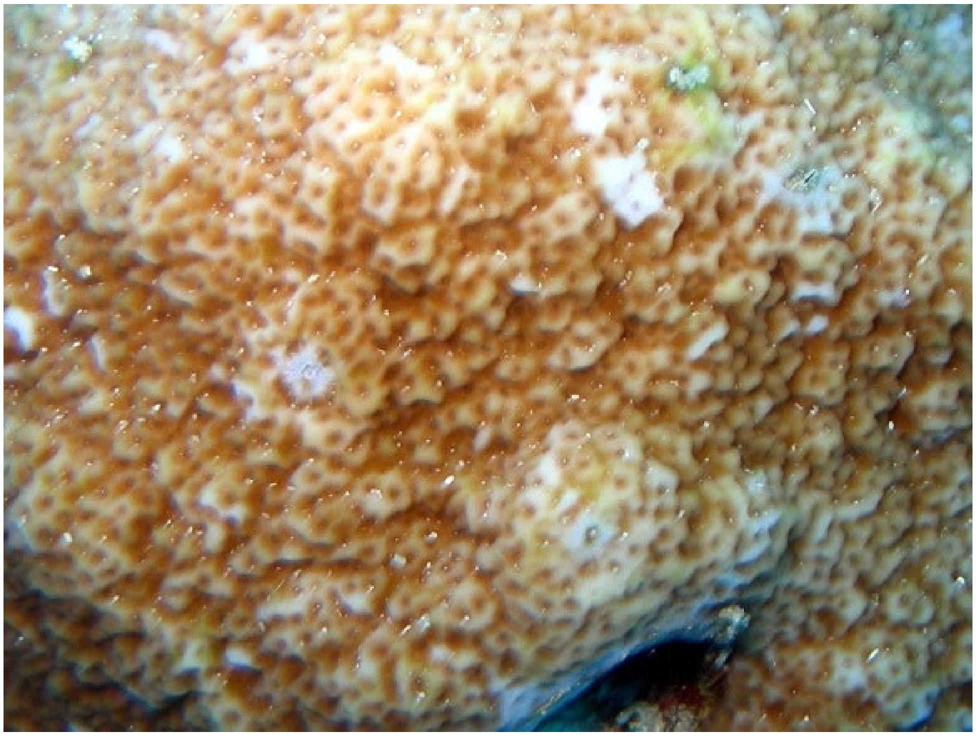
A close-up photo of a colony of *Porites* cf. *superfusa*. This colony looks quite different, perhaps because its polyps are out. But the knobs look very similar.

Porites cf. vaughani

This species can be massive or encrusting. The surface has small irregular bumps on it. Corallites are between the bumps and also on them. Corallites on the bumps often are in a depression in the bump and can be off center. *Porites horizontalata* also has recessed corallites but they are not on and between irregular small bumps but instead separated by rounded smooth raised areas.



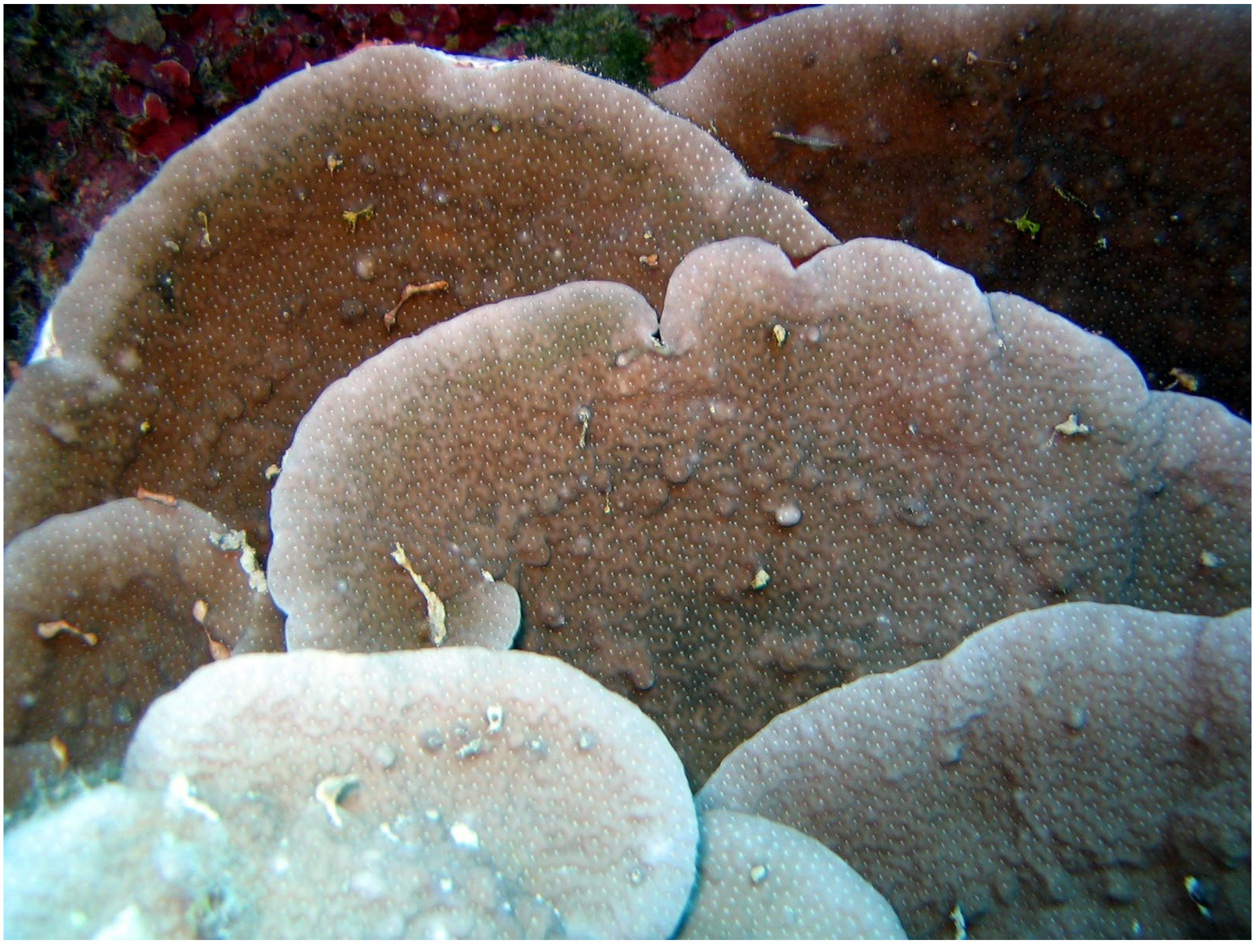
A colony of *Porites* cf. *vaughani*.



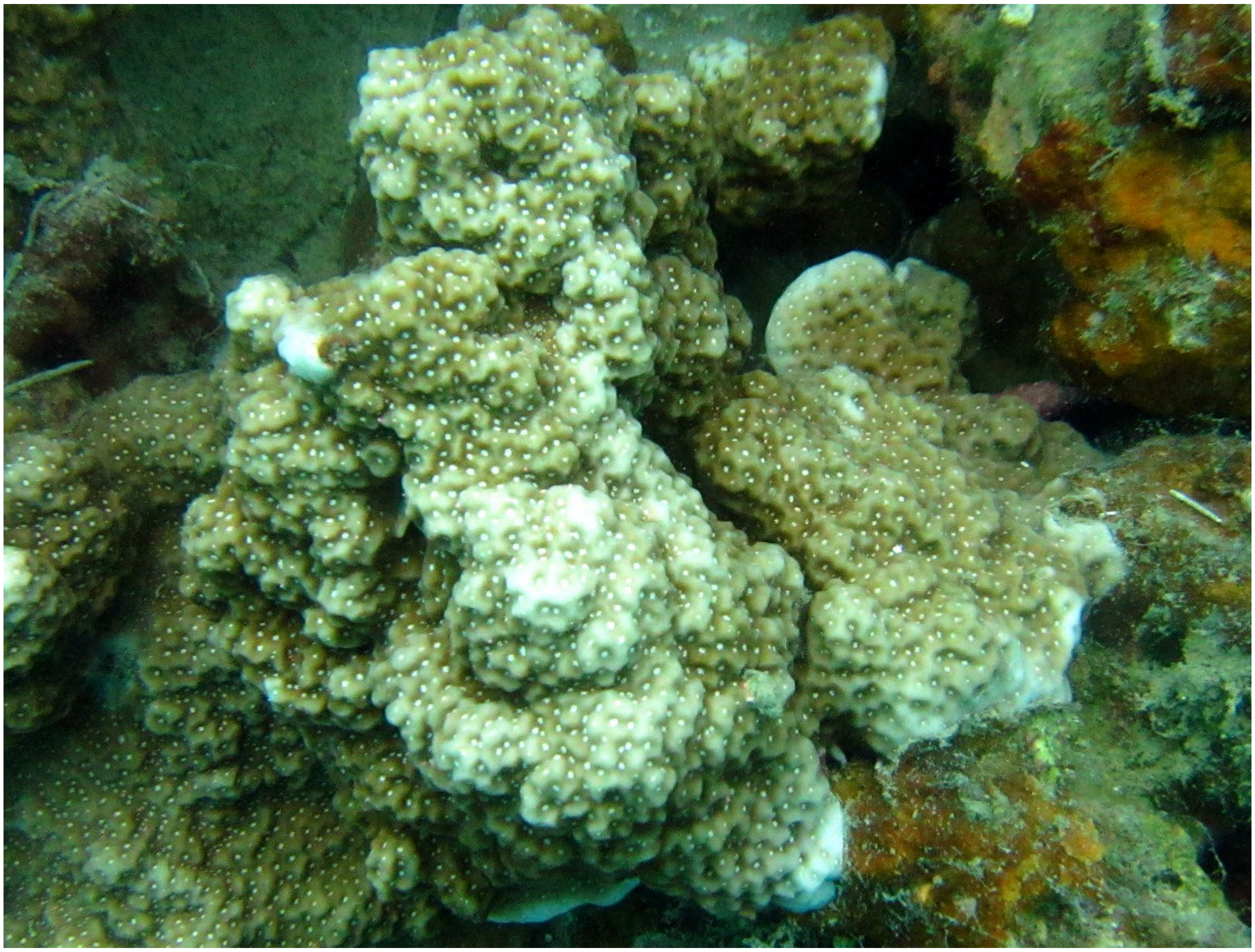
A closer photo of *Porites* cf. *vaughani.*

Porites horizontalata Vulnerable

Colonies are plates or foliose in American Samoa, the type location. In American Samoa, rounded ridges are located between corallites, which appear to have been recessed into the higher level of the ridges. This is clear in the type specimen. At other locations, massive and branching colonies appear to have similar corallites and ridges.



A plating colony of *Porites horizontalata* in Fiji.

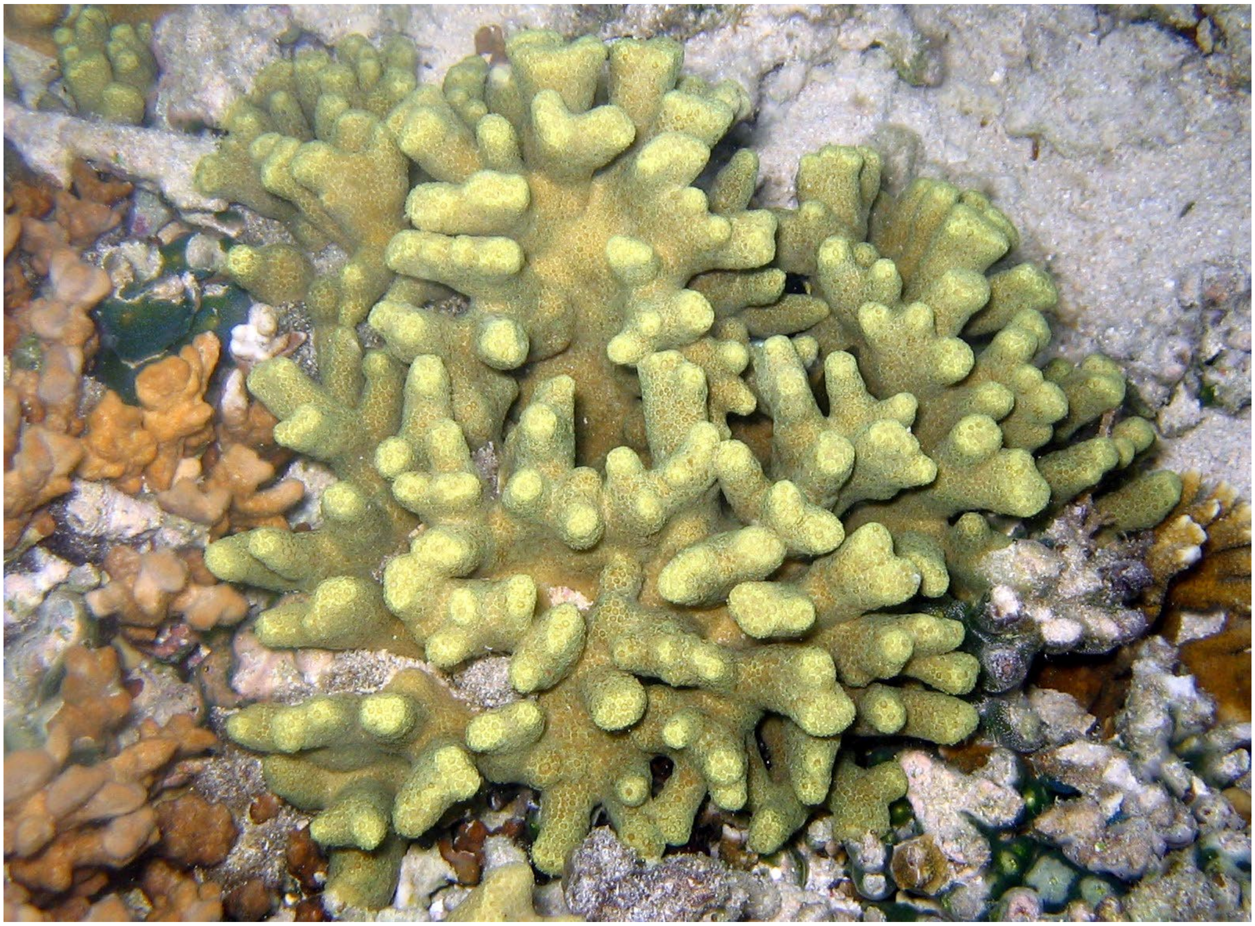


A massive colony of Porites *horizontalata*.

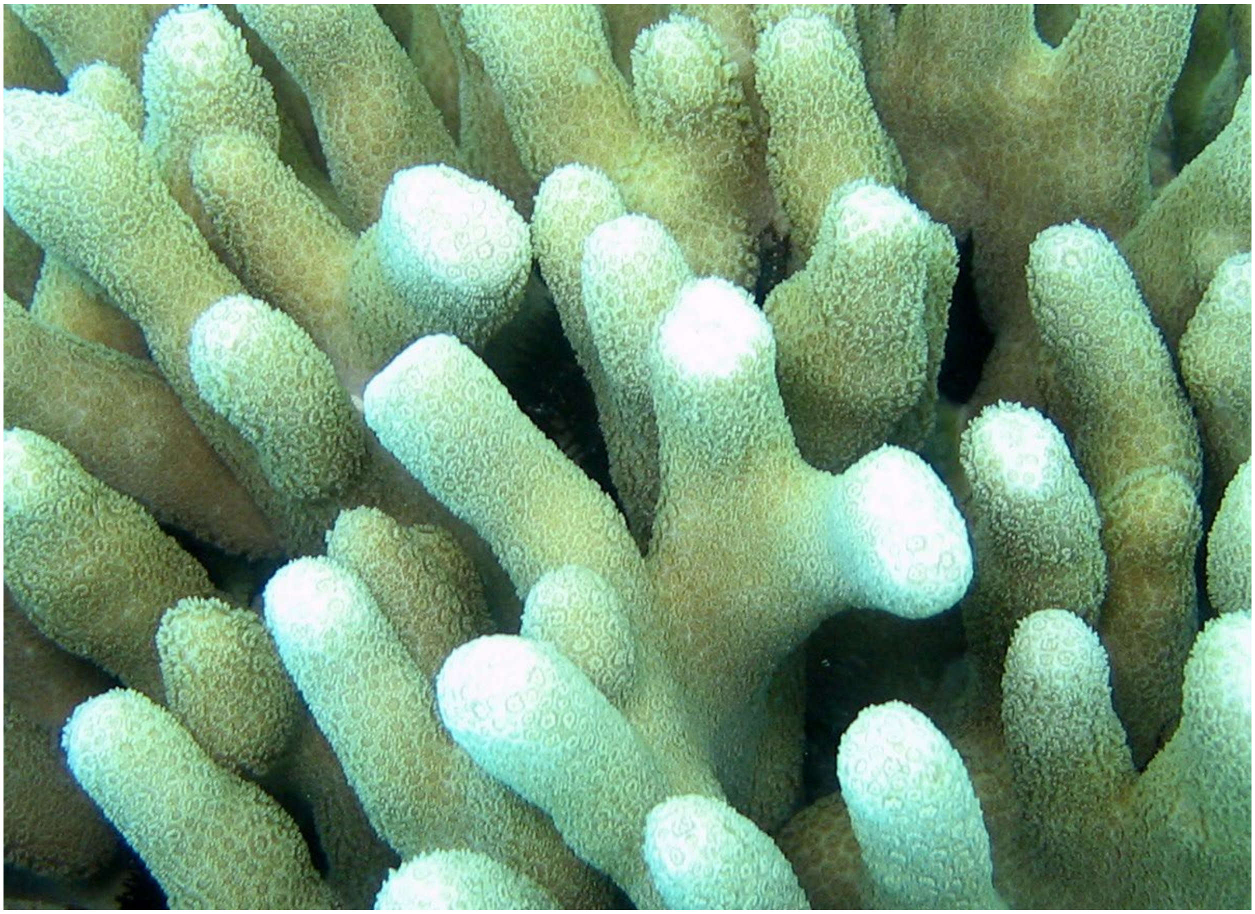
Porites cylindrica "finger coral"

Colonies have cylindrical branches that taper some and have rounded ends. Usually the branches are about finger diameter, but in some colonies the basal sections can be considerably thicker. In some colonies branches go different directions, in others they are mostly vertical and parallel, in a few the branches drape over and the branch tips point down. In some colonies branches are a bit knobby (with expansions of the branch). Colonies range from a few branches to fields of branches. The branches often have a short fuzz of partly extended tentacles. The corallites are not recessed as they are in *Porites attenuata* and the branches are larger and smoother than on *Porites nigrescens*.

A colony of *Porites cylindrica* with somewhat knobby branches.



A colony of *Porites cylindrica* with stubby branches.

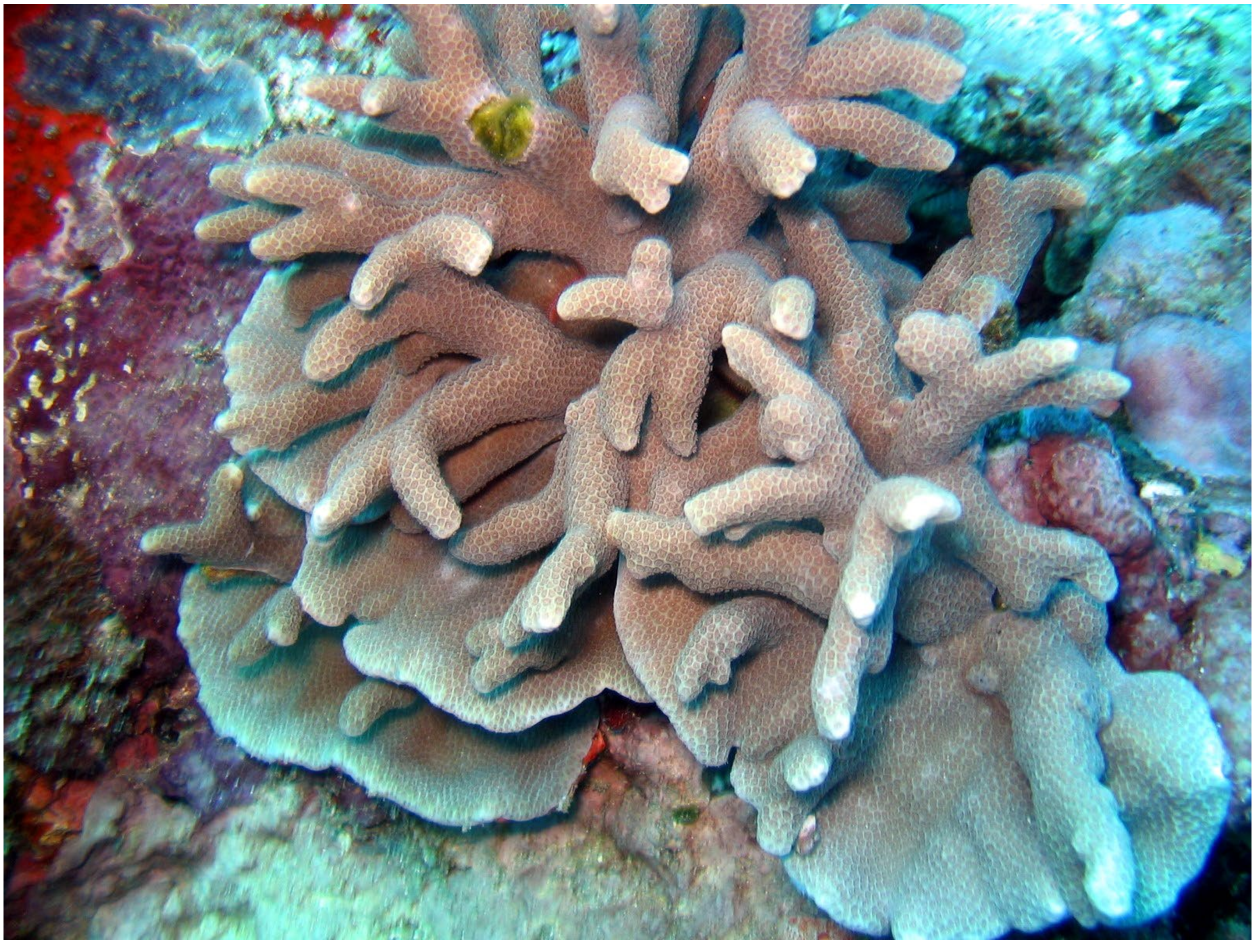


A close-up photo of *Porites cylindrica*.

Porites attenuata Vulnerable

Colonies are branching, with smoothly tapering branches that have rounded ends. The corallites are recessed a little, leaving a narrow, low ridge between corallites.

A large colony of *Porites attenuata*.

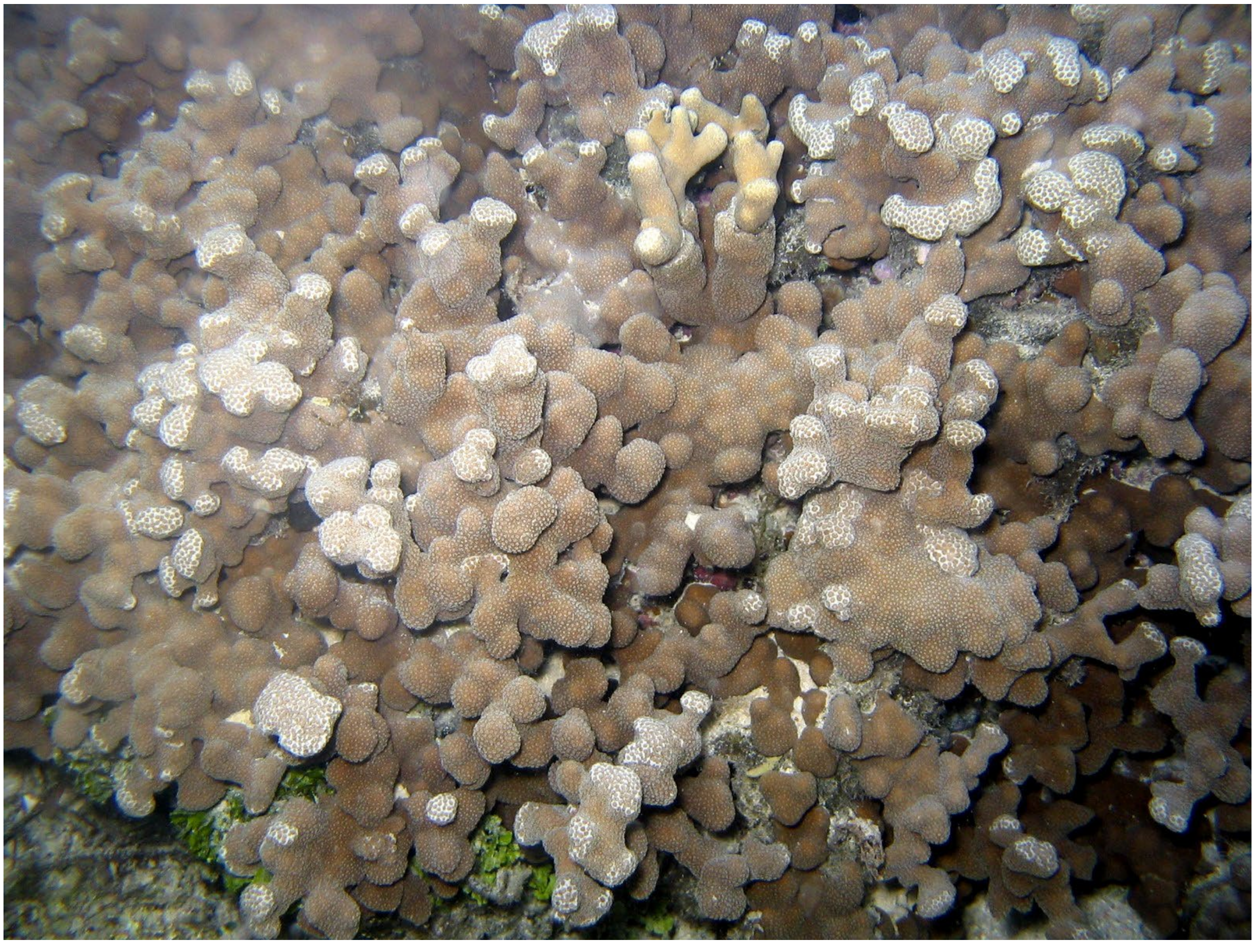


An unusual colony of *Porites attenuata*, with plate bases.

A close-up photo of *Porites attenuata*.

Porites annae

Colonies form knobby columns and sometimes knobby masses. Colonies are usually small, a foot or less in diameter. Columns and knobs are about the diameter of a finger. On all but the tops of columns, tentacles are extended in a tuft in the center of the corallites. Colonies are usually dark brown except for the tops of columns, which are white between brown polyps. Corallites are more widely spaced on the tops of columns. Colonies are lumpy columns, not smooth branches as on *Porites cylindrica* and *Porites attenuata*, and although it is brown with tentacles extended in tufts like *Porites evermanni*, the latter forms large massive colonies.

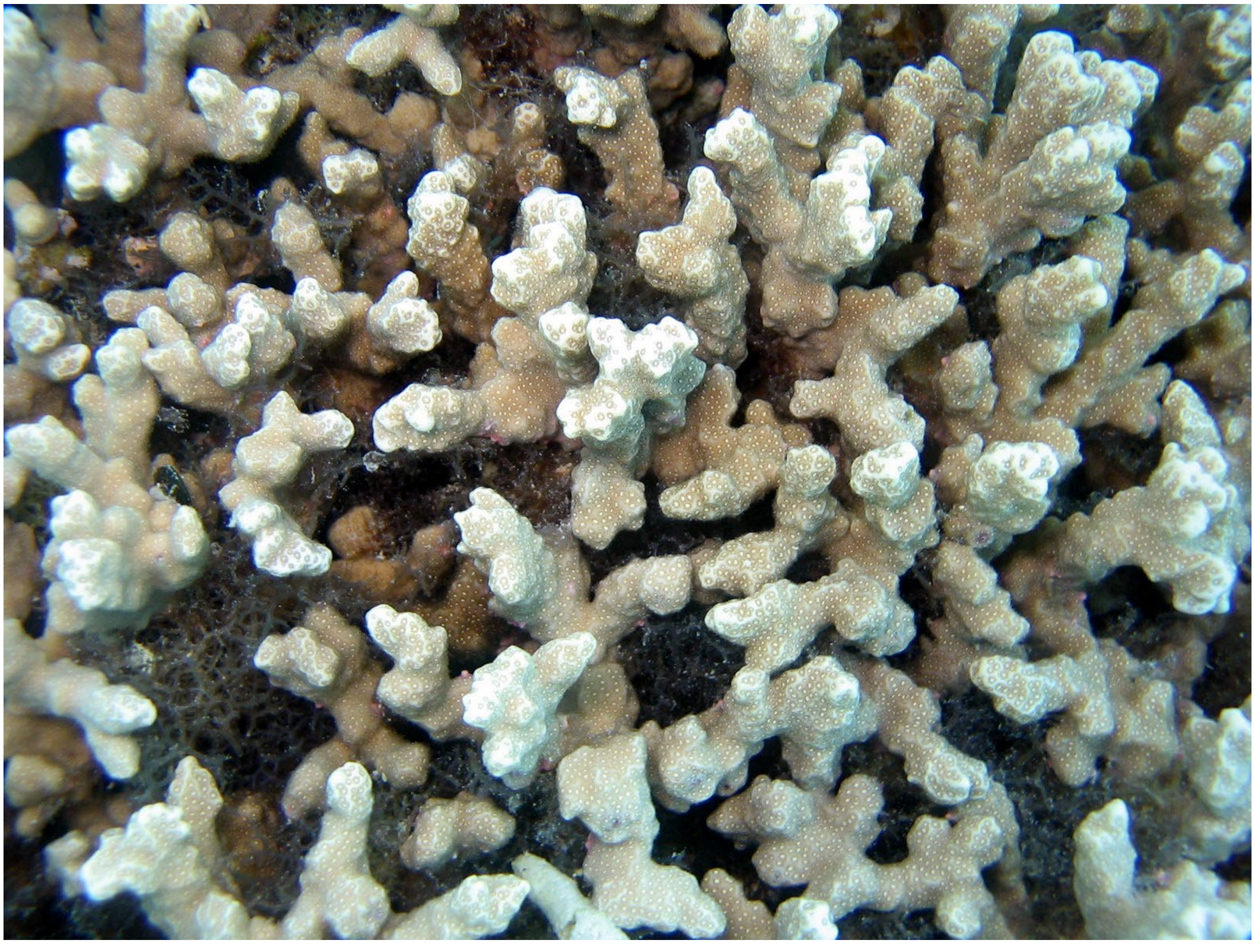


An unusually large colony of *Porites annae*.

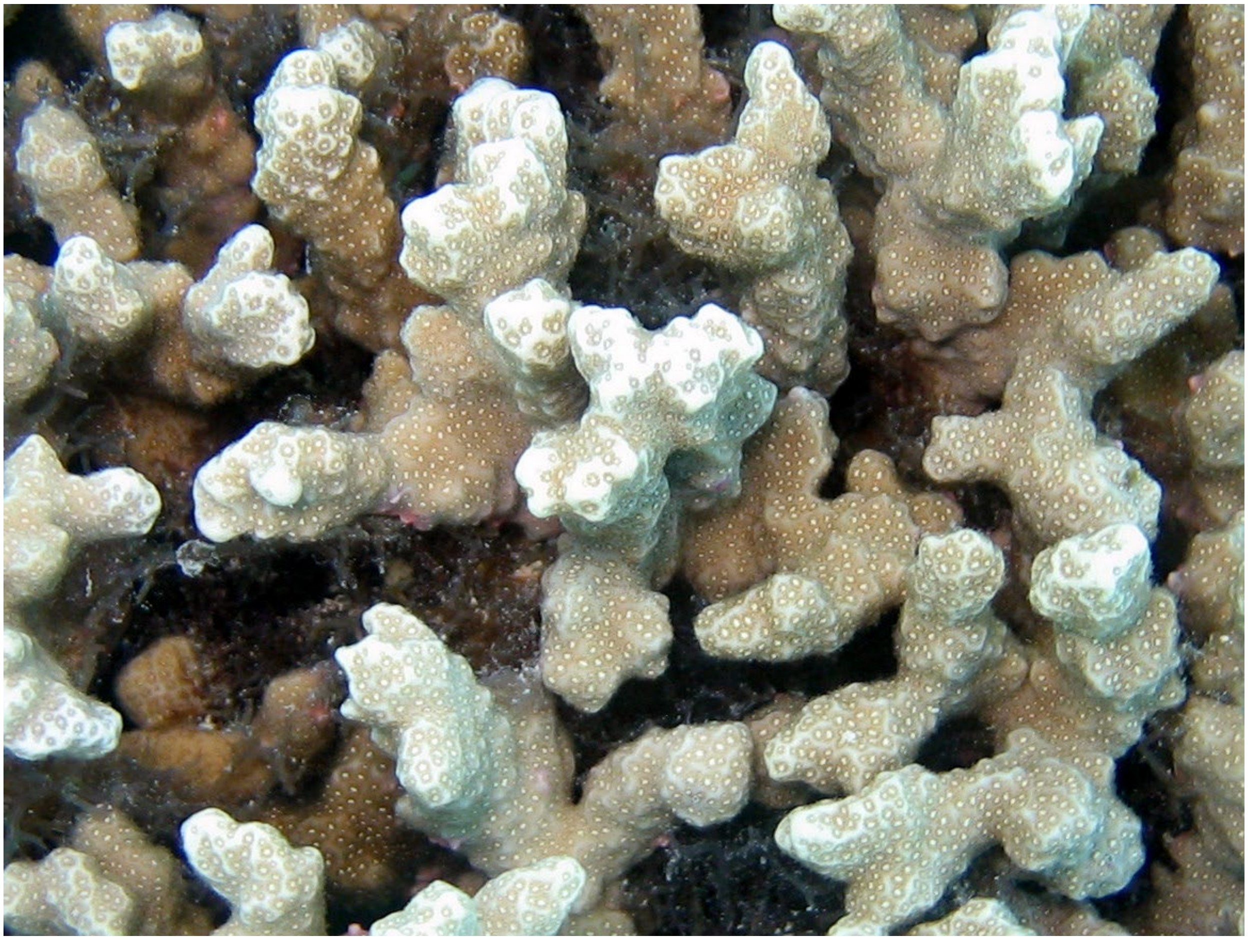
A close-up photo of *Porites annae*.

Porites rus

Colonies most often have both thin near-horizontal plates and irregular columns. The columns may branch some. Columns are on the tops of colonies or on top of plates. On a large colony plates are usually on the side and often near the base. Colonies in protected areas like lagoons may only have columns. Surfaces usually have tiny ridges on them which curve, wind, and divide. Polyp mouths may be white and are dot size. Ridges on the tops of columns may be lighter color than the rest of the colony. *Porites lichen* also has columns on top of thin plates, but the columns are smooth and uniform and the tentacles are extended in tufts like *Porites annae*.



Columns or branches of *Porites rus*.



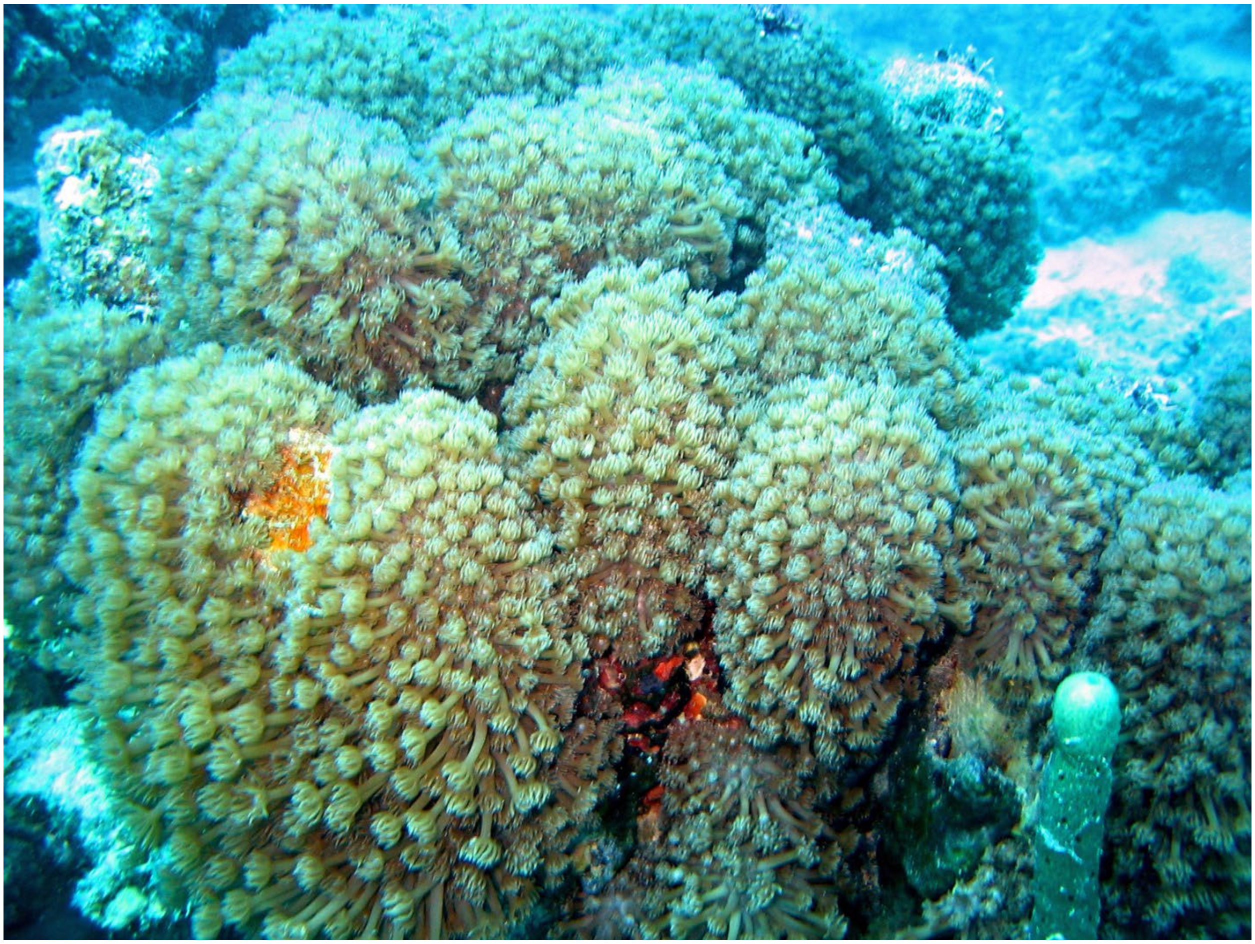
A close-up photo of *Porites rus* columns or branches.

Goniopora

Colonies can be encrusting, massive, columnar or branching. Polyps are daisy-shaped, with a long stem-like "body", and a ring of tentacles surrounding the mouth at the end. Polyps vary greatly in size between species, with the largest having polyps being about 10 cm long and the smallest not extending from the skeleton. Tentacles also vary in size and shape between species. Polyps have 24 tentacles. *Alveopora* has polyps that look very similar, except that they have 12 tentacles. Tentacles are difficult to count in pictures and near impossible under water. *Goniopora* forms a very hard, solid skeleton, while *Alveopora* forms a very spongy skeleton with more holes than skeleton, and so very soft. A finger nail will not sink into a *Goniopora* skeleton but will into an *Alveopora* skeleton. Species are hard to identify in both of these genera.

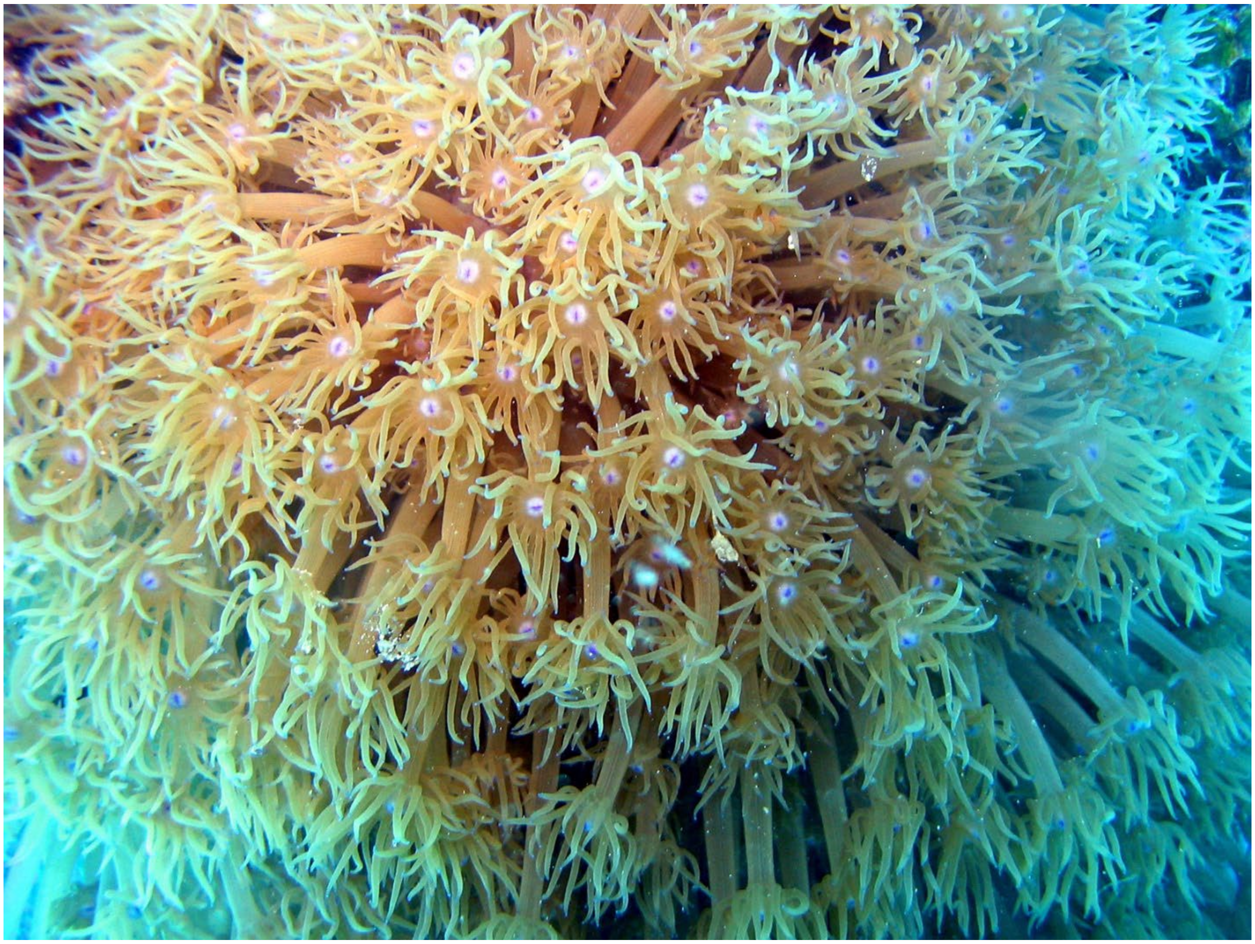
Goniopora sp. 1

Colonies form thick columns. Polyps are long and daisy-like, with a ring of long thin tentacles and a small mouth. *Goniopora* sp. 2 doesn't have thick columns and long polyps. *Goniopora* cf. *somaliensis* is encrusting and usually does not have extended polyps.



A colony of *Goniopora* sp. 1.

A closer photo of the polyps of *Goniopora* sp. 1.

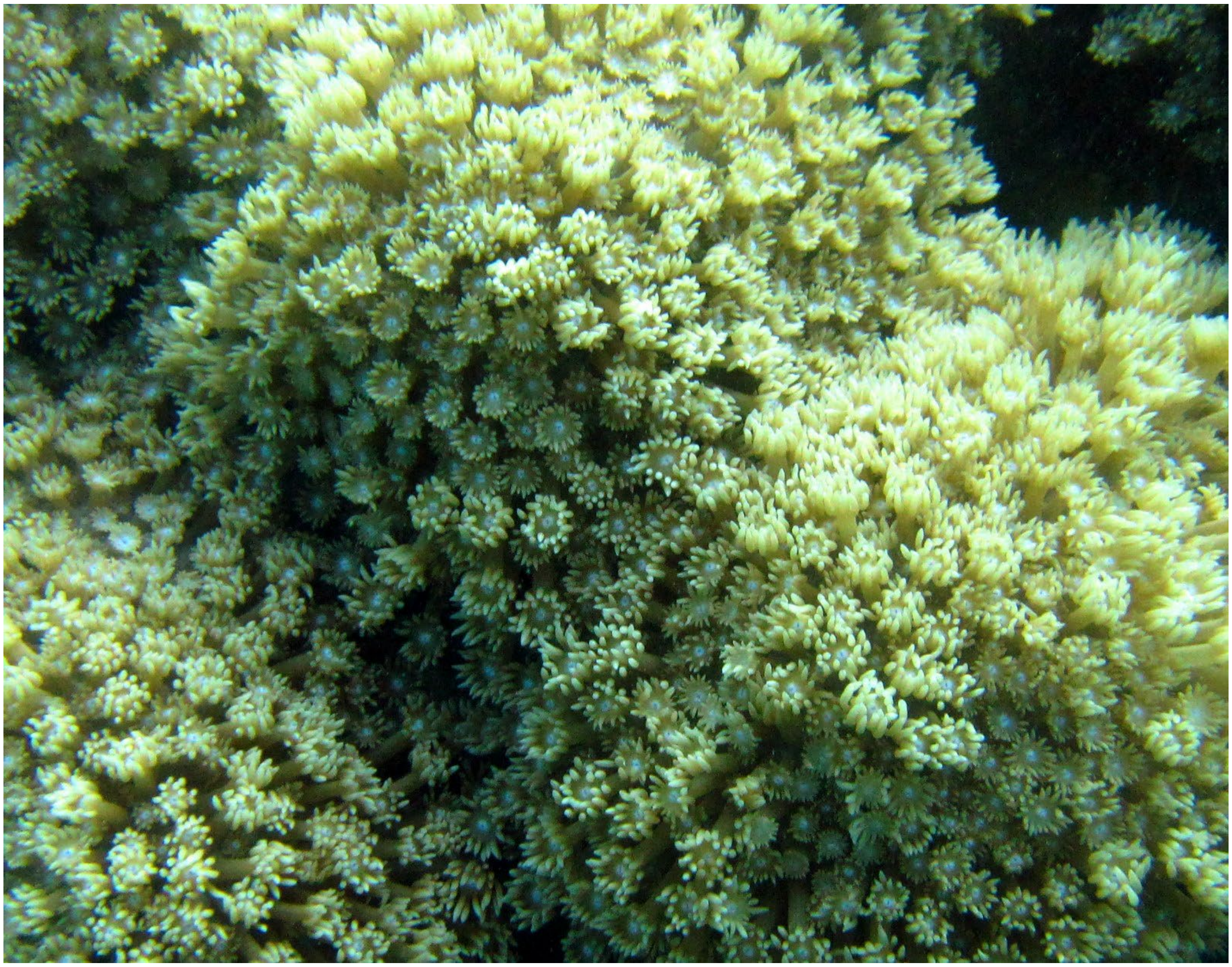


A close-up photo of *Goniopora* sp. 1.

Goniopora sp. 2

Colonies form columns with polyps on the top ends. The polyps are small, looking like short daisies with short stems and small "flowers" which are the tentacles. The polyp mouths are white. The polyps are much smaller than on *Goniopora* sp. 1 but larger than on *Goniopora somaliensis*.

A photo of broken columns of *Goniopora* sp. 2.



A close-up photo of *Goniopora* sp. 2.

Goniopora cf. somaliensis

Colonies are encrusting. Usually the polyps are retracted, but even if extended the tentacles are barely out of the skeleton. The corallites look like those in *Porites*, but are larger, around 2-3 mm diameter. *Goniopora* sp. 1 and 2 have extended polyps on columns.

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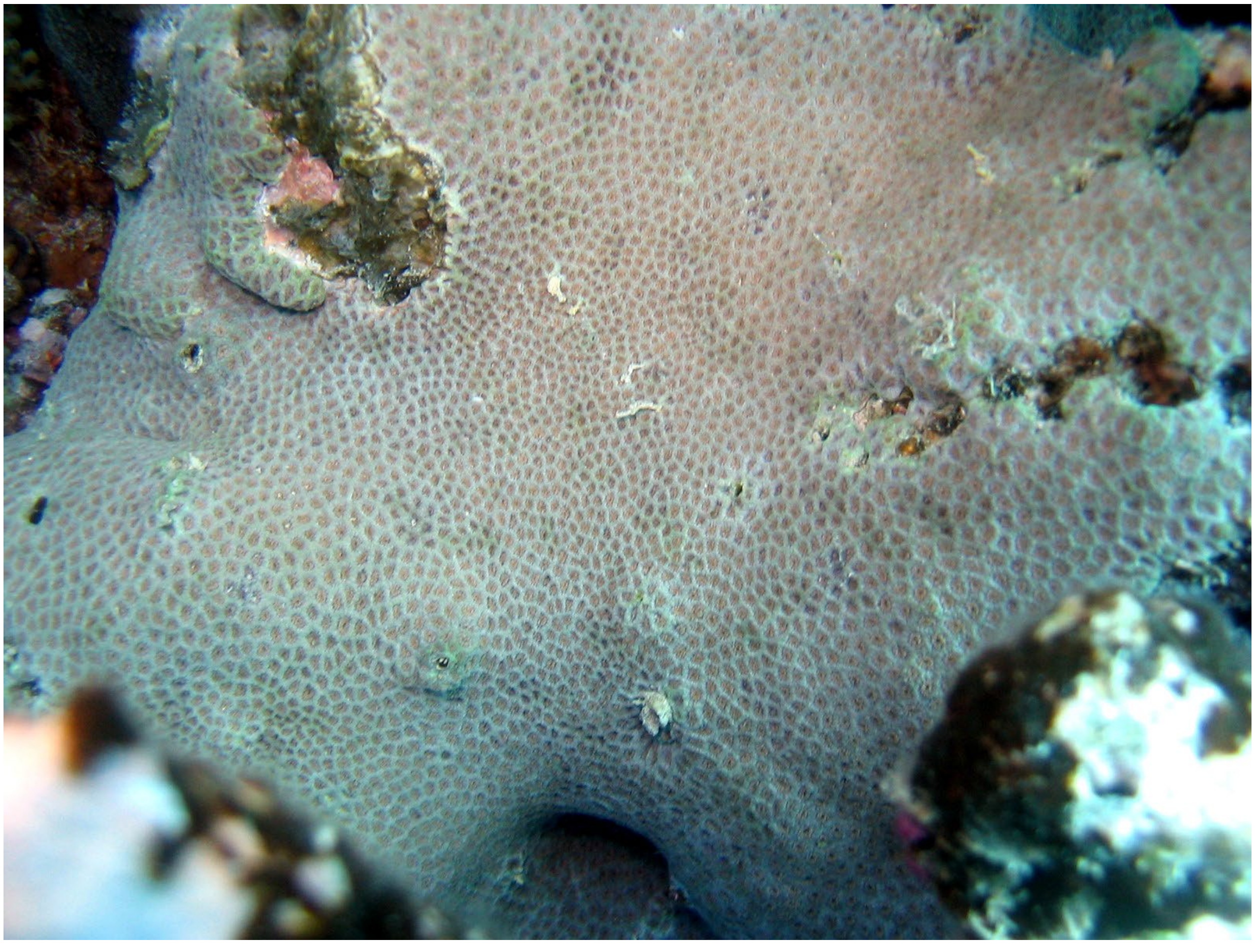
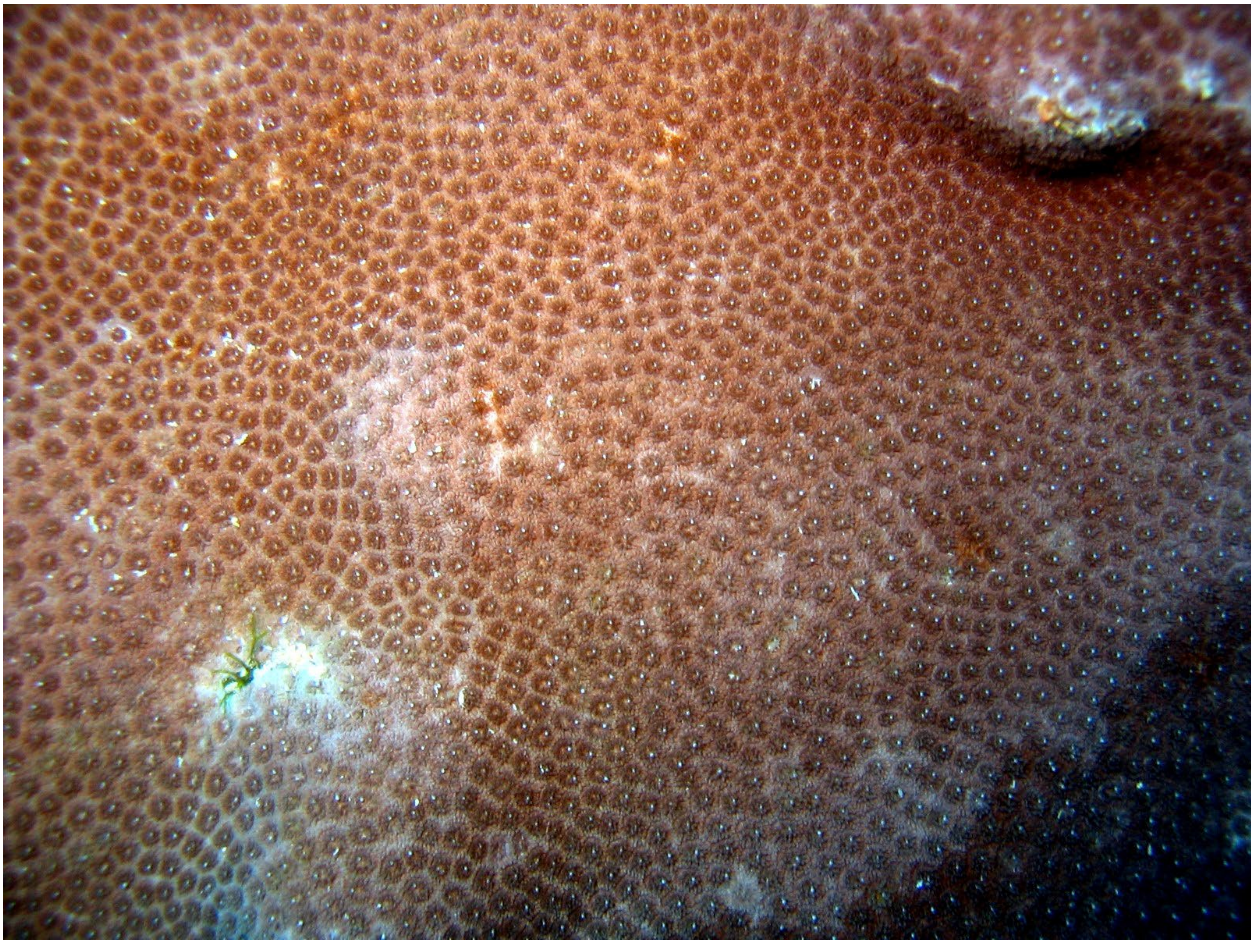


A colony of *Goniopora* cf. *somaliensis*.



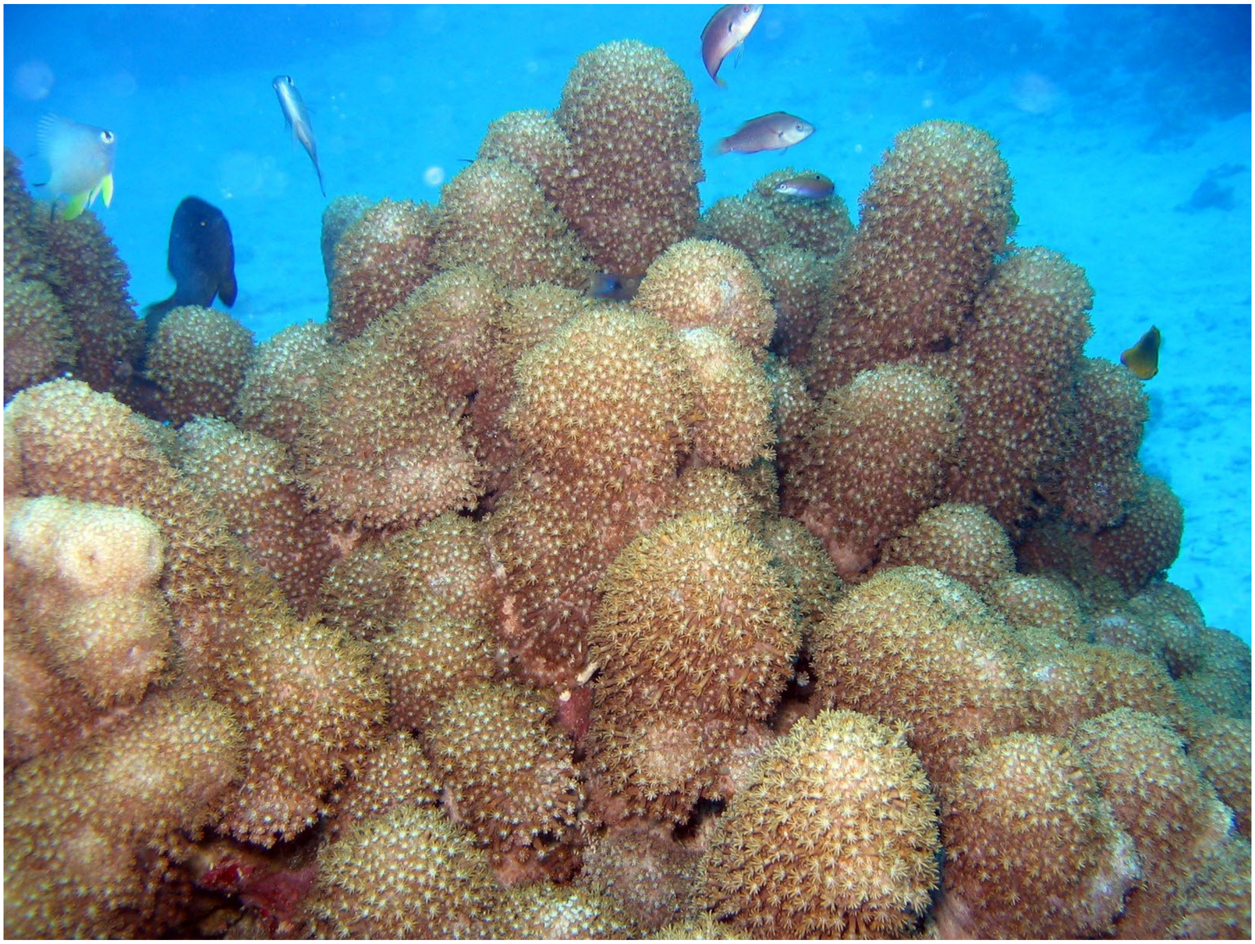
A close-up photo of *Goniopora* cf. *somaliensis*.

Alveopora

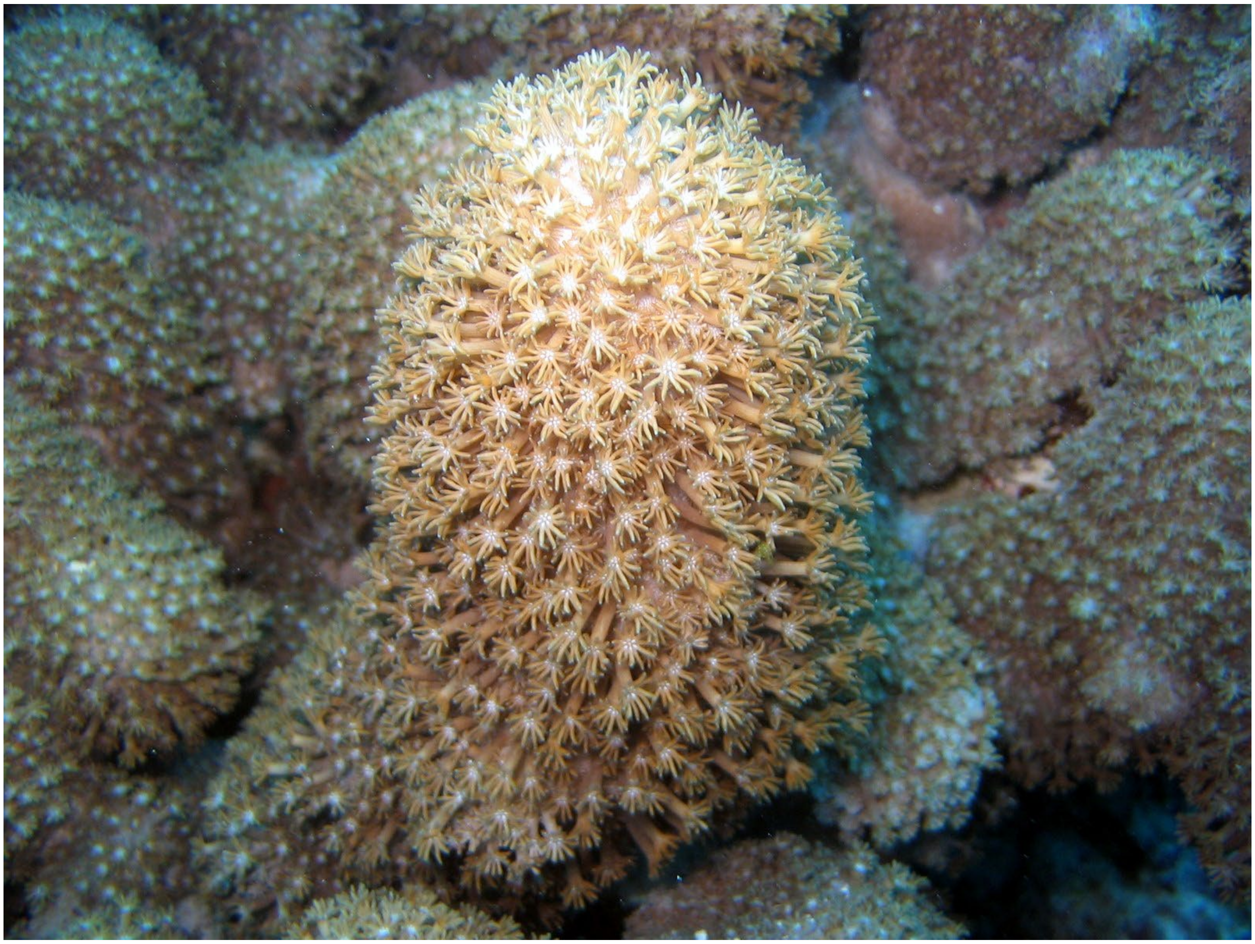
Colonies are encrusting, massive, branching or columnar. The polyps are like daisies, with a long column topped with a ring of 12 tentacles. The polyps vary greatly in size between species, from around 10 cm long to about 1 mm. The skeleton is very light and porous, and consists of interconnected thin spines. *Goniopora* has very similar looking polyps but has 24 tentacles instead of 12. The *Goniopora* skeleton is dense and hard with few holes, and so a fingernail will not sink into a *Goniopora* skeleton but it will easily sink into an *Alveopora* skeleton.

Alveopora sp. 1

Colonies consist of a cluster of columns about 2-3 inches in diameter. Polyps are fairly small. Polyps are larger than *Alveopora* sp. 2 and *Alveopora minuta*.



A colony of *Alveopora* sp. 1.



A close-up photo of *Alveopora* sp. 1.

Alveopora spongiosa

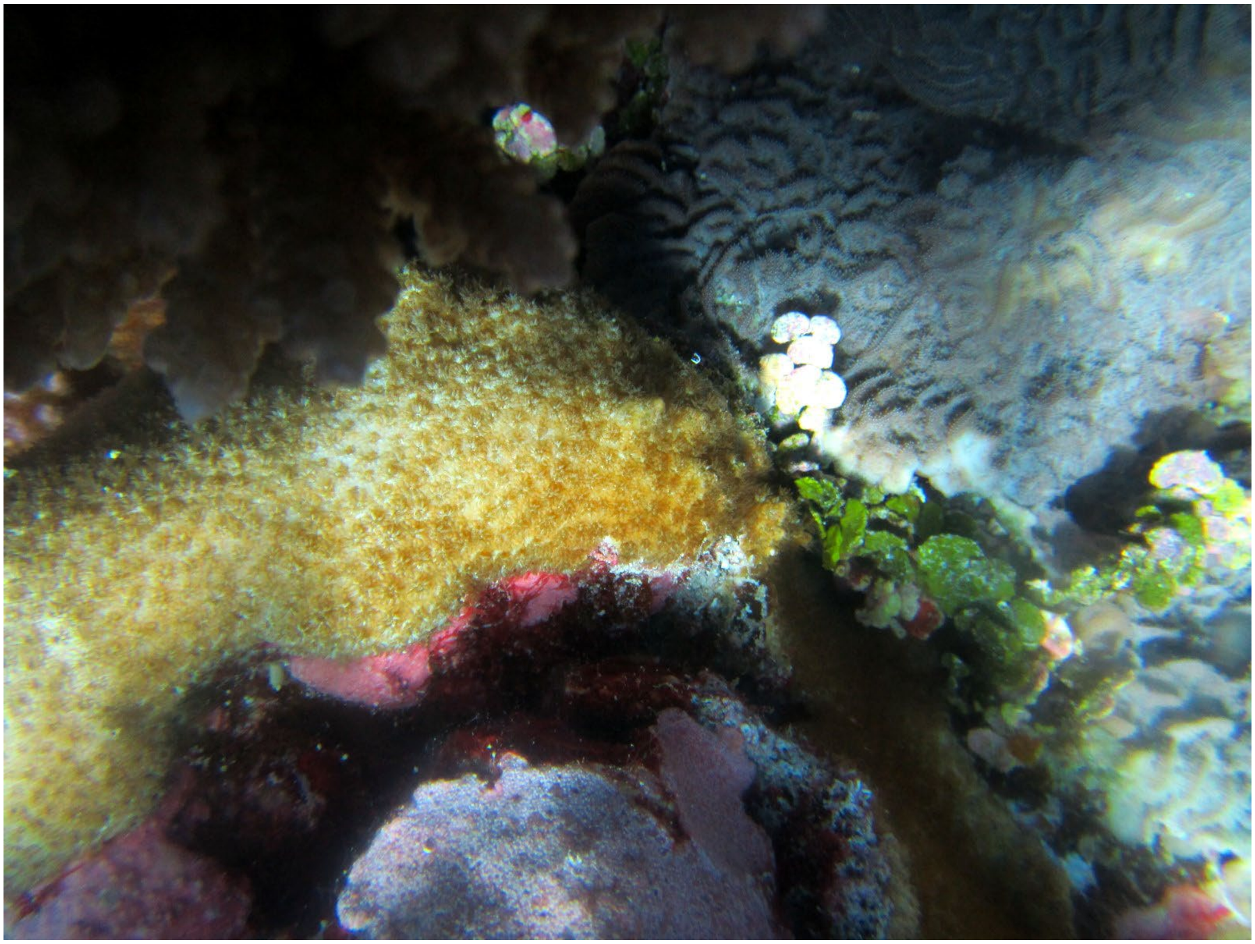
Colonies are flat and encrusting and may have raised plate edges. The polyps are tiny, about 2-3 mm diameter, and very short. The polyps are smaller than on *Alveopora* sp. 1, and slightly larger than on *Alveopora minuta*. The colony is larger than on *Alveopora minuta*.

A colony of *Alveopora spongiosa*.

A close-up photo of *Alveopora spongiosa*.

Alveopora minuta Endangered (IUCN Red List)

Colonies are small and encrusting or massive. The polyps and corallites are the smallest of any *Alveopora* species, less than 2 mm diameter. Septa in the skeleton consist of just a few spines, they are the least developed septa of any coral species. The polyps are almost as small as *Porites*. This appears to be a rare species, though perhaps it is confused with *Porites* and is more common than it seems.



A colony of *Alveopora minuta*.

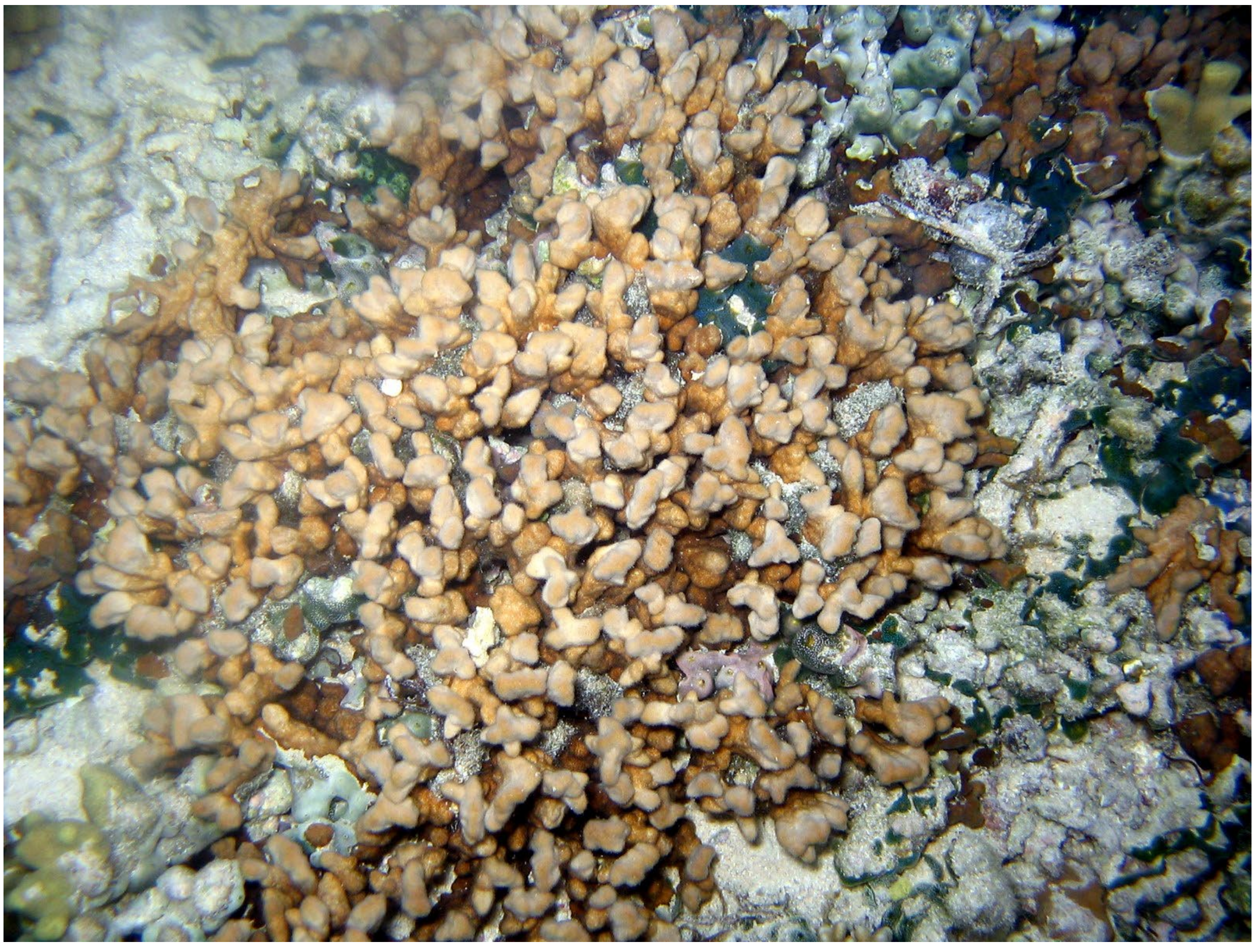
A close-up photo of *Alveopora minuta*.

Psammocora

Colonies are encrusting, branching, columnar, or massive. The corallites on most species cannot be seen underwater, making identification of the genus depend on identifying the species first.

Psammocora contigua

Colonies are branching, with branches about the size of a finger or little finger. Branches are irregularly shaped and often are short (though in other locations can be up to about a foot long) and close together. Other *Psammocora* species in Fiji don't have small branches.



A colony of *Psammocora contigua* with typical coloration (though some colonies may be green).

A close-up photo of a colony of *Psammocora contigua*.

Psammocora profundacella

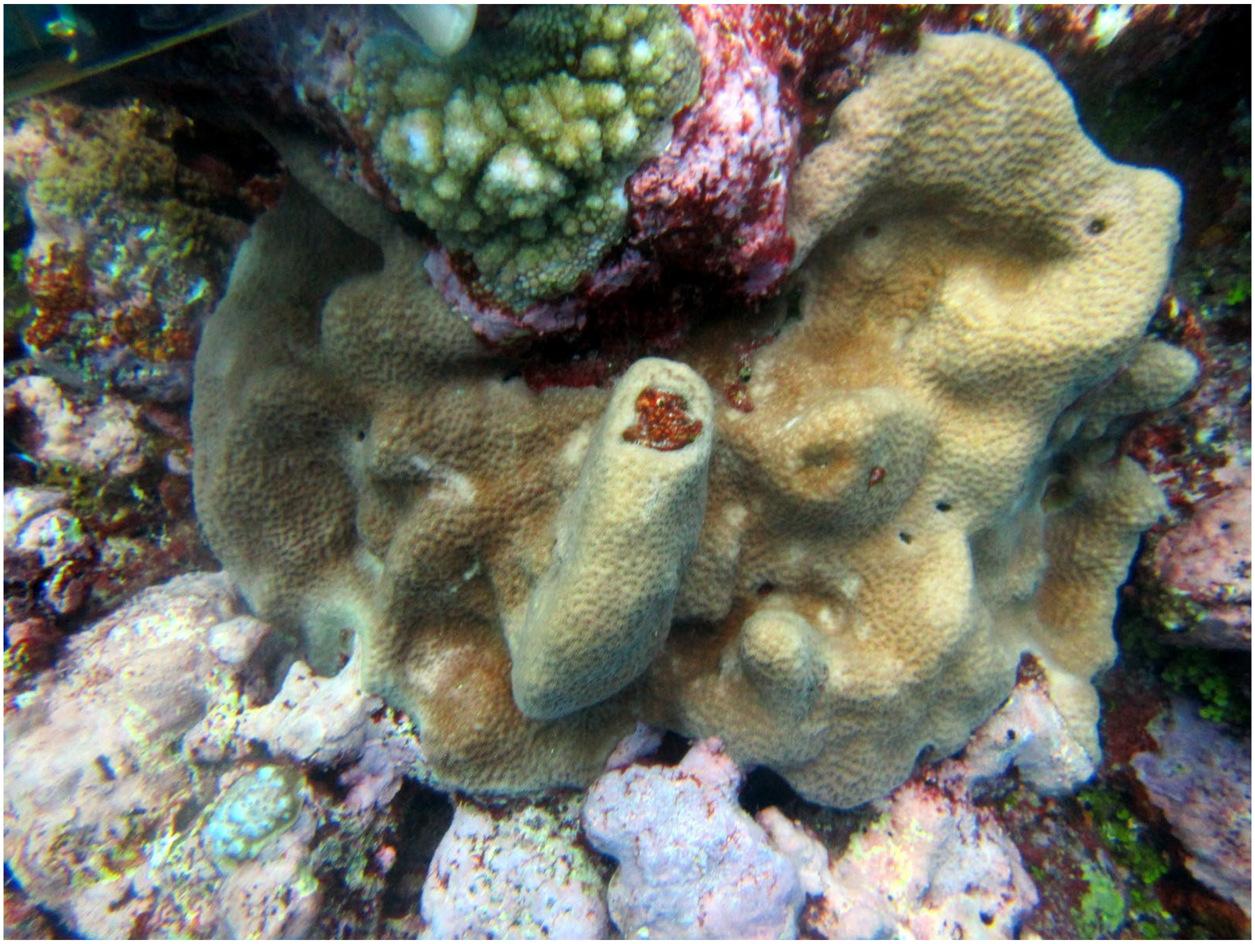
Colonies are small and massive. The corallites are in depressions separated by a rise that has a sharp crest. Colonies vary in how high and obvious the crests are. The polyp center can usually be seen as a dark spot at the bottom of the depression (the depression is the corallite). The ridges sepearating polyps is thicker than on *Pavona venosa* and *Gardineroseris planulata*.

A colony of *Psammocora profundacella*.

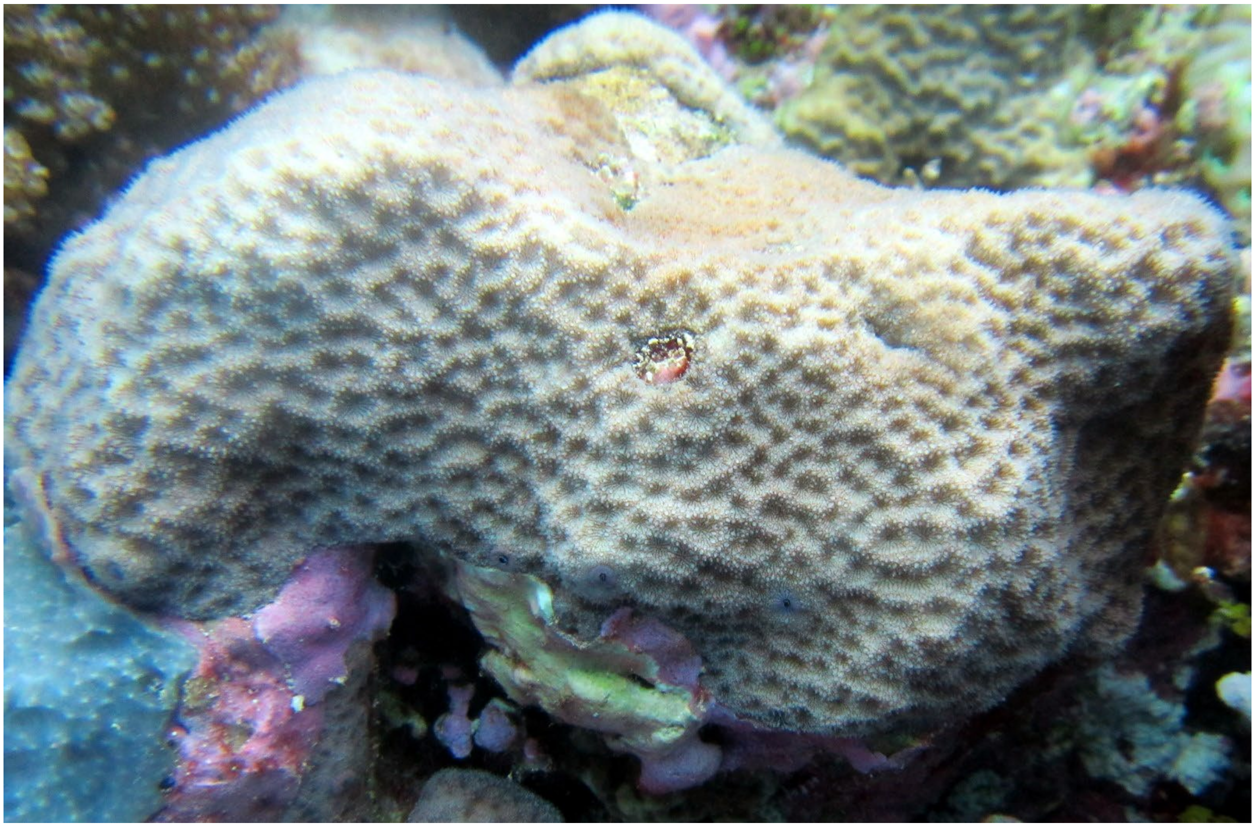
A close-up photo of a colony of *Psammocora profundacella*. At the top of the colony, septa can just barely be seen within corallites, but underwater it is hard to see those.

Psammocora digitata

Colonies are massive but variable in shape. In American Samoa and Tonga, they reach large sizes, up to at least 2 m tall and 1 m or more wide. The shape often includes pairs of parallel ridges, which sometimes form the sides of a mass between them. The surface is finely spiny and polyp centers can be seen. This is by far the largest species of massive *Psammocora*. Until recently, this name was used for another species of *Psammocora* that always forms uniform, non-tapering columns, but a re-examination of type specimens has led to the discovery that this is the species that the name refers to. The corallite details for these two species are very similar, but the colony shape is very different.



A colony of *Psammocora digitata*.



A close-up photo of *Psammocora digitata*.

Psammocora nierstraszi

Colonies are encrusting and covered with small winding ridges. The ridges vary between colonies in how high and obvious they are. The ridges do not have sharp crests and do not extend for long distances on the coral. The ridges on meandroid corals ("brain corals") usually extend for longer distances across the coral and appear more discrete. The ridges on *Pavona varians* are somewhat similar but have tiny septa on their sides, and colonies tend to be brown.

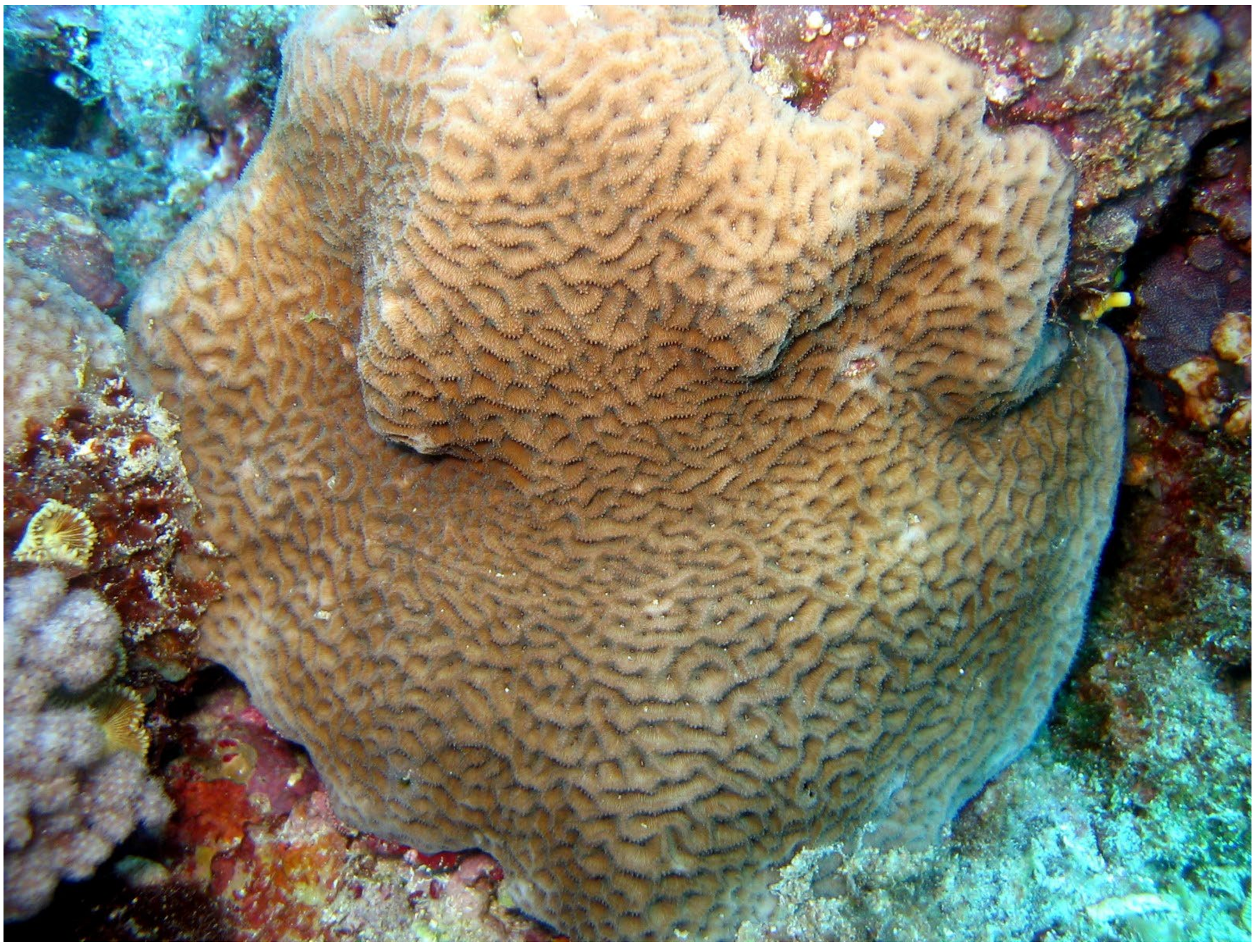
A close-up photo of a colony of *Psammocora nierstraszi*.

Coscinaraea

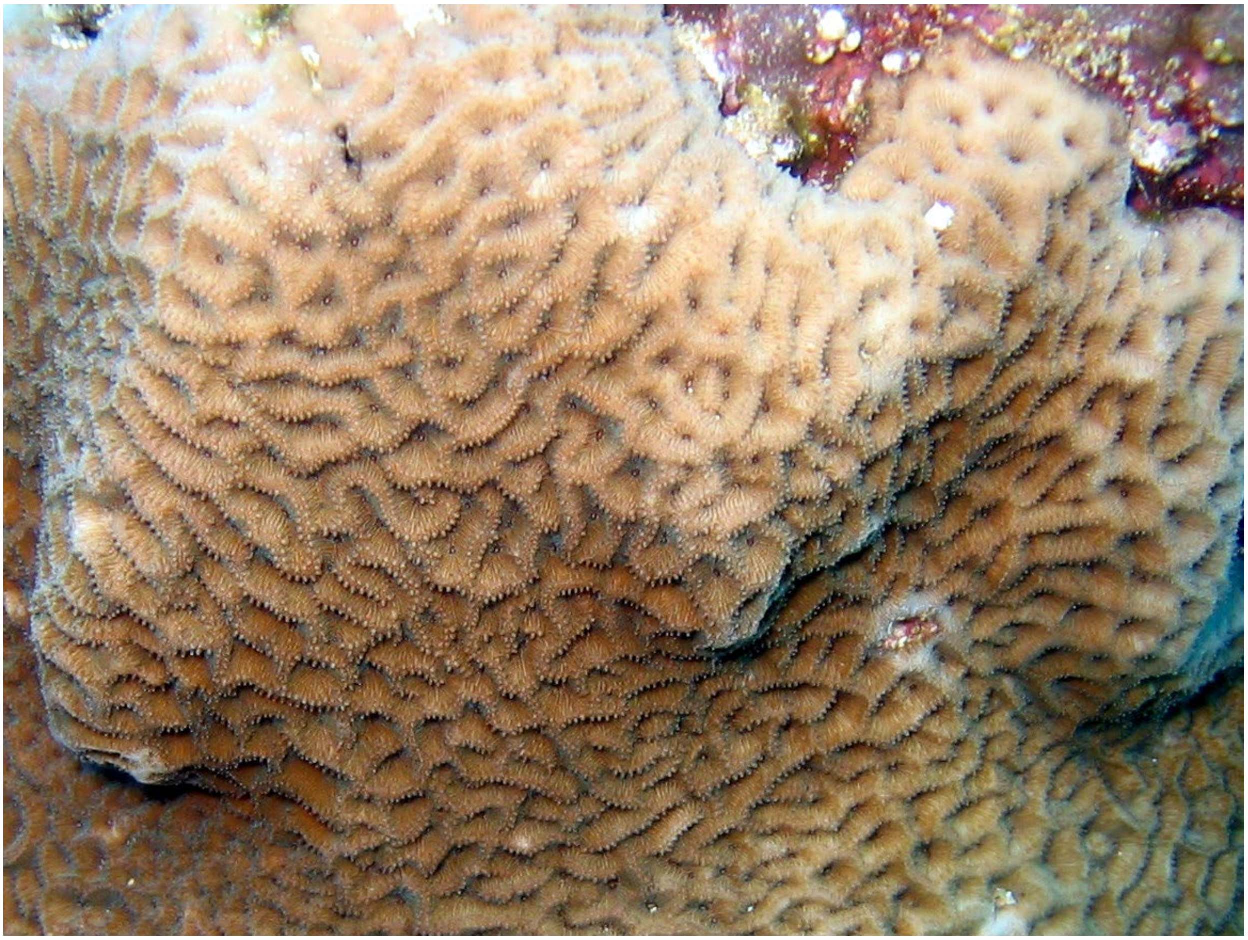
Colonies are massive, columnar, encrusting or plates. Colonies usually have corallites separated by ridges. The size and shape of the ridges vary between species. *Coscinaraea* usually has larger corallites than on *Psammocora*.

Coscinaraea columna

Colonies are massive and have thin ridges (about 2 mm thick) that surround and separate corallites, which are small, only about 5 mm diameter. There are tiny spines on the upper edges of the ridges. All features are uniform. *Coscinaraea exesa* forms columns and has larger, shallower corallites and can be more irregular.



A colony of *Coscinaraea columna*.

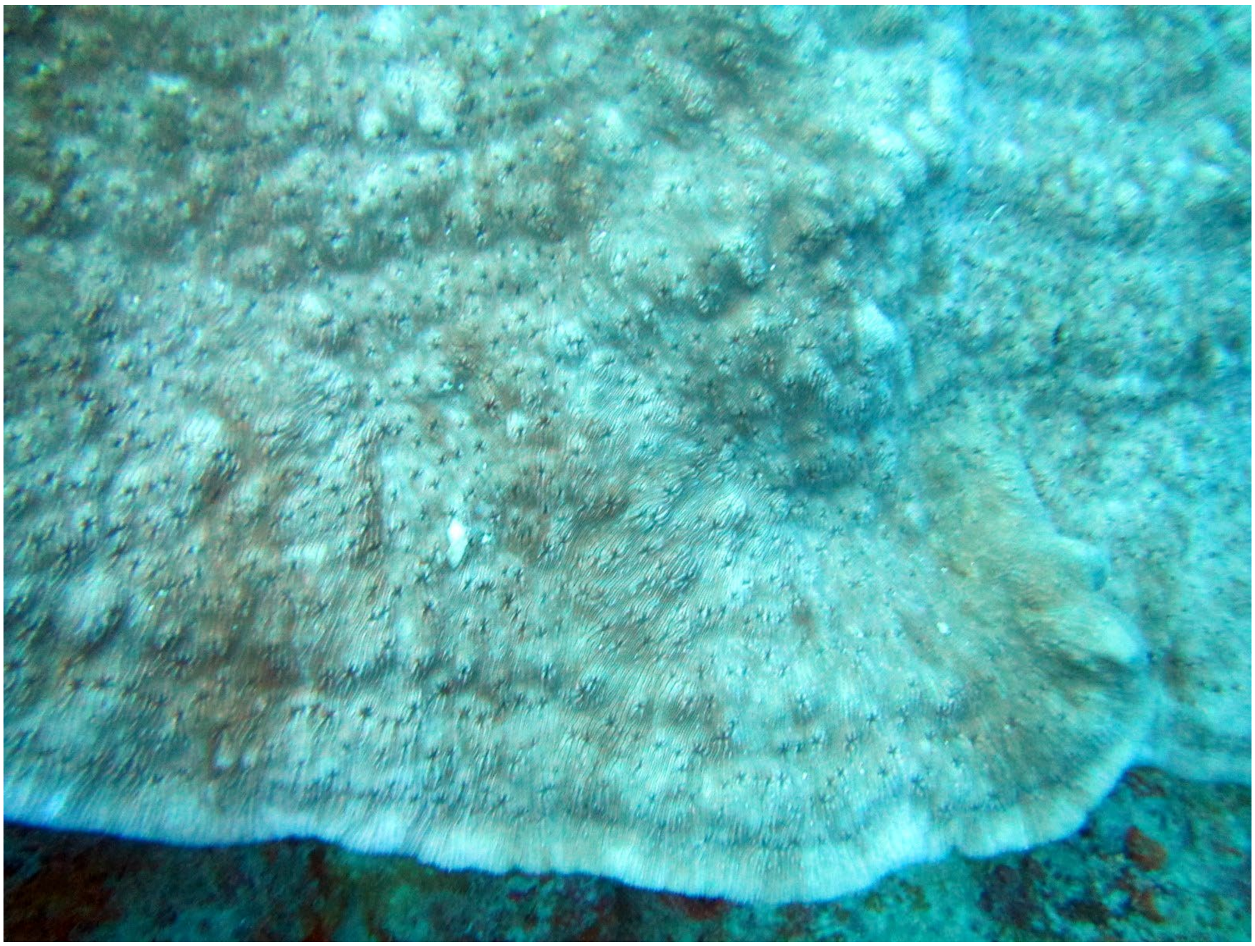


A close-up photo of *Coscinaraea columna*.

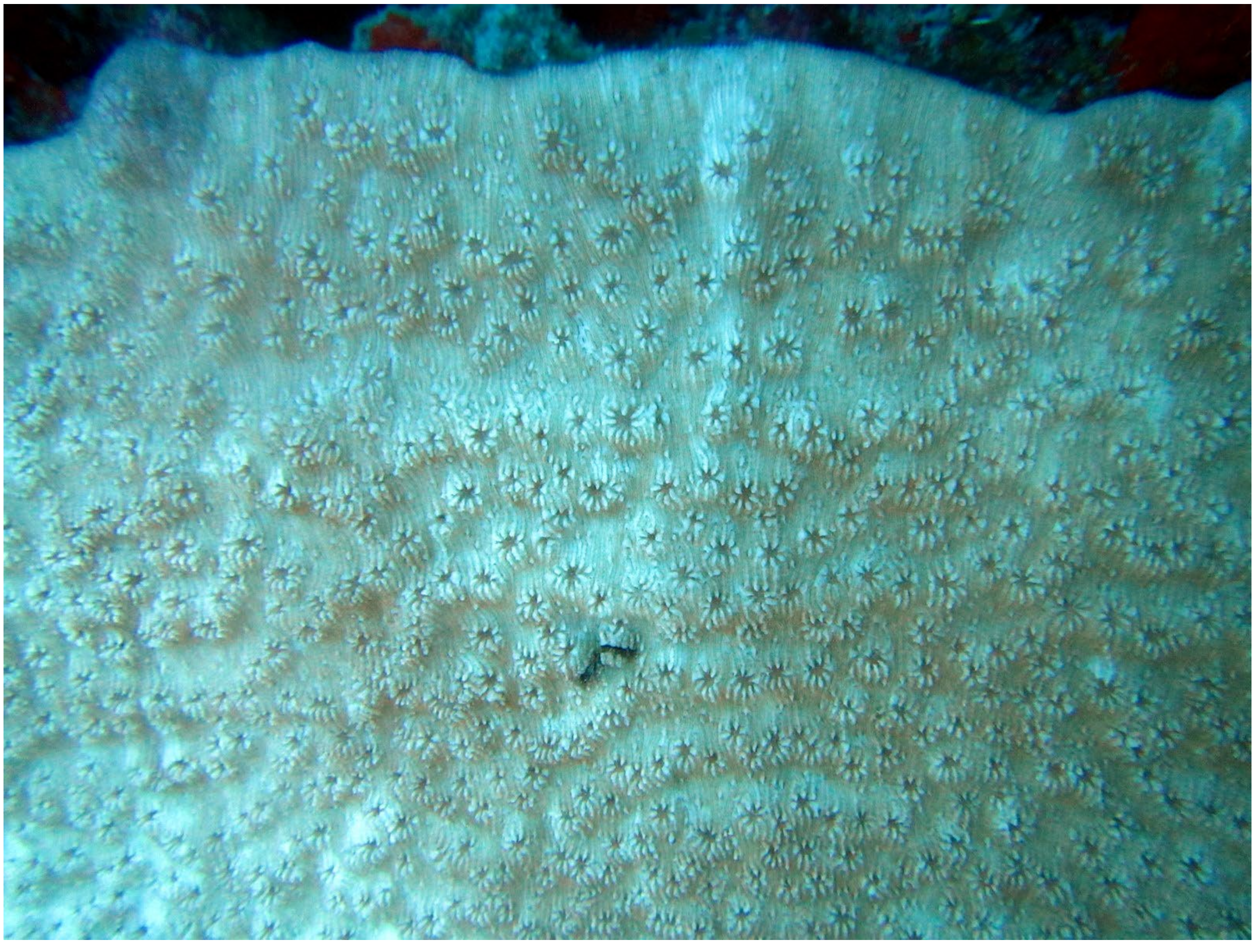
Cycloseris wellsi

This used to be called Coscinaraea wellsi

Colonies are thin plates or encrusting. Tiny costa radiate on the colony towards the edge. Corallites are small raised rings of septa. There are points on the septa between corallites which can range from few to many. *Psammocora explanulata* is similar but does not have the raised ring of septa around corallites, and costa alternate in height. *Podabacia motuporensis* looks somewhat similar, but radiating costae are taller and there aren't raised rings of septa around corallites. Genetics indicats this is in genus *Cycloseris*, which it looks nothing like.



A photo of a colony of *Coscinaraea wellsi*.



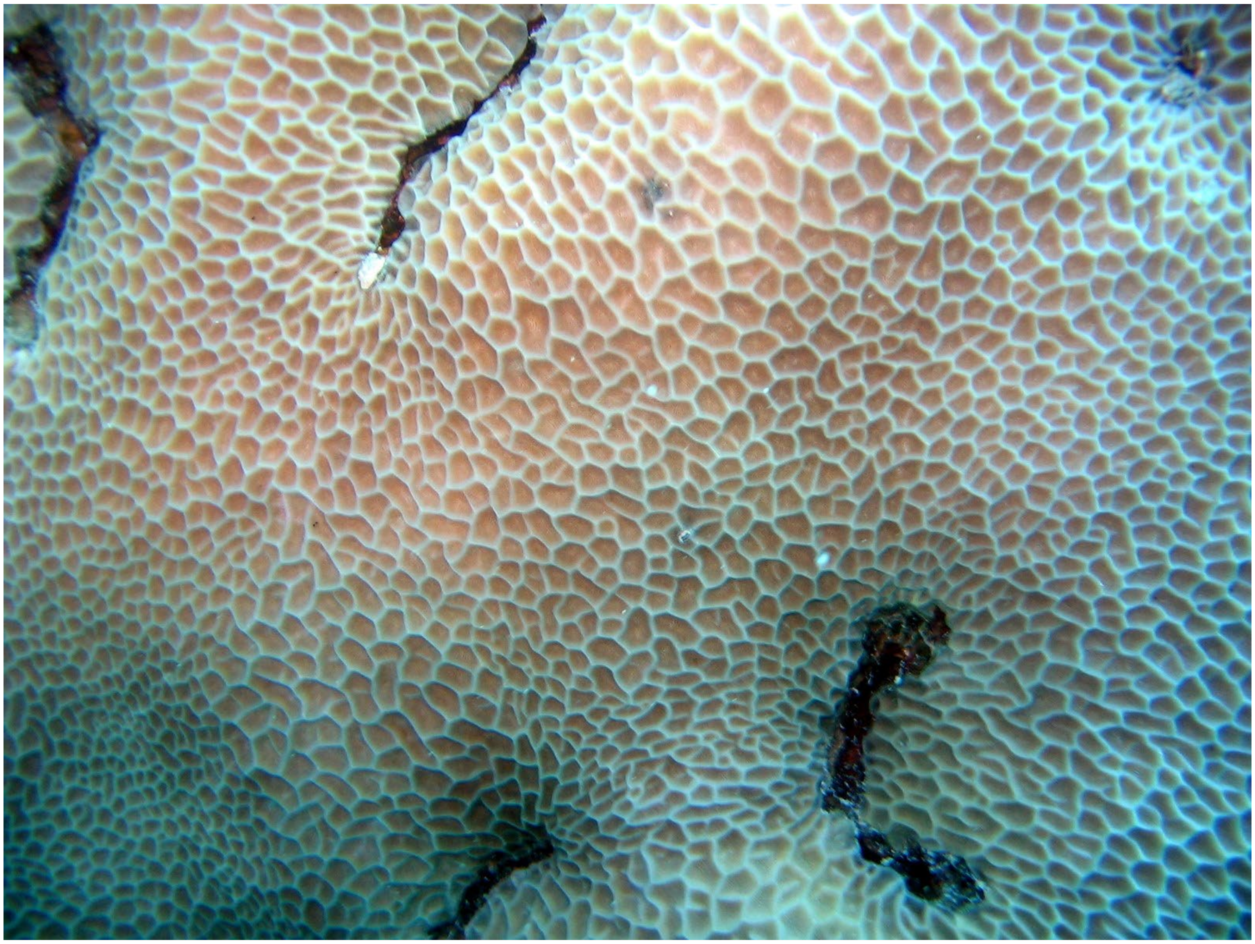
A close-up photo of *Coscinaraea wellsi*.

Gardineroseris

There is only one species in this genus so the properties of the genus are of that species.

Gardineroseris planulata "Honeycomb coral"

Colonies are massive or encrusting. The surface is covered with small deeply excavated corallites that are polygonal. Corallites are up to about 5 mm diameter, but diameters range widely. The ridges between corallites are very thin. The corallites are very smooth, rounded, cups with minute thin septa that are very even in height and close together so they are very hard to see underwater or even in pictures. Colonies look like honeycomb. *Pavona venosa* is similar but some corallites are elongated and it does not form large colonies without division into lumps, and it is usually golden color .



A colony of *Gardineroseris planulata*.

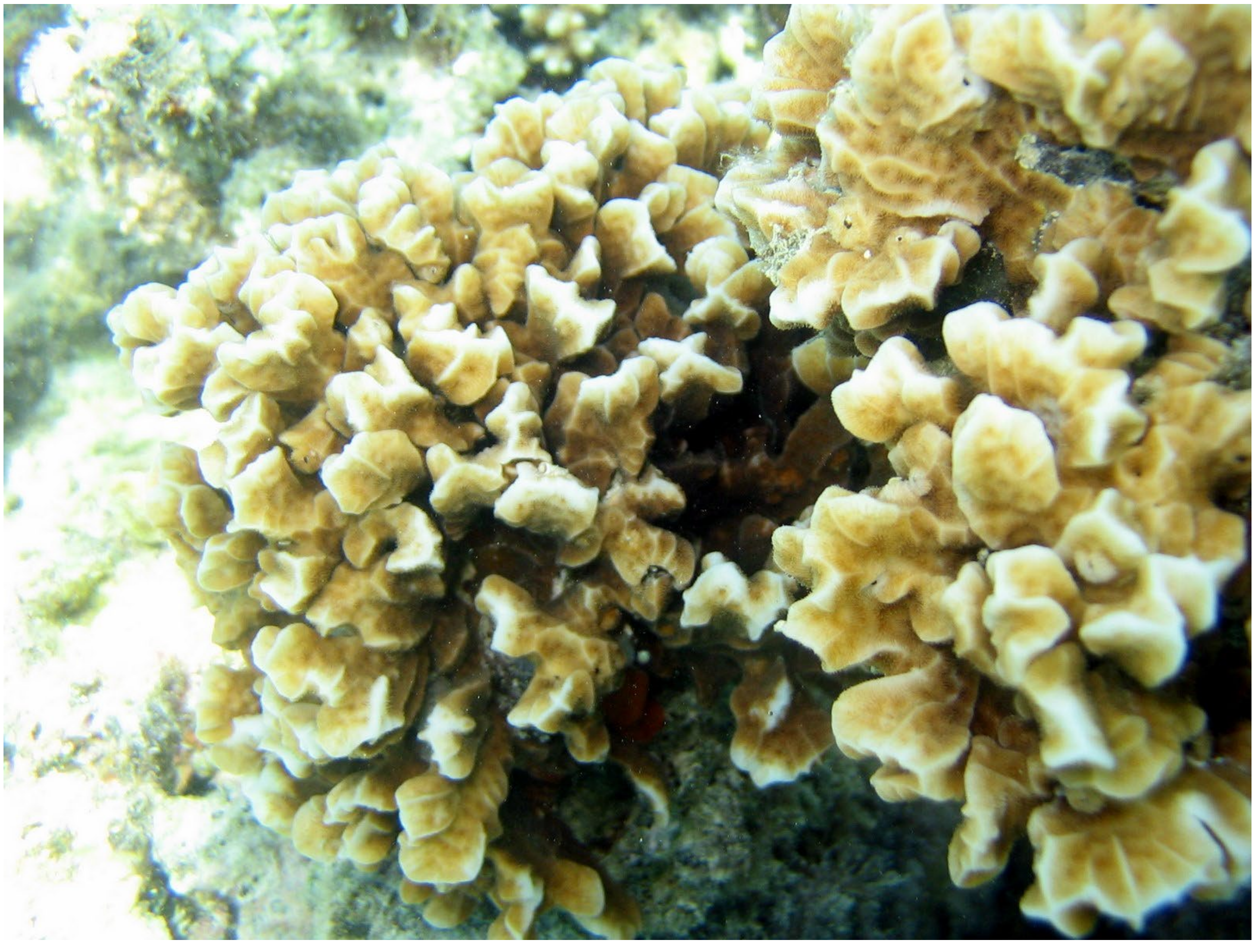
A closer photo of a colony of *Gardineroseris planulata*.

Pavona

Colonies come in a wide variety of shapes, encrusting, plates, massive, branching, and columnar. This genus has septa that continue outside the corallite as costae, across the colony, up the side of a neighboring corallite and down into it as septa, and hence are called "septo-costae." Often that can't all be seen underwater, especially when the corallites are too small. As a result, it is often necessary to learn the species and the species tell you which genus it is in, unfortunately.

Pavona frondifera

Colonies form small vertical plates with many side ridges and/or plates. The resulting colonies look very crinkly. Corallites are on both sides of the plates. The plates are only about 2 cm tall and are almost always a yellow-orange color. This species prefers shallow water and can occur in extended fields. *Pavona decussata* usually has larger plates and and many fewer side plates, and often has tentacles extended.



A colony of *Pavona frondifera*.

A colony of *Pavona frondifera*.

Pavona decussata Vulnerable

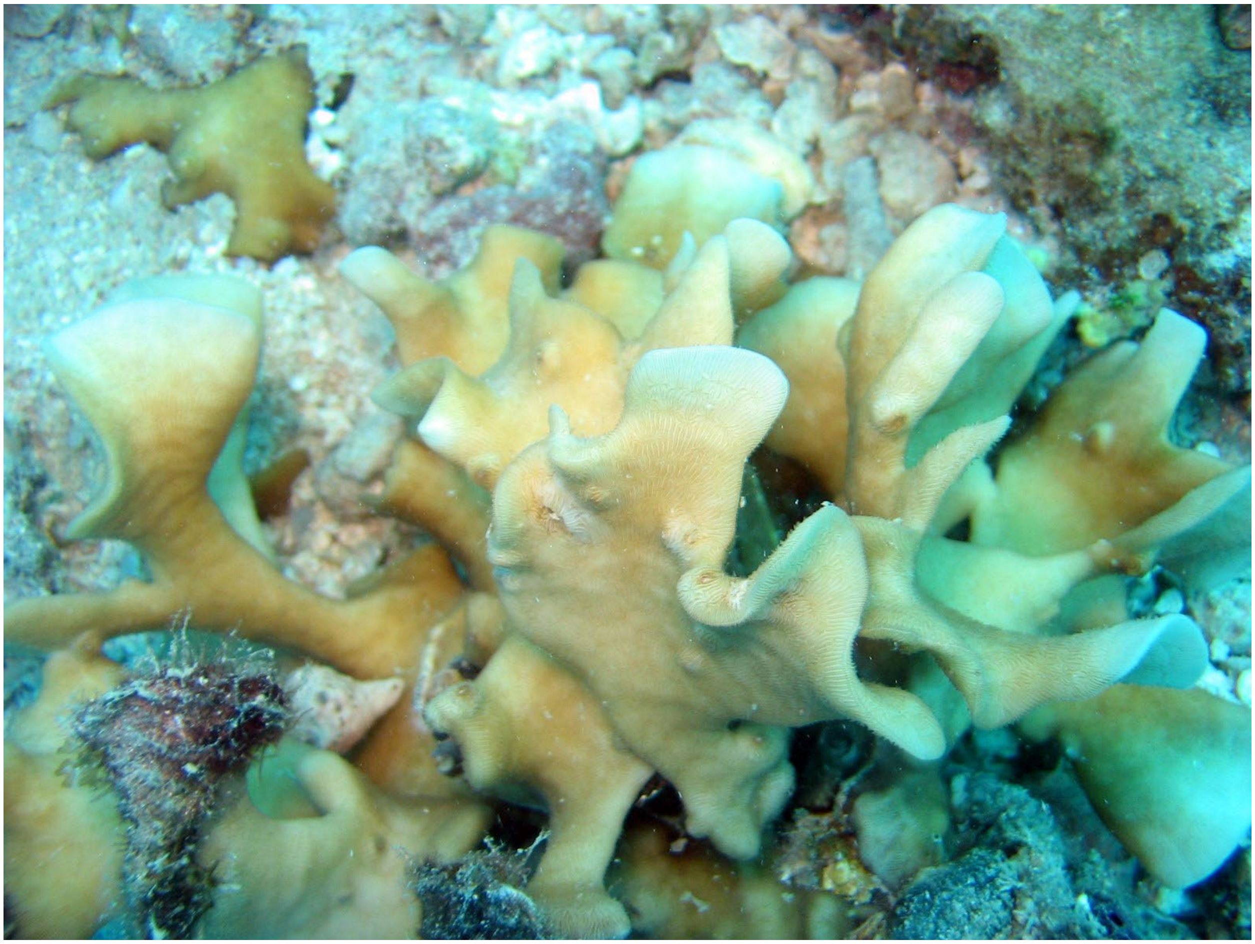
Colonies form vertical plates that can range from one or two centimeters tall to about 15 cm tall. Plates have very few side ridges or plates. Corallites are on both sides of the plates. *Pavona frondifera* always has small plates and many side ridges and plates.

A colony of *Pavona decussata*.

A colony of *Pavona decussata*.

Pavona cactus Vulnerable

Colonies have thin plates or paddles that are often nearly vertical but curve and twist. The paddles can appear completely smooth, or can have slight dimpling. The paddles and plates are about 5-10 cm tall. The corallites and septocostae are minute and very hard to see under water. Corallites and septa are on both sides of the paddles. This species forms paddles instead of connecting plates like *Pavona frondifera* and *Pavona decussata* and has smaller corallites than most other *Pavona*.



Plates or paddles of *Pavona cactus*.

Pavona maldivensis

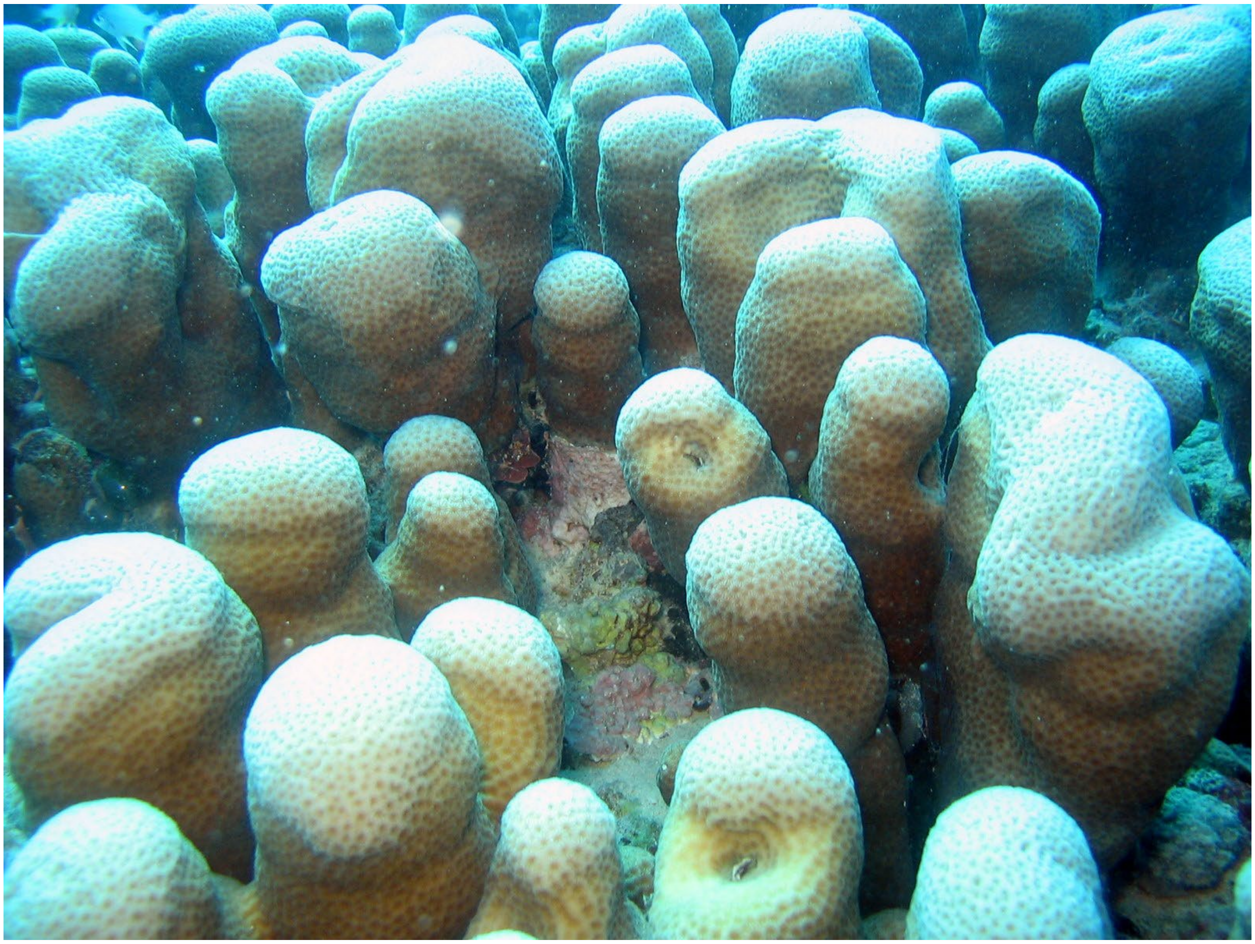
Colonies usually form branching colonies with short stubby rounded branches that are fairly close together. The corallites are tiny (about 2-3 mm diameter), circular and project. A few colonies some places are fluorescent green, a few other colonies are fluorescent copper color. The corallites project unlike on most other *Pavona* species, and other species don't have this shape branches. This species looks like *Cyphastrea* with thick branches, but most *Cyphastrea* is encrusting, and costae are rows of spines that do not connect to other corallites.

A close photo of a branching colony of *Pavona maldivensis*.

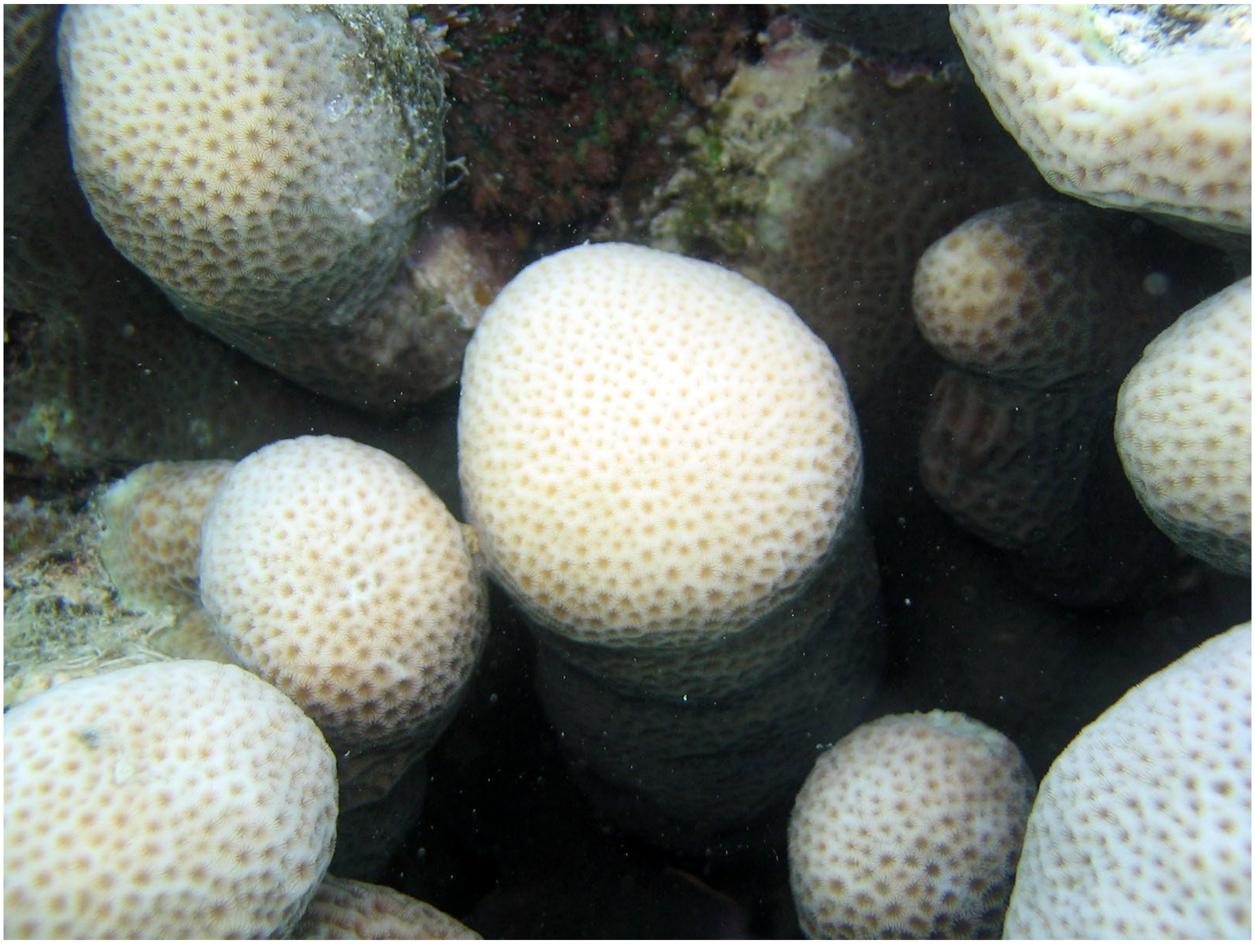
A close-up photo of a lumpy colony with copper color on the rim of corallites.

Pavona clavus

Colonies form clusters of rounded columns which are about wrist diameter and can be several feet tall. Colonies seem to have no maximum size and can be huge, though most are not that large. The corallites are small depressions in the colony surface. *Pavona bipartita* has almost identical corallites but colonies are irregular rounded lumps and there may be a few rounded low ridges running between corallites.



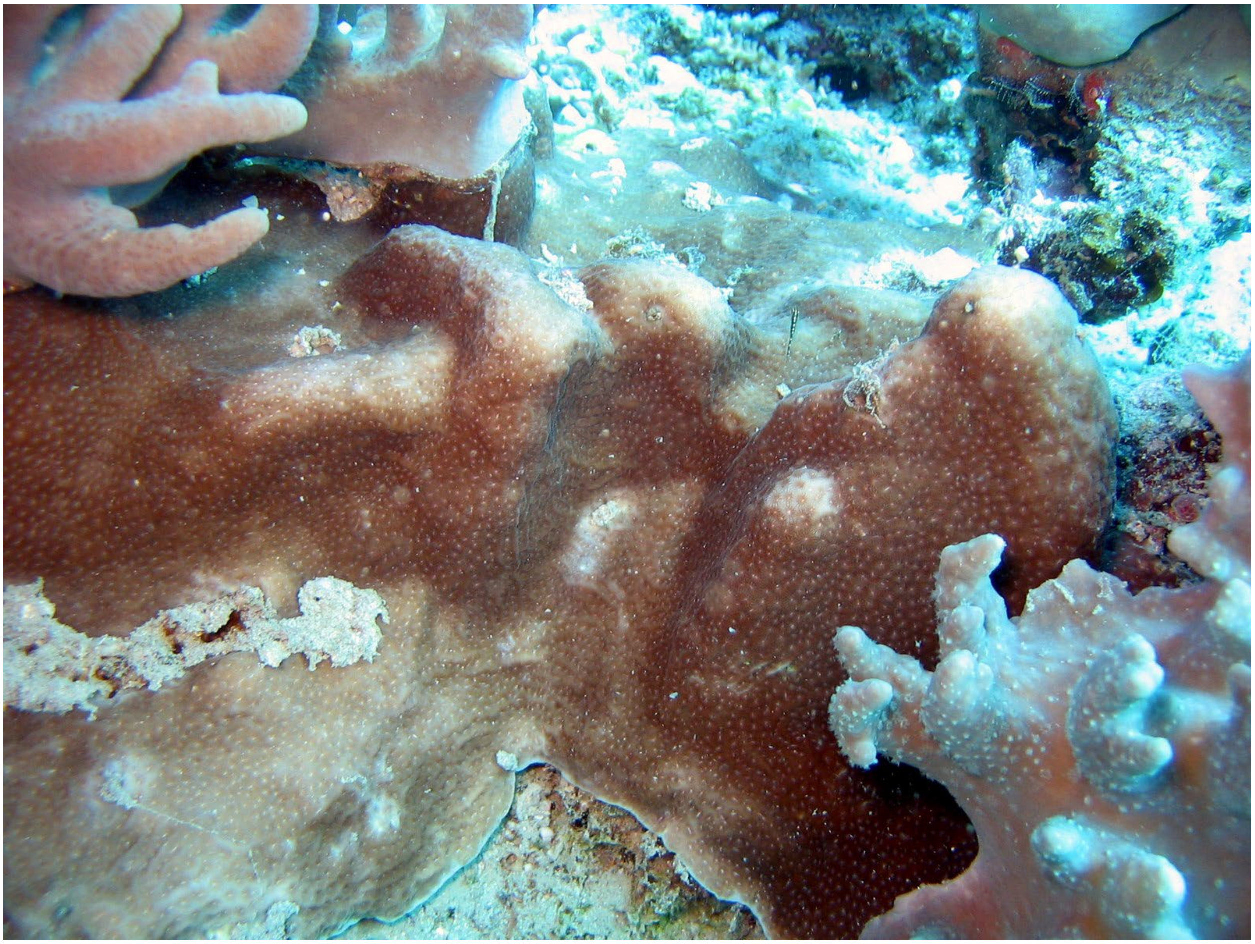
Pavona clavus columns.



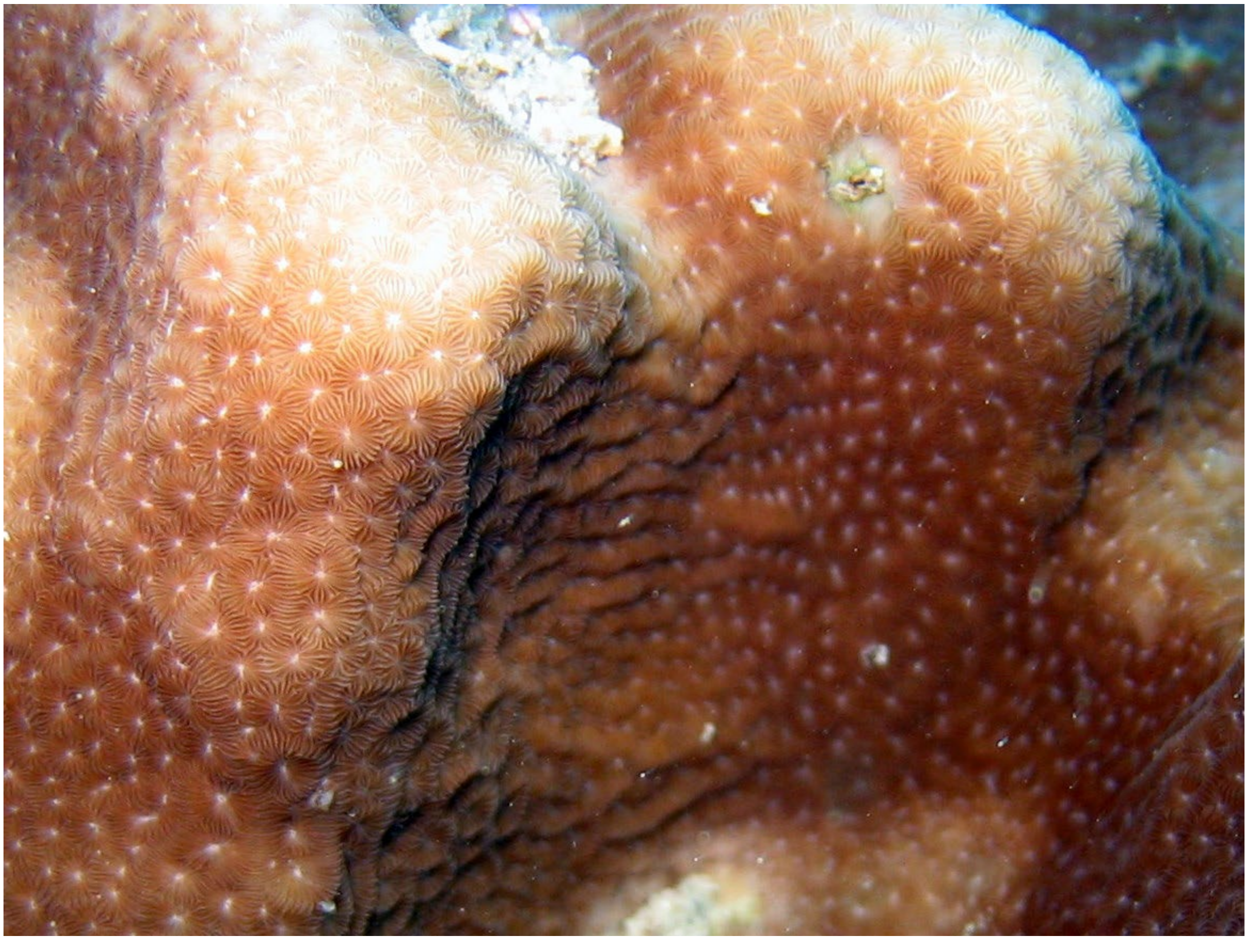
A closer photo of *Pavona clavus*.

Pavona bipartita Vulnerable

Colonies are lumpy and often brown. Corallites are small depressions in the colony surface. There are often slightly raised rounded ridges that run some places between corallites. The corallites are nearly identical to those on *Pavona clavus*, but colonies do not form rounded, smooth, uniform tall columns. Also the surface can have a few low rounded ridges between corallites.



A colony of *Pavona bipartita*.

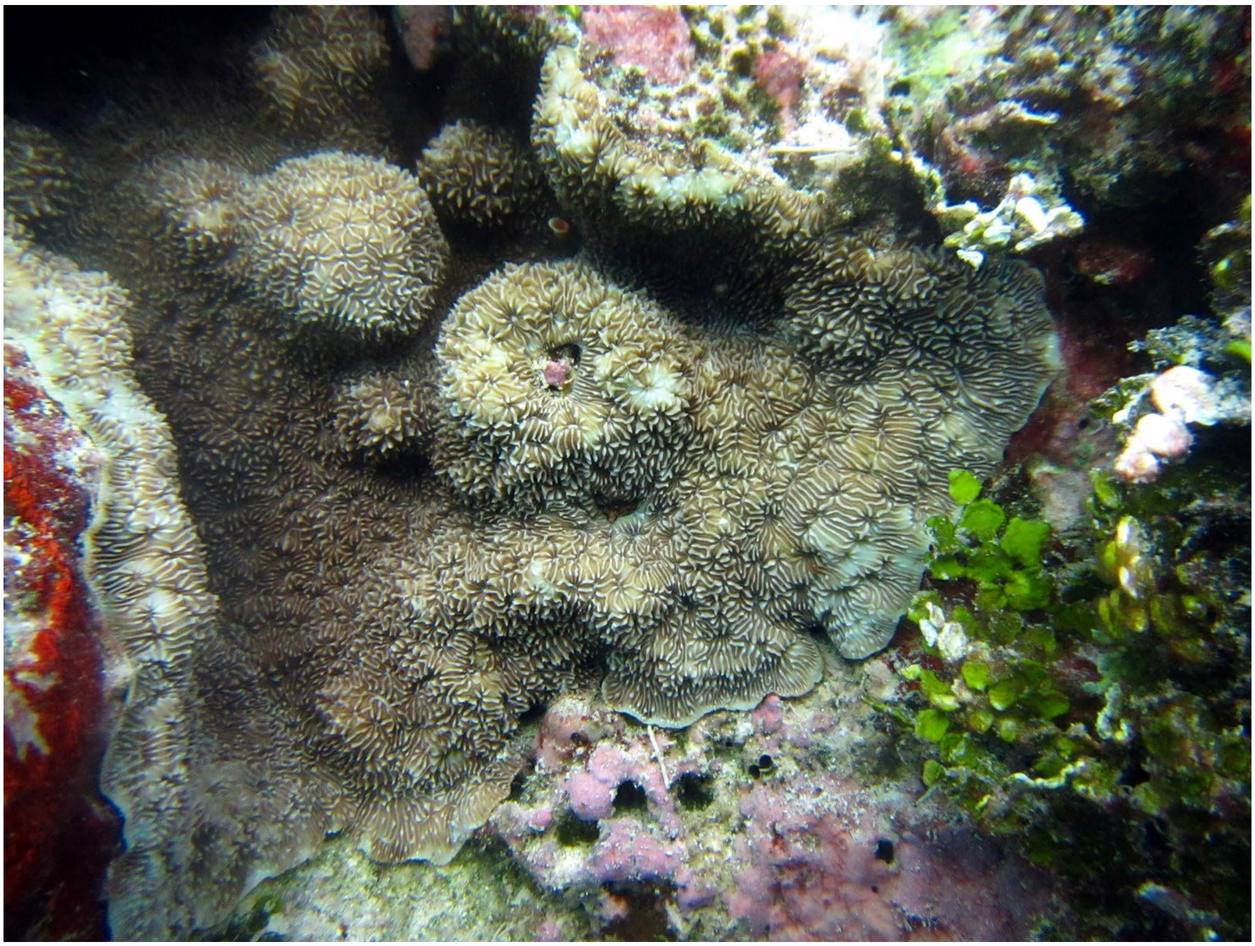


A close-up photo of *Pavona bipartita*.

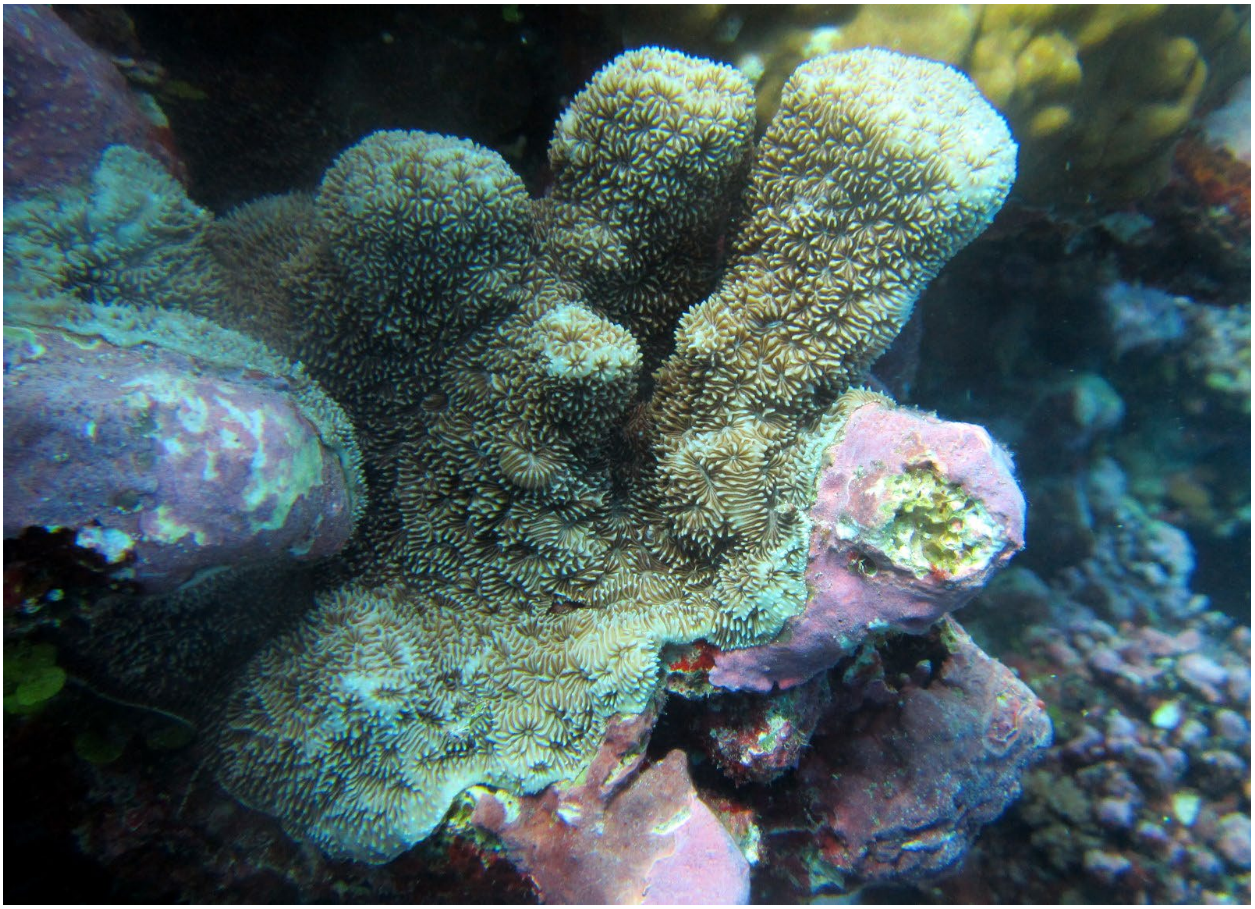
Pavona cf. *diffluens*

The Red Sea species is listed as Vulnerable

Colonies can be small lumpy or encrusting colonies, larger colonies usually form laterally flattened lobes, and the largest colonies resemble *Pavona duerdeni* closely in colony shape, though the author has not yet seen any large colonies in Fiji. Corallites are larger than on *Pavona duerdeni*, and have a large deep center. Septa are large enough to be fairly easily seen. The type location of *Pavona diffluens* is the Red Sea, and Richard Randall was first to find what appeared to be that species in Guam and the Marianas and then American Samoa. It is not known in most of the Indian Ocean. They appear to be morphologically at least very similar, but at huge distances apart while not known in between suggesting they may be separate species at least genetically.



An small encrusting and lumpy colony of *Pavona* cf. *diffluens*.

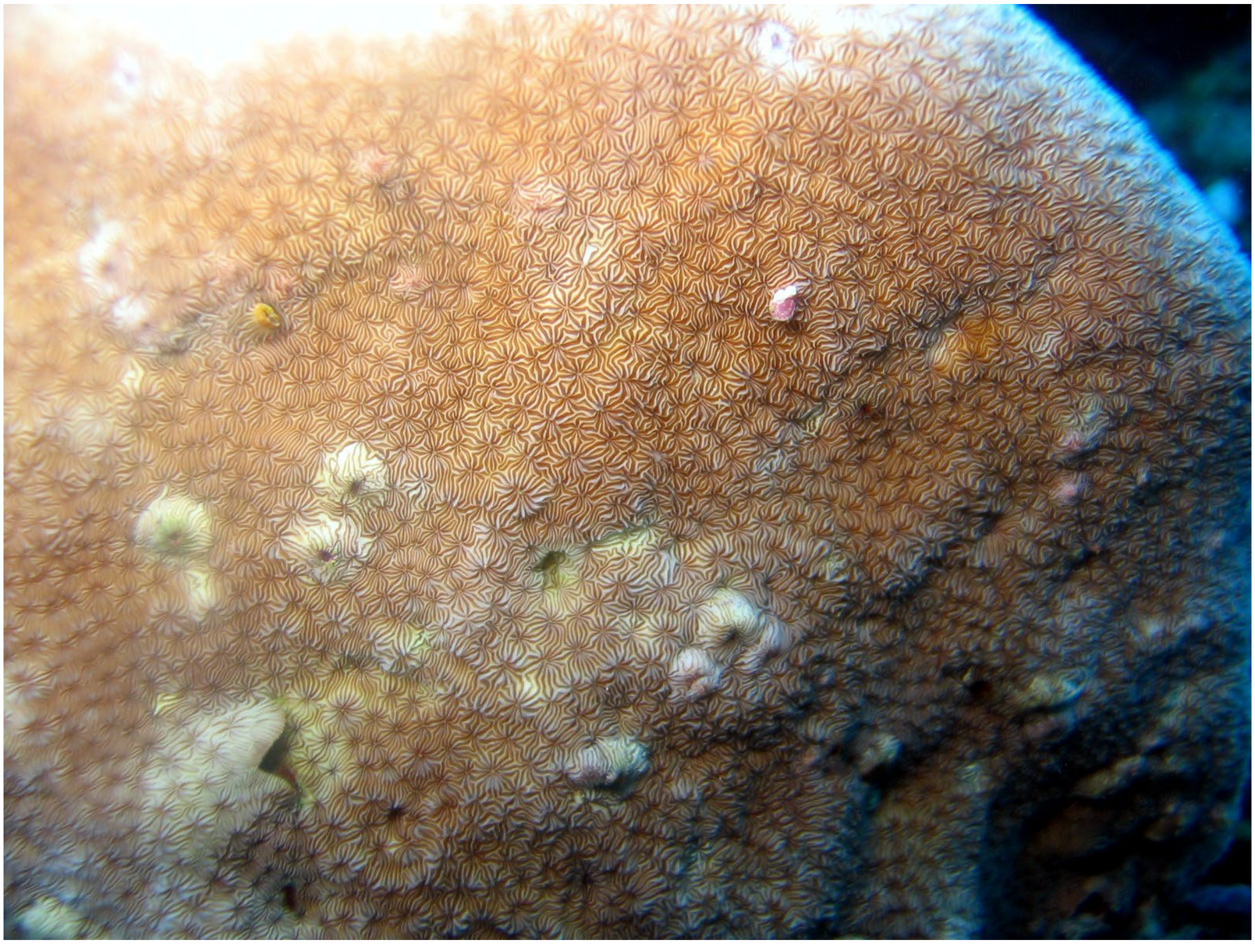


A closer photo of a small colony of *Pavona* cf. *diffluens*.

Pavona duerdeni

Colonies usually form thick, flat vertical walls or discs, sometimes several connected to each other. Colonies can be up to about a half meter tall and wide and vertical walls can be up to at least 5 cm thick. Small colonies and parts of larger colonies can be rounded lumps. The corallites are tiny, raised little if any, and hard to see. The corallites are slightly larger than on *Pavona minuta*, and the colonies are massive vertical thick plates instead of incrusting with thin plate lower edges like *Pavona minuta*. Corallites are raised more on *Pavona maldivensis* and larger on *Pavona* cf. *diffluens*.

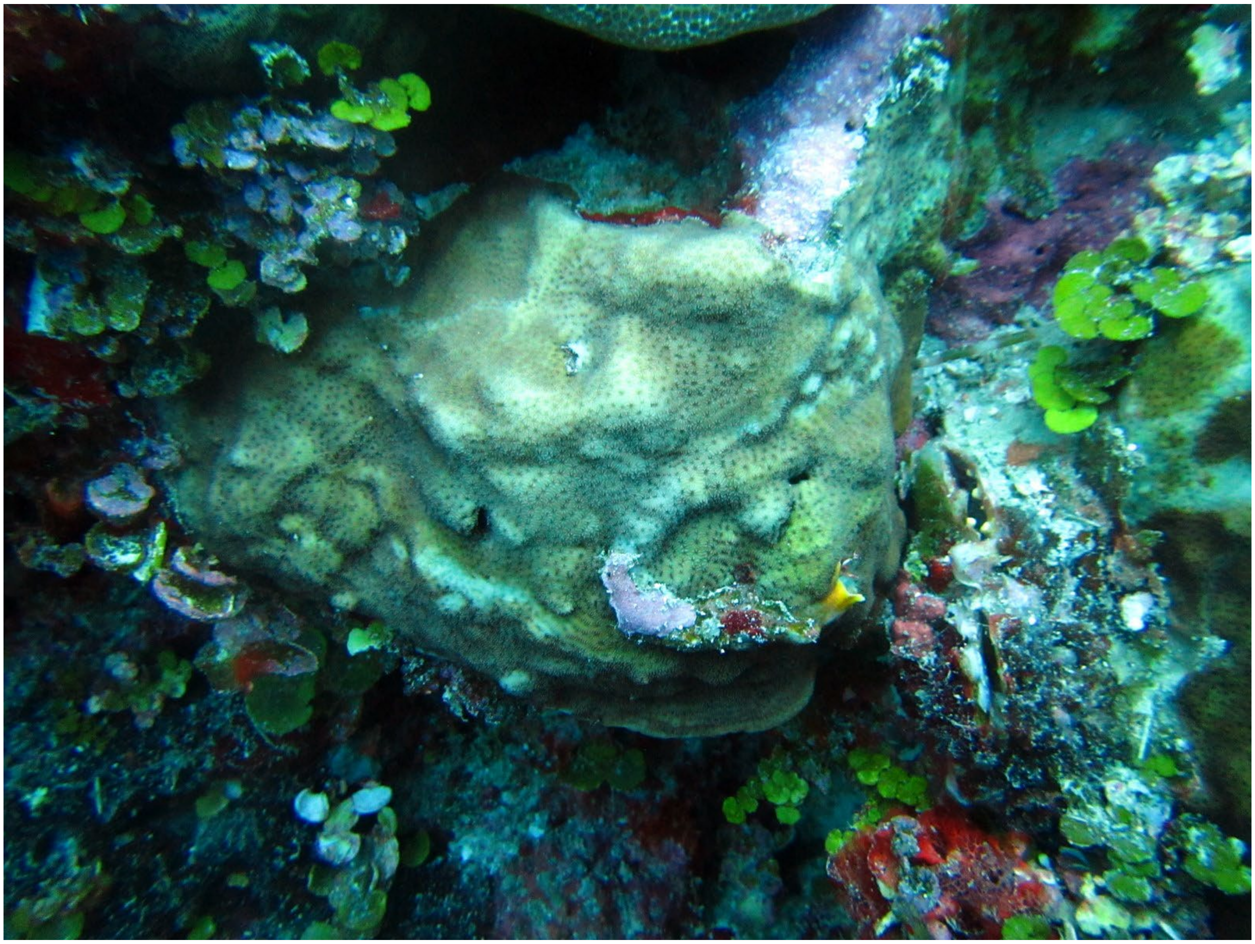
A vertical plate of *Pavona duerdeni*. White spots are barnacles.



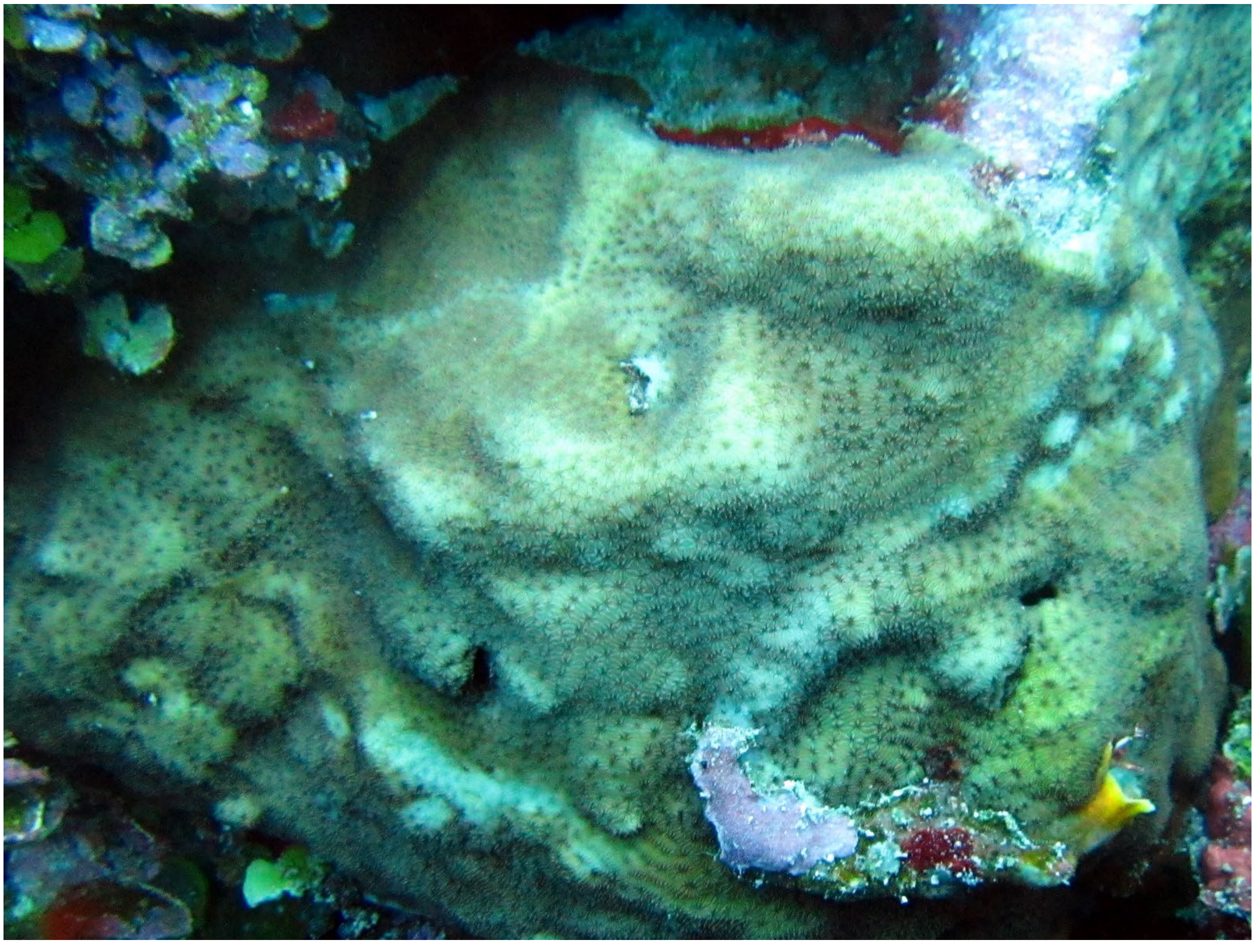
A close-up photo of *Pavona duerdeni*.

Pavona minuta

Large colonies form encrusting sheets on near vertical surfaces, often with small, thin, plate lower edges. Rarely, small colonies can form elsewhere and appear massive, though they may be encrusting. The corallites are the smallest of *Pavona*, smaller than *Pavona duerdeni*.



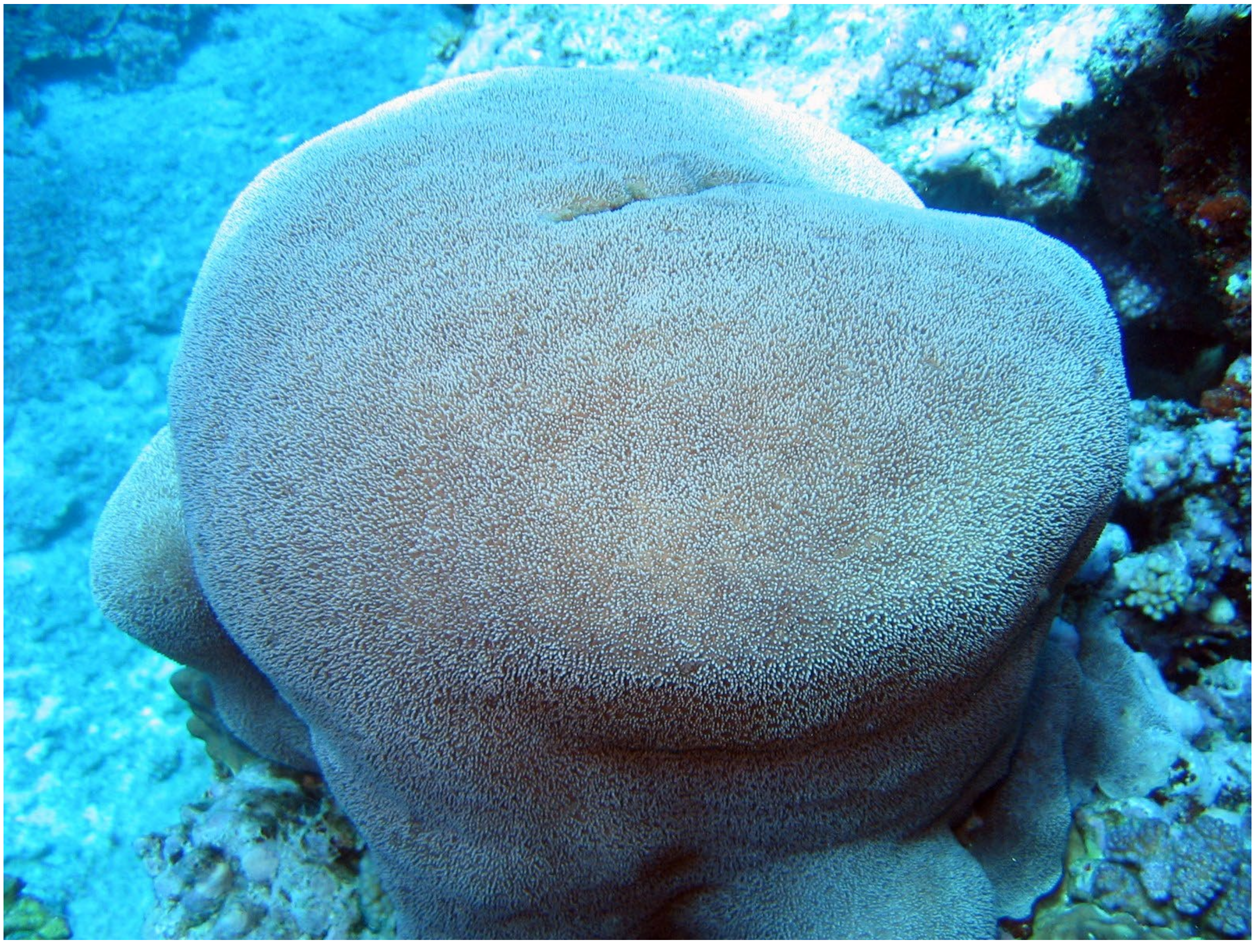
A small colony of *Pavona minuta*.



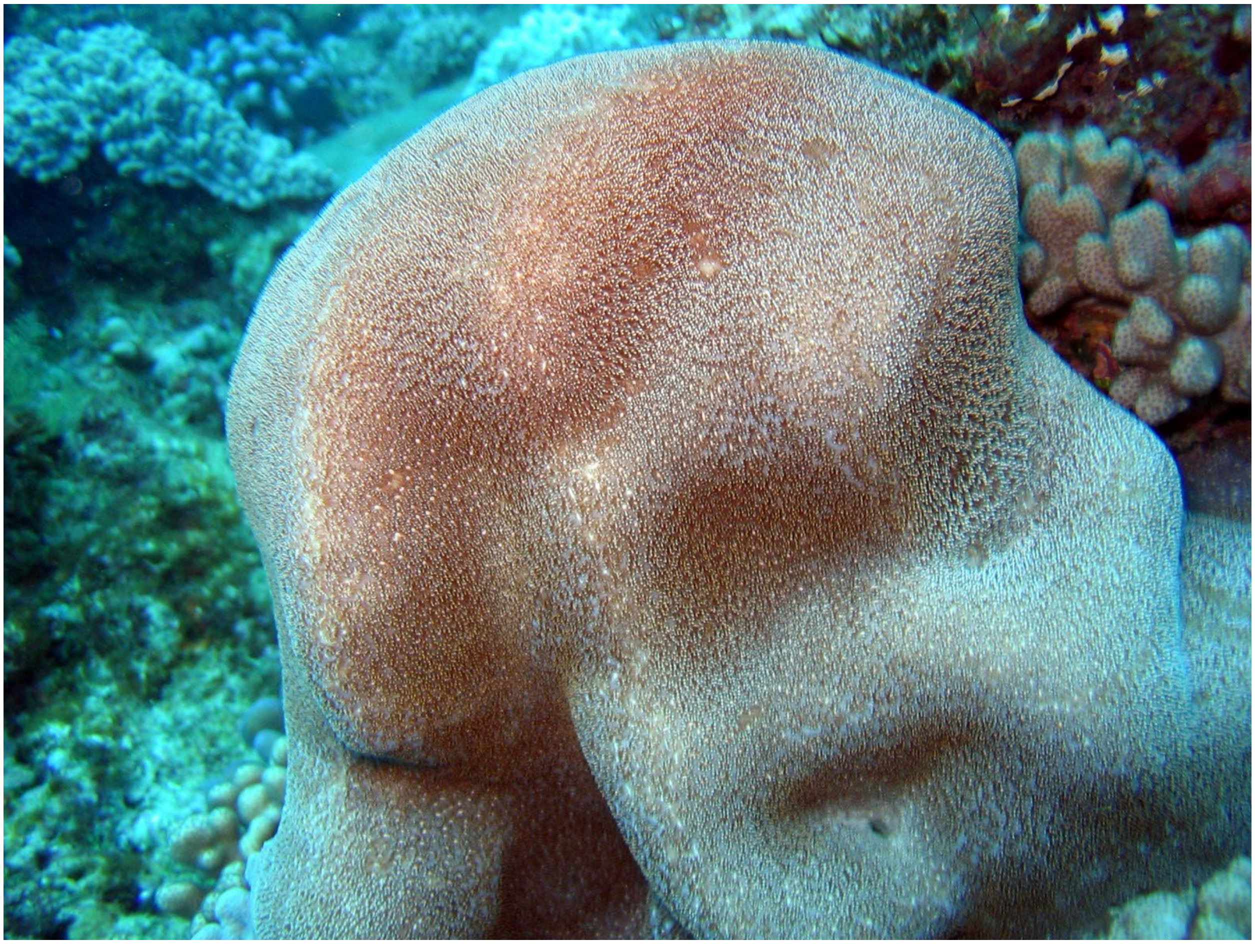
A close-up photo of *Pavona minuta*, showing the tiny, flush corallites.

Pavona gigantea

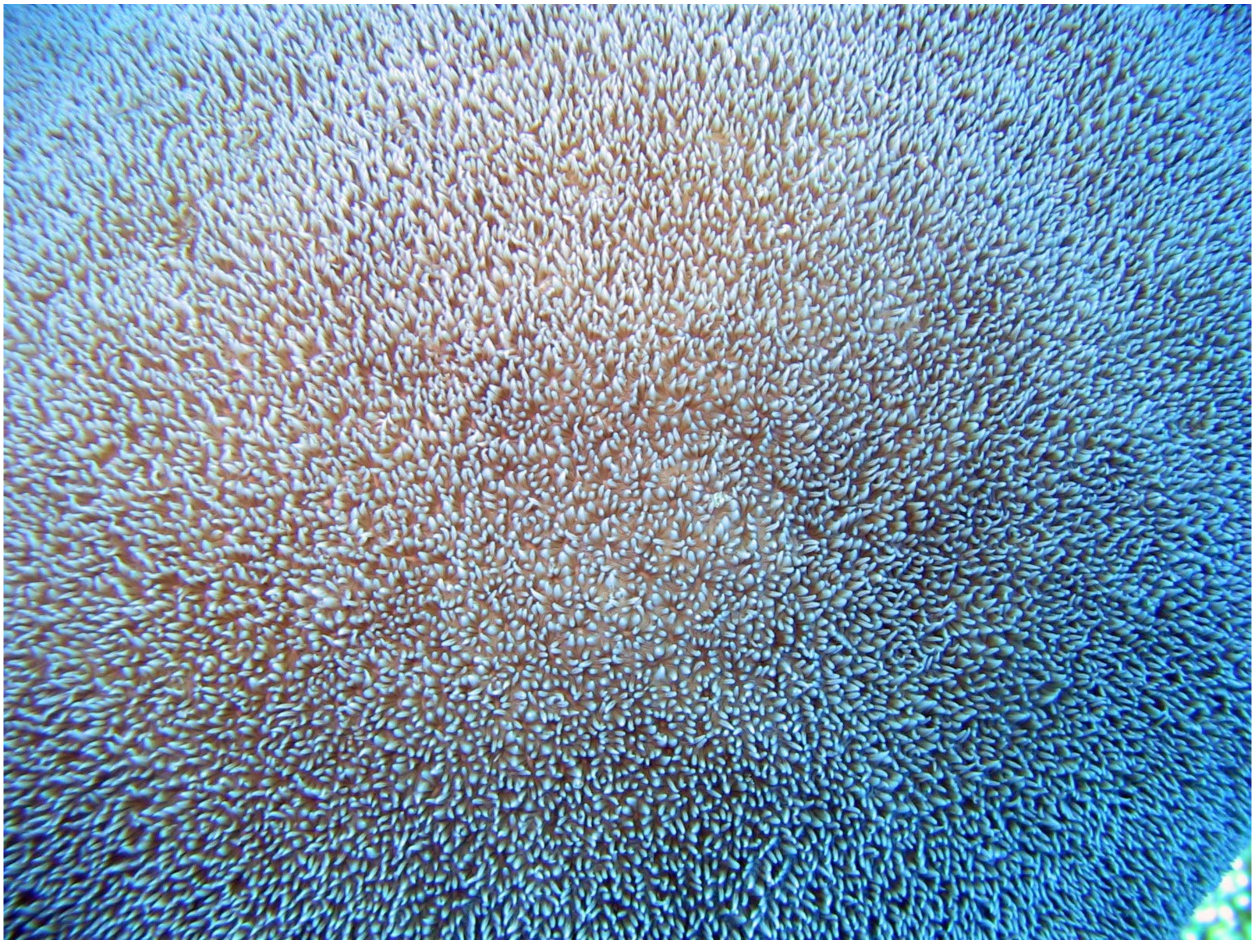
Colonies are massive, and can be clumps of columns. Tiny tentacles cover the surface, particularly on the tops of colonies. Corallites may be visible on the sides of colonies, and are similar to *Pavona explanulata*, which is encrusting or a plate.



A colony of *Pavona gigantea*.



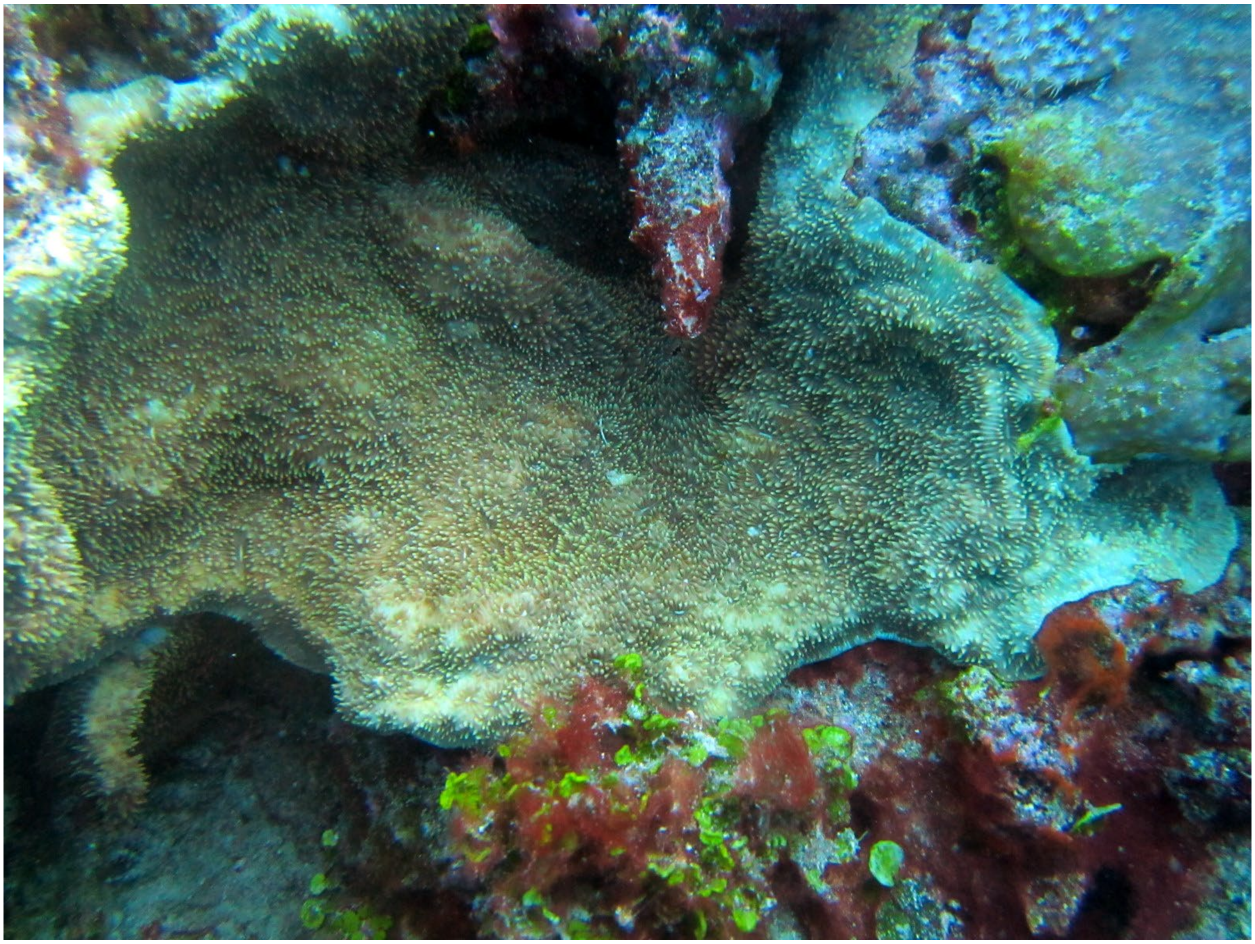
A colony of *Pavona gigantea* with corallites more visible among the tentacles.



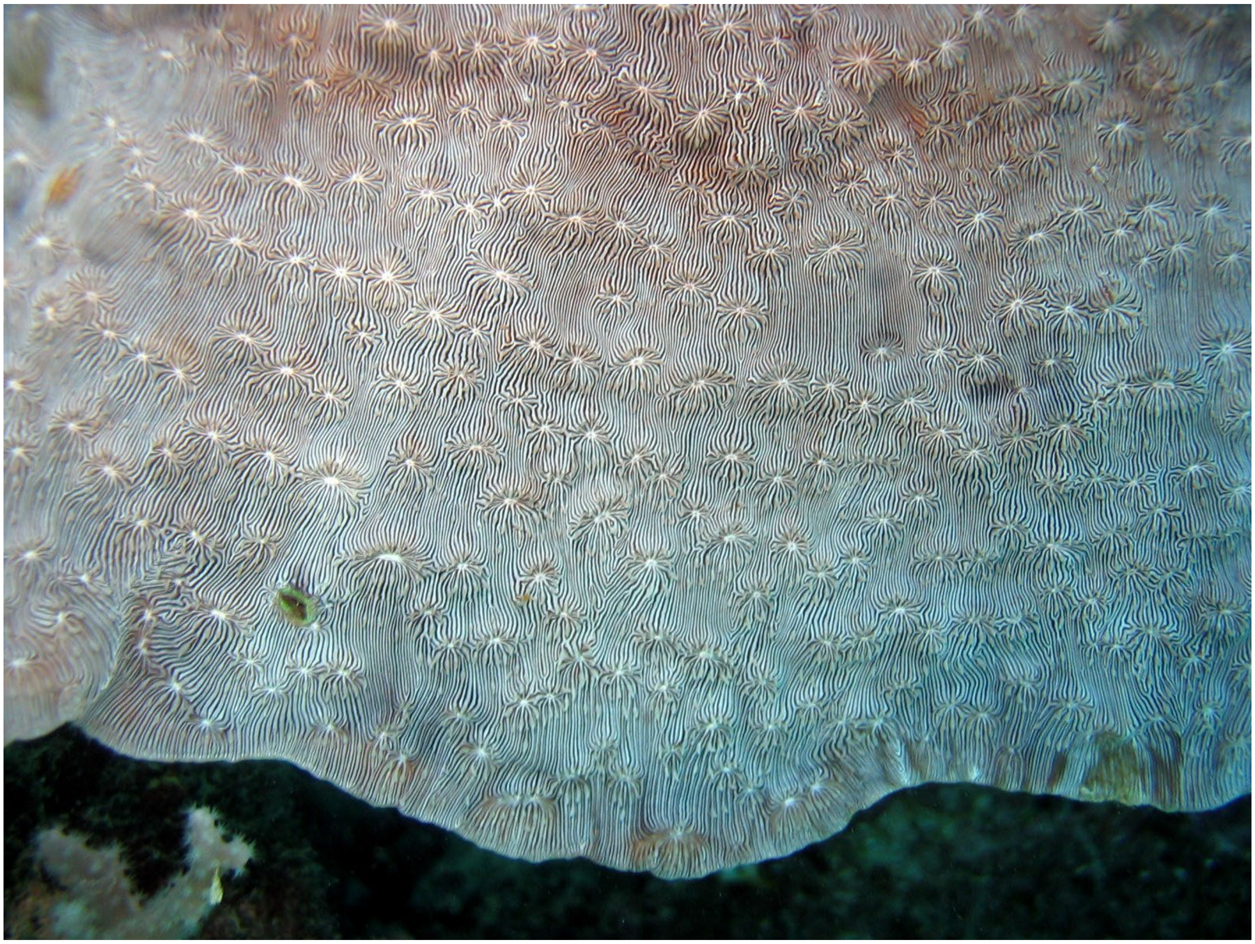
A close-up photo of tentacles on the top of a colony of *Pavona gigantea*. Rings of tentacles are polyps.

Pavona explanulata

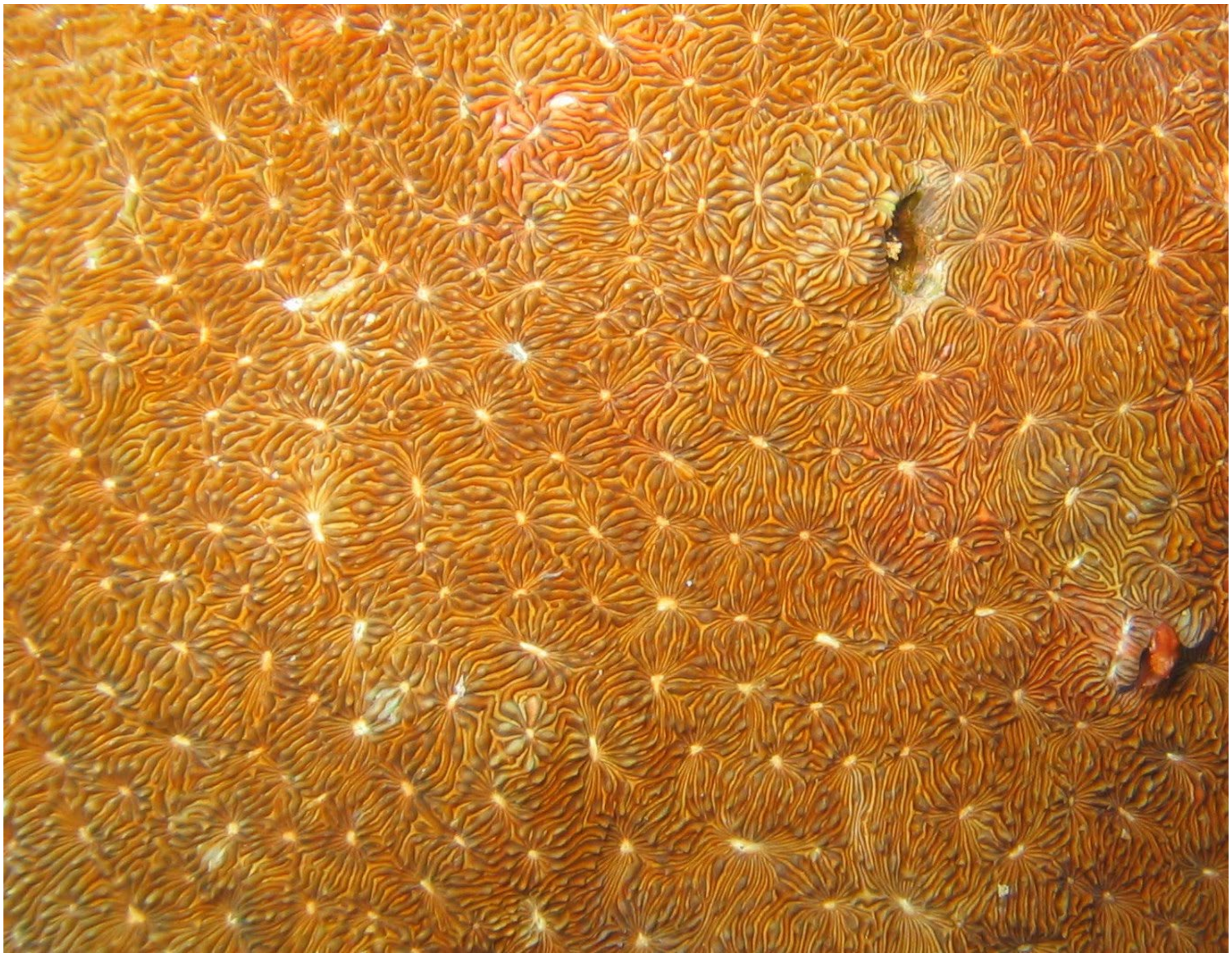
Colonies are encrusting or thin plates near the substrate. Corallites may be visible as rings of little points or tentacles. The centers of corallites are very shallow. *Pavona gigantea* has similar coallites but is massive and has tentacles extended obscuring the surface.



A small colony of *Pavona explanulata* with tentacles extended.



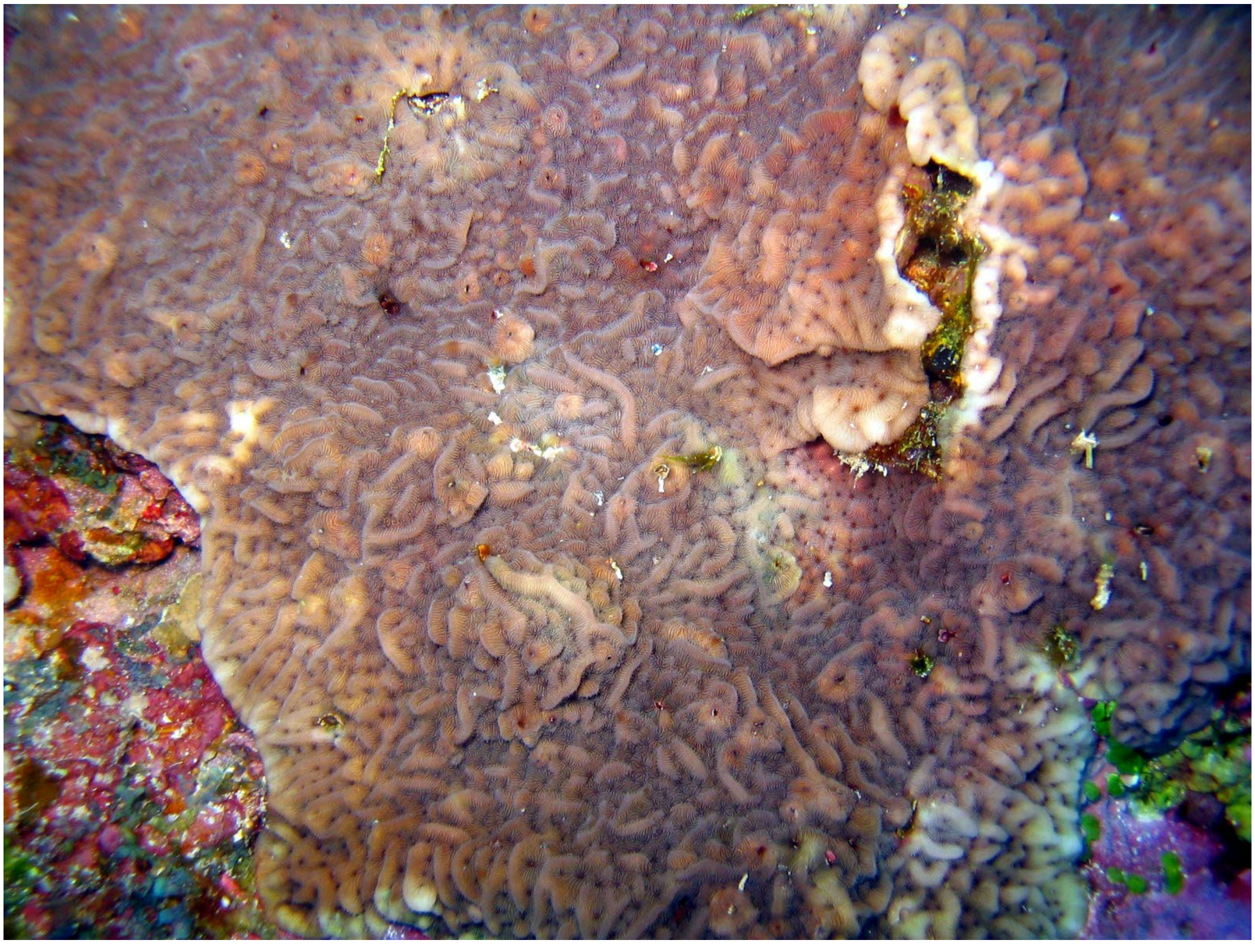
A plate of *Pavona explanulata* with the tentacles withdrawn.



A close-up photo of a *Pavona explanulata* colony.

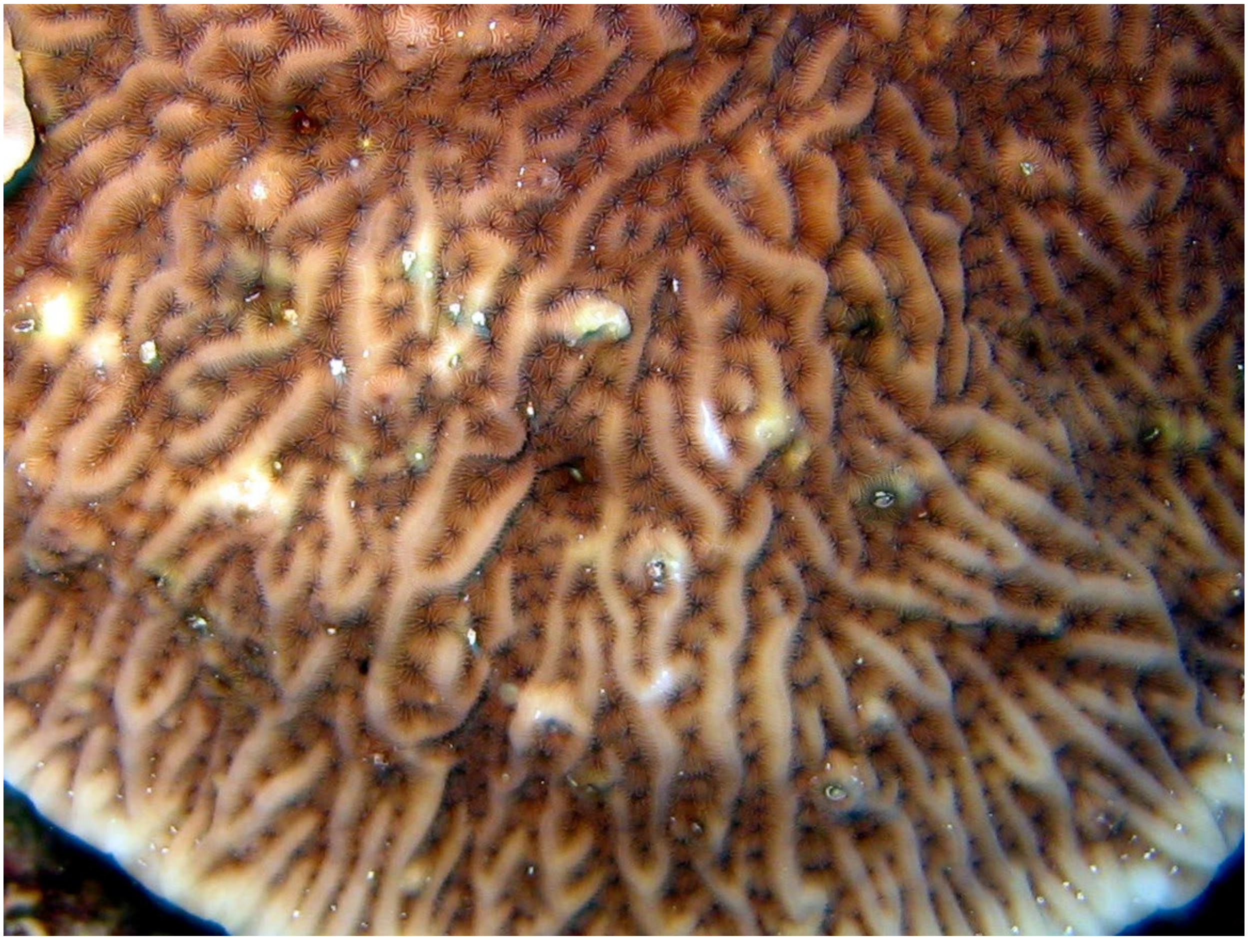
Pavona varians

Colonies are encrusting or plates. Surfaces are covered with small winding ridges. The ridges do not extend far enough for it to be called “brain coral”. Ridges are a bit better defined than on *Psammocora nierstraszi*, are often longer and may connect, and in sharp close-up photos tiny septa and sometimes corallites can be seen. Colonies are usually brown.



A colony of *Pavona varians*.

A plate colony of *Pavona varians*.



A closer photo of *Pavona varians*, showing the corallite centers between the ridges.

Pavona chiriquiensis

Colonies are encrusting. Colony surfaces have bumps which range from circular to oval to elongated. Sometimes polyp tentacles are white. All details are the same as *Pavona varians* except that the ridges are divided into short segments that are bumps.

A photo of *Pavona chiriquiensis*.

A colony of *Pavona chiriquiensis*.

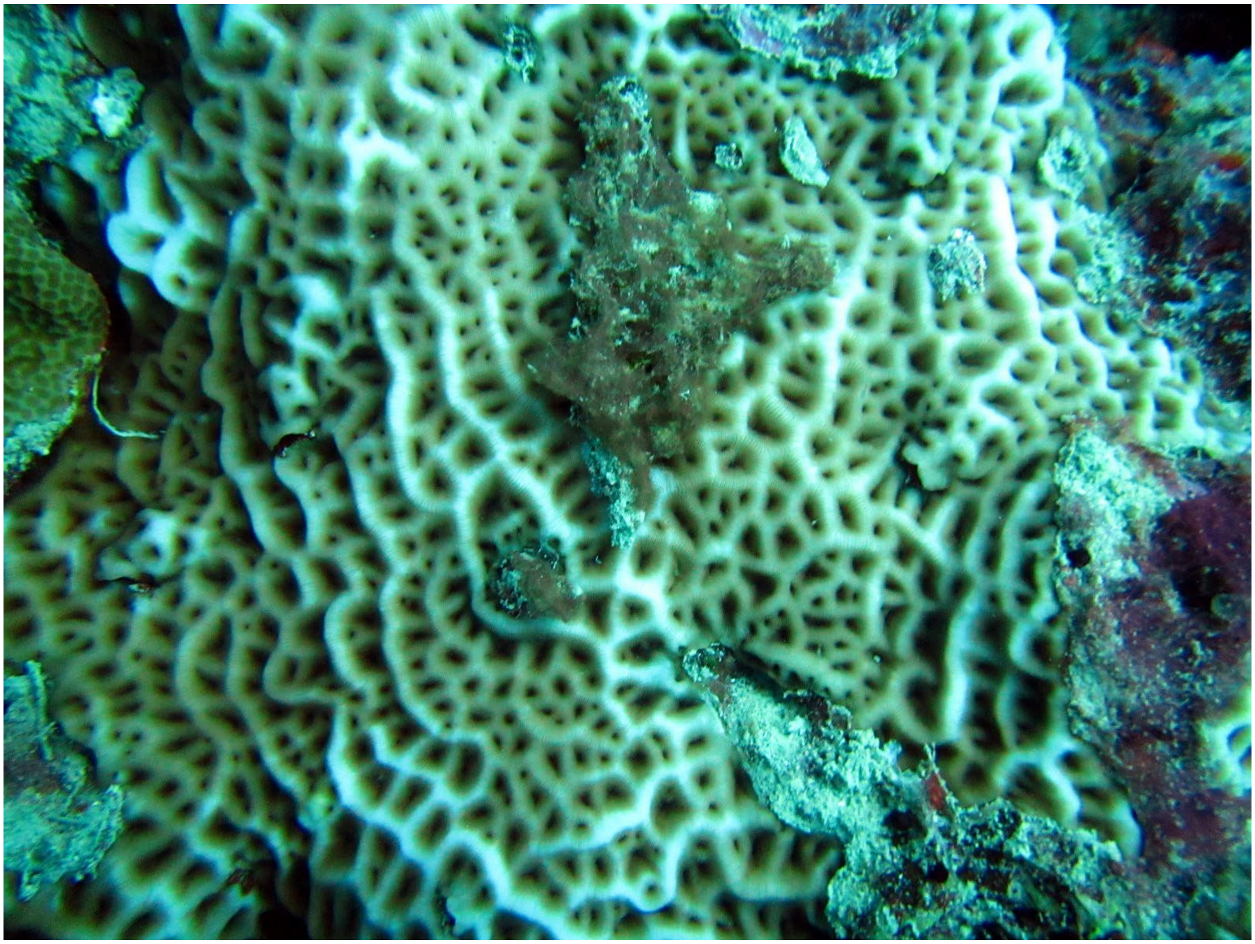
Leptoseris

Colonies are thin plates or encrusting. Some plating species are divided into fronds a bit like palm leaves. Colonies are found most often in lower light conditions such as under overhangs or in deeper water. Some species have corallites raised as cushions, often inclined towards the outer edge of the plate. *Leptoseris* is like *Pavona*, except that *Pavona* is often massive or branching while *Leptoseris* forms thin plates, fronds, and encrusting colonies. Corallites on Leptoseris often form raised rounded mounds but do not do that on *Pavona*. The fine features that distinguish the genus are generally not visible underwater.

Leptoseris mycetoseroides

Colonies are encrusting and are covered with ridges of different heights that go in near random directions and intersect, enclosing corallites between them. *Leptoseris yabei* forms plates and has similar ridges which are divided into concentric ridges and radiating ridges. The ridges are smooth and rounded at the top and don't have any spines, unlike on *Coscinaraea columna*, and corallites are larger, plus *Coscinaraea columna* is massive while *Leptoseris mycetoseroides* is encrusting.

A photo of a colony of *Leptoseris mycetoseroides*.



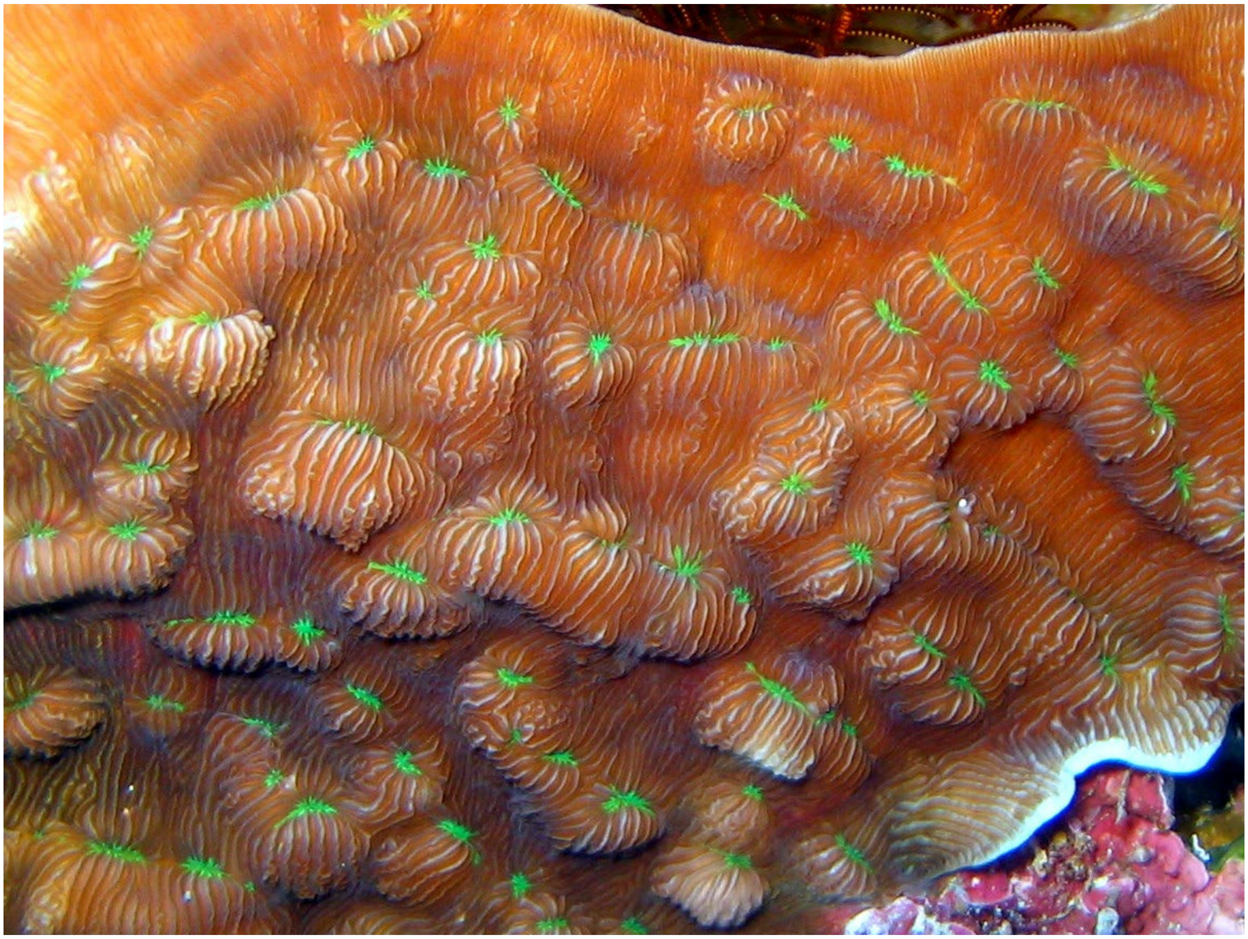
A colony of *Leptoseris mycetoseroides*.

Leptoseris explanata

Colonies are foliose with thin plates raised above the substrate. Sometimes they are divided into fronds. Corallites are raised and inclined towards the outer margin of the plate. There are two different sizes of septa, tall and short, which alternate. Septocostae are so tiny they are hard to see underwater. Septocostae are all equal on *Leptoseris hawaiiensis*.

A colony of *Leptoseris explanata*.

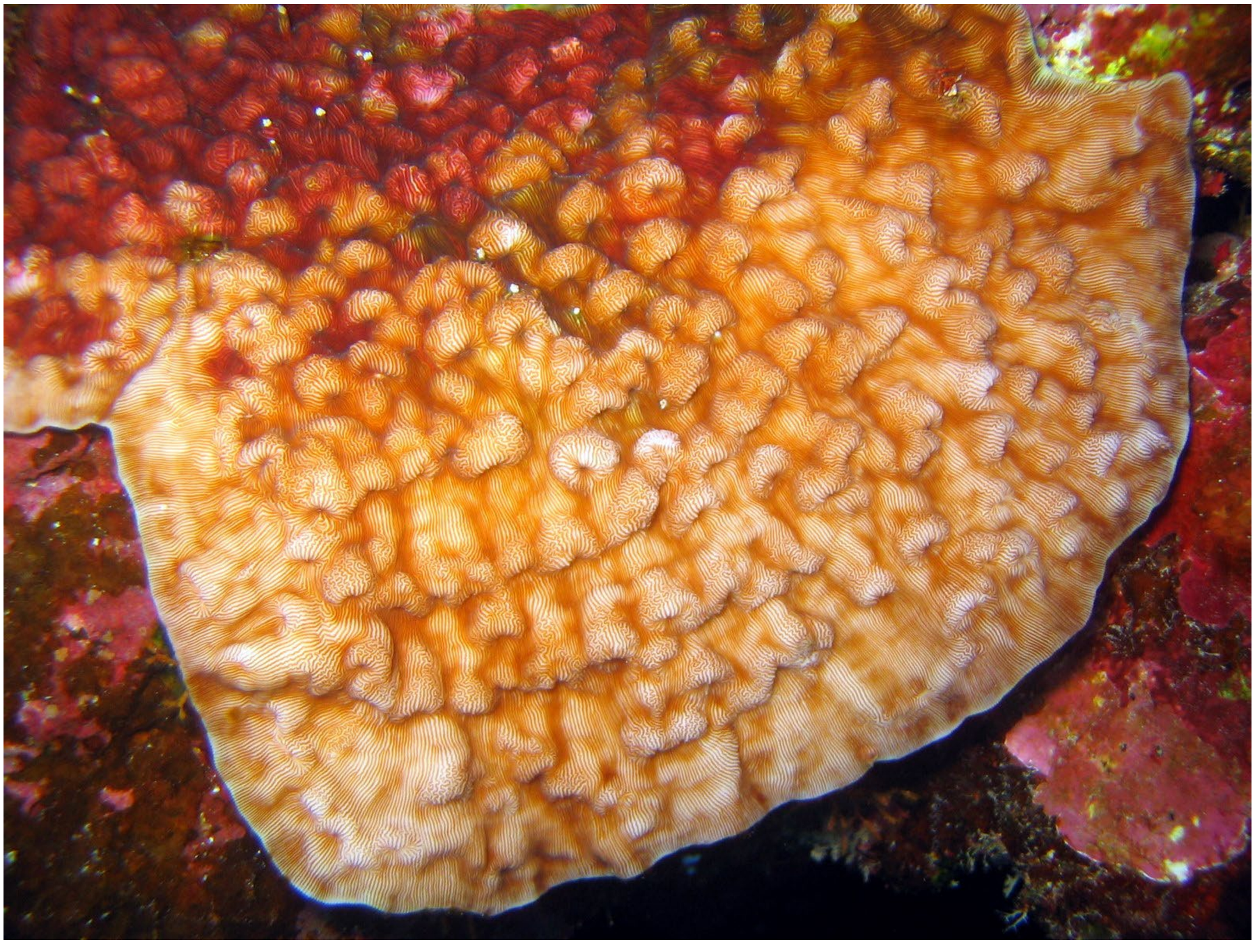
A colony of *Leptoseris explanata*.



A close-up of a very unusual colony of *Leptoseris explanata* which green polyp mouths.

Leptoseris hawaiiensis

Colonies are thin plates. Corallites are raised as rounded cushions and inclined towards the outer edge of the plate. The septocostae are all the same size, but they are so tiny they are hard to see under water. Septocostae are in two sizes on *Leptoseris explanata* and *Leptoseris scabra*.



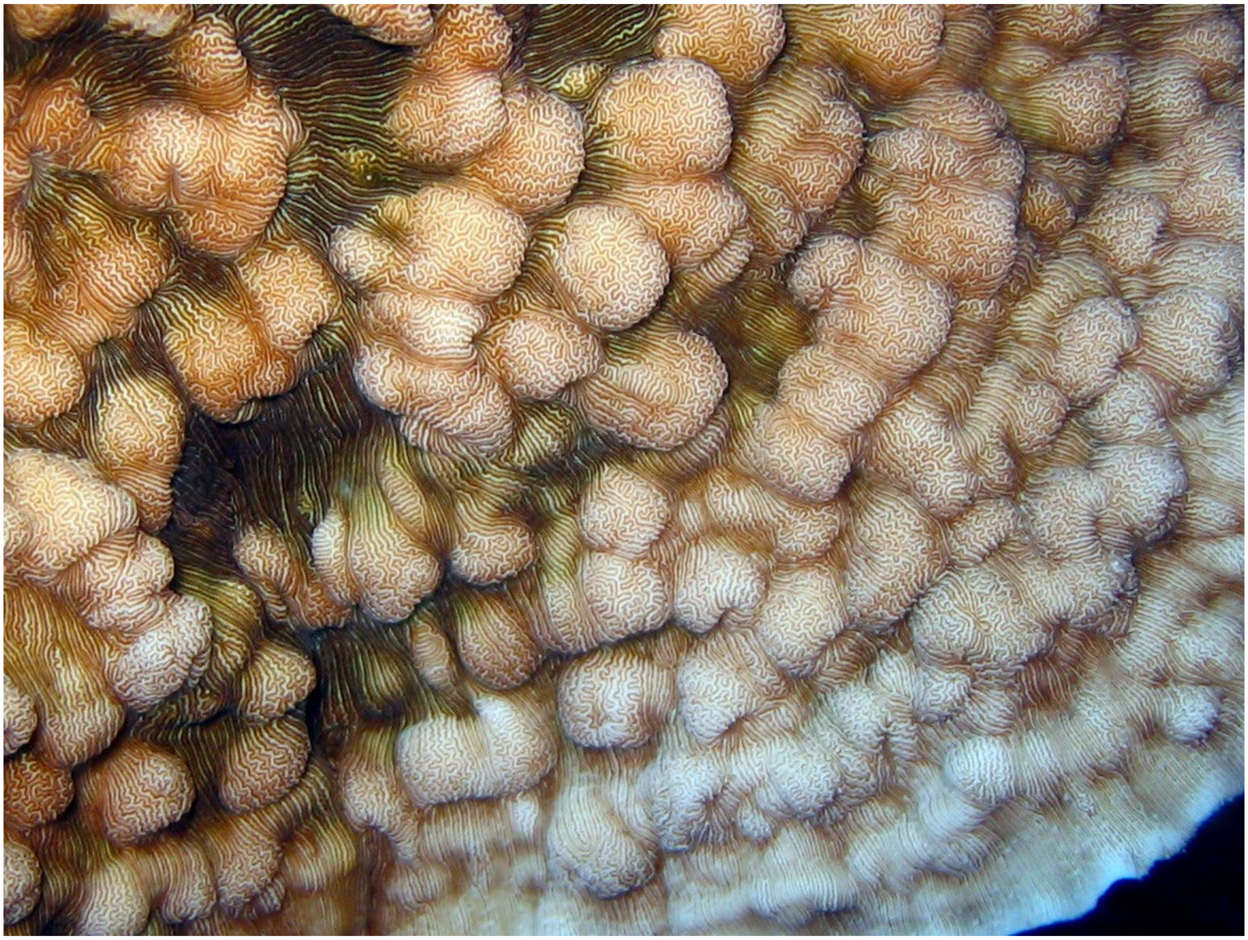
A colony of *Leptoseris hawaiiensis*.

A close-up photo of *Leptoseris hawaiiensis*.

Leptoseris solida

Colonies are thin plates. Corallites are commonly raised as rounded cushions and inclined towards the outer edge of the colony. In addition, rounded lumps without a corallite often have very winding septocostae on them. *Leptoseris incrustans* has lumps that are not corallites but they do not have winding septocostae on them.

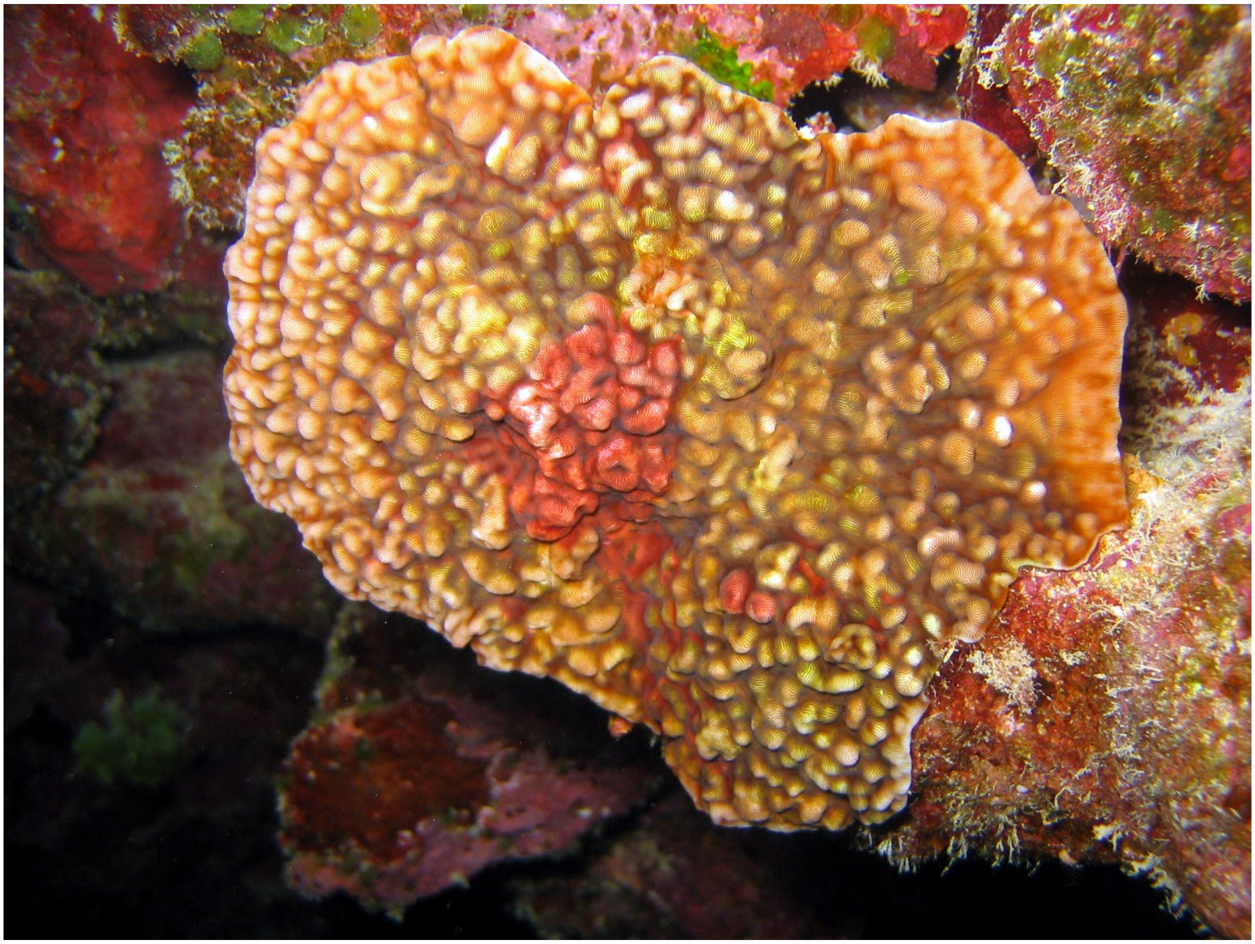
A colony of *Leptoseris solida*.



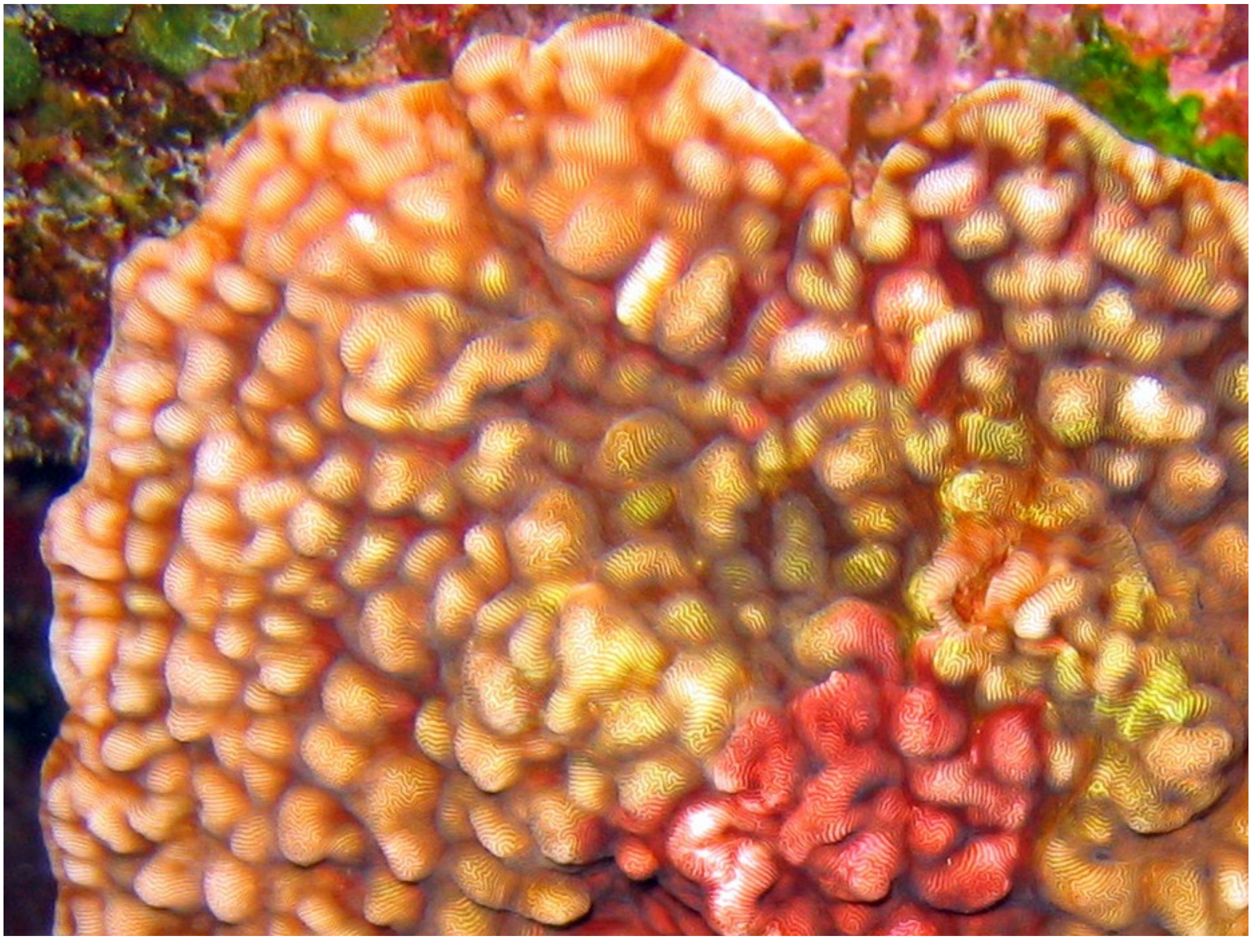
A close-up photo of *Leptoseris solida*.

Leptoseris incrustans Vulnerable

Colonies are encrusting but may have a slightly raised edge. Some corallites may be raised as cushions but others are flat with the colony surface. A variety of rounded lumps on the surface are not corallites. Colonies are generally 10 cm or less and most often found under overhangs. *Leptosersi solida* has raised lumps some of which are corallites and some not, but it has winding septocostae.



A colony of *Leptoseris incrustans*.



A close-up photo of *Leptoseris incrustans*.

A close-up photo of *Leptoseris incrustans* showing the tiny septocostae that usually can’t be seen underwater.

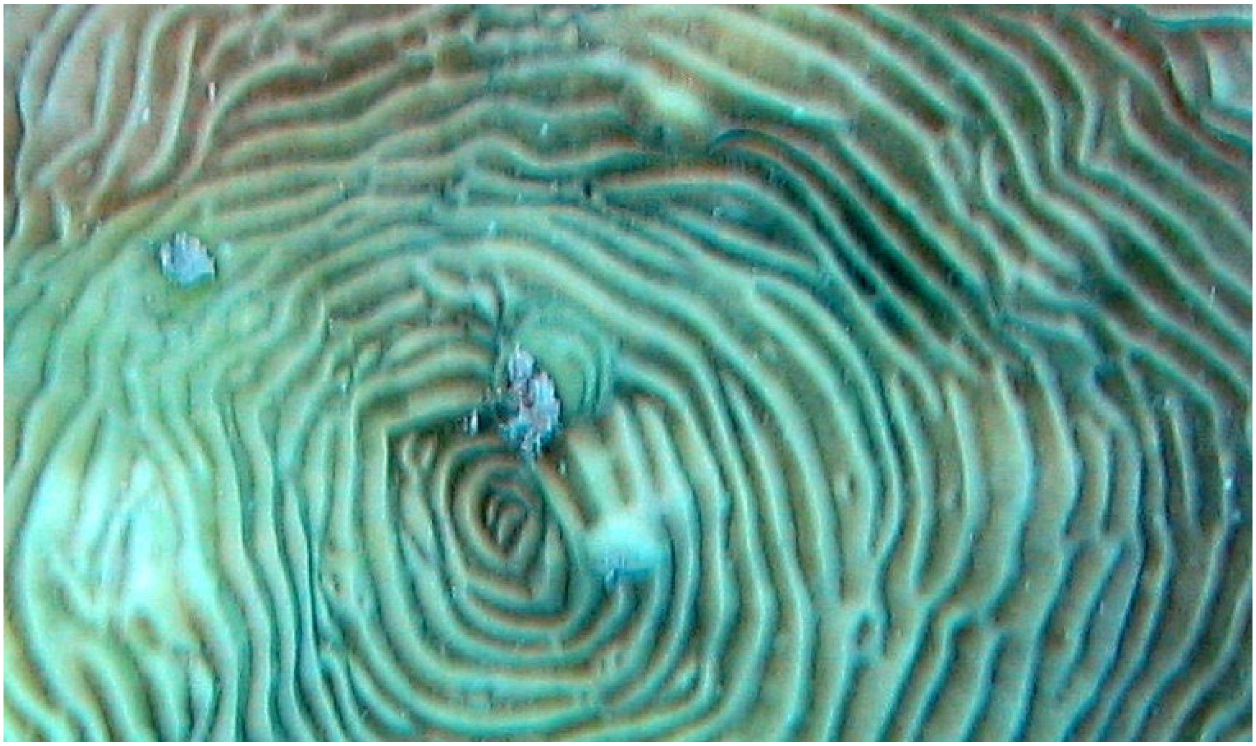
Pachyseris

Colonies are foliose or plates, most are thin foliose plates that are horizontal or growing up at an angle. One species forms vertical, thick plates and paddles. All species have small sharp ridges on them, usually in parallel.

Pachyseris speciosa

Colonies are thin plates that may be horizontal or parallel the substrate, or grow upward and outward at an angle. The upper plate surface is covered with uniform concentric small ridges which have V-shaped valleys between them. The polyp mouths are at the bottom of the V-shaped valleys. *Pachyseris gemmae* is similar, but the ridges go up and down in waves.

A colony of *Pachyseris speciosa*.

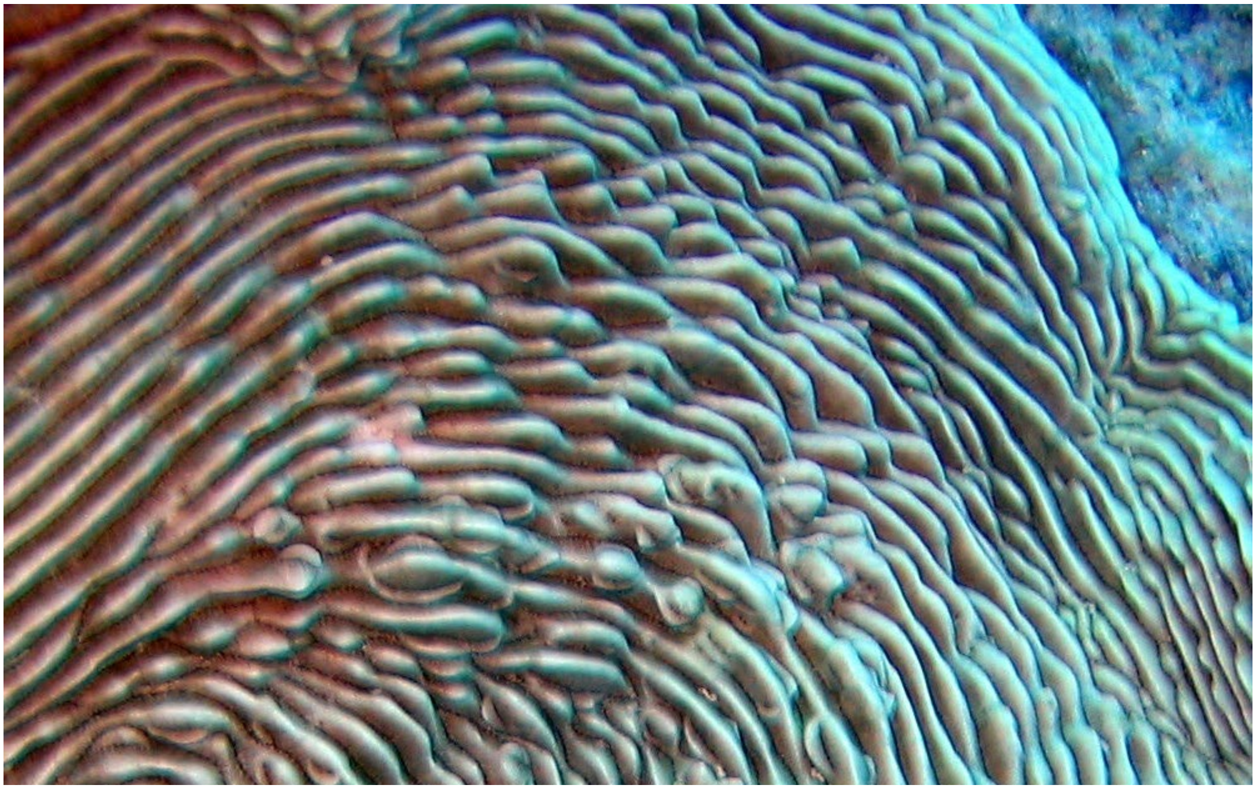


A close-up photo of *Pachyseris speciosa*.

Pachyseris gemmae

Colonies are thin plates with concentric little ridges. The ridges are wavy, becoming taller and shorter in waves. *Pachyseris speciosa* has concentric ridges that do not have waves.

A photo of *Pachyseris gemmae*.



A close-up photo of *Pachyseris gemmae*.

Cycloseris *"mushroom coral or fungiid"*

Corals are small, unattached discs, most often about 3 cm or less in diameter. Corals are single polyps (called "solitary") and unattached. The upper surface has a small crack in the center which is where the mouth is, and radiating thin ridges of skeleton (covered with a thin layer of tissue) called septa which make it look like the overturned cap of a mushroom, hence the name "mushroom coral." The underside is covered with a dense, even cover of granules like sandpaper. These corals look like miniature versions of corals in the genus *Fungia*, but most *Fungia* have radiating rows of spines on the underside. About 6 species of *Fungia*, all of one of which are oval, also have granules on the underside. One rare species of *Cycloseris* reaches large sizes and is oval. All species of all corals must start out very small, so there are small individuals of *Fungia* that are the same size as most adult *Cycloseris*. Most species of *Cycloseris* are uncommon to rare. Some species of *Cycloseris* are easy to identify, others hard.

Cycloseris cf. tenuis

Corals often have a convex, domed upper surface. On the underside, radiating ridges are visible near the outer edge. *Cycloseris vaughani* is usually flatter and has color patterning on the upper surface.

An individual *Cycloseris* cf. *tenuis*.

A *Cycloseris cf. tenuis* individual.

A *Cycloseris* cf. *tenuis* coral.

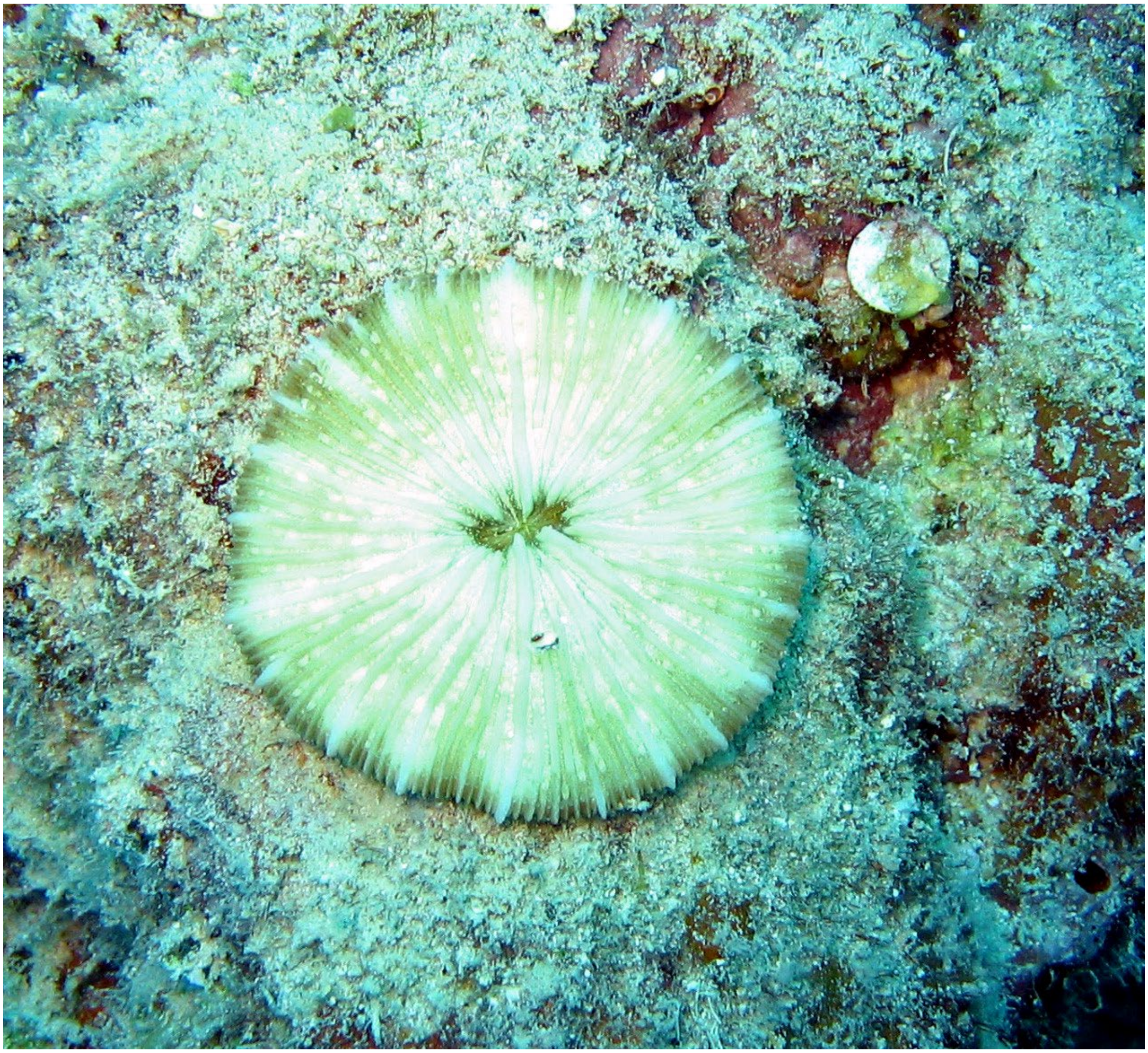
Cycloseris cf. vaughani

Corals are nearly flat and often have mottled coloration on the upper surface. On the lower surface, they have radiating ridges near the edge of the disc.

An individual *Cycloseris* cf. *vaughani.* Without a photo of the underside, uncertainty remains for this identification.

Cycloseris cf. hexagonalis

Corals when young (and small) have a hexagonal outline and 6 septa that are larger than the others which are at the points of the hexagon. As they grow larger they lose the hexagonal outline and additional septa grow larger than the others. They are also flat, and can get up to around 5 cm diameter. No other *Cycloseris* has either the hexagonal shape or the larger septa.



An individual of *Cycloseris* cf. *hexagonalis*.

Cycloseris sinensis

Corals are flat and the septa appear thin and relatively uniform, giving the corals a relatively smooth appearance.

A broken individual *Cycloseris sinensis*.

Cantharellus

Corals are attached and usually solitary but may be colonial.

Cantharellus jebbi

Corals are attached and encrusting and usually solitary but may be colonial. The septa are fairly thick and may curve around each other and fit together in a puzzle-like pattern. This species does not have lifted edges, like other species of *Cantharellus*. Other *Cantharellus* and most other fungiids don't have the thick, wavy septa. It is attached unlike most fungiids.

A colony of *Cantharellus jebbi*.

A close-up photo of a colony of *Cantharellus jebbi*.

Lithophyllon *"mushroom corals or fungiids"*

Corals are either to two major shapes. Some are small attached plates wth multiple mouths, and others are single polyps (solitary), unattached circular discs. The crack in the center is the mouth. Ridges called septa radiate from the mouth, which are made of calcium and covered with a thin layer of tissue. The radiating septa make the upper surface look like the undersurface of a mushroom cap, hence the name "mushroom coral." Adults reach sizes ranging from about 5 cm diameter for the smallest species to about 10-15 cm for many species, to 15-30 cm for the largest species. The underside has radiating rows of spines except on the oval species, which have an even cover of granules like sandpaper, as does the smallest circular species. *Cycloseris* reach smaller adult sizes in most species, except for one or two species, and they have granules on the underside.

Lithophyllon concinna or Lithophyllon repanda These were previously in Fungia

Corals are circular discs that are nearly flat, with taller septa widely spaced from each other and with tiny to minute teeth on the upper edge of the septa that are hard to see but can be felt. These two species are quite hard to separate in the water, the only difference is a series of tiny slits on the underside, which can't be seen through tissue. *Fungia fungites* has septa closer together with larger teeth, and small tentacles extended.

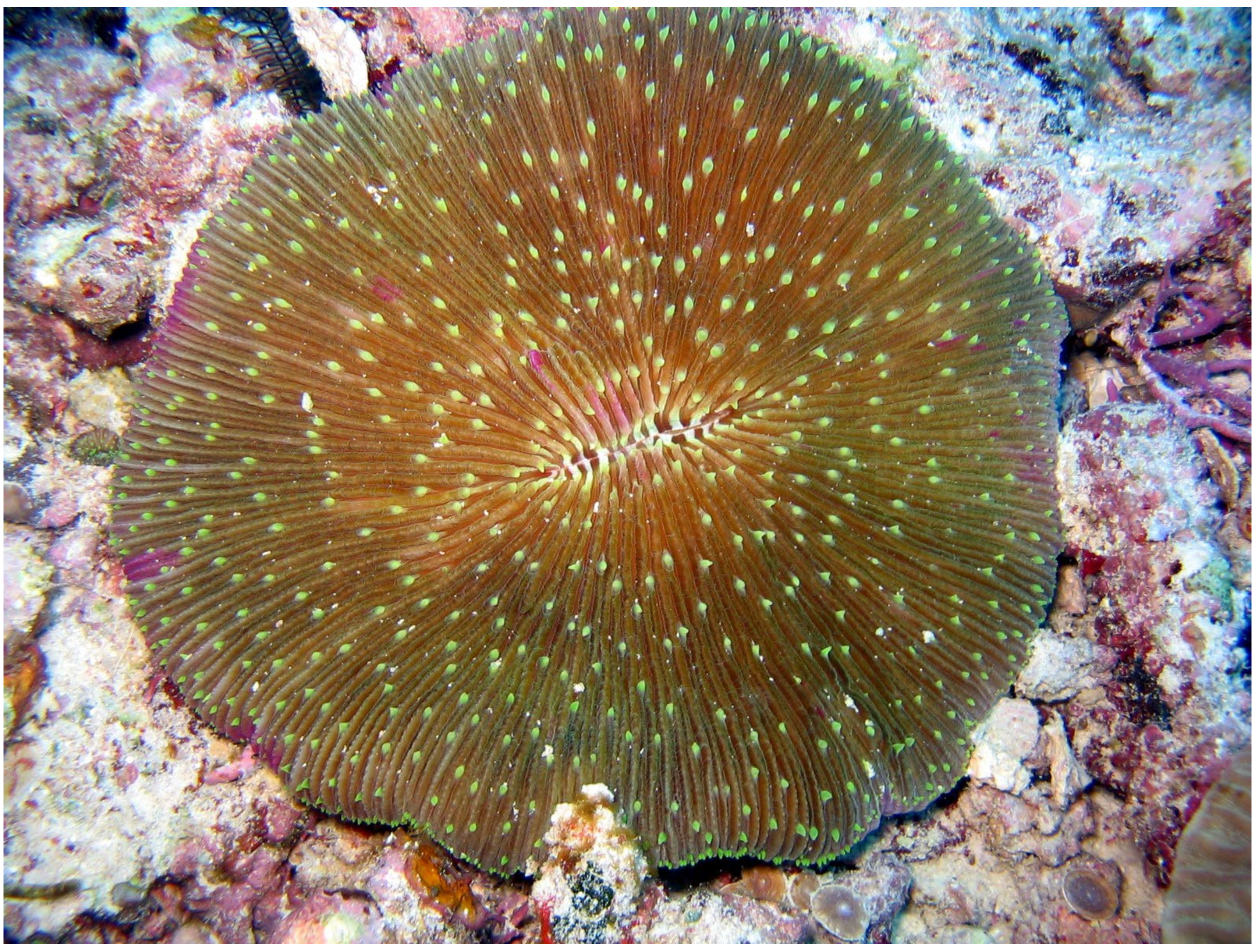
A *Lithophyllon concinna* or *Lithophyllon repanda* coral. The white areas are non-lethal disease.

Fungia *"mushroom corals or fungiids"*

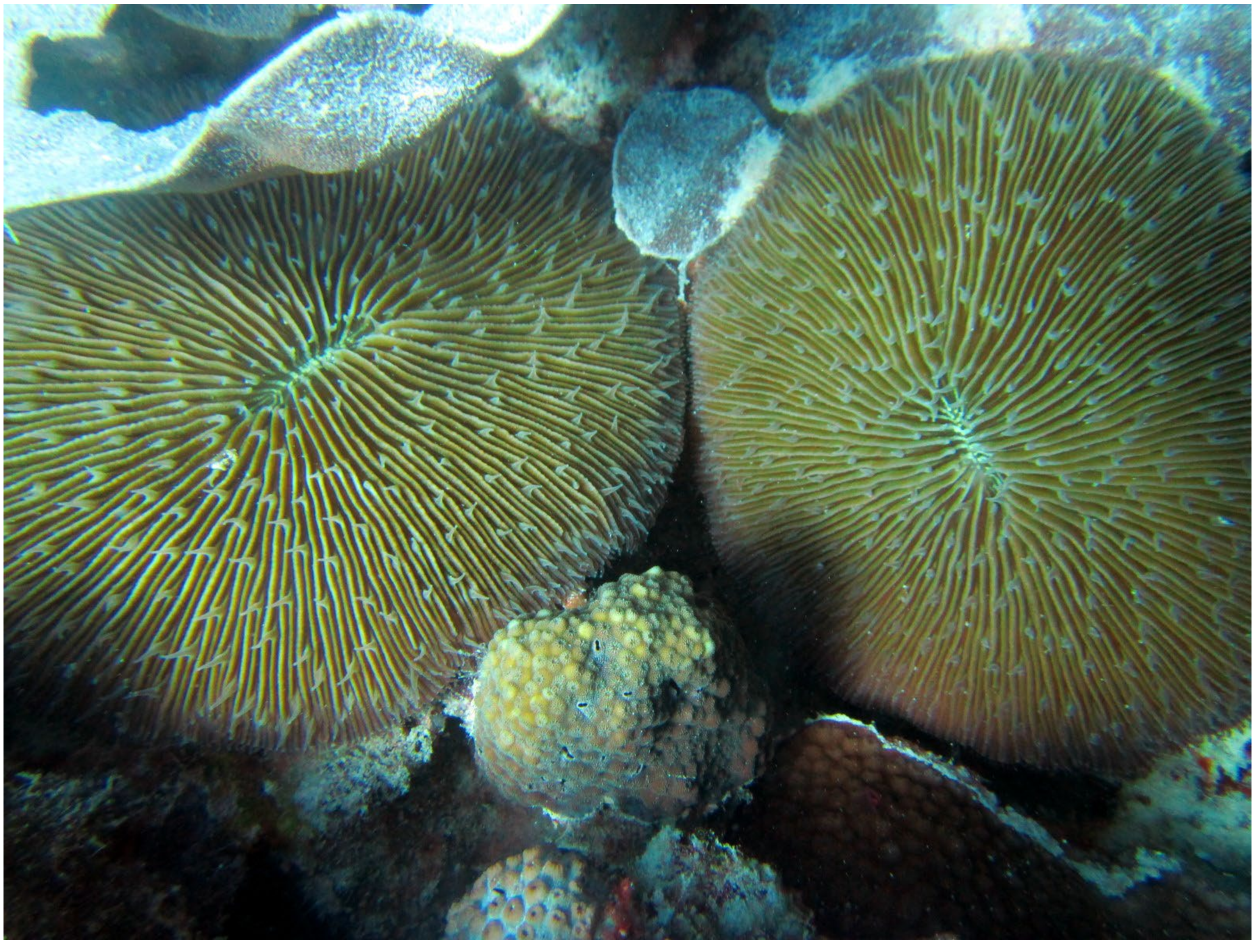
Corals are single polyps (solitary), unattached discs, most are circular but several are oval. The crack in the center is the mouth. Ridges called septa radiate from the mouth, which are made of calcium and covered with a thin layer of tissue. The radiating septa make the upper surface look like the undersurface of a mushroom cap, hence the name "mushroom coral." Adults reach sizes ranging from about 5 cm diameter for the smallest species to about 10-15 cm for many species, to 15-30 cm for the largest species. The underside has radiating rows of spines except on the oval species, which have an even cover of granules like sandpaper, as does the smallest circular species. *Cycloseris* reach smaller adult sizes in most species, except for one or two species, and they have granules on the underside.

Fungia fungites

Corals are circular discs, commonly up to 15 cm but may reach 25 or 30 cm diameter. The septa appear small, thin, close together, and with tiny teeth that may be visible. Small tentacles are usually extended. Corals may have purple edges or patches of purple, or be completely red/purple. Septa are closer together and have slightly larger teeth than on *Lithophyllon concinna* or *Lithophyllon repanda*, and small tentacles are extended.



An individual of *Fungia fungites*.



Individuals of *Fungia fungites*.

An individual of *Fungia fungites* showing the teeth on septa.

Danafungia *These species used to be in Fungia.*

Corals are solitary, unattached discs. Corals are similar to *Fungia* and some *Lithophyllon* species, but have largre teeth on the septa.

Danafungia scruposa This used to be in *Fungia*.

Corals have some septa taller than others, moderately large teeth on the septa that may be fairly uniform, and the center of the upper surface is often raised in a cone shape, over the whole surface or sometimes only in the center. There may be "tentacle lobes", which are at the central end of septa and are a thickening and raised semicircle which has a tentacle attached to it (which may or may not be extended). *Lithophyllon concinna*, *Lithophyllon repanda*, and *Fungia fungites* have smaller teeth on septa, but *Danafungia horrida* has larger teeth.

A distorted individual of *Danafungia scruposa*.

An individual *Danafungia scruposa*.

Danafungia horrida

This used to be in *Fungia*.

Corals are usually nearly flat but may have a central hump. They always have very large teeth on the septa. Corals often have a mottled brown and light coloring. The teeth are larger than on any other fungiid.

A *Danafungia horrida* coral. The white areas are a non-lethal disease.

A *Danafungia horrida* coral.

Pleuractis

These used to be in Fungia.

Corals are solitary, unattached discs. One species is circular but the others are oval. The undersde has fine granules, instead of the spiines that *Danafungia*, *Fungia*, and some *Lithophyllon* have.

Pleuractis granulosa

This used to be in Fungia.

Corals are circular discs that commonly reach about 5 cm diameter as adults. The septa are wavy, and in some individuals appear thick. The underside has an even cover of fine granules. This species has the waviest septa of any circular fungiid.

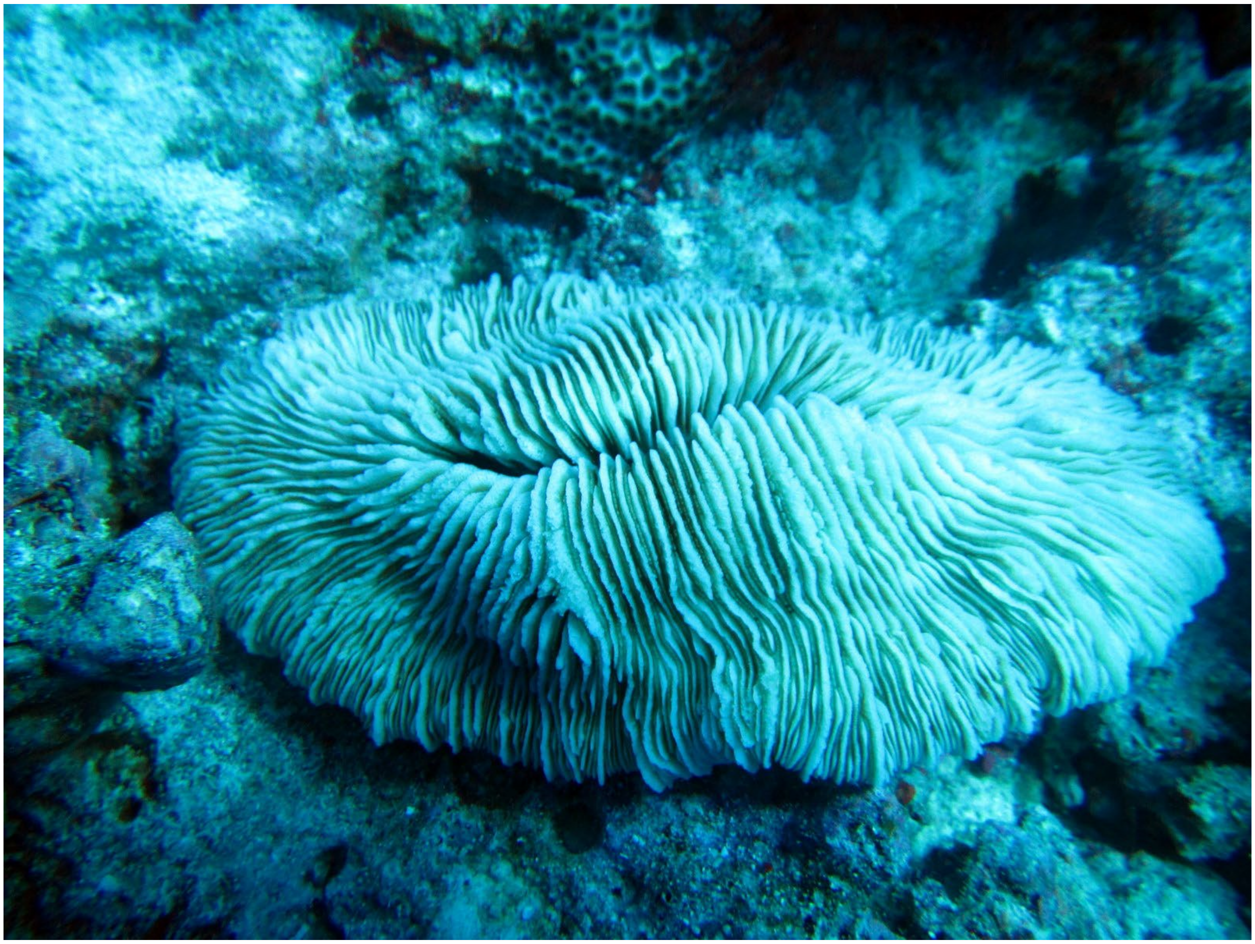
A *Pleuractis granulosa* coral.

A *Pleuractis granulosa* coral.

Pleuractis moluccensis

This used to be in Fungia.

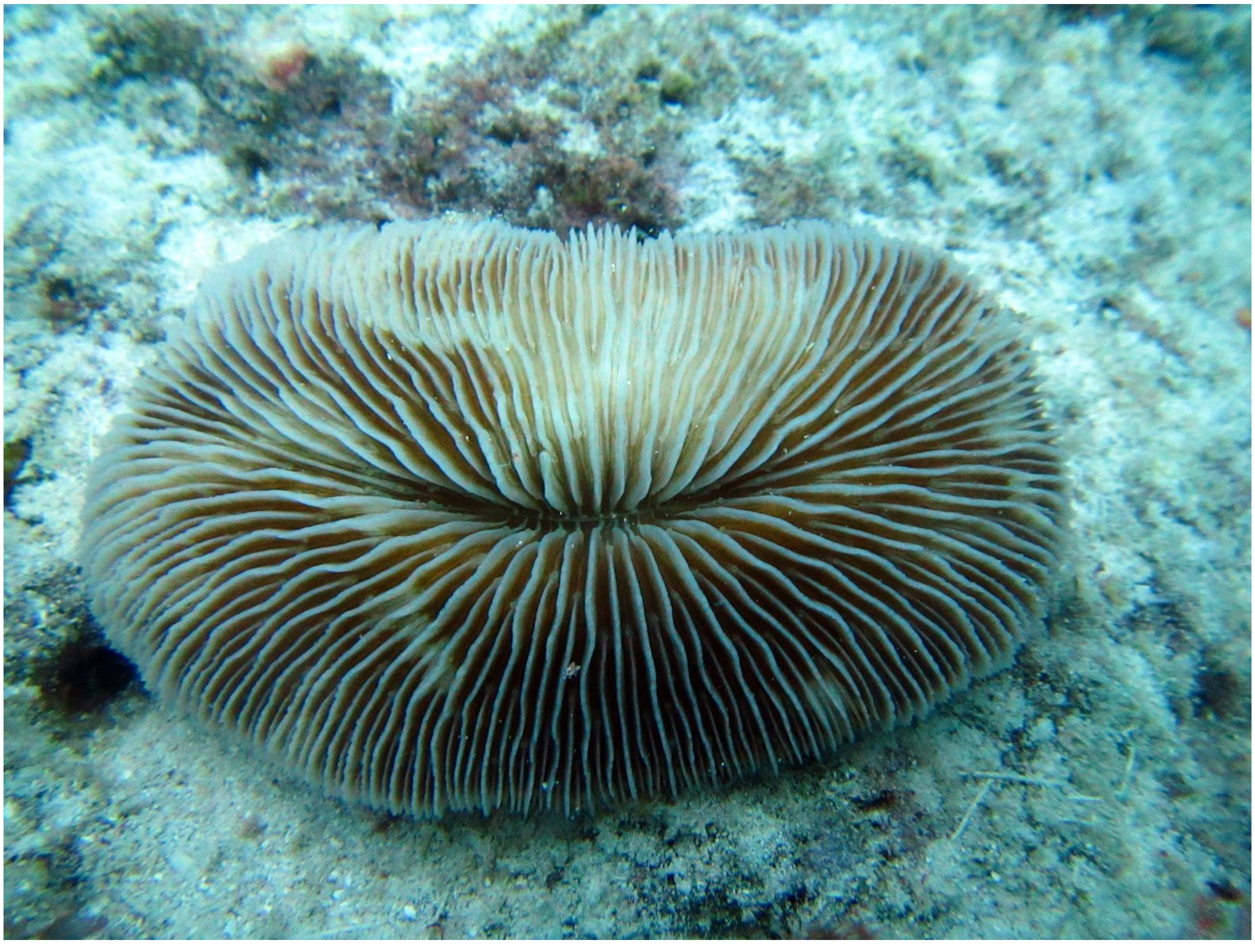
Corals are usually oval but are often asymmetrical and/or distorted. The two ends of the oval may be somewhat pointed. The center of the coral is usually raised in a hump. The septa have minute teeth that can't be seen but can be felt. The underside has an even cover of granules like sandpaper. The center of the underside usually has an attachment scar. A few individuals may remain attached as adults. This is the only asymmetrical or distorted oval *Pleuractis* species and only one with a large attachment scar.



A *Pleuractis moluccensis* coral.

Pleuractis seychellensis Vulnerable This used to be in *Fungia*.

Corals are ovals and usually nearly flat. The radiating septa are wavy. The underside has an even covering of granules. *Pleuractis paumotensis* is very similar but has nearly straight septa.



A *Pleuractis seychellensis* coral. The light areas are a non-lethal disease.

Lobactis

Corals are oval, unattached discs. The underside has fine granules instead of spines as in *Danafungia*, *Fungia* and some *Lithophyllon*. Corals have th largest tentacle lobes of any fungiid.

Lobactis scutaria

This used to be in *Fungia*.

Corals are oval, though there may be slight distortions of the oval. Septa have prominent tentacle lobes projecting above the level of the rest of the septa, and when tentacles are extended they can be seen to be attached at those lobes. The underside is a uniform covering of granules. This species has the largest tentacle lobes of any fungiid.

A *Lobactis scutaria* coral.

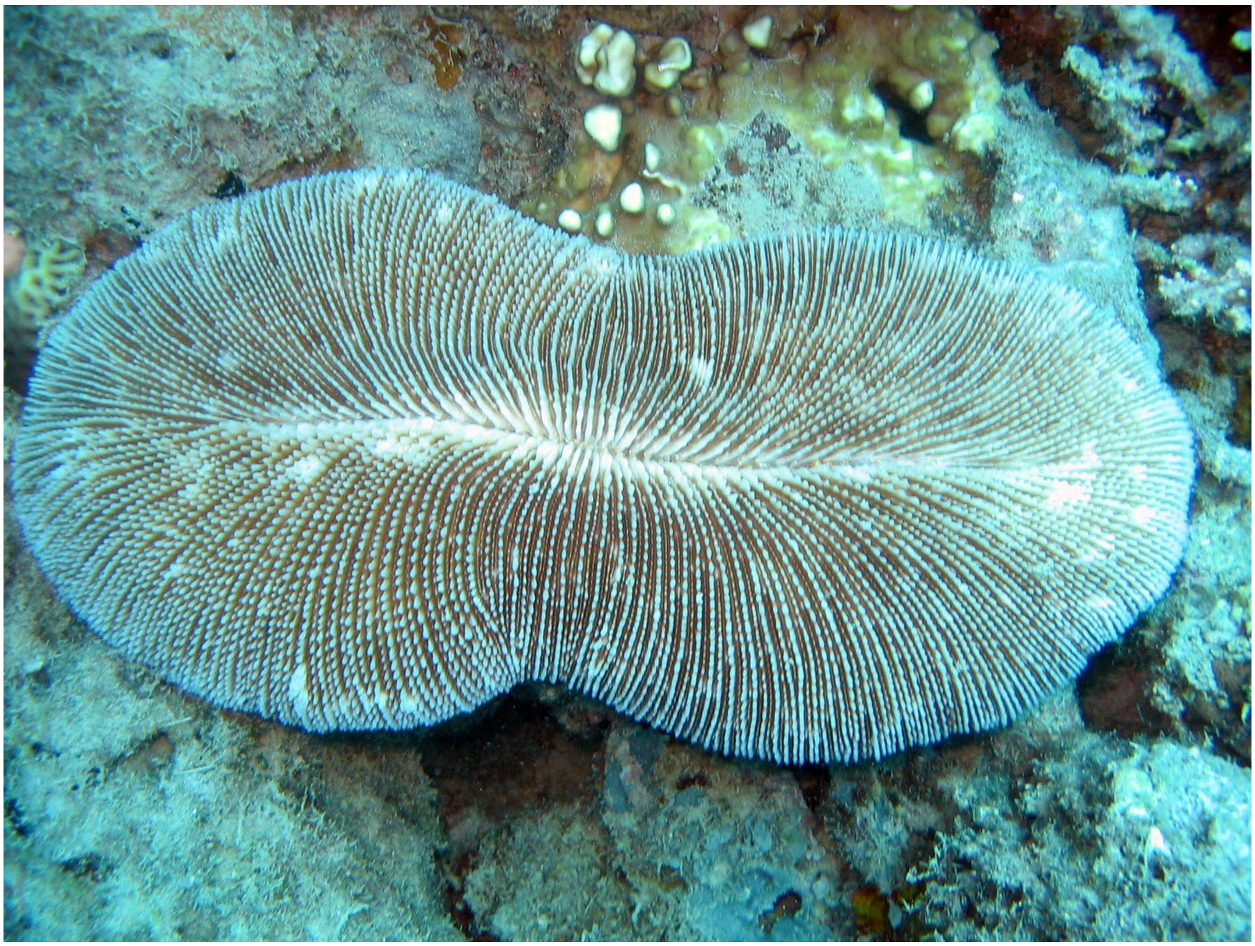
A *Lobactis scutaria* coral. The white areas here appear to be disease of some kind.

Ctenactis

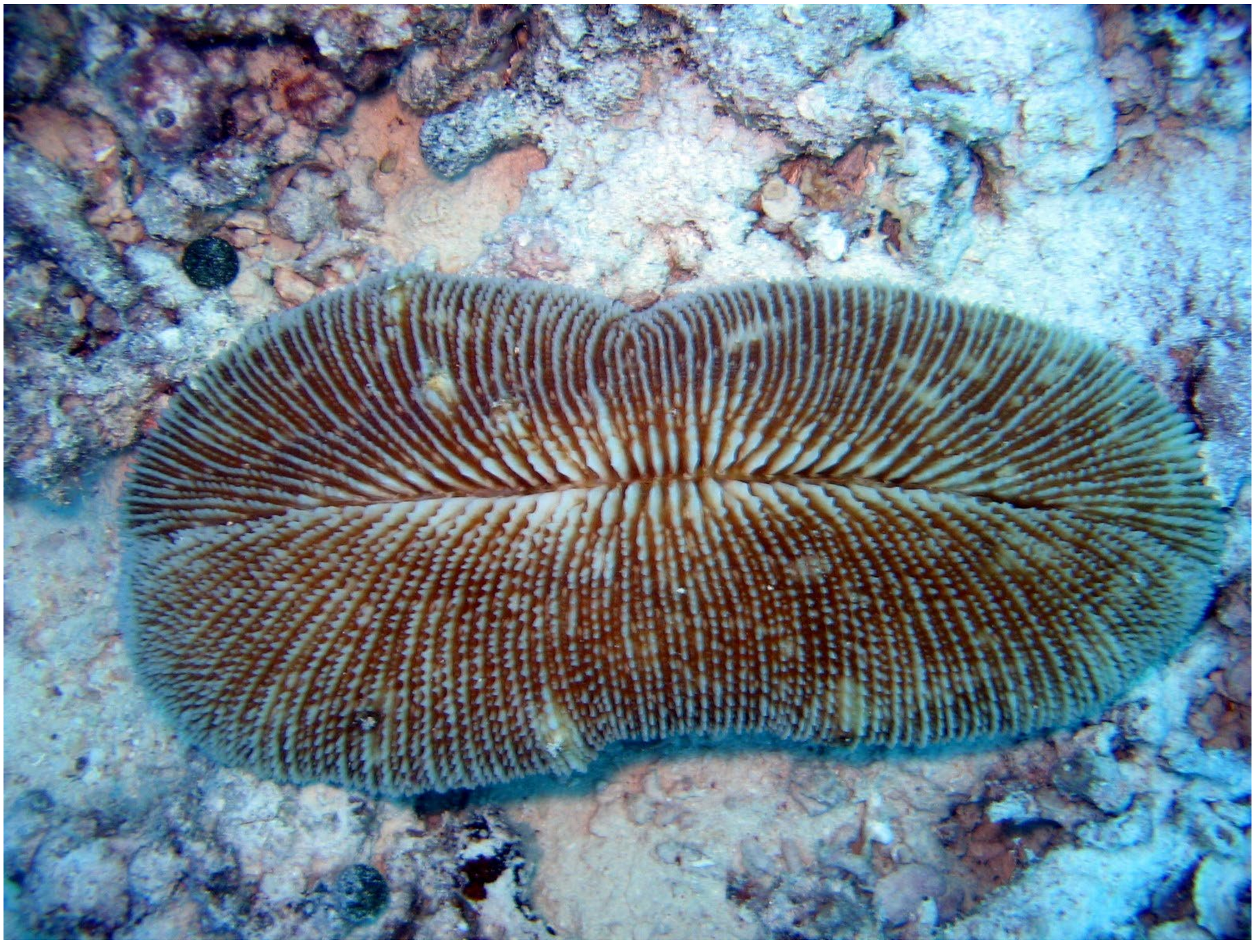
Corals are elongated, wide ovals. They have an elongated crack in the middle, which may have one long undivided mouth, or be divided into a series of shorter mouths. Septa radiate away from the central crack to the edge of the coral. The septa have visible teeth on the upper edge of the septa. *Herpolitha* is similar but usually not as wide, and has no visible teeth on the septa.

Ctenactis echinata

Corals have one long central crack with one mouth. Other *Ctenactis* species have the central crack divided into several mouths. *Ctenactis albitentaculata* has white tentacles.



A *Ctenactis echinata* coral.

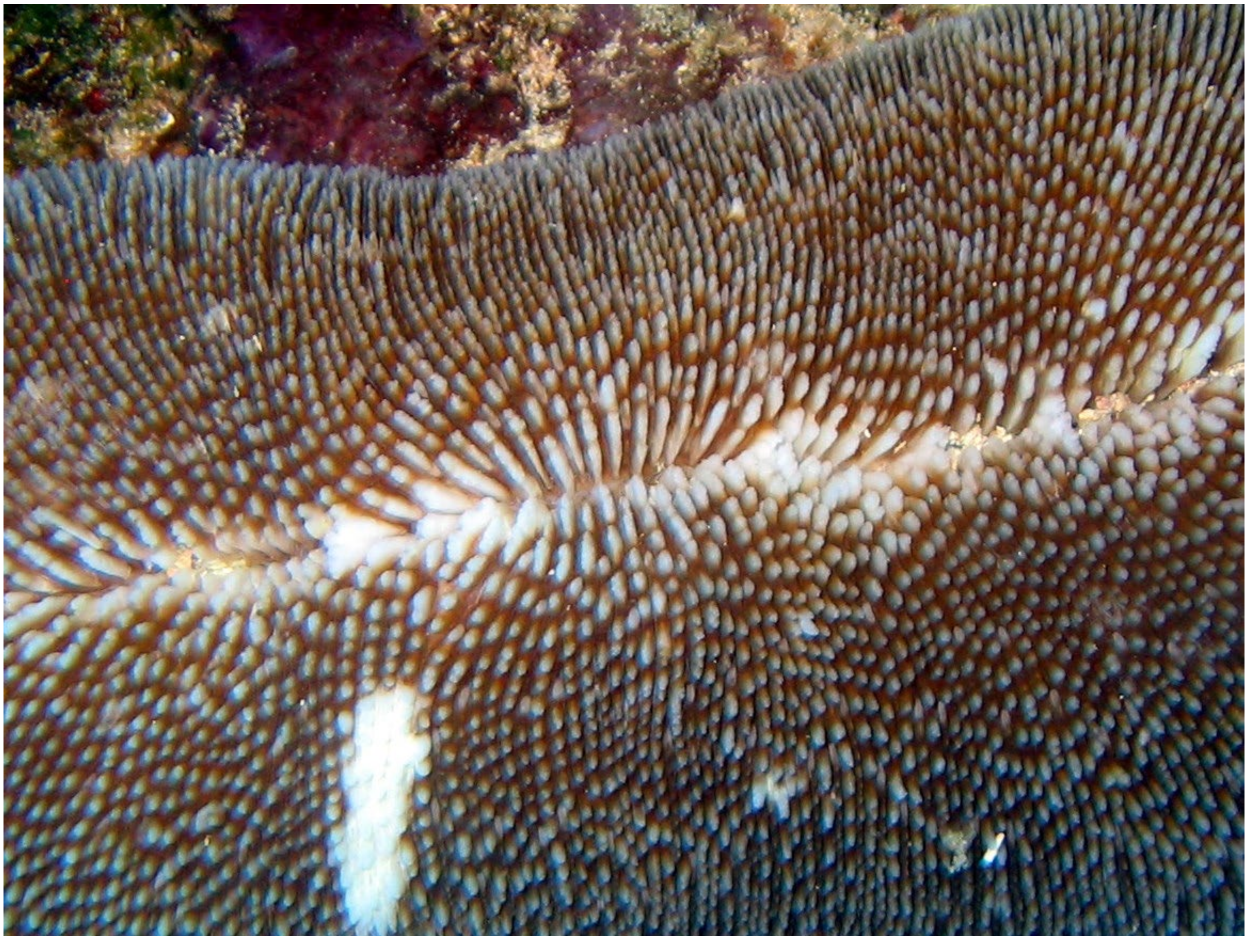


A *Ctenactis echinata* coral.

Ctenactis crassa

Corals have the central crack divided into sections by crosspieces. Each section of crack has a separate mouth. *Ctenactis echinata* has only one unbroken crack, and *Ctenactis albitentaculata* has white tentacles.

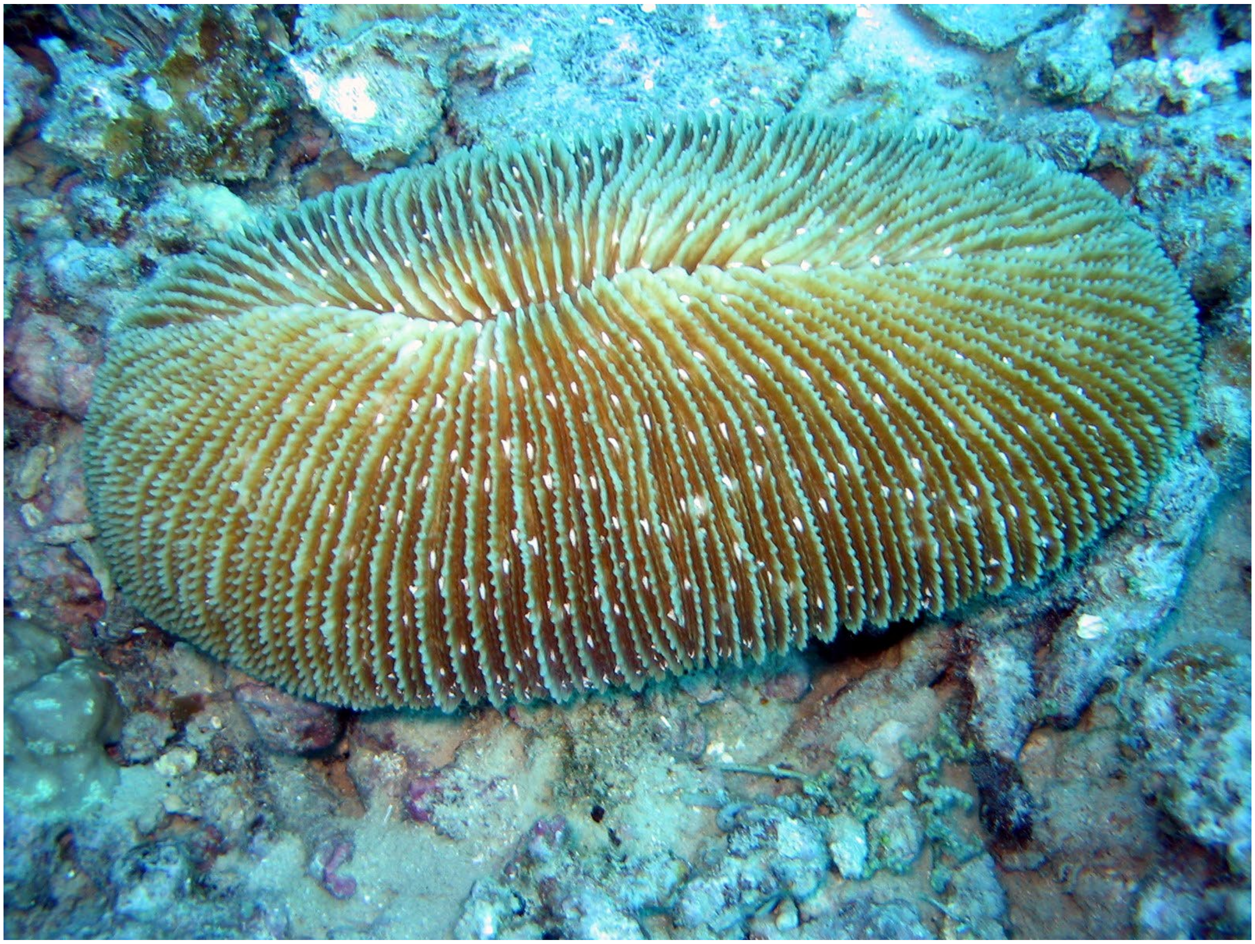
A *Ctenactis crassa* coral.



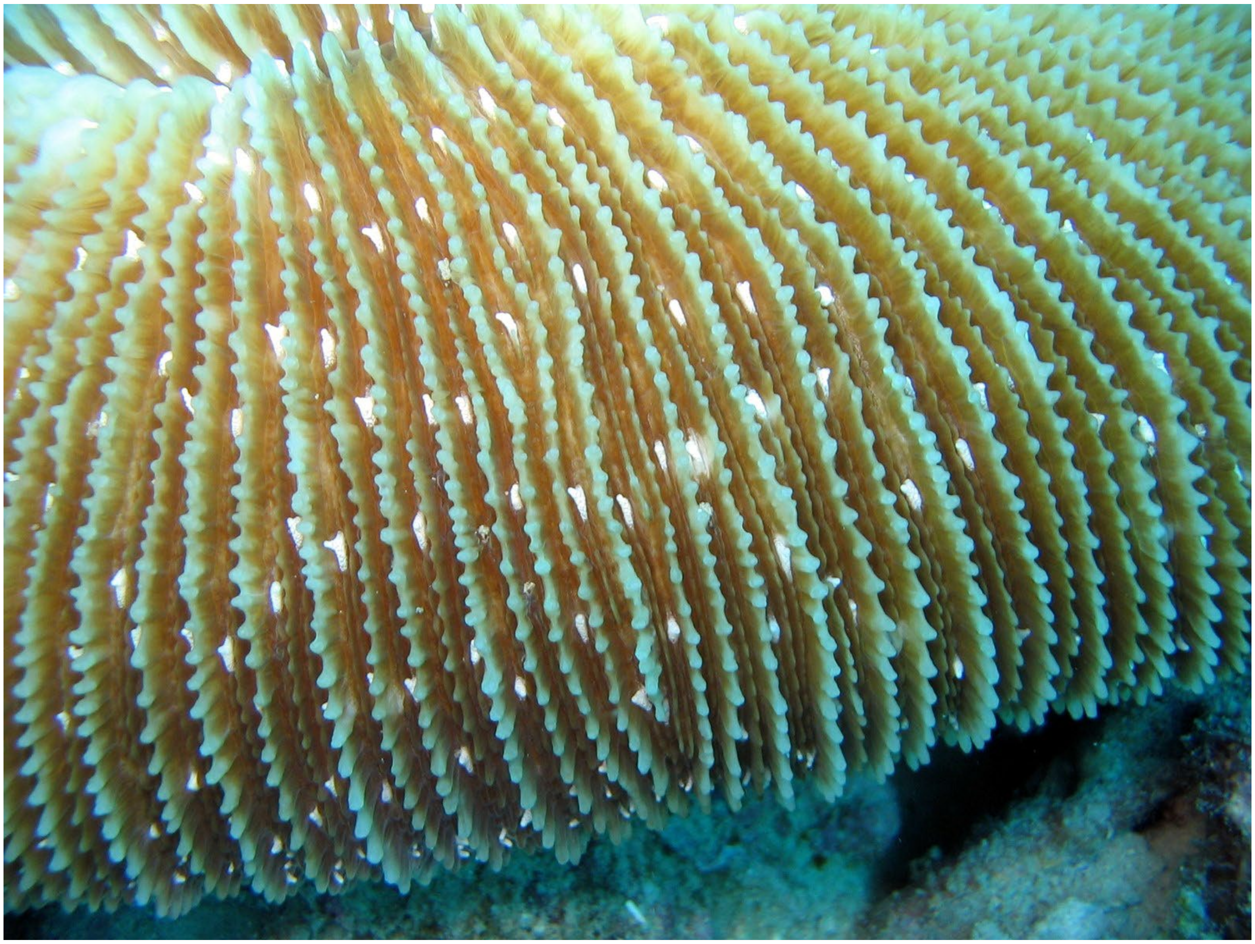
A close-up of *Ctenactis crassa*, showing the cross-bridges that divide the central crack. The white spot is a non-lethal disease.

Ctenactis albitentaculata

Corals have the central crack divided into multiple mouths, and have white tentacles. These corals are usually green, and the septa are more widely spaced than the other species of *Ctenactis*.



A *Ctenactis albitentaculata* coral.



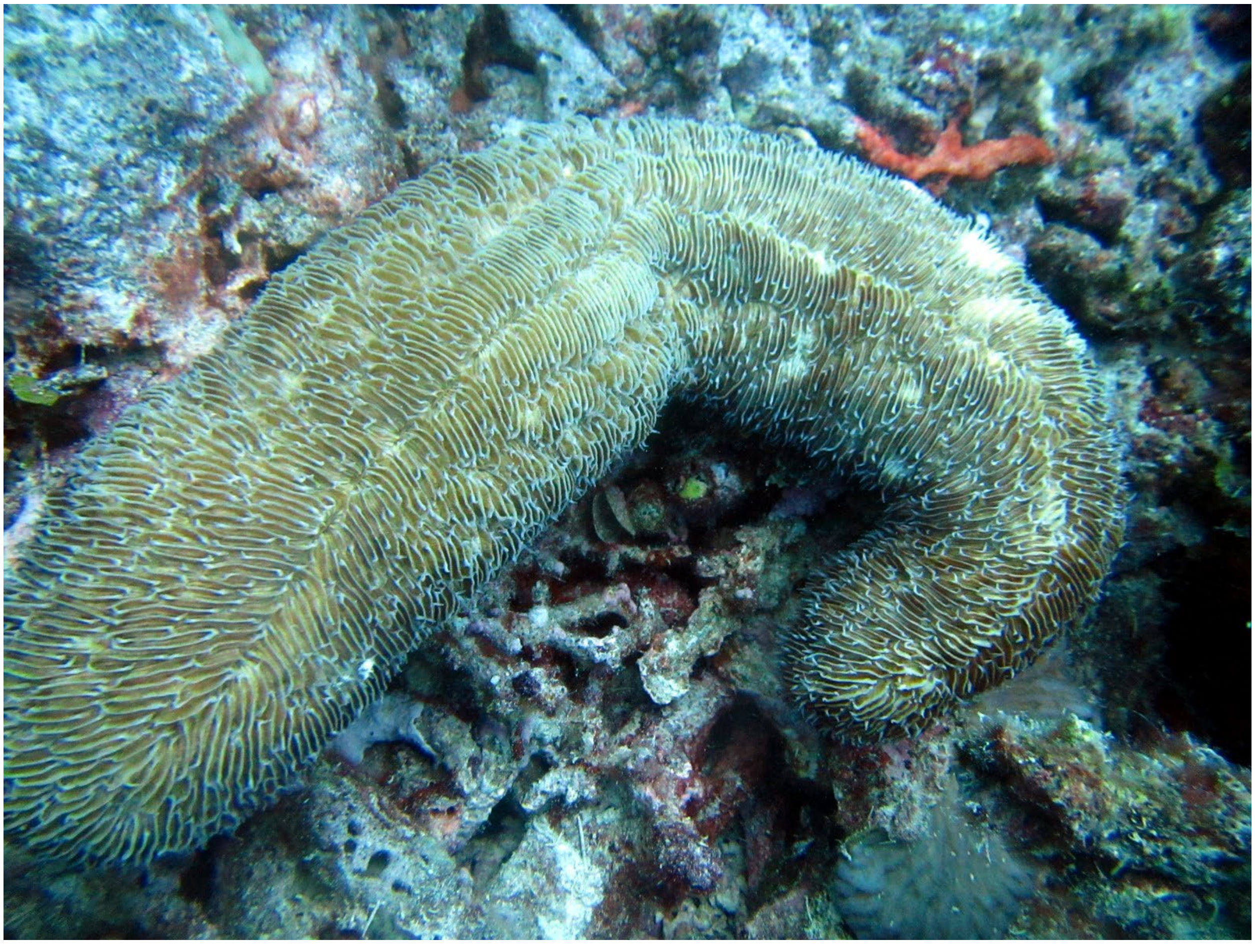
A close-up photo of *Ctenactis albitentaculata*.

Herpolitha

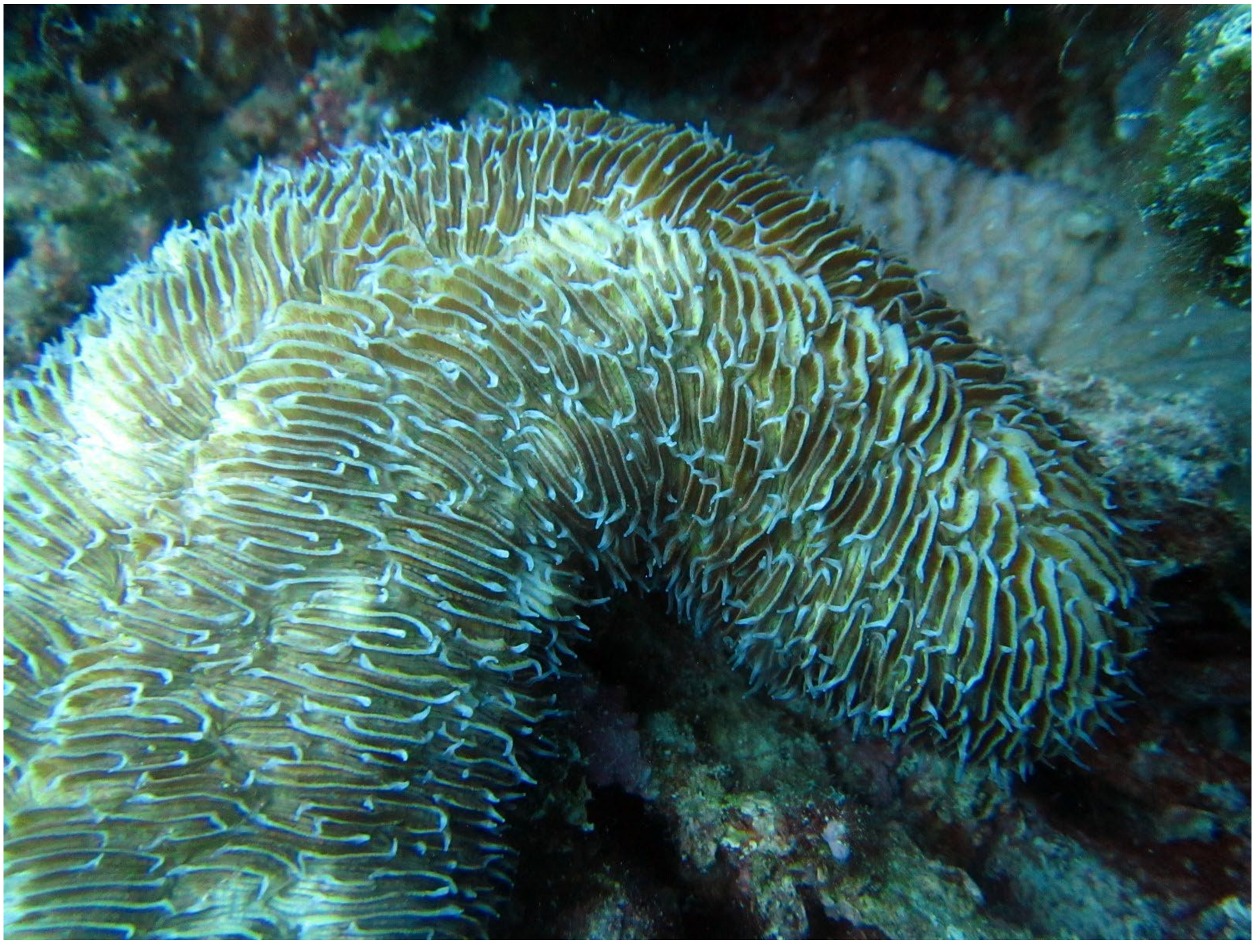
Colonies are elongated, have many mouths, and are not attached. There is a clear central crack. Septa have minute teeth but look like they have smooth edges. If tentacles are extended, there are only a few and they do not cover the entire coral, unlike on *Polyphyllia*. *Ctenactis* has large enough teeth that they are easily seen.

Herpolitha limax

Colonies may be anything from strongly arched to flat. If the upper surface is strongly convex then the underside is strongly concave. Septa only go part way between the crack and the edge of the colony, particularly in large colonies. It is unusual for tentacles to be extended. *Herpolitha weberi* has septa that go most of the way from the crack to the edge of the colony, and is much less common than *Herpolitha limax*.



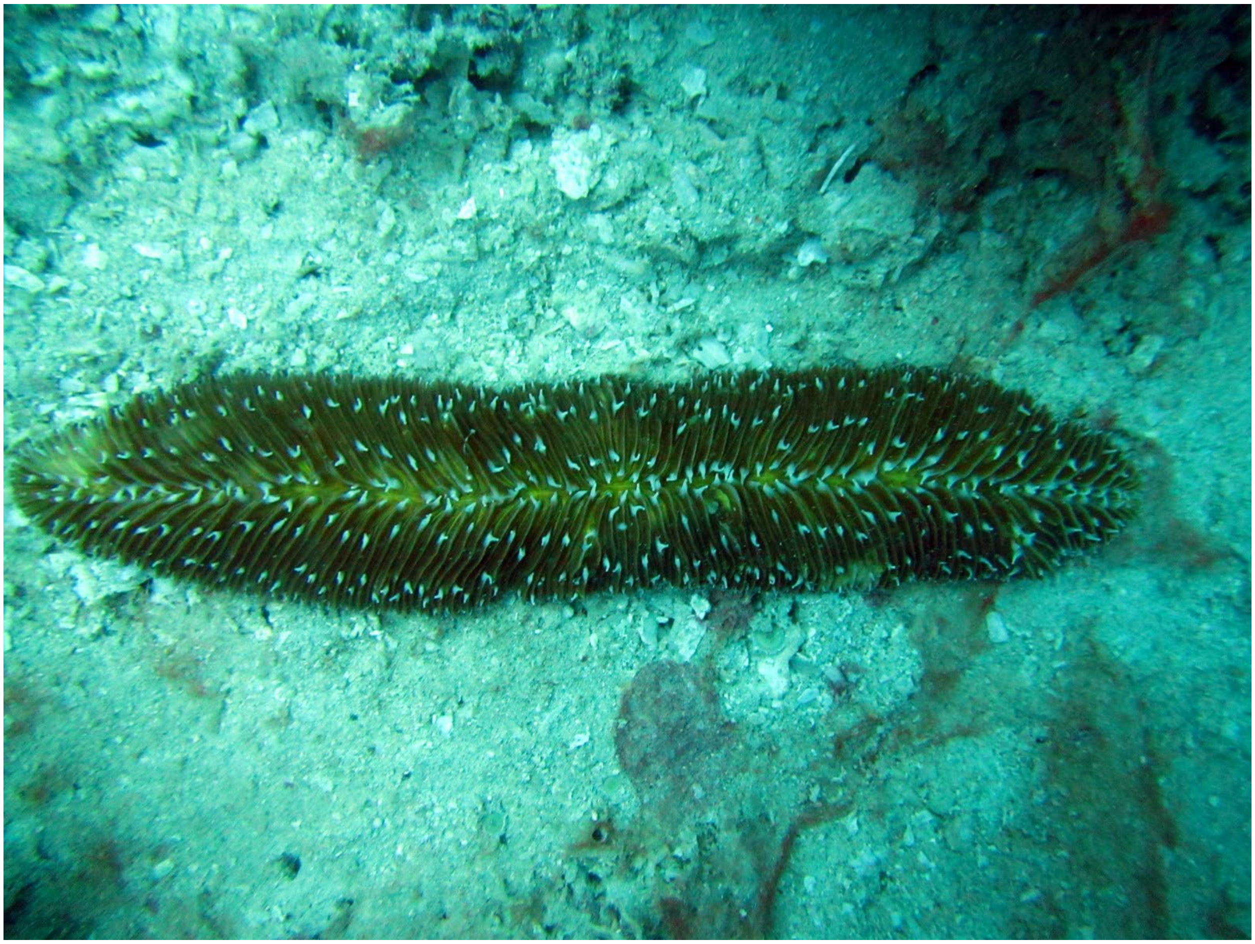
A colony of *Herpolitha limax* which is strongly curved, which is unusual.



A close-up of a colony of *Herpolitha limax*, with small white tentacles extended.

Herpolitha weberi

Colonies are usually flat and narrow, with septa that go most of the way to the edge of the colony. Septa on *Herpolitha limax* do not extend unbroken to the edge of the coral. Taxonomists differ on whether this is a valid species separate from *Herpolitha limax*.



A colony of *Herpolitha weberi*.

A close-up photo of *Herpolitha weberi*.

Polyphyllia

Colonies are elongated or irregular shapes but do not have an obvious long central crack. They may be strongly arched or nearly flat. They are not attached. Septa are short. Tentacles are often extended and are numerous and completely cover and obscure the coral. *Ctenactis* and *Herpolitha* are elongated but not covered with tentacles.

Polyphyllia talpina

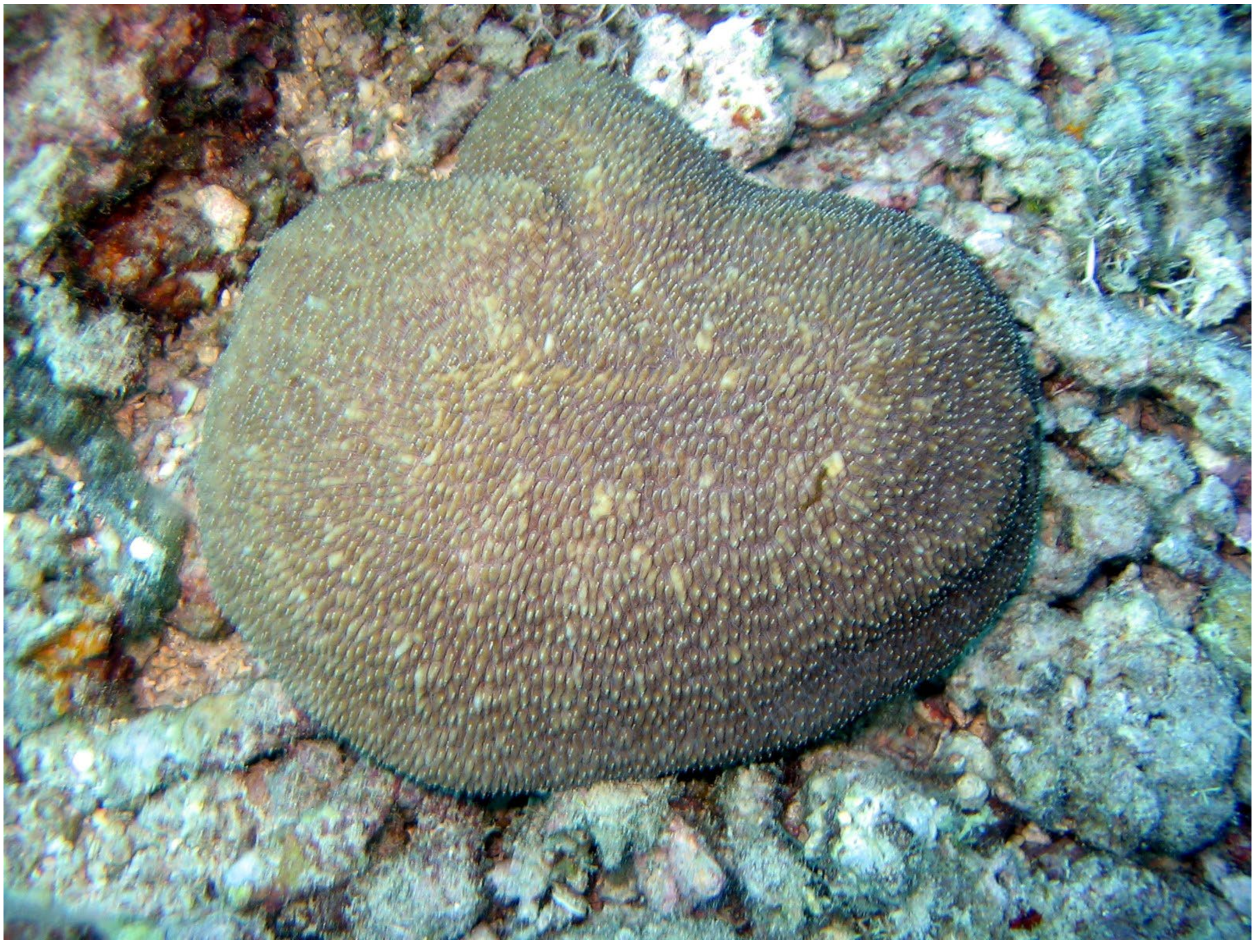
Colonies are elongated and usually strongly arched with a convex upper surface and concave lower surface. They are thick and strong and rarely break and so do not need to regenerate. *Polyphyllia novaehiberniae* usually nearly flat, is thin and is irregular in shape.

A colony of *Polyphyllia talpina* with tentacles part way extended.

A colony of *Polyphyllia talpina* with tentacles part way extended.

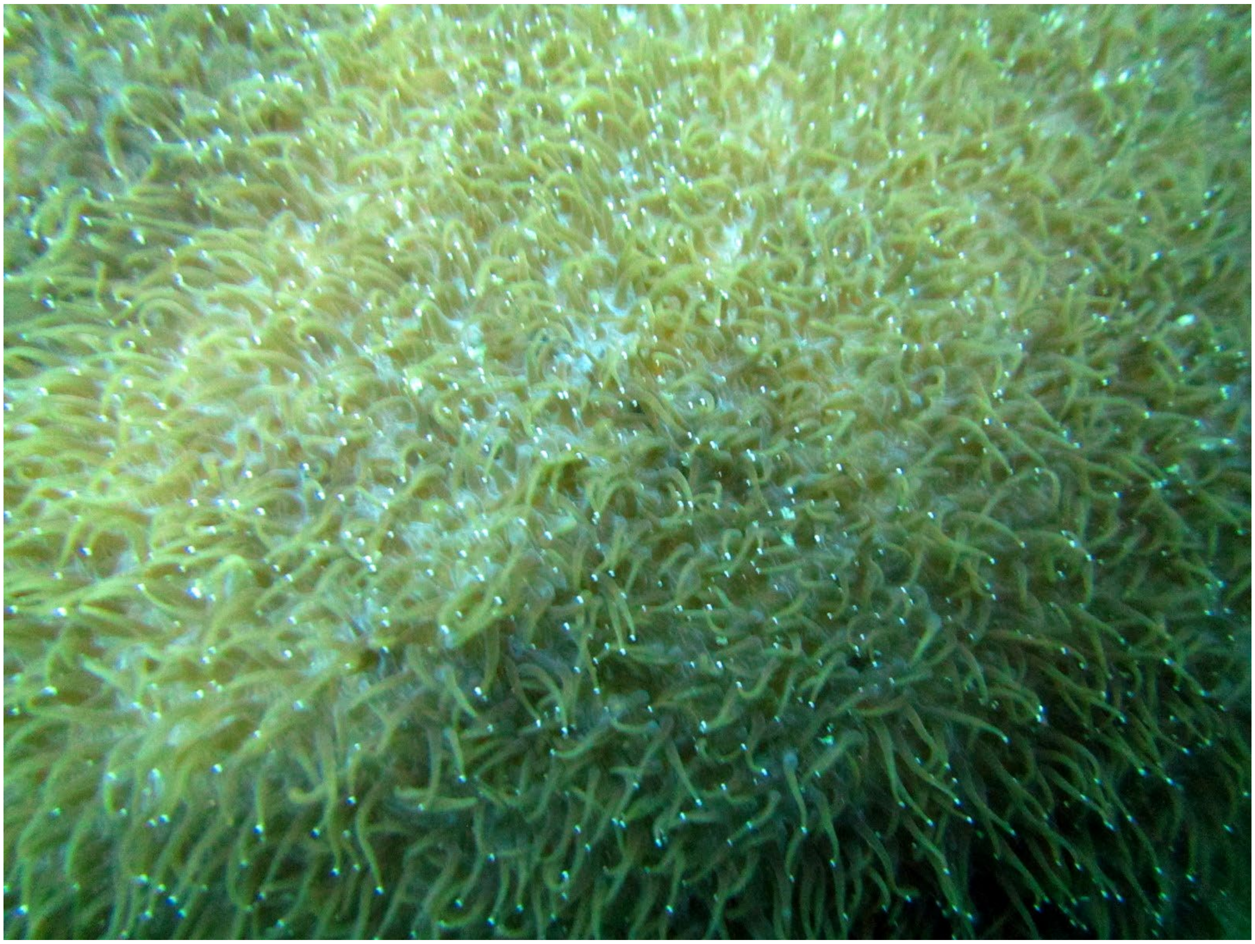
Polyphyllia novaehiberniae

Colonies are thin and sufficiently delicate to get broken. As a result, they are usually irregular shapes and in the process of regenerating. They may be arched or flat, and have many mouths that are hard to locate. The tentacles are essentially identical to those on *Polyphyllia talpina*. *Polyphyllia talpina* has a much wider range. It is long, narrow, strongly arched, thick and strong.



A colony of *Polyphyllia novaehiberniae* with tentacles partway retracted.

A colony of *Polyphyllia novaehiberniae* with tentacles extended.



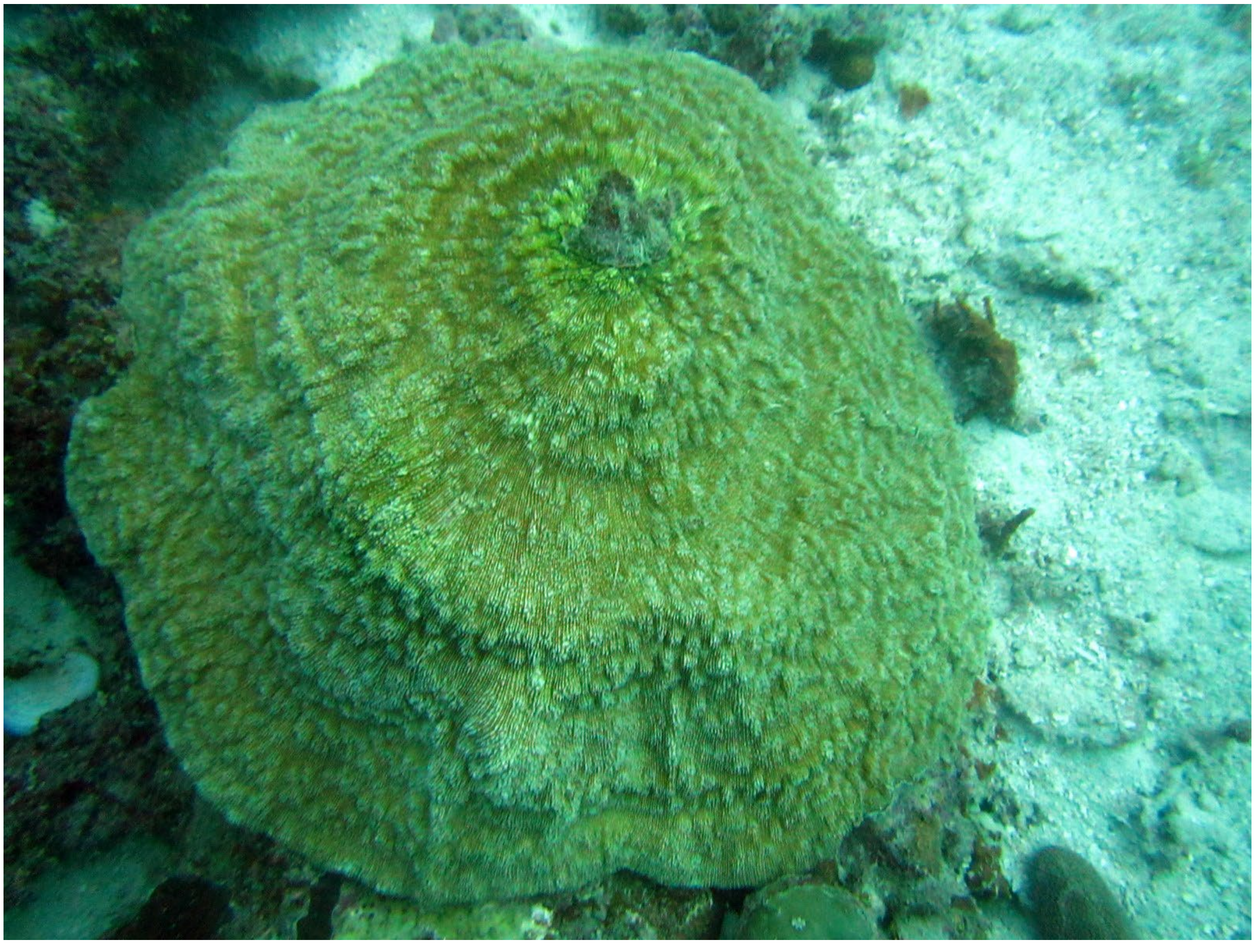
A close-up photo of *Polyphyllia novaehiberniae* with tentacles fully extended.

Halomitra

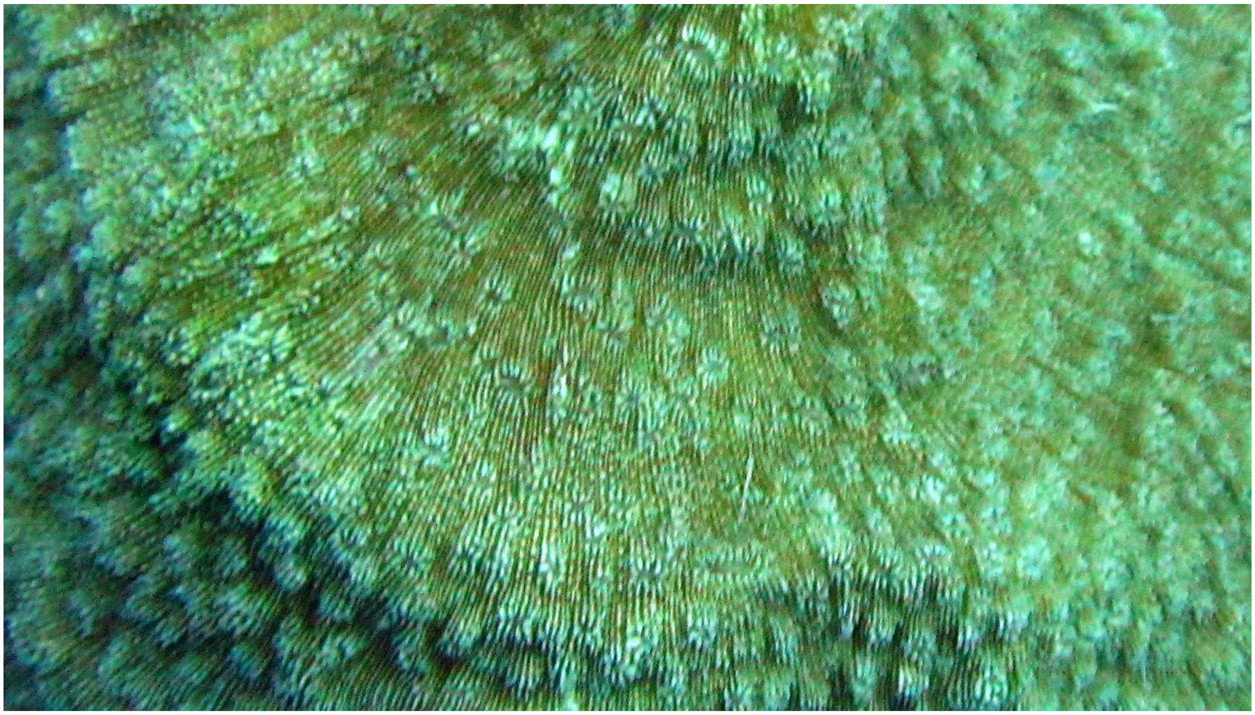
Colonies are circular, inverted bowls with many mouths and not attached. They can look like they are massive, but they are not. The upper surface has many mouths which sometimes are white, and septa that have large teeth. Usually there is a central corallite at the top of the colony, from which the septa radiate. Colonies are sufficiently thin and delicate that they are sometimes broken. *Sandalolitha* has some similarity but is oval, a low dome or flat, and has a thick skeleton that is rarely broken.

Halomitra pileus

The septal teeth do not have tiny knobs on their points and the edges of colonies are almost always purple.



A large colony of *Halomitra pileus*. The small bumps are the corallites.



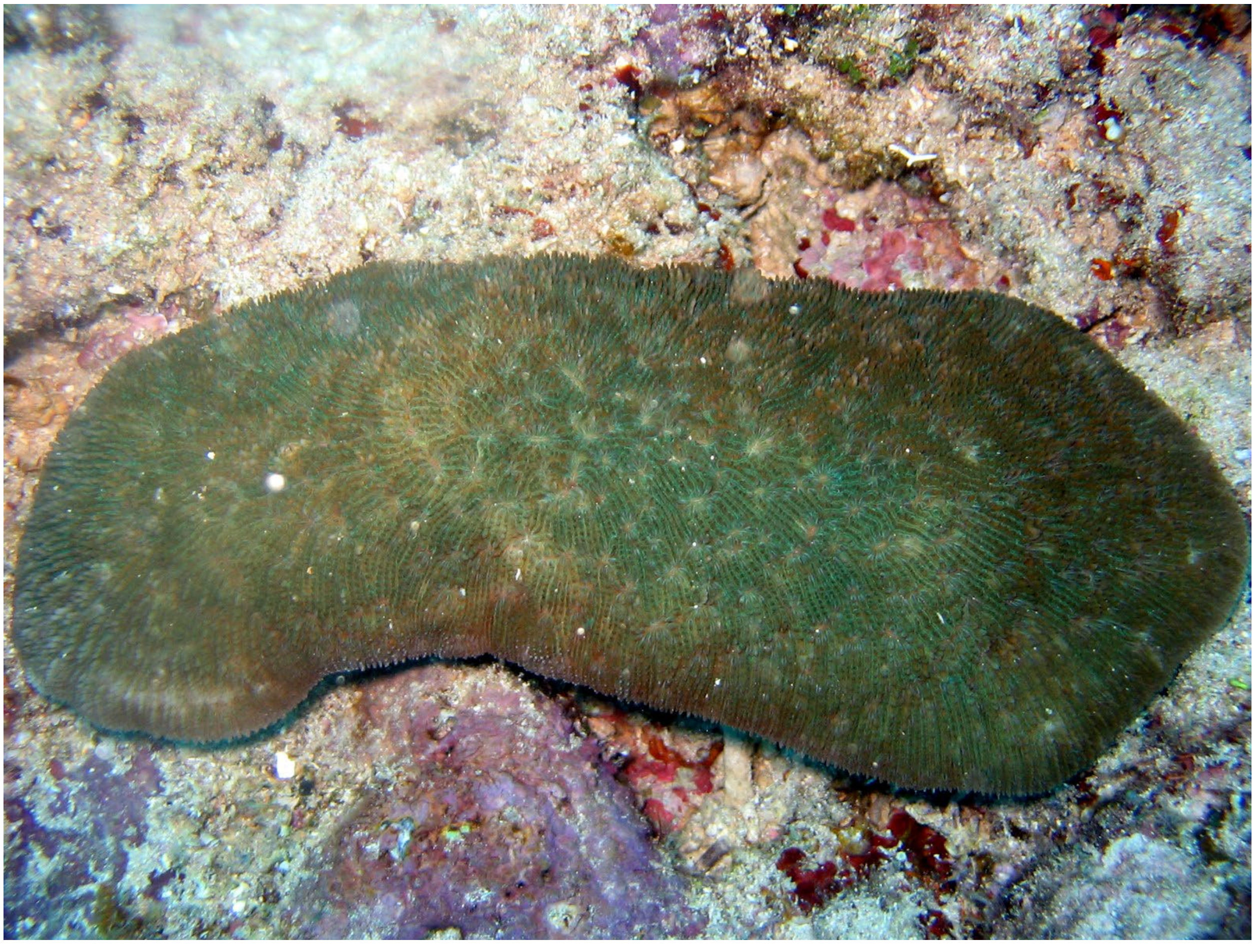
A close-up photo of *Halomitra pileus*.

Sandalolitha

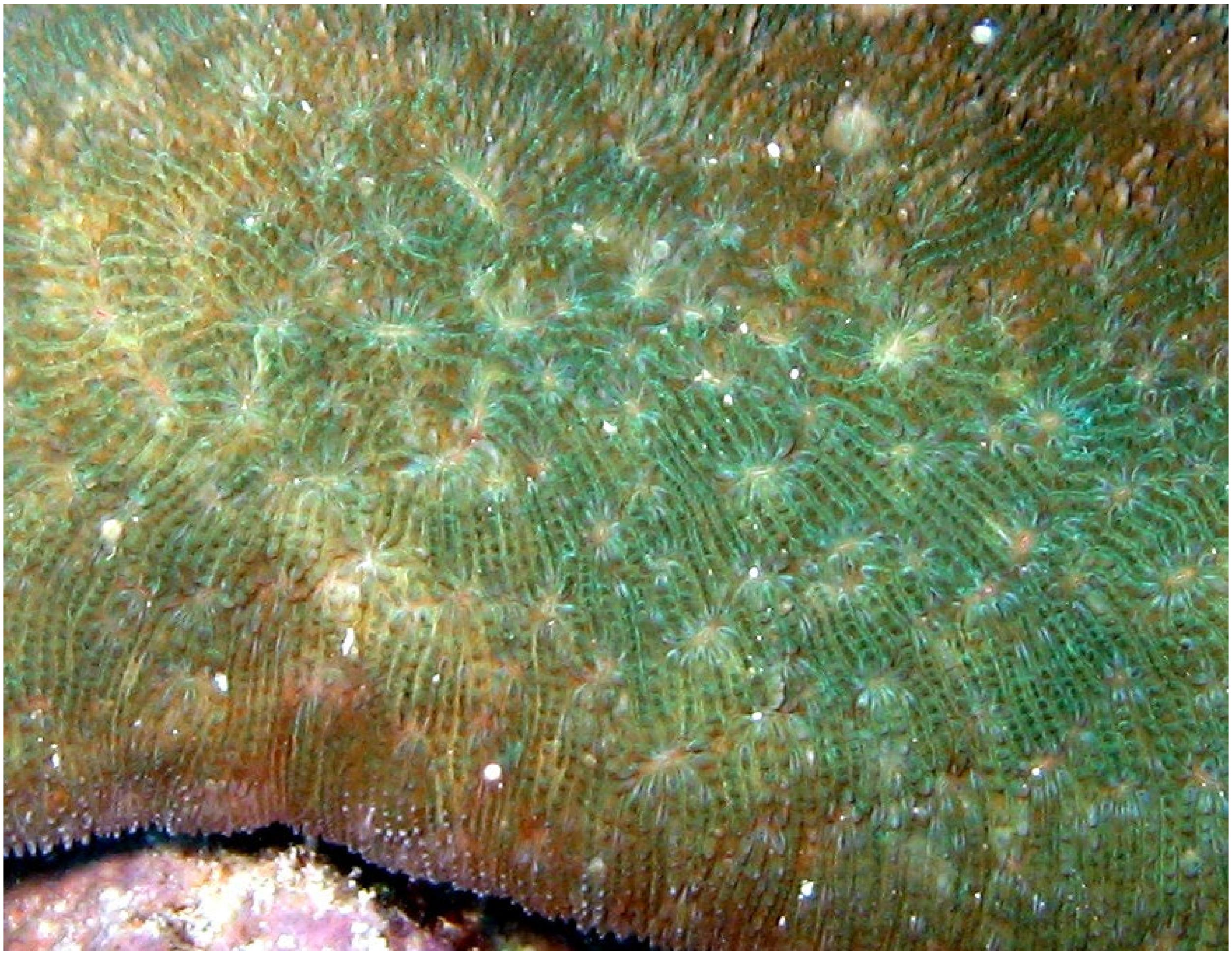
Colonies are oval, not strongly arched, thick and strong, and not attached. Species differ in whether mouths are spread evenly over the whole colony or concentrated in the center of the colony. *Halomitra* is circular, more strongly bowl-shaped, and thinner.

Sandalolitha robusta

Colonies have mouths distributed evenly all over the colony and usually a central corallite is not obvious because it is no larger than other corallites. Septa do radiate from the central corallite making it possible to locate. *Sandalolitha dentata* has mouths clustered together in the center.



A colony of *Sandalolitha robusta*.



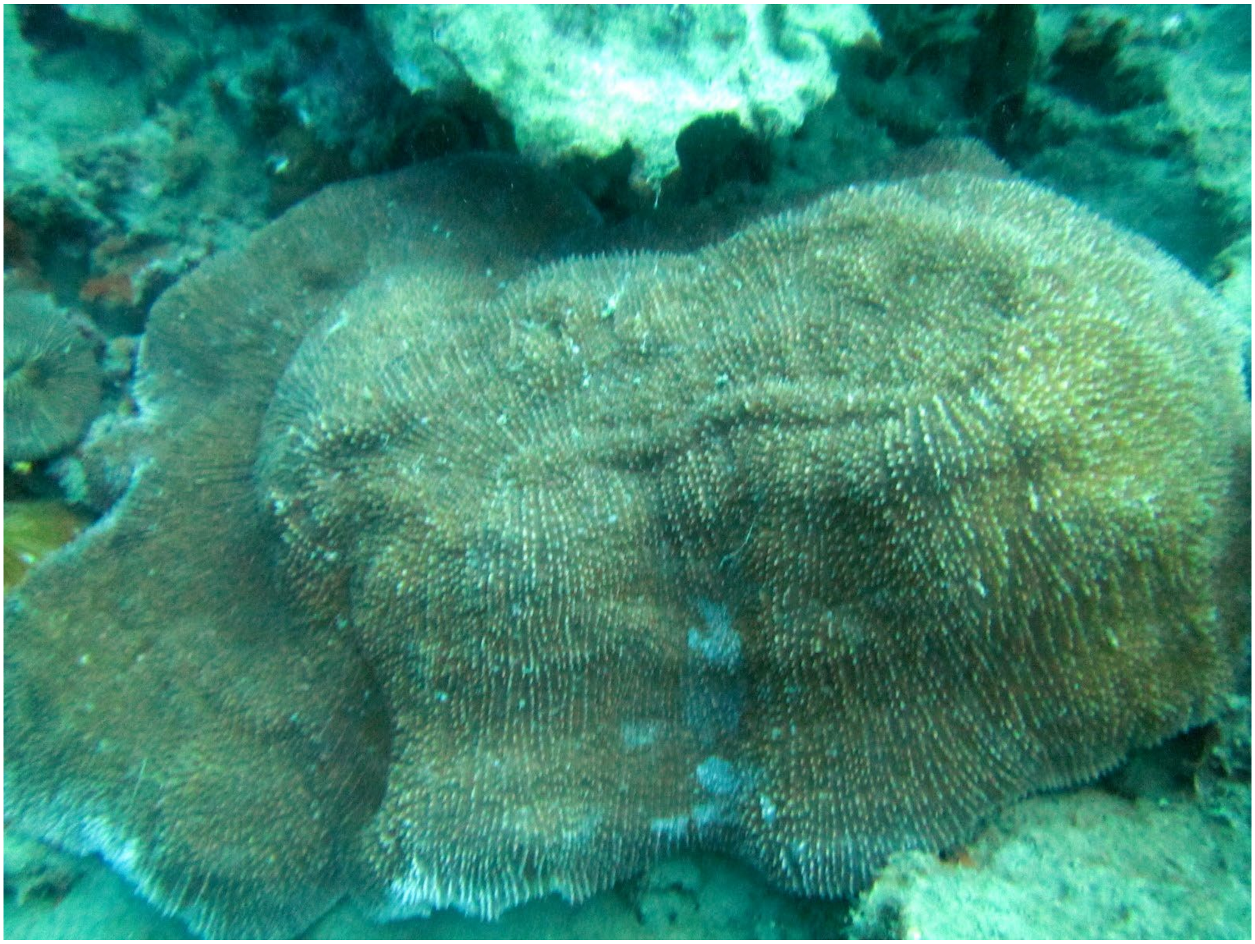
A close-up photo of *Sandalolitha robusta*.

Zoopilus

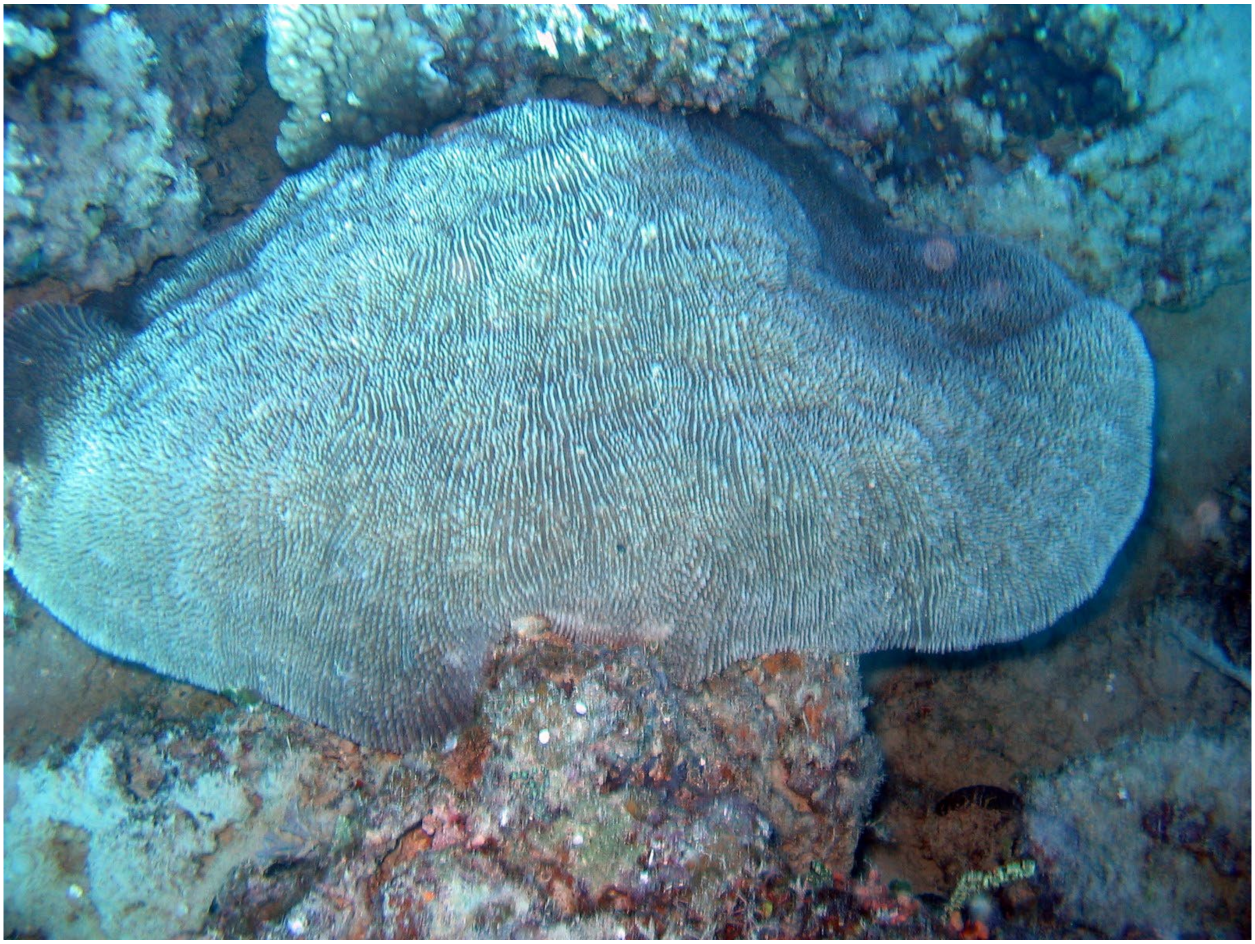
There is only one species so the characteristics of the species are those of the genus.

Zoopilus echinata

Corals form large inverted bowls that can reach at least 1 m diameter but usually are smaller. The corals are thin enough that they often break, so many are regenerating. Usually they only have one mouth, of the founder polyp. Septa have moderately large teeth. Regenerating colonies often have parallel septa on the original fragment, and septa radiating to the colony edge on the regenerating areas radiating from the edges of the original fragment. *Sandalolitha* is oval, low, and thick so it does not fragment. *Halomitra* has many mouths which may be white and is a bit thicker and so fragments less often.

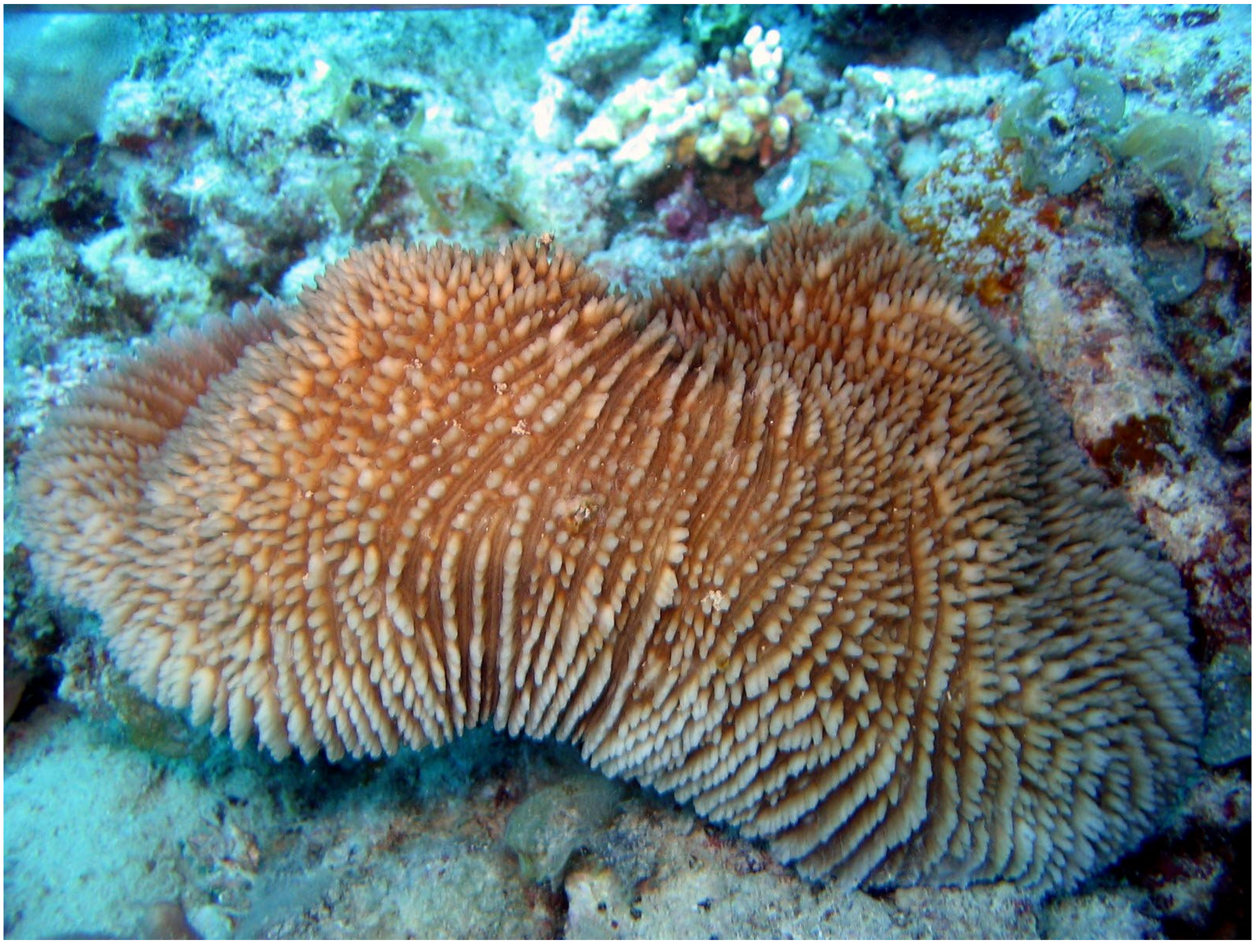


A large, distorted *Zoopilus echinata* coral.



A *Zoopilus echinata* coral, with no mouths visible.

A small *Zoopilus echinata* coral with septa showing the pattern of regenerating around the edges of a central fragment.



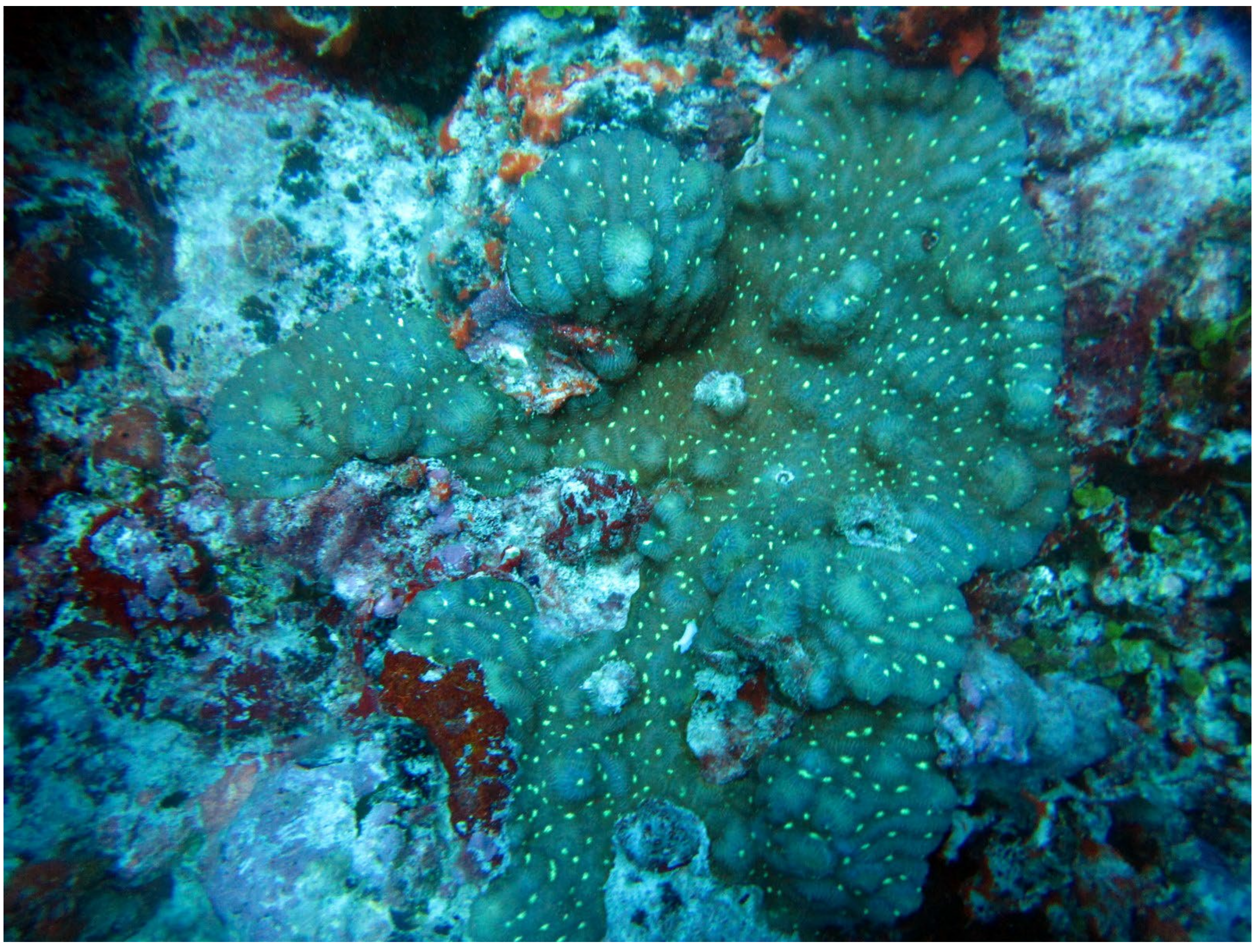
A close-up photo of a small *Zoopilus echinata* coral.

Merulina

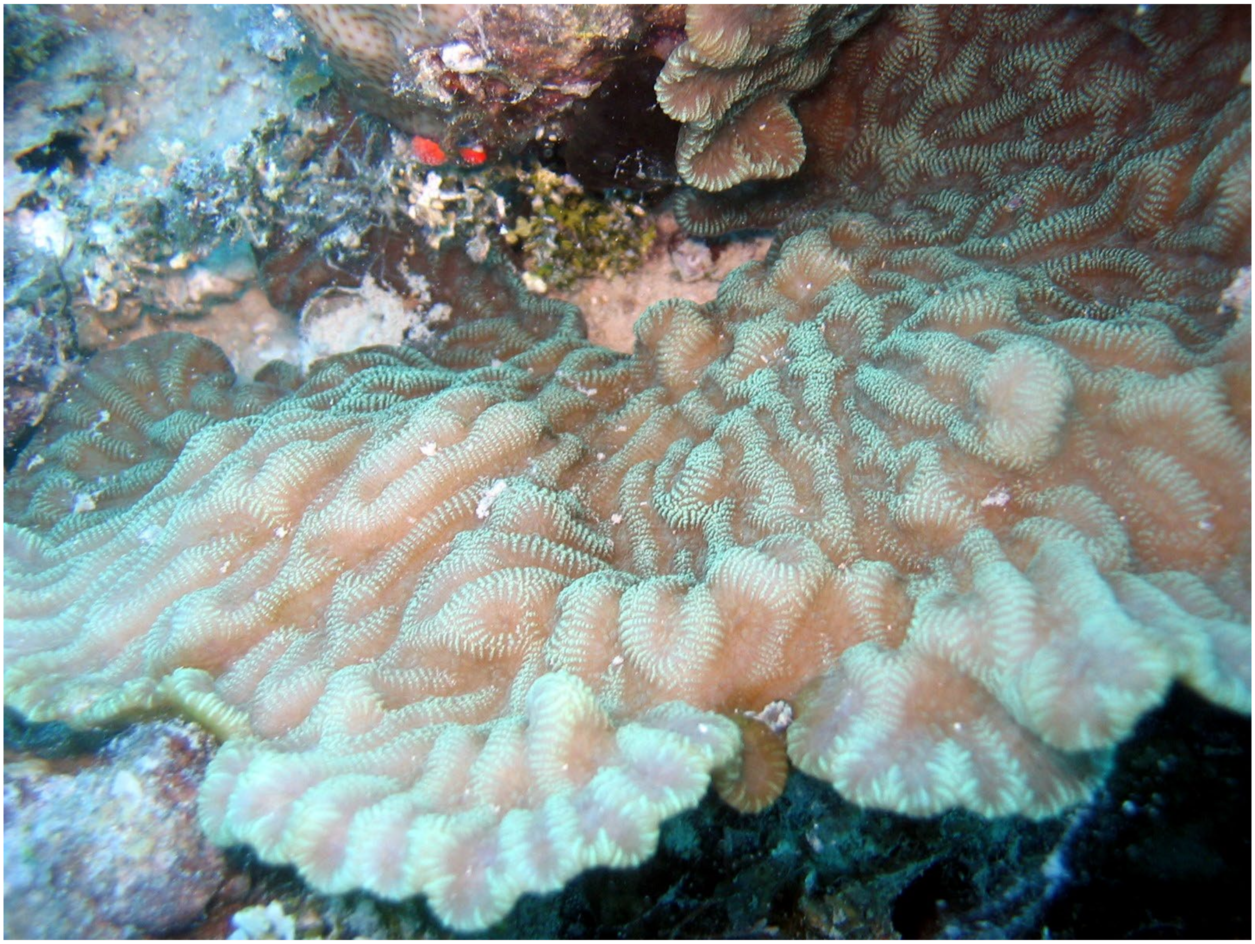
Colonies are usually foliose (plates) and can be at almost any angle, horizontal, angled or near vertical. Sometimes colonies are encrusting. Some colonies have knobs or columns, but they are irregular in shape and usually not very thick. Plates have radiating ridges on their upper surface and are smooth on their lower surface. The ridges divide with the widening fan of the plate, but also do some fusing so they anastamose. Tiny ridges going crosswise on the ridges are septa, the corallite mouths are in the valleys. Different species of *Merulina* differ in how thick the ridges are. Columns are much less thick and uniform than the columns on *Scapophyllia*.

Merulina ampliata

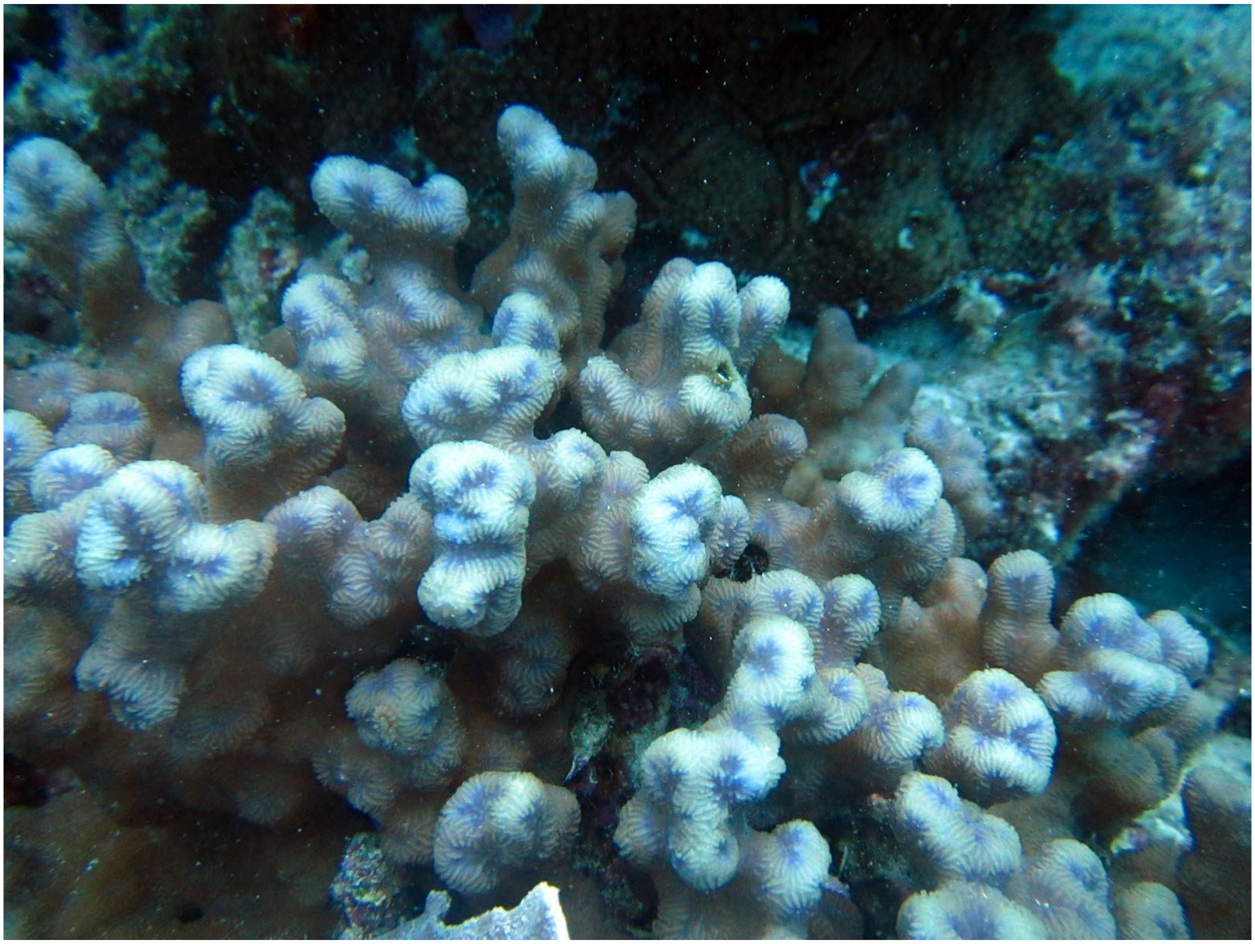
Colonies have thick, rounded ridges. *Merulina speciosa* has thinner ridges.



An encrusting colony of *Merulina ampliata* with a few knobs. The yellow spots are mouths.



A close-up of a colony of *Merulina ampliata* showing the thick, rounded ridges.



A close-up photo of knobs on *Merulina ampliata*. The blue areas are the valleys where the polyps are.

Merulina speciosa This species used to be referred to as *Merulina scabricula*.

Colonies have thin plates with thin ridges on them. The ridges are thinner than on *Merulina ampliata*. The type specimen of *Merulina scabricula* is branching, wth thick rdges so it is most similar to *Merulina ampliata*. The type specimen of *Merulina speciosa* has small thiin plates with thiin ridges, as does this coral. The type specimen of *Merulina scabricula* is branching with wide, rounded ridges.

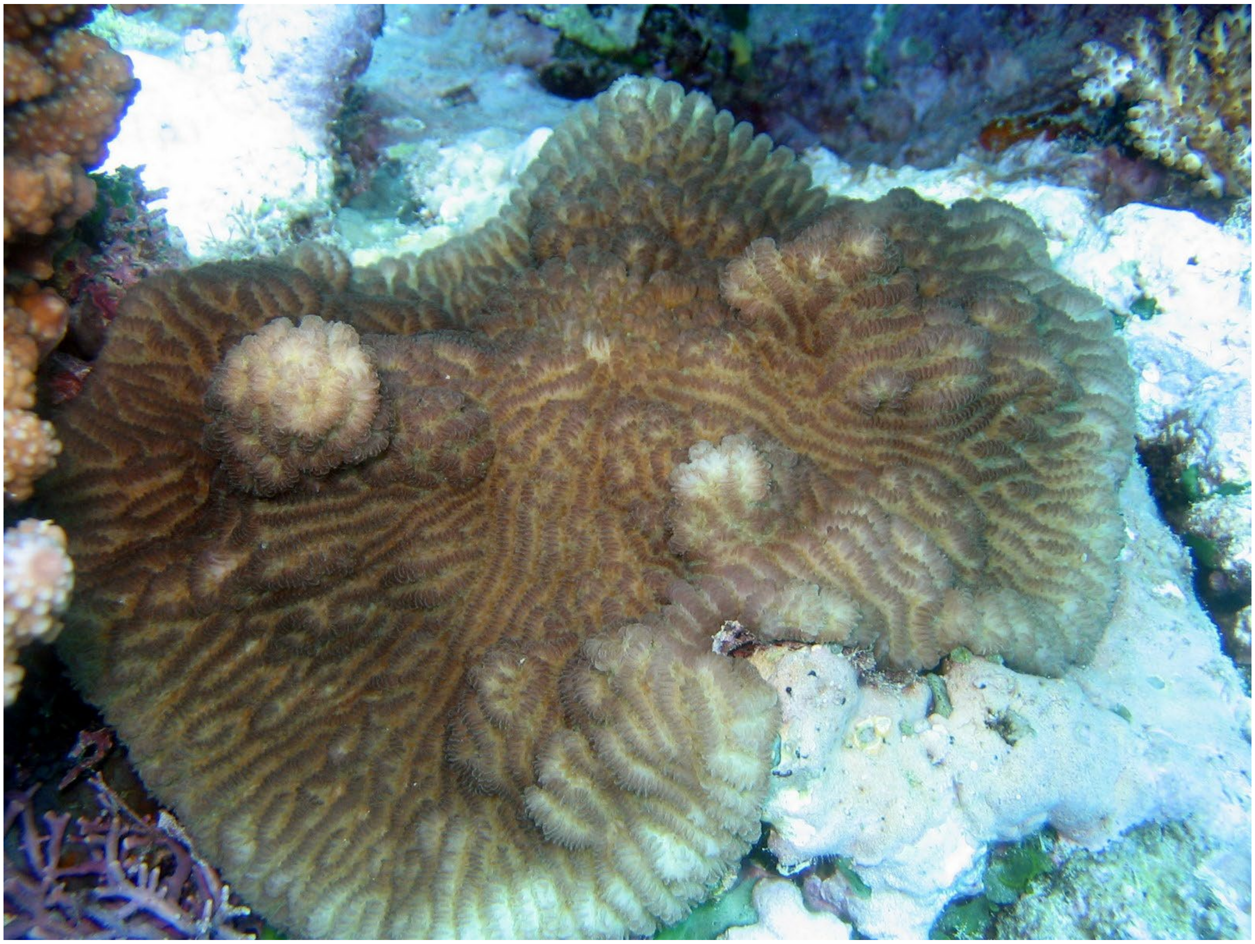
A close photo of a colony of *Merulina speciosa*.

Scapophyllia

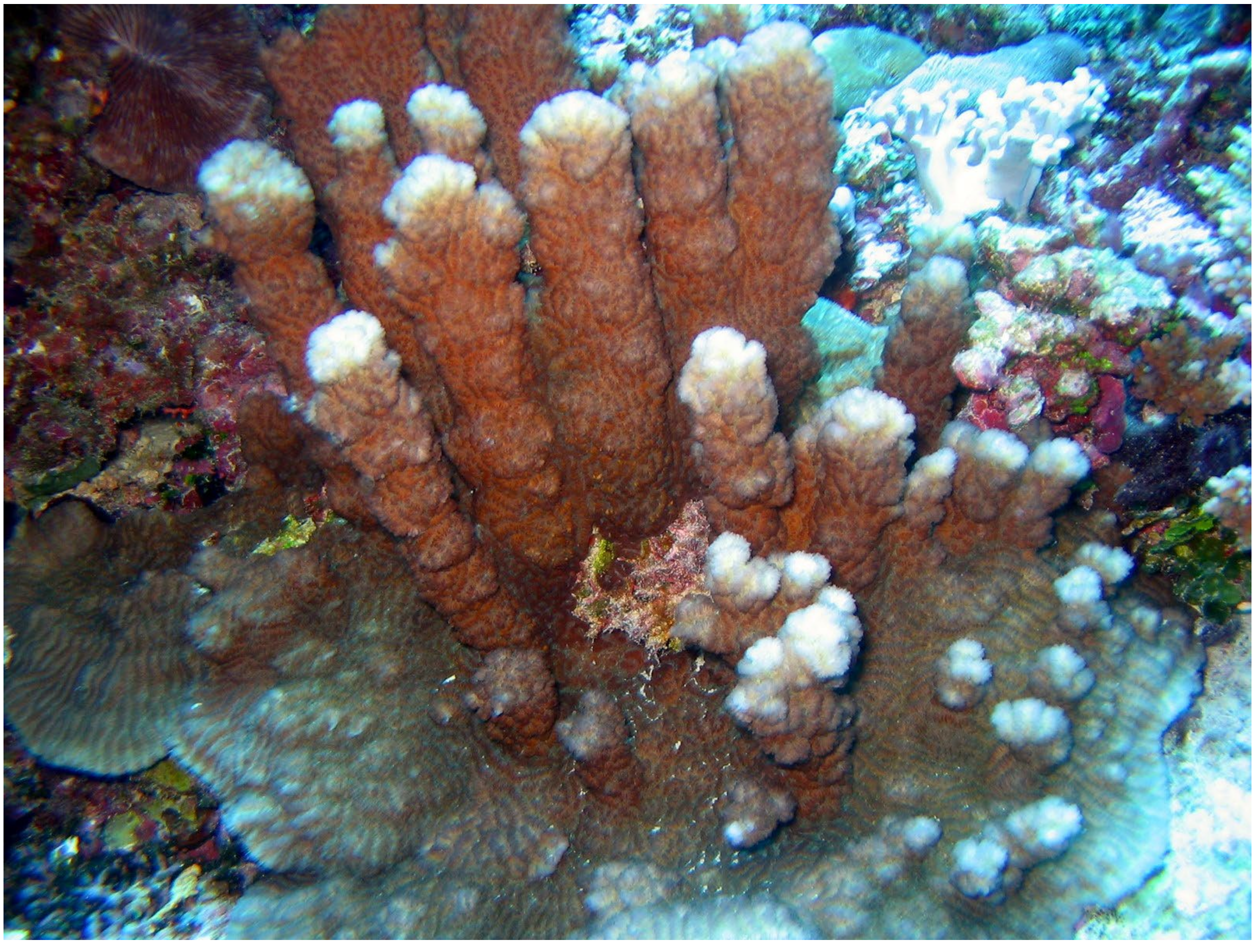
There is only one species in *Scapophyllia* so the charachteristics of the genus are those of the species.

Scapophyllia cylindrica

Colonies are usually encrusting with knobs or columns but could be just encrusting or only columns. Surfaces are covered with ridges that anastamose. The ridges are very similar to those on *Merulina*, but the knobs and columns on *Merulina* are much smaller and more irregular. The columns are more cylindrical and regular than in most other columnar species except *Pavona clavus*, and colonies are much smaller than *Pavona clavus* can get.



A colony of *Scapophyllia cylindrica*.



A colony of *Scapophyllia cylindrica* showing columns.

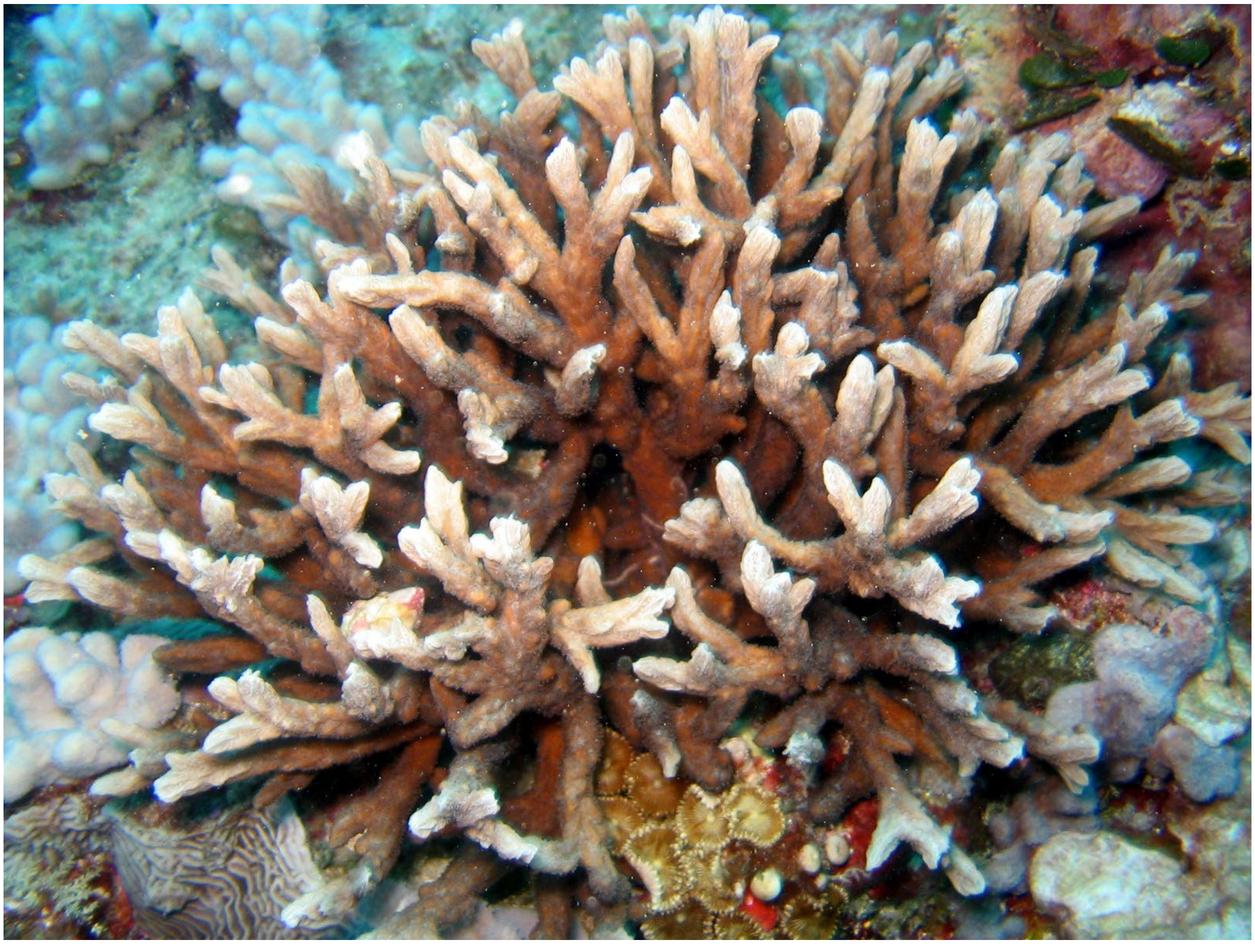
A close-up photo of a colony of *Scapophyllia cylindrica*. The little bit of plate is quite unusual.

Hydnophora

Colonies can be branching, massive, or encrusting, and single colonies can have an encrusting base with thick branches. Surfaces have bumps or ridges called "hydnophores." These are short segments of the walls between corallites. So polyp mouths are between the bumps and septa run up the sides of bumps. Tentacles can more or less obscure the hydnophores if extended. Species differ in colony shape, the shape and size of hydnophores and tentacle size. Almost nothing looks like *Hydnophora*.

Hydnophora rigida

Colonies are branching. Hydnophores are oval on branch sides and elongated and sharp near branch tips. There are no corallites on the branch tips. Sometimes tentacles obscure the hydnophores. This is the only common branching species of *Hydnophora*. *Hydnophora* cf. *grandis* has thicker branches.

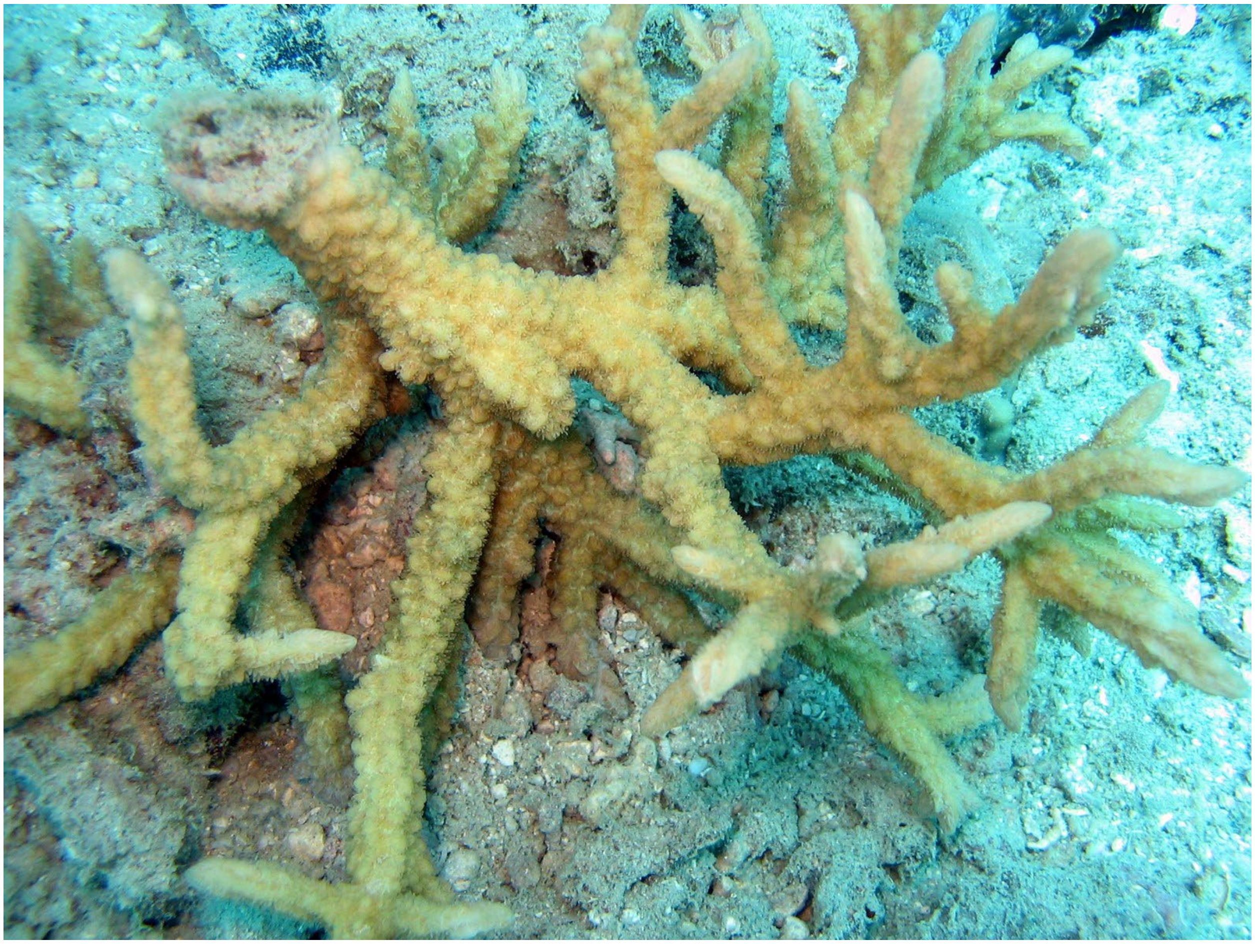


A colony of *Hydnophora rigida*.

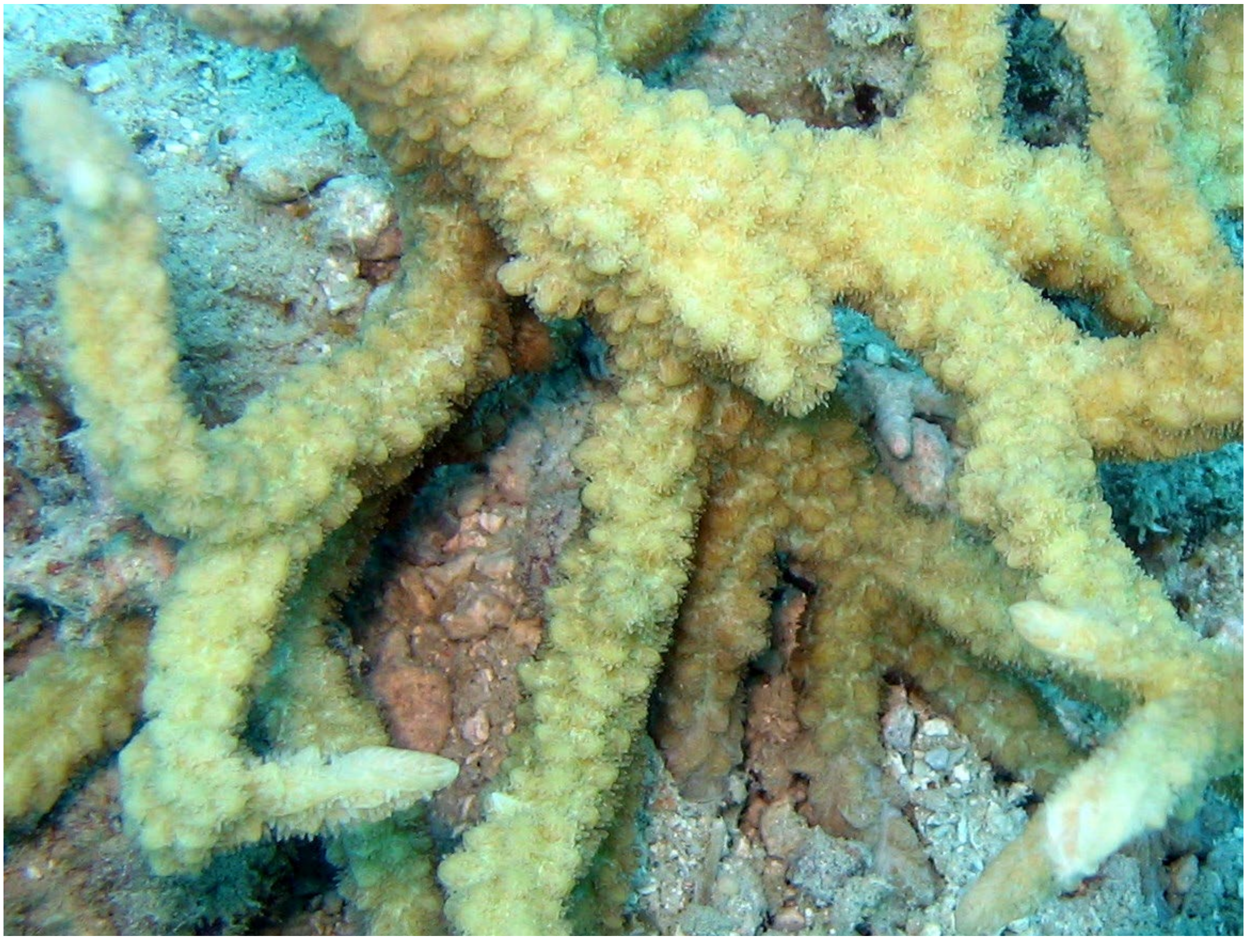
A closer photo of *Hydnophora rigida*.

Hydnophora cf. grandis sensu Veron, 2000

This species has thick branches and hydnophores on branch sides are circular or short ovals. The branches are thicker and hydnophores are more circular than on *Hydnophora rigida*. Veron et al (2020) write that this species is actually unnamed and they will be naming and describing it. *Hydnophora rigida* has thinner branches.



A colony of *Hydnophora* cf. *grandis sensu* Veron, 2000.



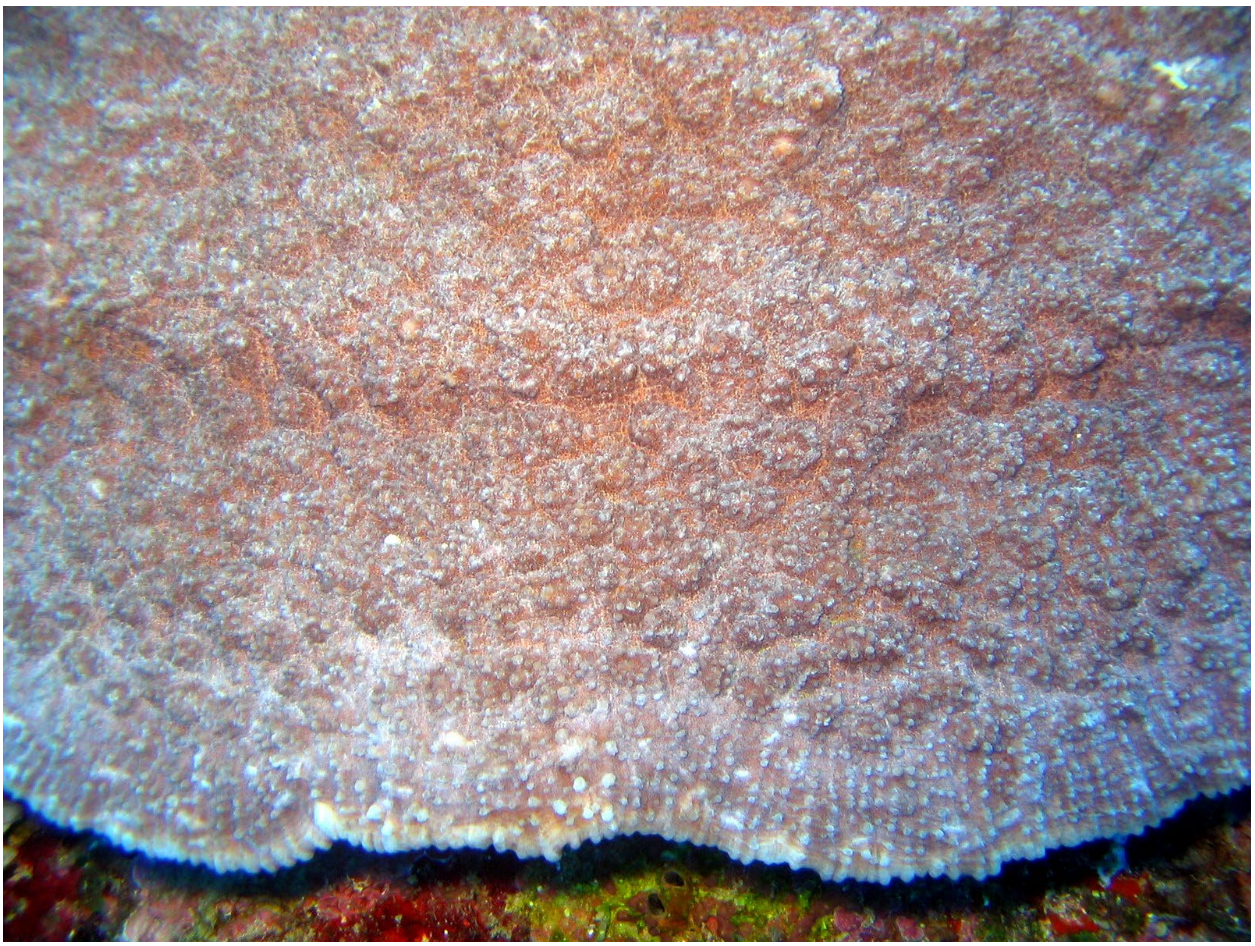
A closer photo of *Hydnophora* cf. *grandis sensu* Veron, 2000.

Oxypora

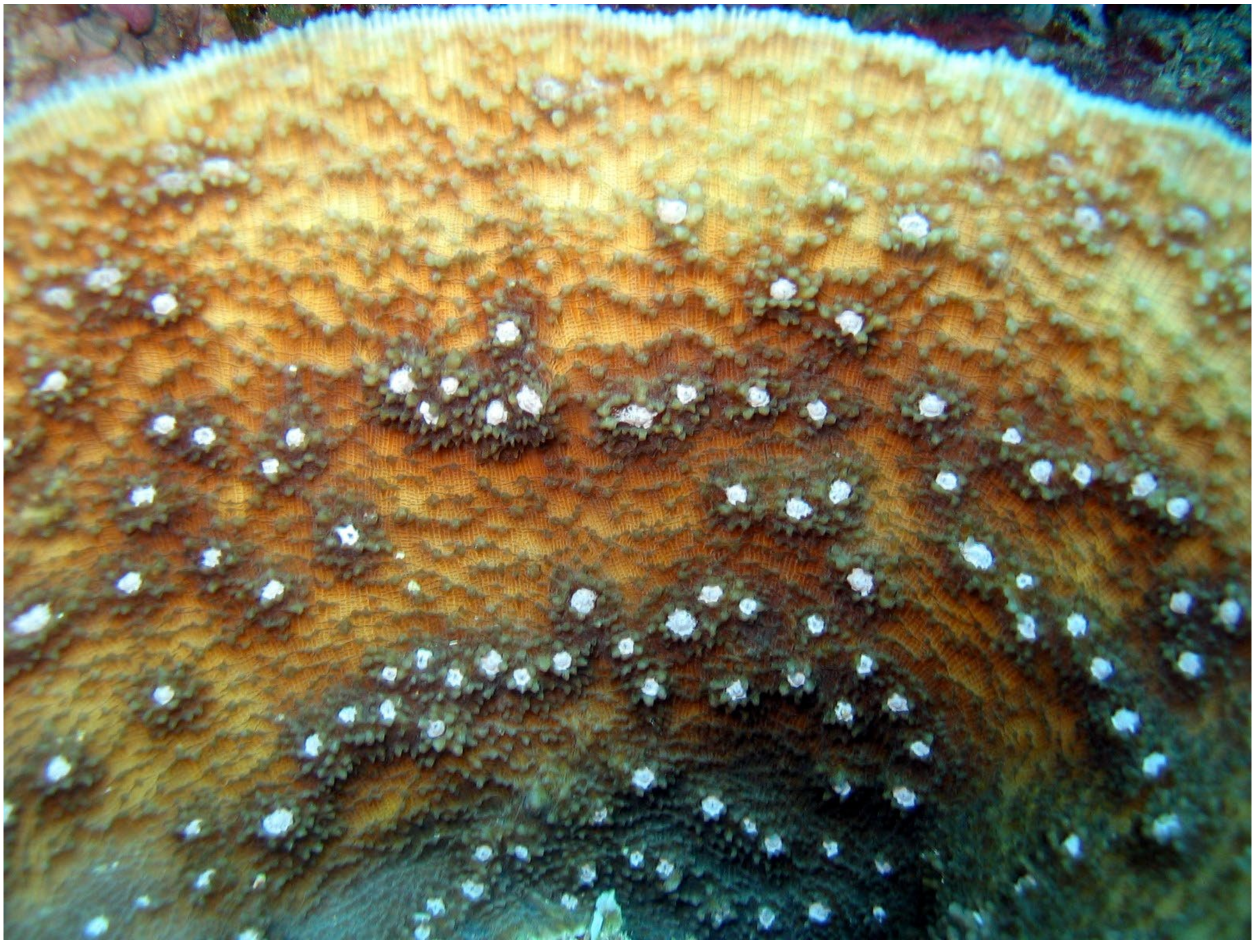
Colonies are thin plates covered with lots of small spines. Corallites are slight lumps in the spines. Sometimes the polyp mouths are a different color making it easy to spot the polyps. Species differ in the amount of spines and their uniformity and size of the spines. One species of *Oxypora* looks much like one species of *Echinophyllia*, because they both have lots of spines and the corallites are hard to pick out. But the corallites are larger on that species of *Echinophyllia* than the *Oxypora* that looks like it.

Oxypora lacera

Colonies have many small, irregular spines, which corallites also have, making it hard to spot the corallites. Spines are much thicker on *Oxypora crassispinosa*. Corallites are smaller and project less than on *Echinophyllia aspera*.



A colony of *Oxypora lacera* where corallites are not easy to spot.



A colony of *Oxypora lacera* in which the polyp mouths are white, making it easy to locate them. Also, the spines are larger around corallites, which is unusual.

Oxypora cf. crassispinosa

Colonies have very large spines which can be more like knobs, which are often in radiating rows. The spines are larger than on other *Oxypora*.

A close-up photo of *Oxypora* cf. *crassispinosa*.

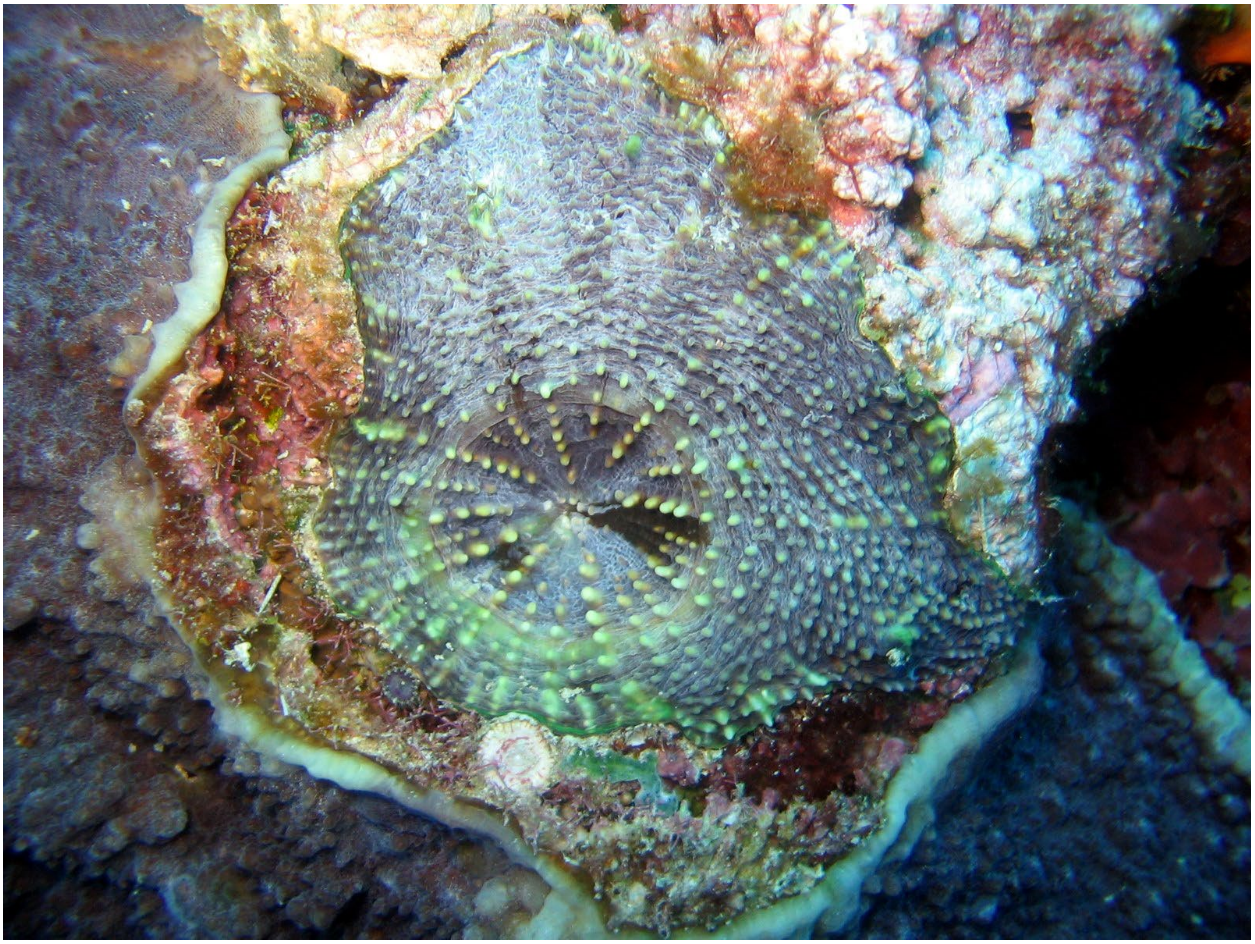
Echinomorpha

There is only one species so the characteristics of the genus are those of the species.

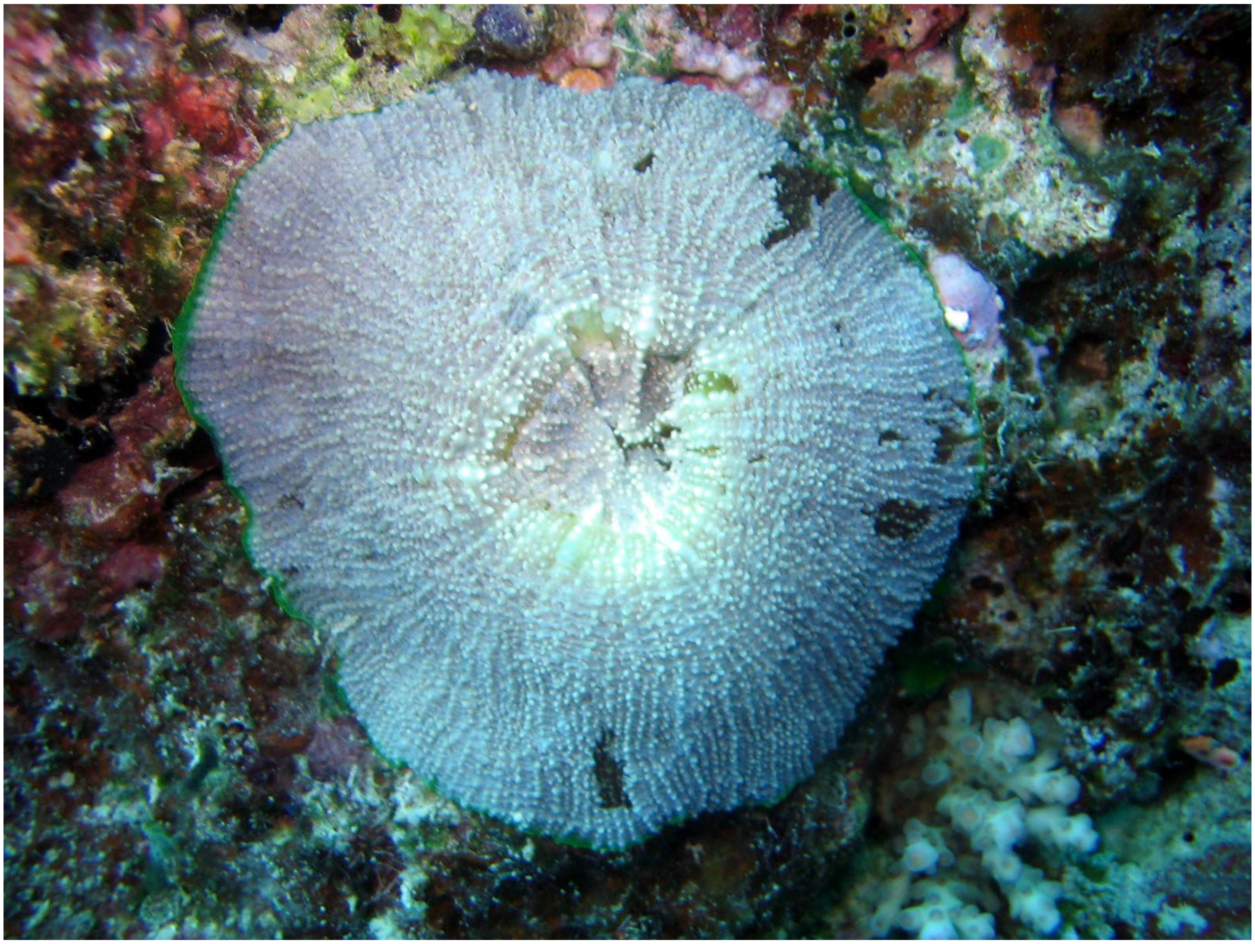
Echinomorpha nishihirai

Corals are always encrusting and usually solitary though they can have multiple polyps. They are less than 10 cm diameter. Each corallite has a large, circular, slightly depressed center, which is the inside of the corallite. The majority of the coral is the outside which slopes gradually to the edge of the colony. The coral has lots of small spines, and can have concentric tiny folds of tissue hung on the spines. This is not a common coral. *Parascolemia vitiensis* is similar, but the outer part is a smaller proportion of the colony, it has more continuous costae outside the center, and it doesn't have concentric tissue rings.

An *Echinomorpha nishihirai* coral with concentric circles of tissue folds.



An *Echinomorpha nishihirai* coral.



An *Echinomorpha nishihirai* coral.

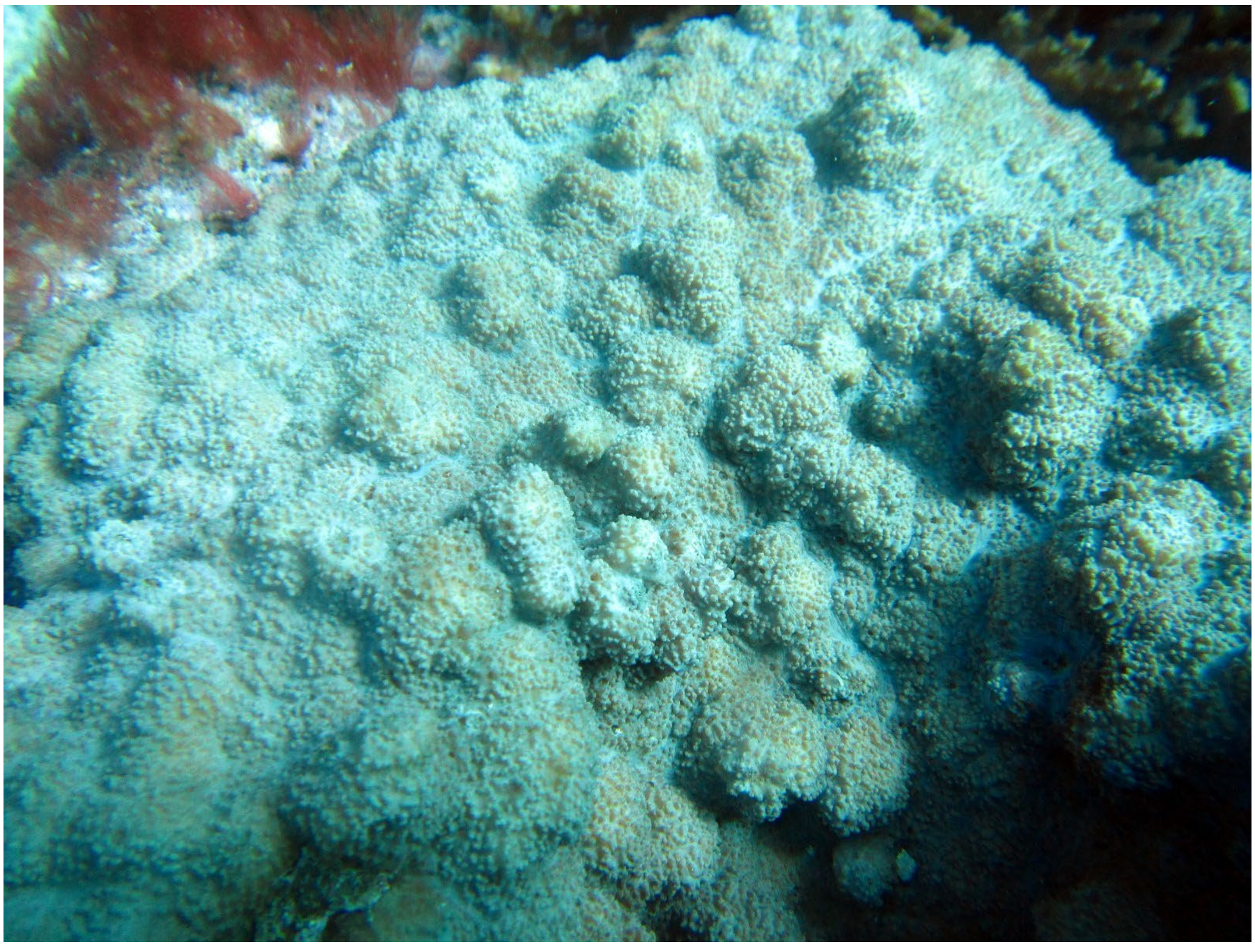
An *Echinomorpha nishihirai* colony with multiple polyps.

Echinophyllia

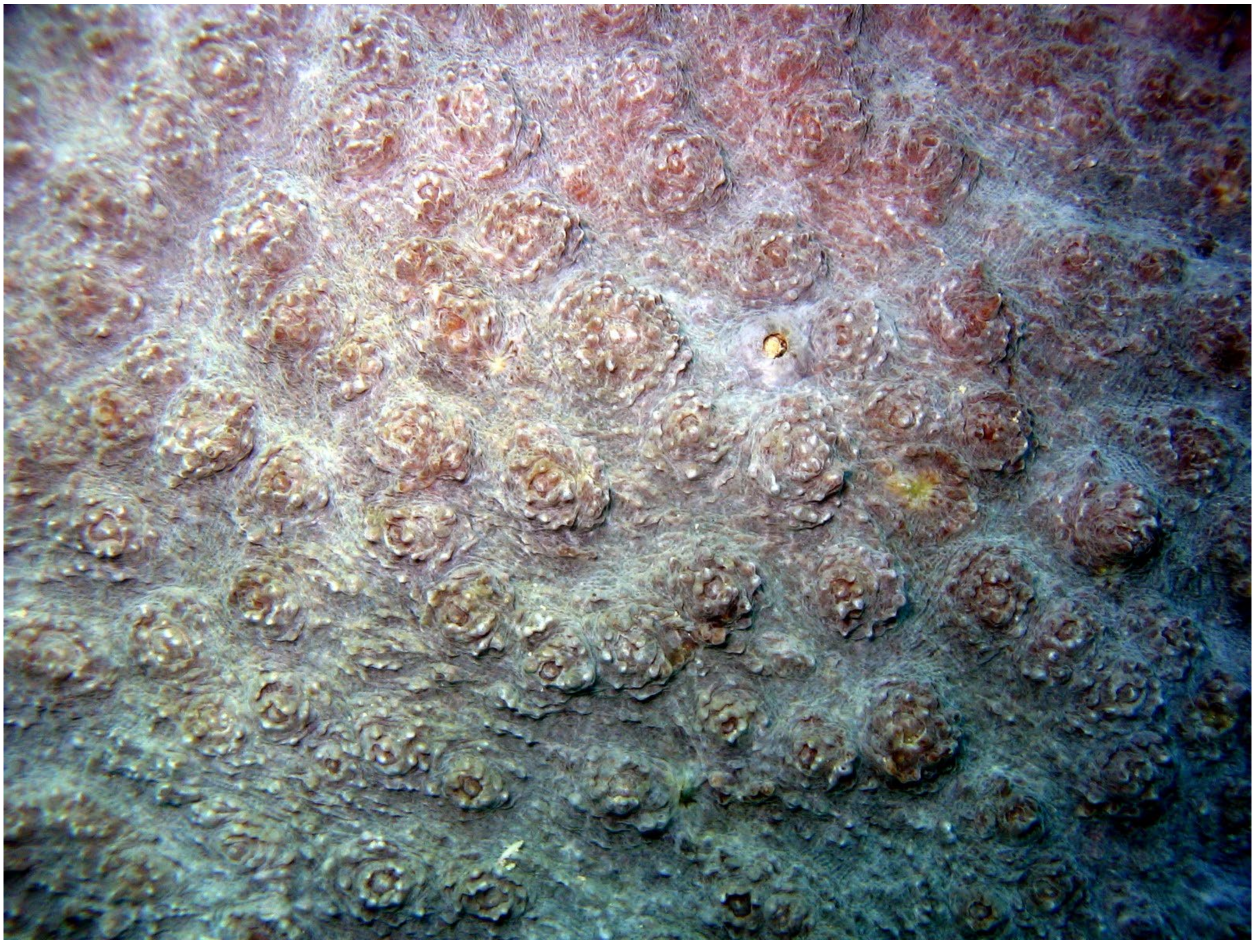
“Echino” means spiny, and some species are certainly spiny, but a few are not. There is no single feature of the genus that can distinguish it in the water from similar genera such as *Oxypora*. It is necessary to learn the species, and that tells you the genus.

Echinophyllia aspera

Colonies are thin plates with spiny surfaces. Corallites are often rounded and projecting. Corallites are a little larger and easier to see than on *Oxypora*. Corallites project farther on *Echinophyllia orpheensis* and are easier to see.



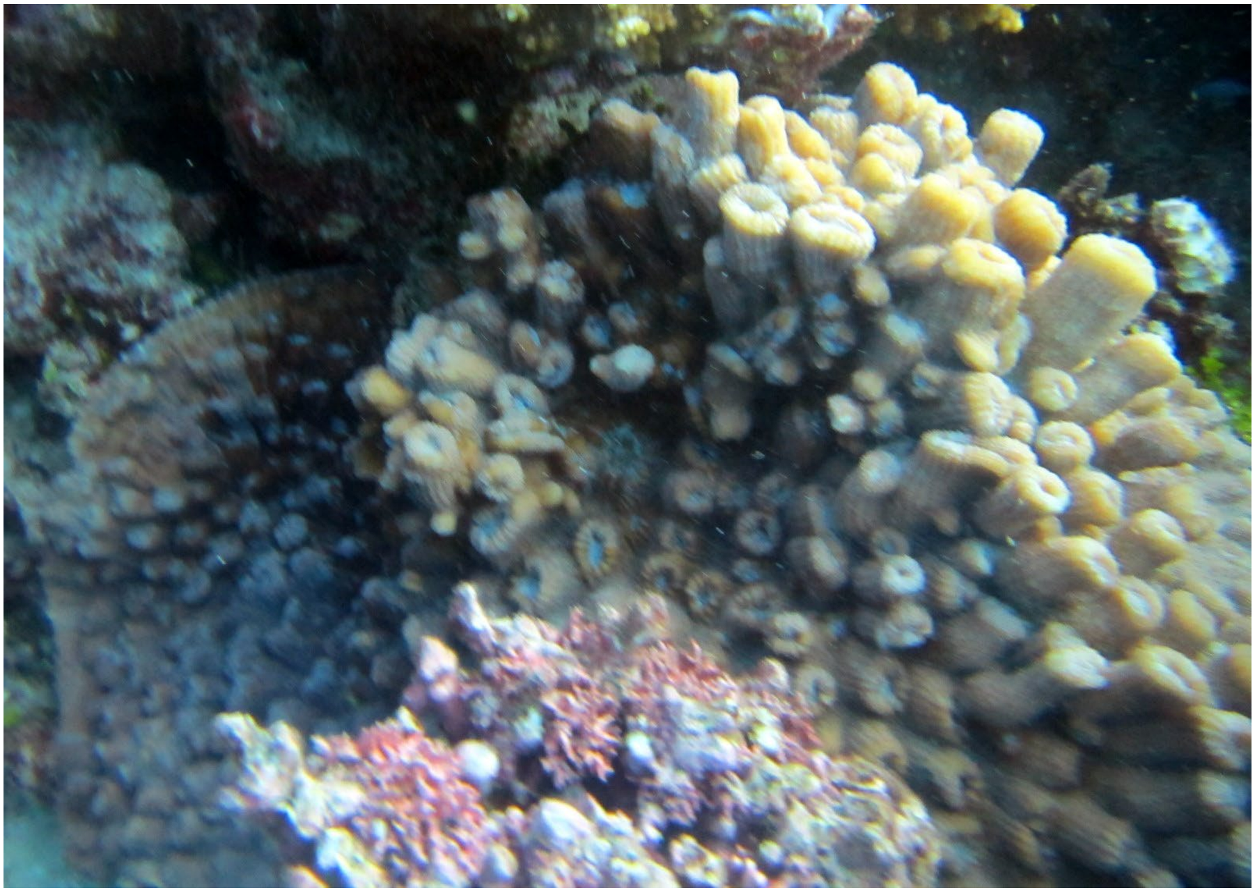
A colony of *Echinophyllia aspera*.



A colony of *Echinophyllia aspera* in which corallites don't extend far. Without a color difference they are harder to spot. Often there is no color difference.

Echinophyllia orpheensis

Colonies have corallites about the diameter of a small finger that sometimes project a significant distance from the colony surface. Corallites on *Echinophyllia aspera* are short and spiny and hard to see.



A colony of *Echinophyllia* orpheensis.

A close-up photo of *Echinophyllia orpheensis*.

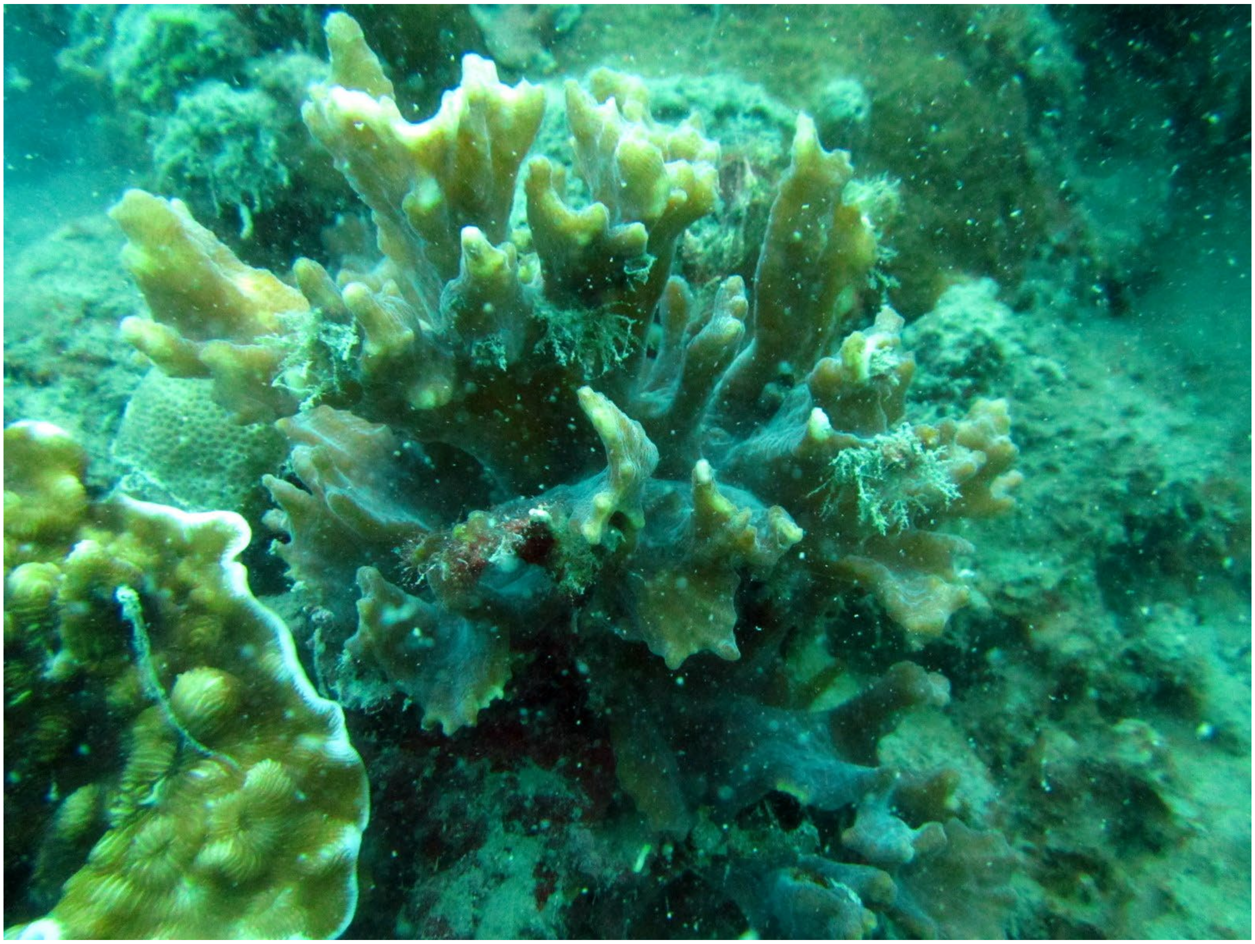
Pectinia

Colonies may have thin plates with "spires" around the edge which have thin costae on them. In some species corallites can be on the sides of spires, and some species only have spires not plates, and thus are branching. Almost nothing else looks like *Pectinia*.

Pectinia paeonia

Colonies have thin basal plates with spires growing upward from the edges of the plates. Colonies can be highly variable in shape. *Pectinia alcicornis* has larger corallites, *Pectinia teres* has more spire development.

A colony of *Pectinia paeonia*.



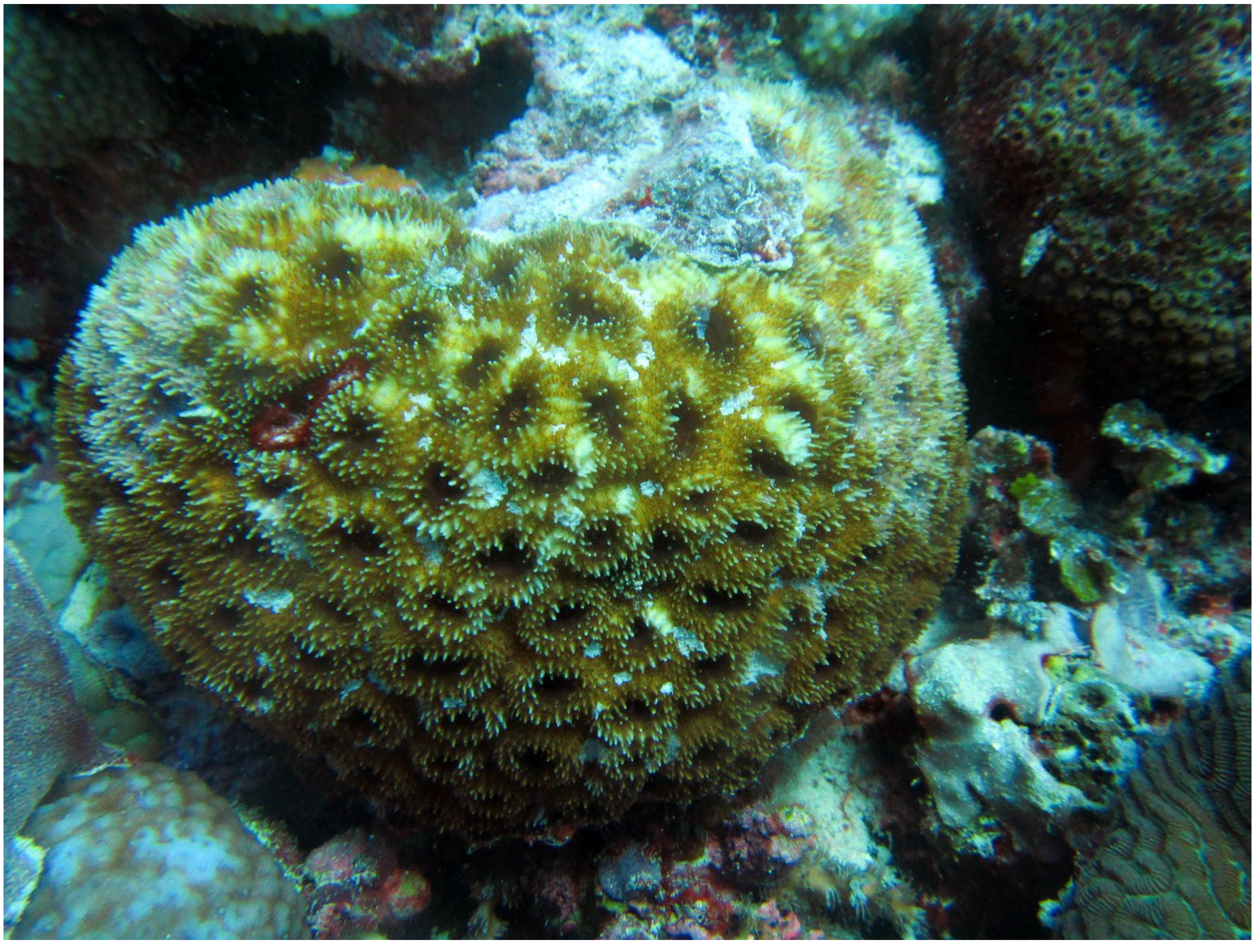
A colony of *Pectinia paeonia*.

Acanthastrea

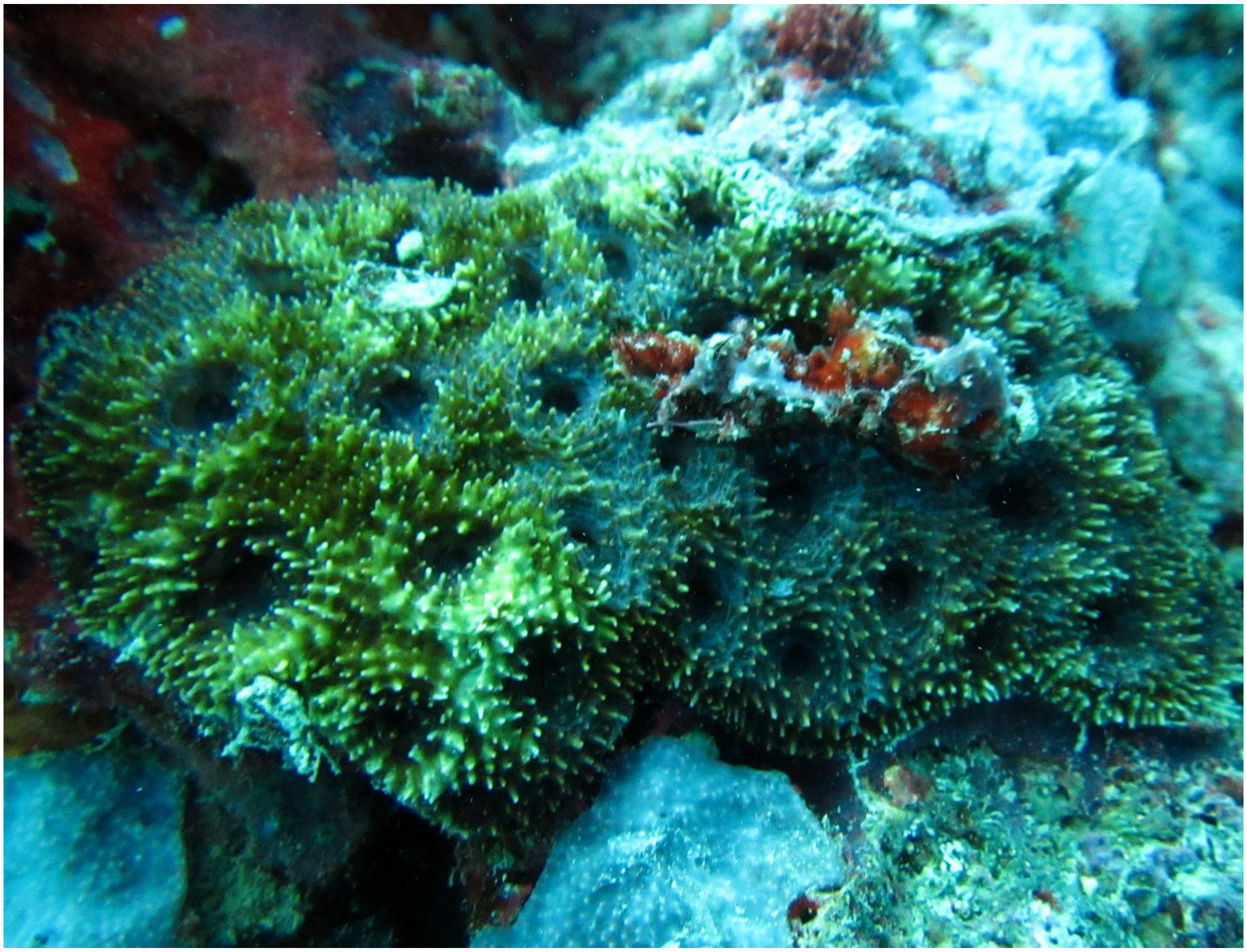
Most species are encrusting, but at least one is massive. Colonies have moderate sized corallites, about the diameter of a thumb or finger. Corallite centers are concave. The width of the wall between corallites varies between species. *Favia* and *Favites* are usually much less spiny.

Acanthastrea brevis   Vulnerable

Colonies are usually small and encrusting. This species has longer spines than other species. It is less fleshy than *Acanthastrea echinata*, which usually has small, concentric tissue folds.



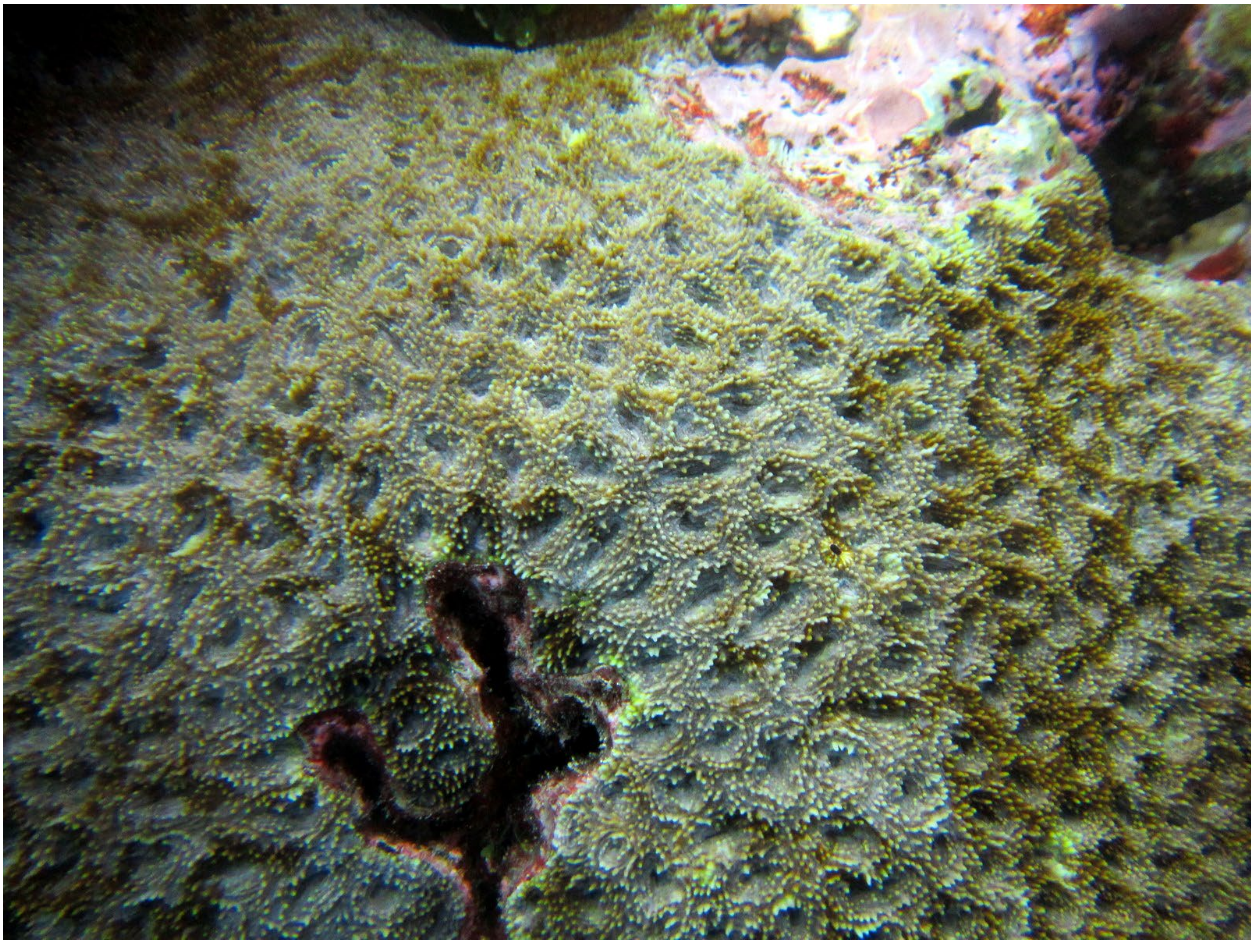
A colony of *Acanthastrea brevis*.



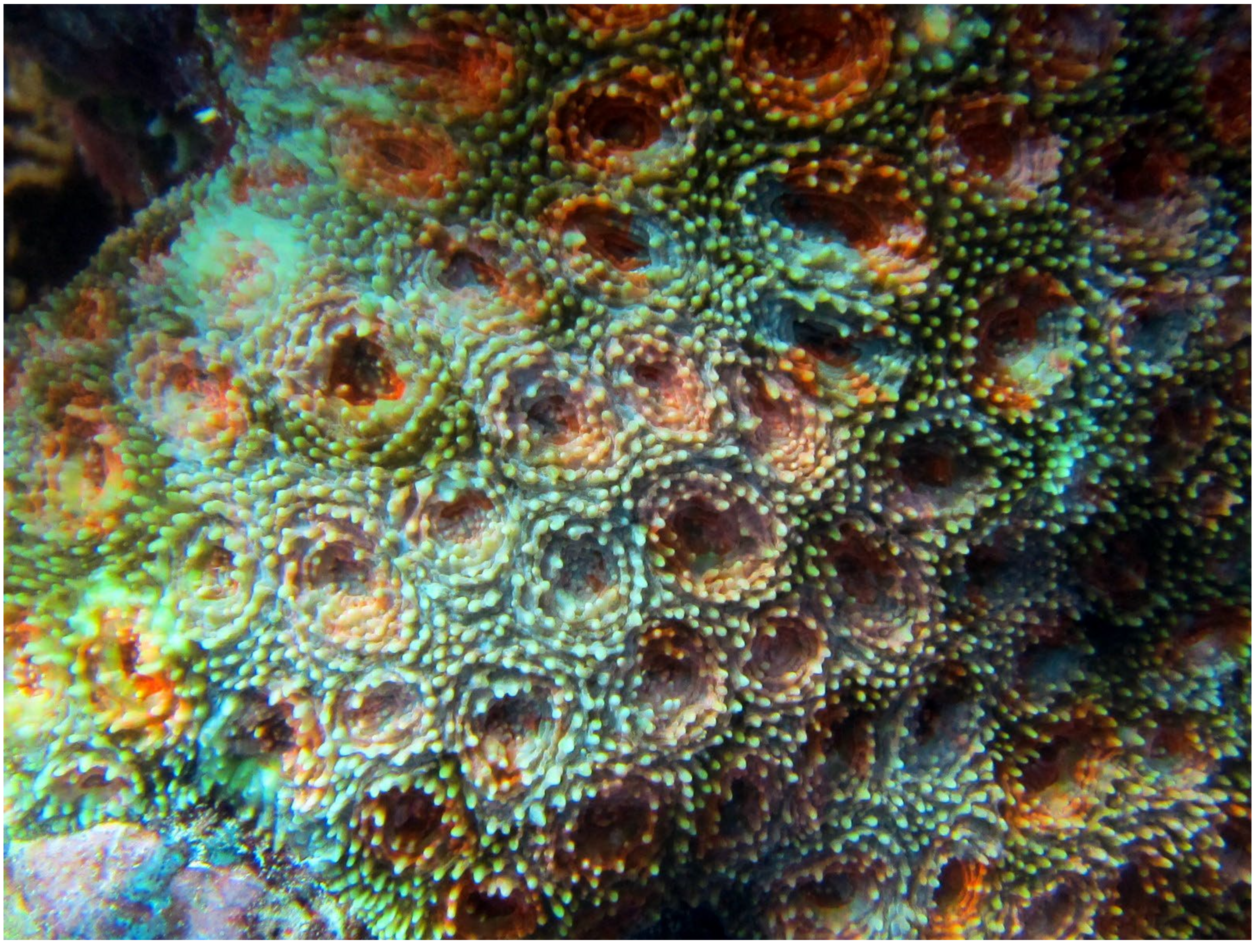
A closer photo of *Acanthastrea brevis*.

Acanthastrea echinata

Colonies are fleshy enough to have concentric tissue folds around the corallites, looking like little rings. *Acanthastrea brevis* has taller spines and no tissue folds.



A colony of *Acanthastrea echinata*.



A close-up photo of *Acanthastrea echinata*.

Acanthastrea rotundoflora

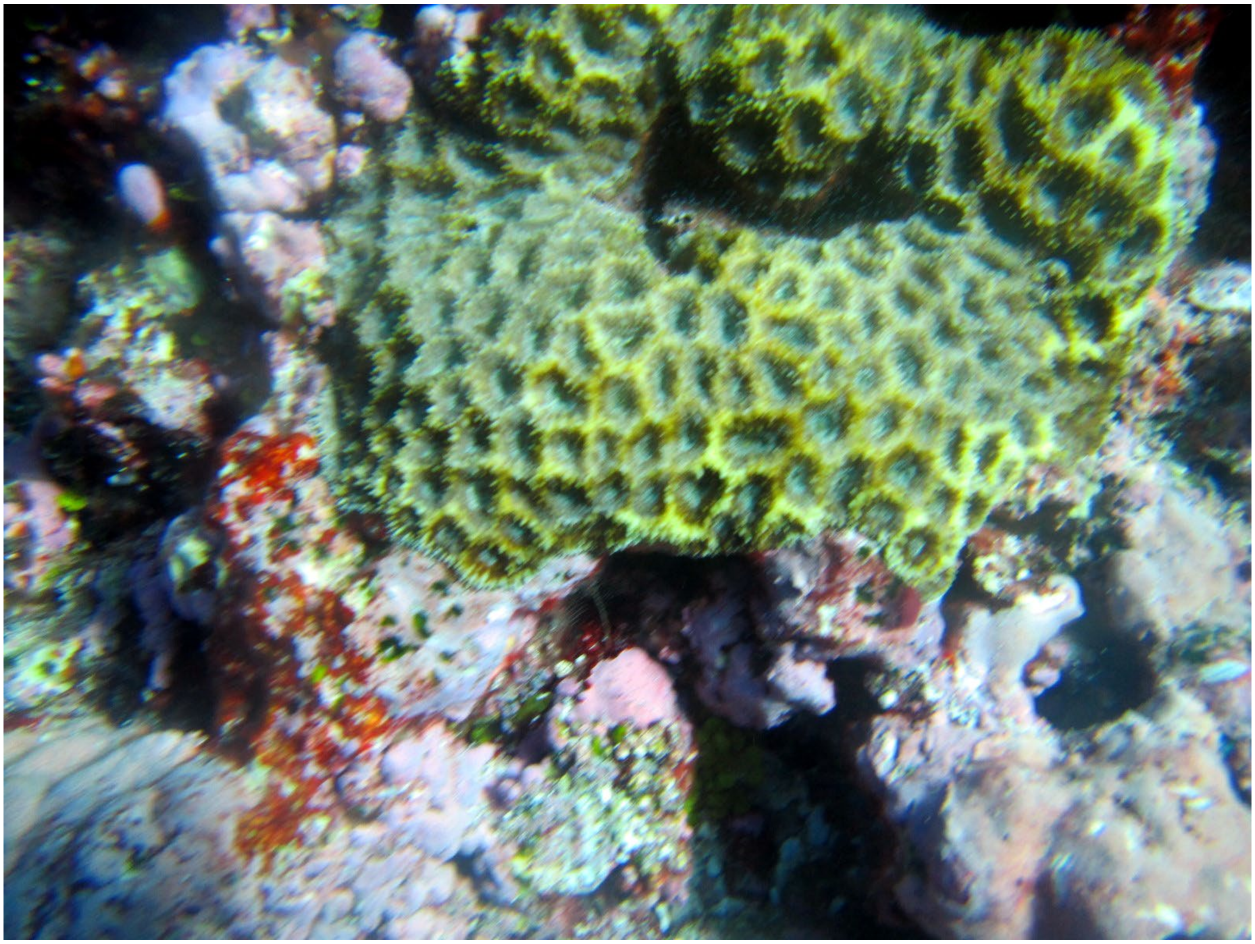
Corallites are widely spaced. Corallites may project slightly or not. Colonies may be quite fleshy or not. Corallites are more widely spaced than other species.

A colony of *Acanthastrea rotundoflora*.

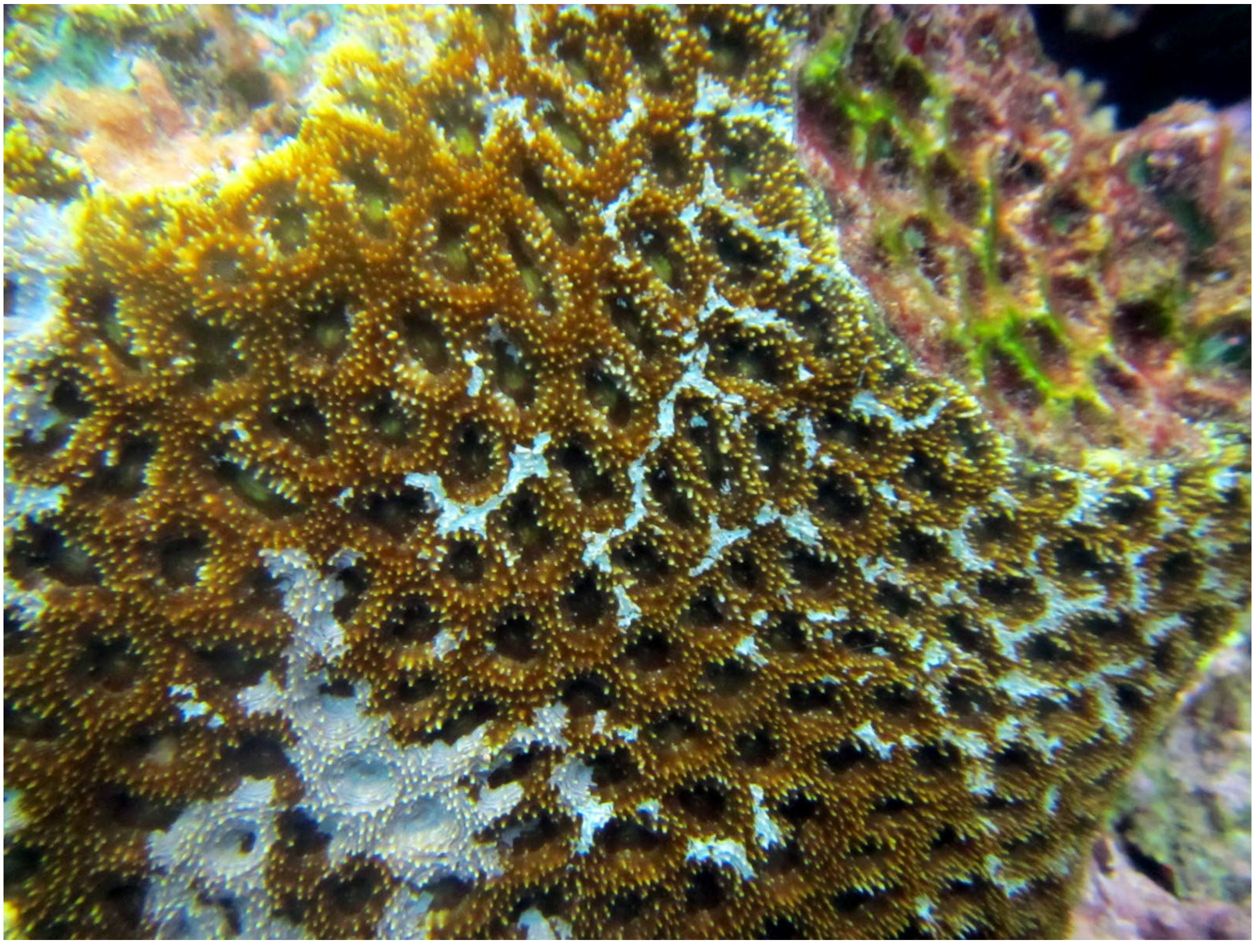
A colony of *Acanthastrea rotundoflora*.

Acanthastrea hemprichii Vulnerable

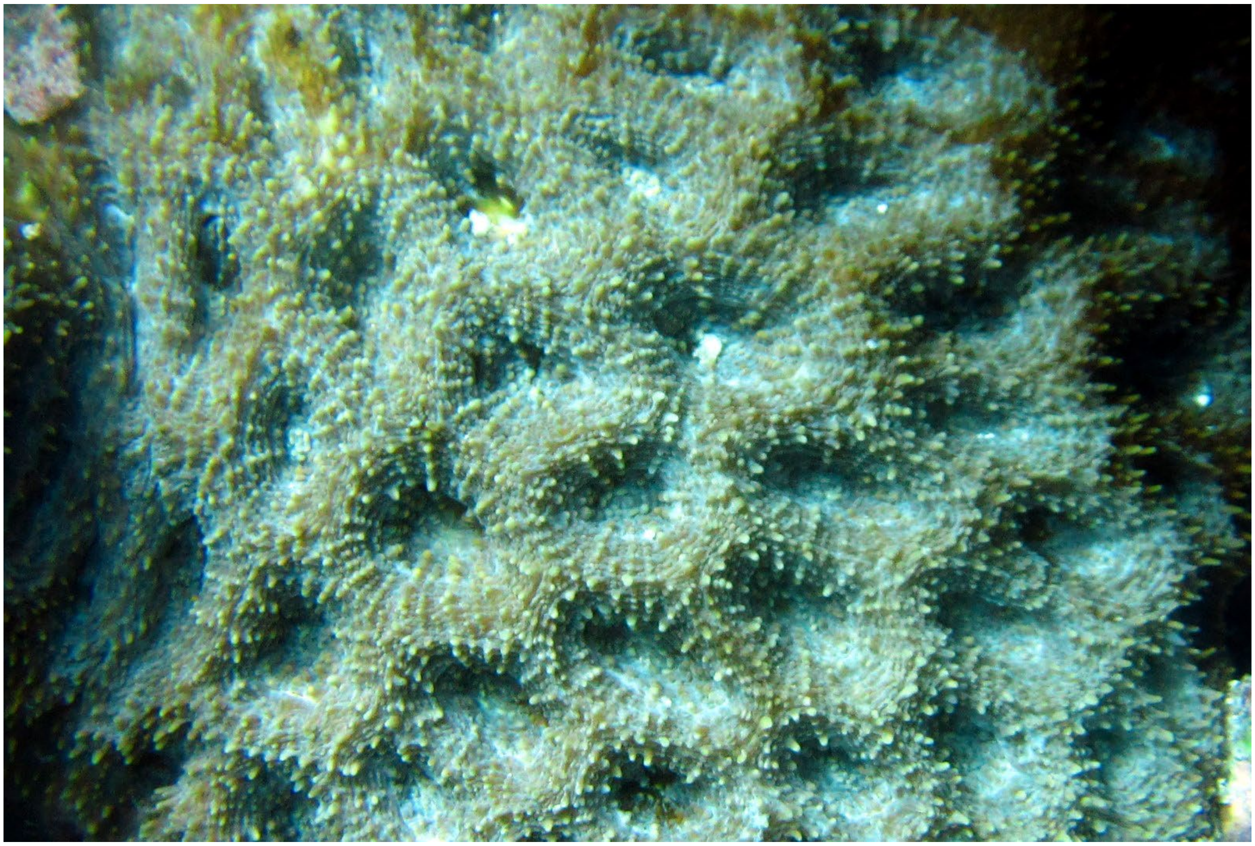
Colonies have corallites separated by a narrow ridge. Spines are relatively short. This species has corallites closer together and a thinner wall between them than other similar *Acanthastrea* species. *Favites* can be similar, but is usually less spiny.



A colony of *Acanthastrea hemprichii* with particularly thin walls.



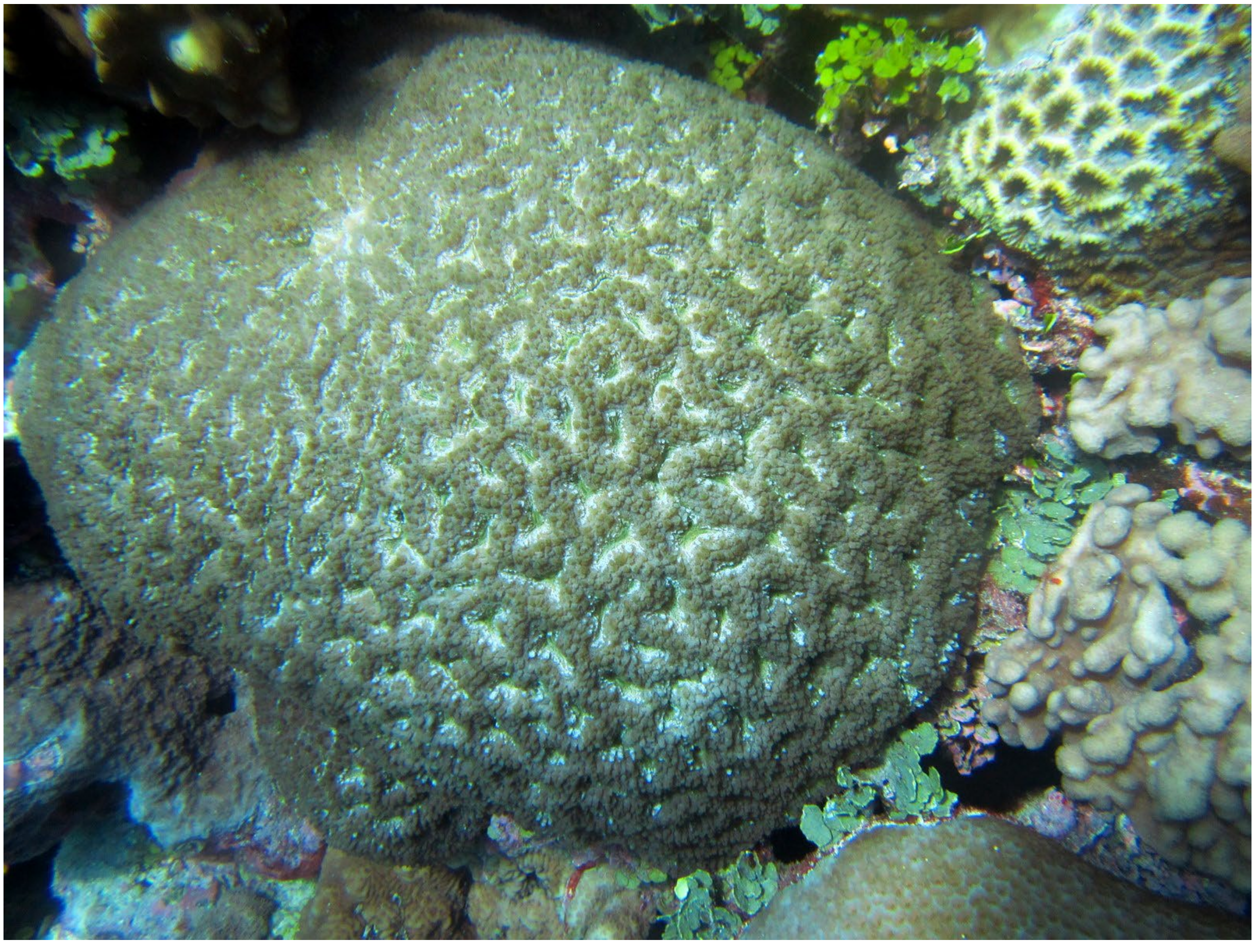
A colony of *Acanthastrea hemprichii*.



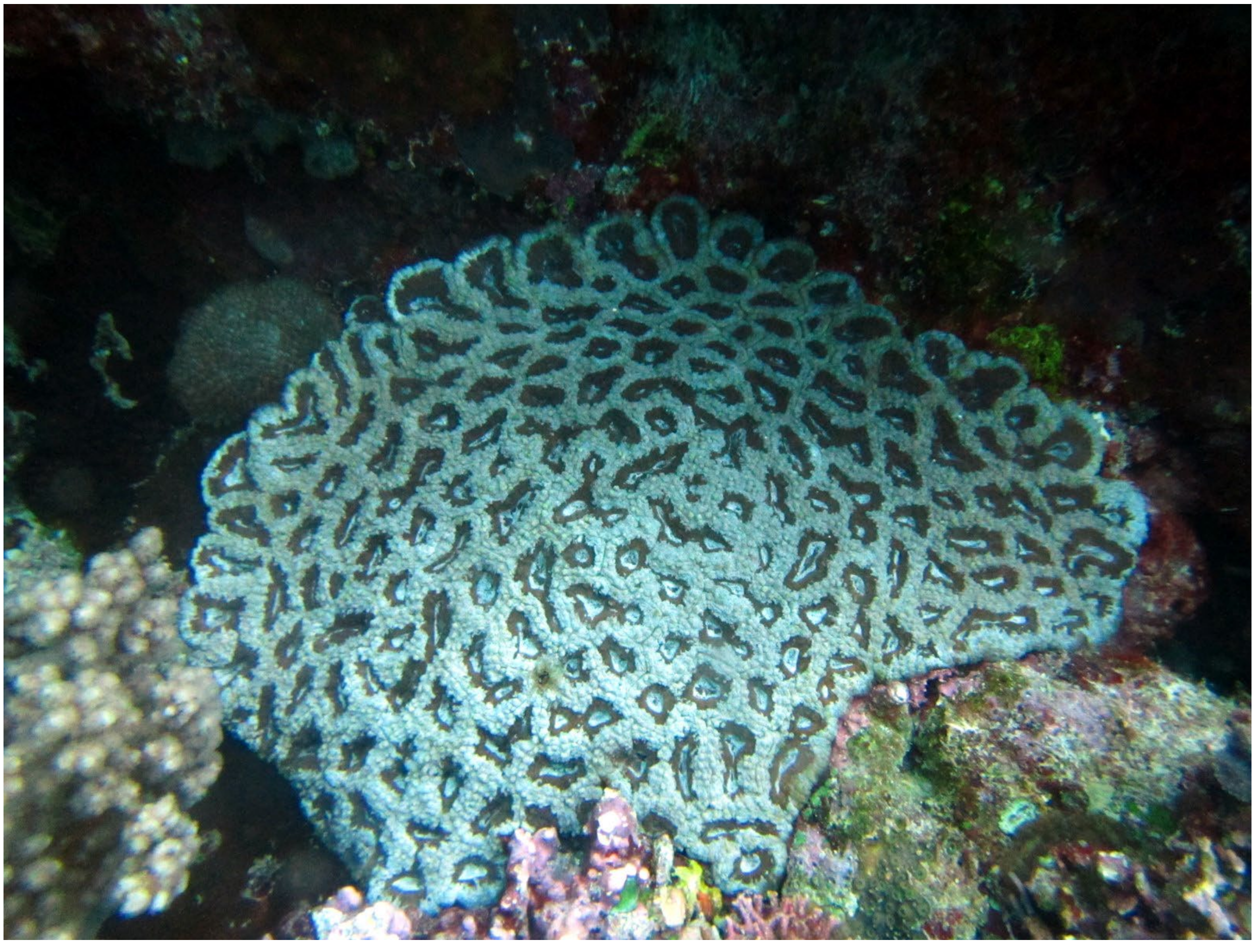
A close-up photo of *Acanthastrea hemprichii*.

Acanthastrea ishigakiensis Vulnerable

Colonies are massive. Corallites may be near round, but most are elongated or pinched sideways. Spines are short but a bit thick. Colors are highly variable and often contrast between ridges and valleys. No other *Acanthastrea* has massive colonies and few have pinched corallites. This species is more common in Fiji than many other places.

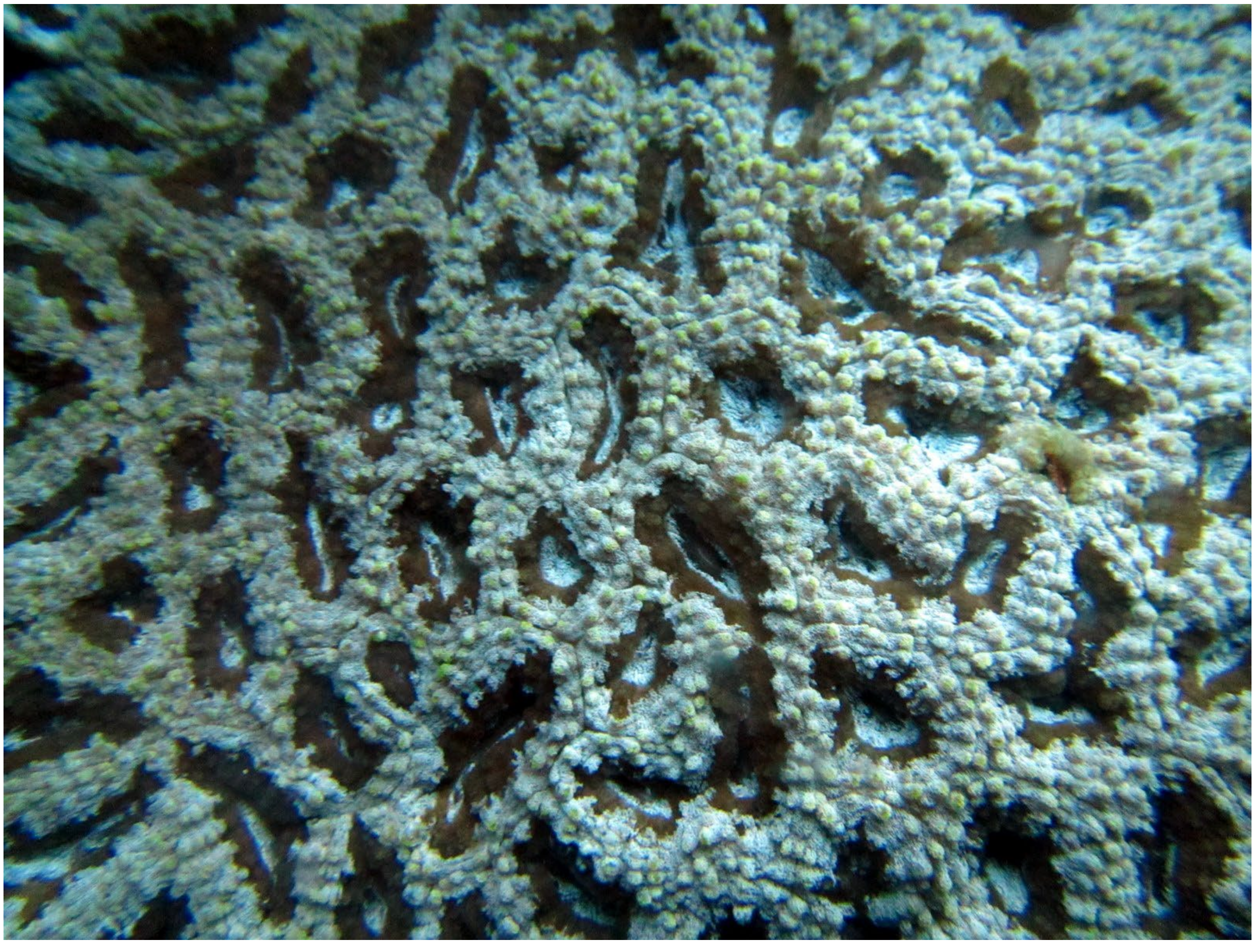


A colony of *Acanthastrea ishigakiensis*.



A colony of *Acanthastrea ishigakiensis*.

A closer photo of *Acanthastrea ishigakiensis*.



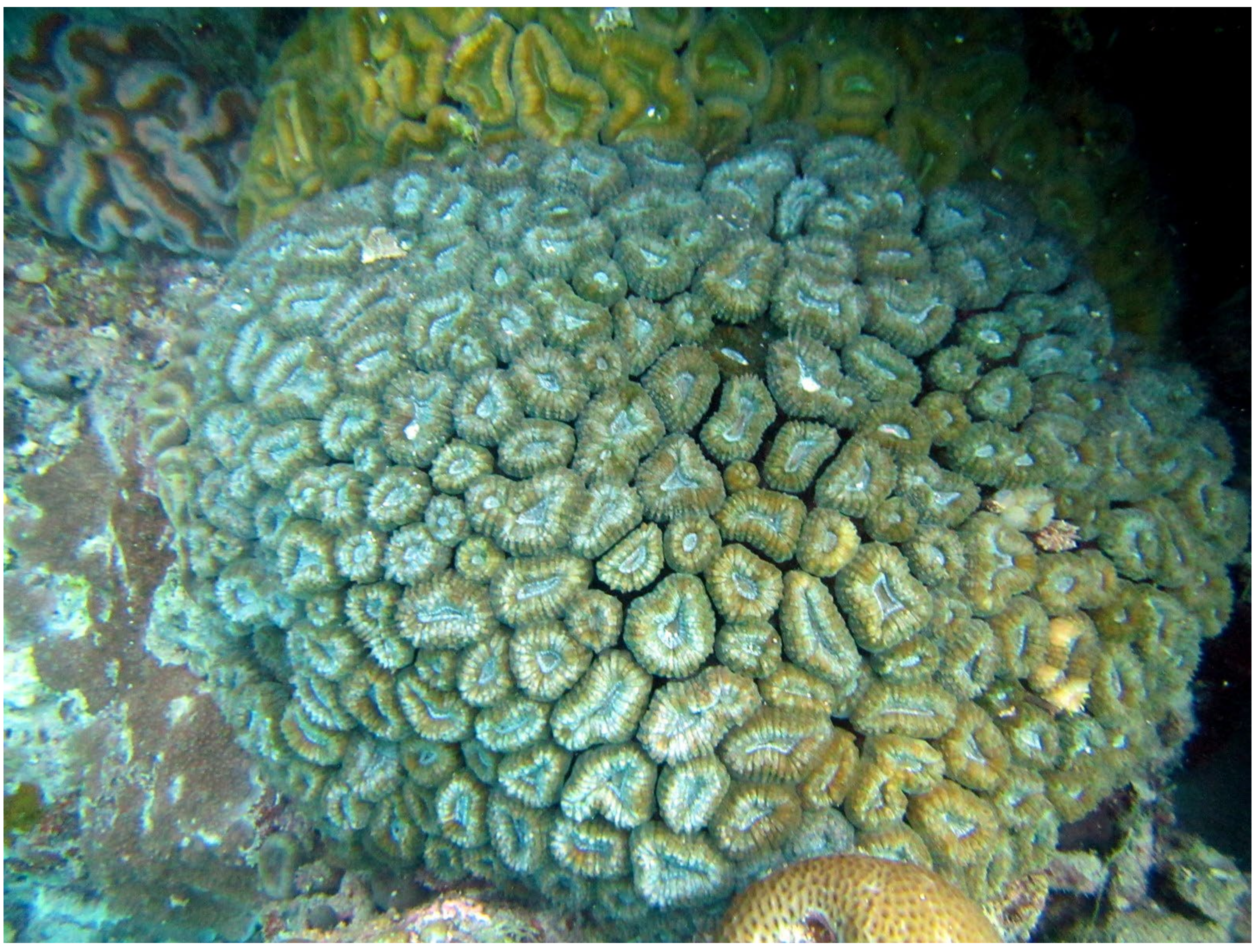
A close-up photo of *Acanthastrea ishigakiensis*.

Lobophyllia

Colonies can be of either of two shapes, or In between. Colonies long called *Lobophyllia* are submassive; they appear to be massive but are actually branching with branches very close together and tissue only on the ends of branches. Polyps vary from circular and only a couple centimeters in diameter, to oval, elongated, branching and nearly meandroid and around a foot across. Tissues vary from smooth to rough. Spines on septa and costae can be seen on some species. Colonies long called *Symphyllia* can look very similar, but they have single ridges without a deep crack in them, Coloniies are solid and massive instead of a submassive that is actually branching. Also, the ridges do not form loops like they do in *Lobophyllia*. Three specis show characters that are intermediate between these two morphologies, with separate corallites near the edge of the colony and fused corallites near the center of the colony.

Lobophyllia corymbosa "submassive"

Colonies have modest sized polyps which are almost all circular or slightly oval, and have only one mouth. Thick septa and costae can be seen on the corallite walls and sometimes thick short spines. Corallites are smaller and more nearly circular than on *Lobophyllia hemprichii*, and spinier.



A colony of *Lobophyllia corymbosa*.

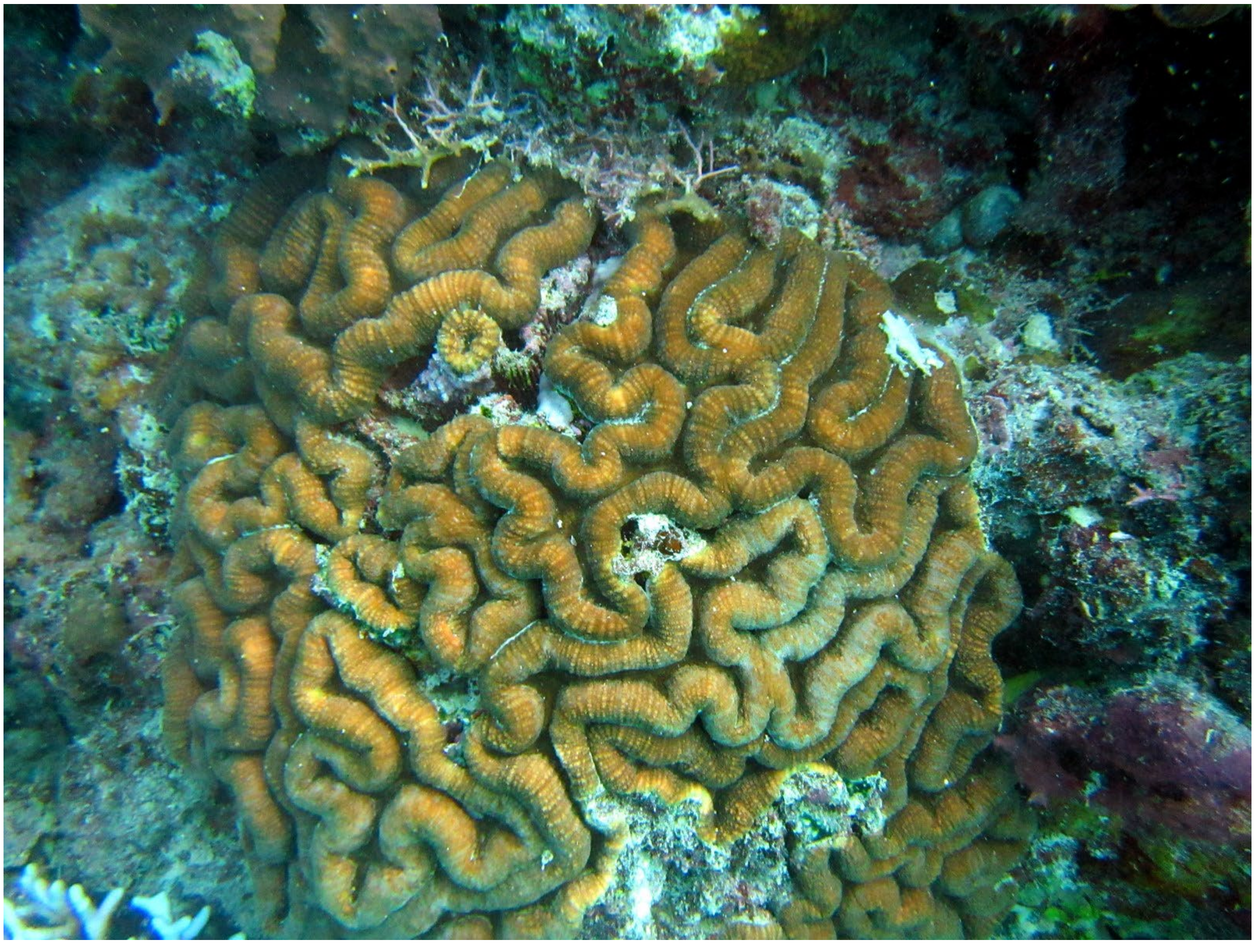
A close photo of *Lobophyllia corymbosa*.

A close photo of *Lobophyllia corymbosa*.

A close-up photo of *Lobophyllia corymbosa*.

Lobophyllia hemprichii "submassive"

Colonies can get very large and appear to be massive or may be flat. Corallites are large, often 5 cm or more in diameter, and often elongated or Y shaped. In some individuals, corallites can be long and nearly meandroid. The tissue on the outer ring is usually fairly smooth. *Lobophyllia corymbosa* has smaller, more circular corallites and rougher surfaces. *Lobophyllia hataii* has long, nearly meandroid valleys which are much wider.



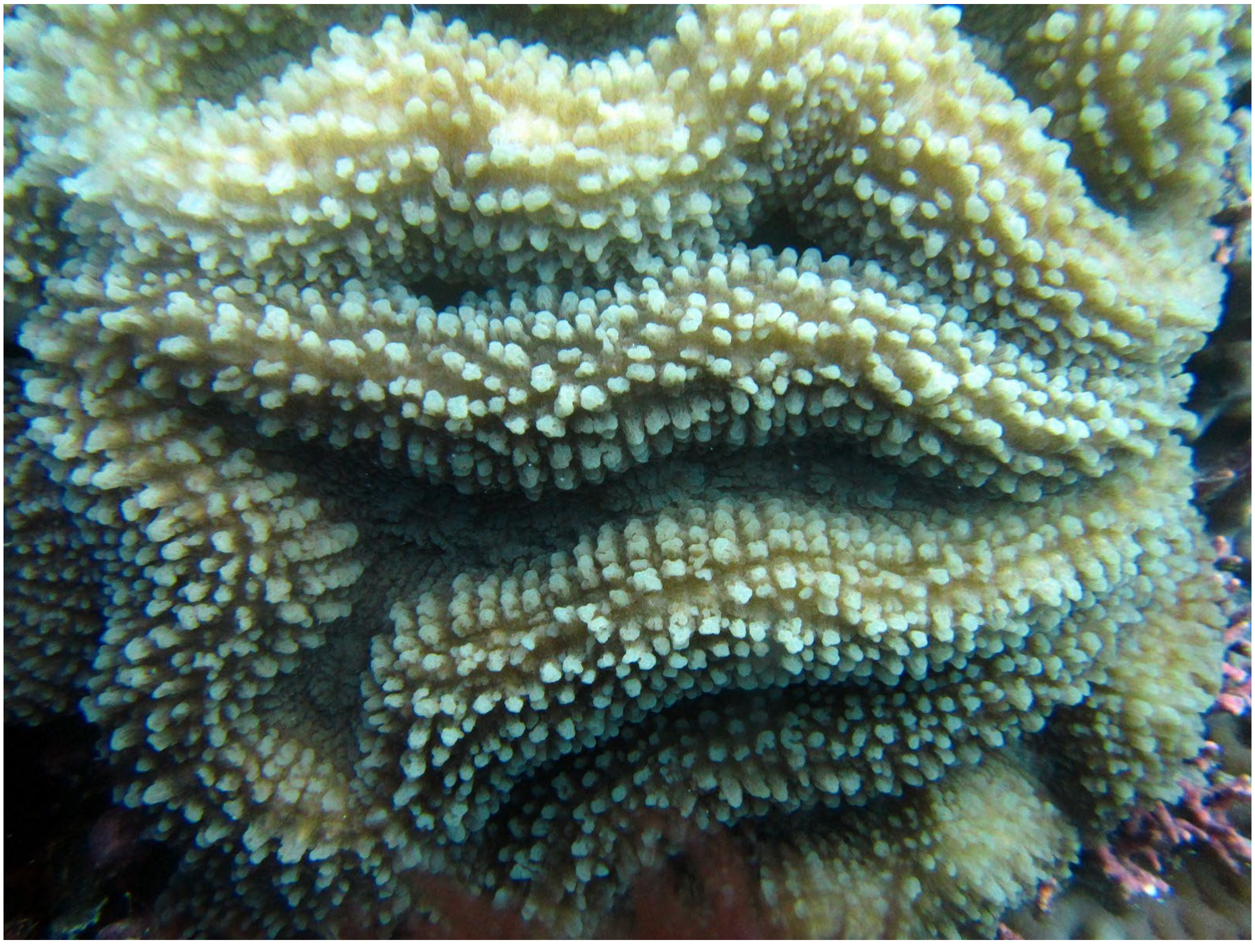
A colony of *Lobophyllia hemprichii*.

A colony of *Lobophyllia hemprichii*.

Lobophyllia robusta "submassive"

Colonies have large polyps with rough surfaces on the rim, and have thick flesh. Polyp surfaces are rougher than on *Lobophyllia hemprichii*, but not as fleshy as on *Lobophyllia serratus*.

A colony of *Lobophyllia robusta*.



A close-up photo of *Lobophyllia robusta*.

Lobophyllia hataii

Colonies are usually relatively small, less than 50 cm diameter. Colonies usually have only one extensive valley that has many side extensions and a wide flat central surface surrounded by a raised rounded edge. *Lobophyllia hemprichii* can have long valleys on polyps but they are narrow and the colony can grow large and have many polyps. *Lobophyllia valenciennesi* is spinier and the infolded raised edges can be at least partly fused together. *Lobophyllia* cf. *hassi* has outer raised edges that usually become greatly thickened in places.

A colony of *Lobophyllia hataii*.

A closer photo of *Lobophyllia hataii*.

Lobohyllia cf. *hassi*		This used to be in *Symphyllia*	Vulnerable

Colonies are small. The rounded ridges outline the edge of the coral and wind inward towards the center. Ridges going toward the center of the coral fuse with themselves where they go back towards the edge and can be particularly wide where they fuse. *Lobophyllia valenciennesi* and *Lobophyllia hataii* do not have thickened sections of the outer raised rim.

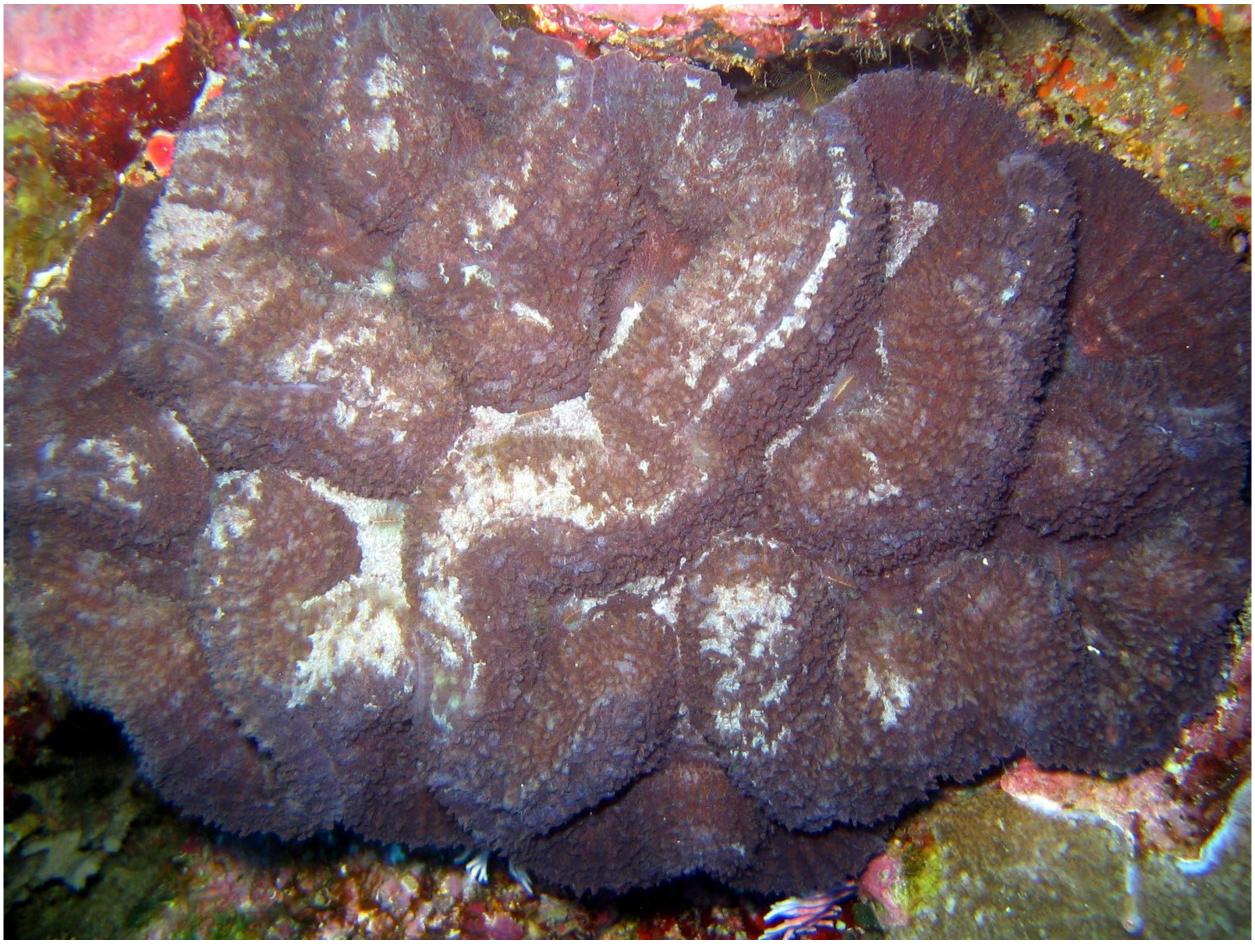
Two colonies of *Lobophyllia* cf. *hassi*.

A colony of *Lobophyllia* cf. *hassi*.

Lobophyllia agaricia Massive and “meandroid” or “brain coral”, this used to be in *Lobophyllia*

Colonies are massive and meandroid, and have large rounded ridges meandering on the surface. The ridges are thicker than a thumb but close together. All other massive, meandroid *Lobophyllia* have smaller ridges.

A colony of *Lobophyllia agaricia*.

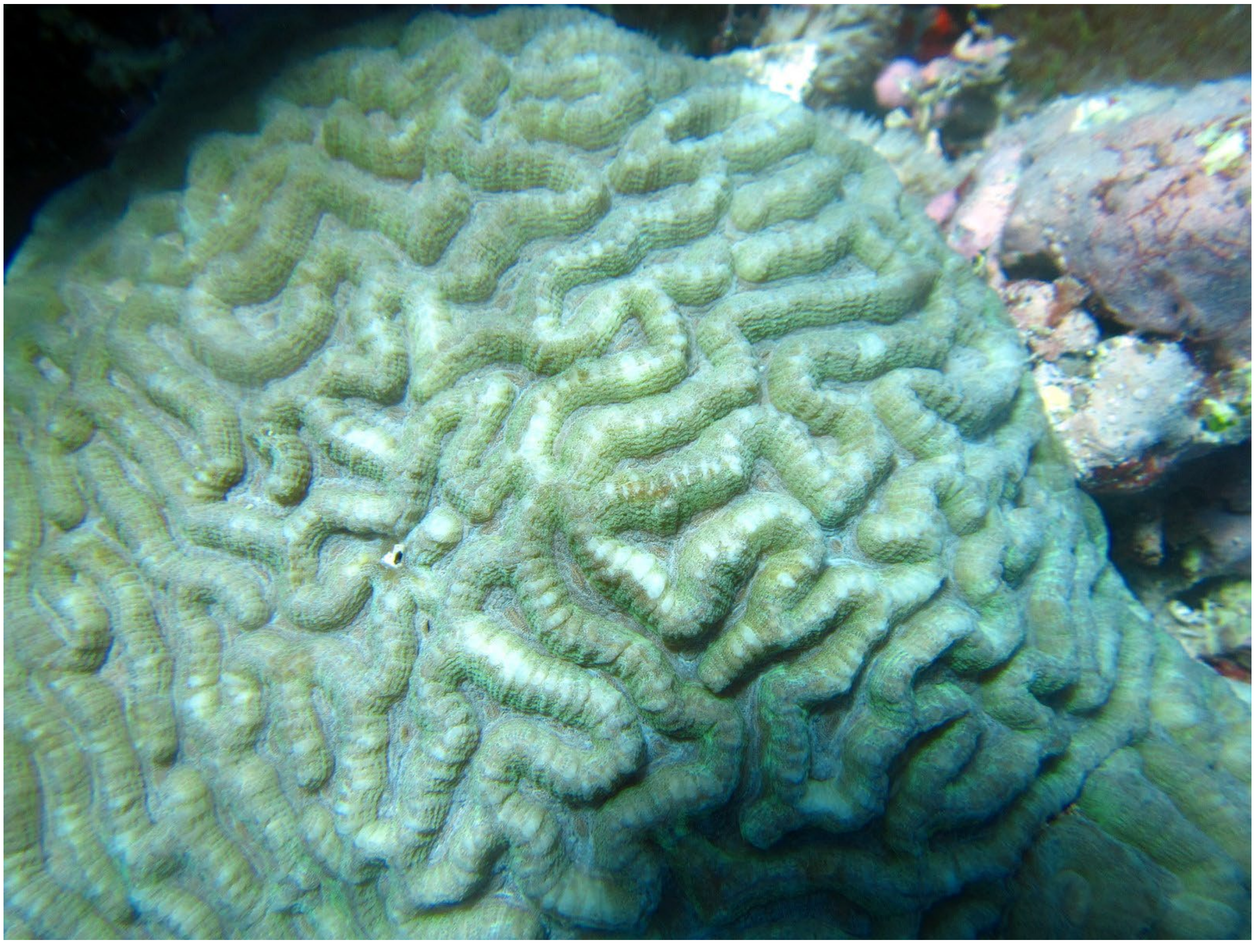


A closer photo of a colony of *Lobophyllia agaricia*.

Lobophyllia recta massive, meandroid, "brain coral" This used to be in *Symphyllia*

Colonies have the smallest ridges of any *Lobophyllia*, the width of a little finger. But the ridges are still larger than on *Platyphylla* or *Goniastrea australiensis*.

A colony of *Lobophyllia recta*.



A closer photo of *Lobophyllia recta*.

Parascolymia *This genus used to be called Scolymia*

Corals are attached discs which are usually single corallites. The center of *Echinomorpha* is raised more, the spines are all small, and there are concentric tissue folds.

Parascolymia vitiensis

Corals can reach at least 5 cm or more diameter. In some individuals the outer edge is higher than the center of the corallite. Corals are larger and less fleshy than *Parascolymia australis*.

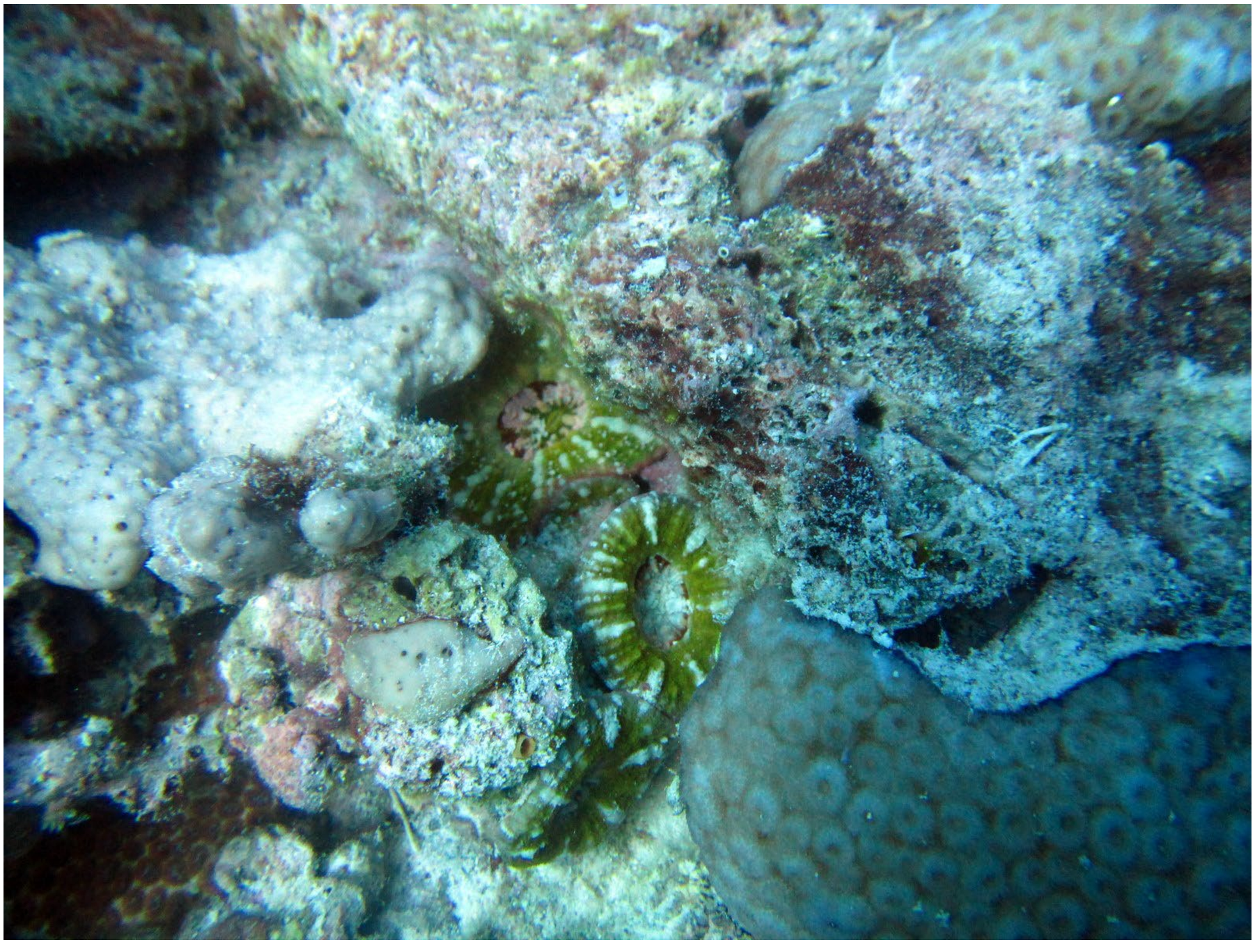
An individual of *Parascolymia vitiensis*.

An unusual individual of *Parascolymia vitiensis* with some large spines.

An individual of *Parascolymia vitiensis*.

Parascolymia australis (this used to be in Scolymia)

Corals are small, a few centimeters in diameter, and can appear fleshy. The outer ring is raised above the central depression of the corallite. Individuals are smaller and more fleshy than *Parascoymia vitiensis*. This is a relatively rare species in the tropics, but more common in temperate areas.



Two *Parascolymia australis*.

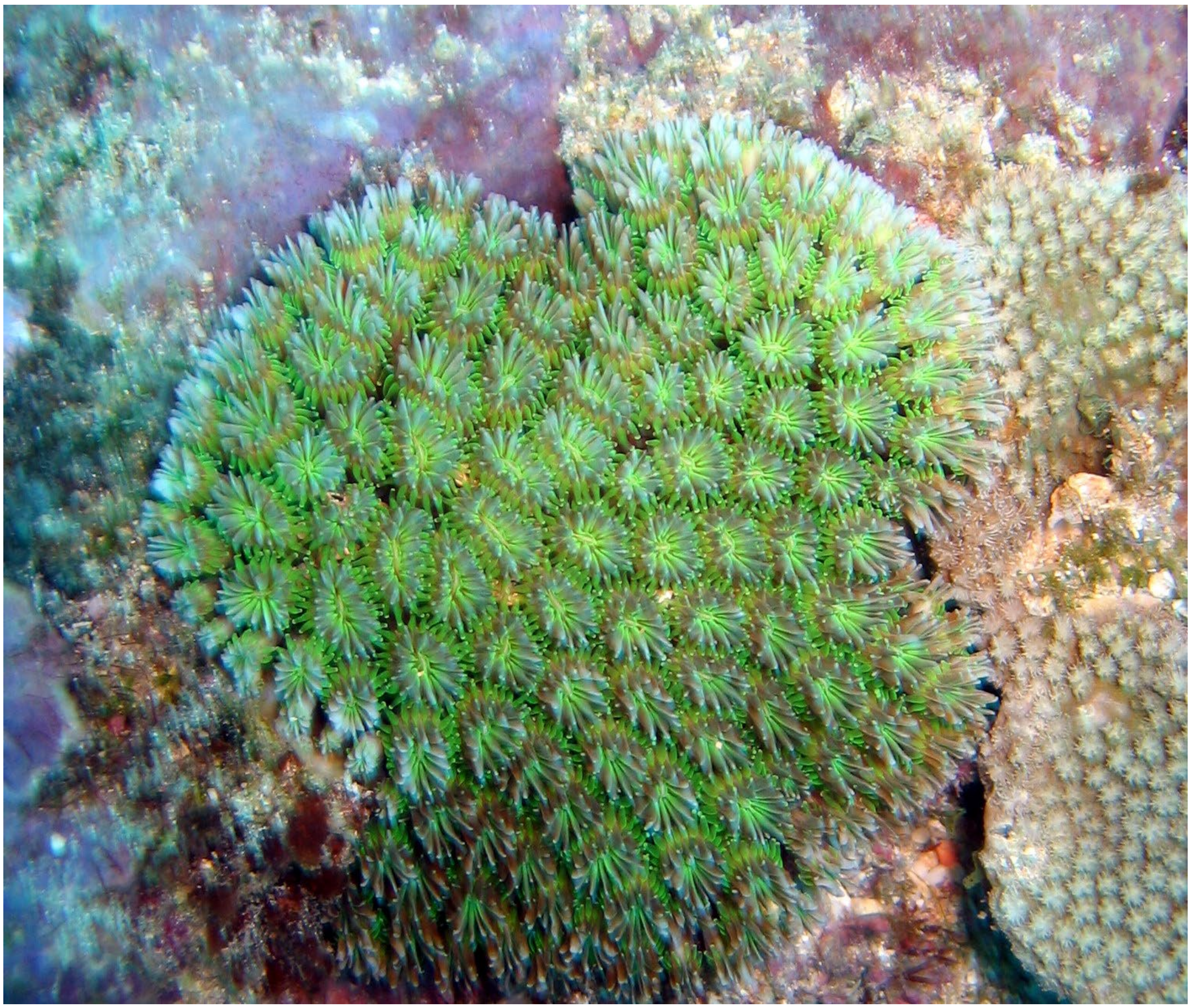
A closer photo of *Parascolymia australis*.

Galaxea

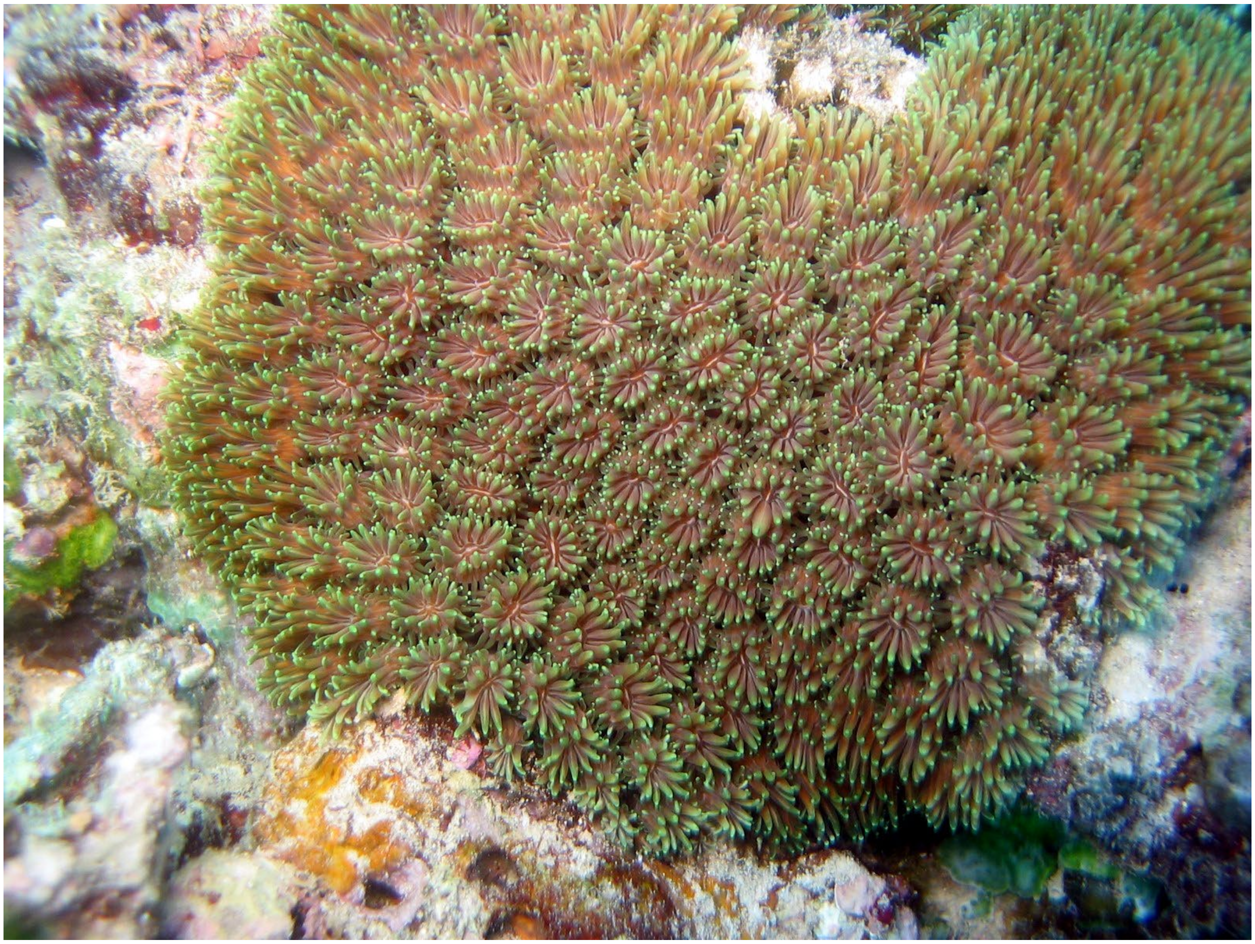
Colonies are encrusting or branching, and have corallites that project. The corallites have septa which project upward beyond the rim of the corallite, and resemble spines. *Favia* is much less spiny.

Galaxea fascicularis

Colonies are encrusting and small. Corallites are about the diameter of a little finger. A ring of septa projects from the inner edge of each corallite. Corallites are larger than on *Galaxea astreata* and *Galaxea horrescens* colonies are branching.



A close photo of a colony of *Galaxea fascicularis*.



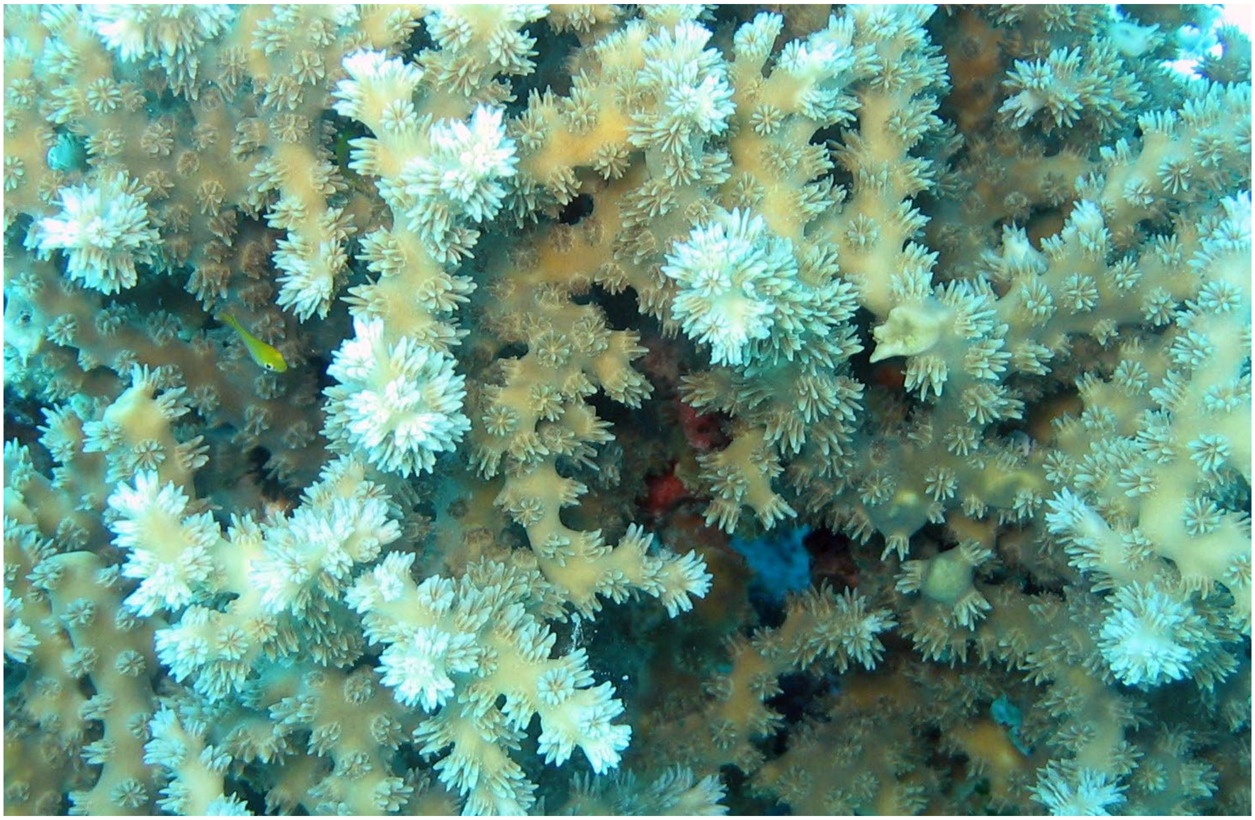
A close photo of *Galaxea fascicularis*.

Galaxea horrescens

This used to be in a separate genus, *Acrhelia.*

Colonies are branching. Corallites may be widely separated. Corallites have long septa spines projecting. This is the only fully branching species of *Galaxea*.

A colony of *Galaxea horrescens*.



A close-up photo of *Galaxea horrescens*.

Caulastrea

Colonies are branching, with the corallites and polyps on the ends of branches. Corallites and branches are about 1-2 or 3 cm diameter. Some colonies have as much space between branches as the thickness of the branches, others have branches very close together. Colonies with branches close together can be called submassive, since they look like they are massive. The corallites are much smaller than on most *Lobophyllia* and less spiny. Colonies are branching while *Favia* is massive.

Caulastrea tumida

Branches and corallites are thicker and shorter than other species in the genus.

A close photo of a colony of *Caulastrea tumida*.

A close photo of a colony of *Caulastrea tumida*.

A photo of a colony of *Caulastrea tumida* with short corallites.

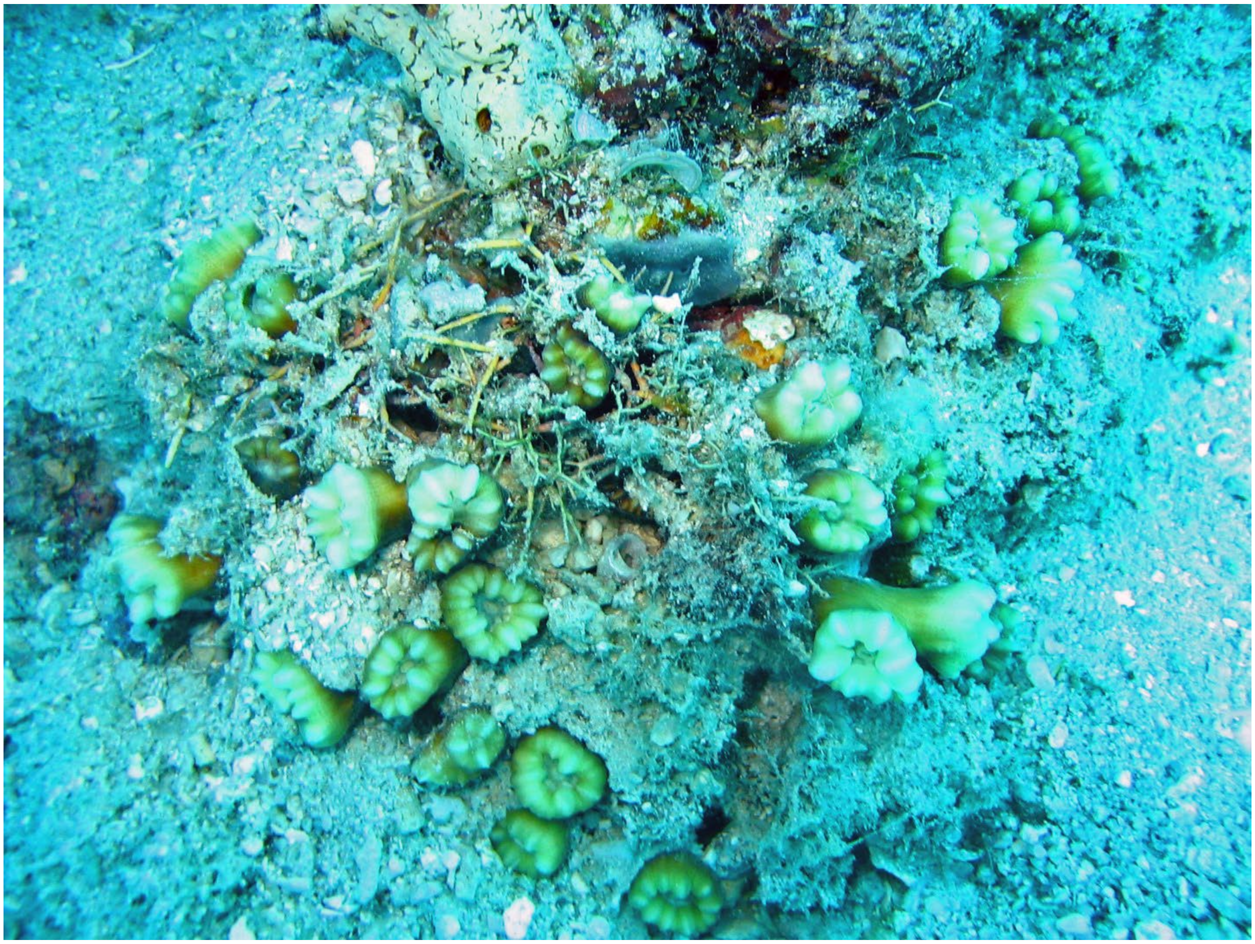
Caulastrea furcata

Colonies have branches that diverge widely so that the polyps on the ends of branches are not close together. Branches are smaller and longer than on *Caulastrea tumida*, thicker than on *Caulastrea tumida*.

A colony of *Caulastrea furcata*. Sediment has accumulated between the branches.

Caulastrea curvata Vulnerable

Branches are widespread and are thinner than on *Caulastrea furcata*.



A colony of *Caulastrea curvata*. Sediment has accumulated between branches.

Dipsastrea *This used to be Favia.*

Colonies are massive, and corallites are separate so each one has its own walls and there is a groove or space between adjacent corallites. Species differ in the size of corallites and other details. Identification of *Dipsastrea* species is difficult and uncertain. Genetics evidence caused the name change. *Favites* has a single wall between corallites, they share one wall and there is no groove between corallites. *Diploastrea* corallites taper, *Echinopora* has smaller corallites than most *Favia* and they are spinier. *Cyphastrea* has much smaller corallites. *Astrea* and *Phymastrea* have to be distinguished by distinguishing their individual species.

Dipsastrea rotundata This used to be in Favia.

Colonies are encrusting or massive. Corallites are moderate size and close together. The outer rim of each polyp is smooth and usually sloped towards the center of the corallite. Corallites are smoother than many *Dipsastrea* with the smooth outer rim.

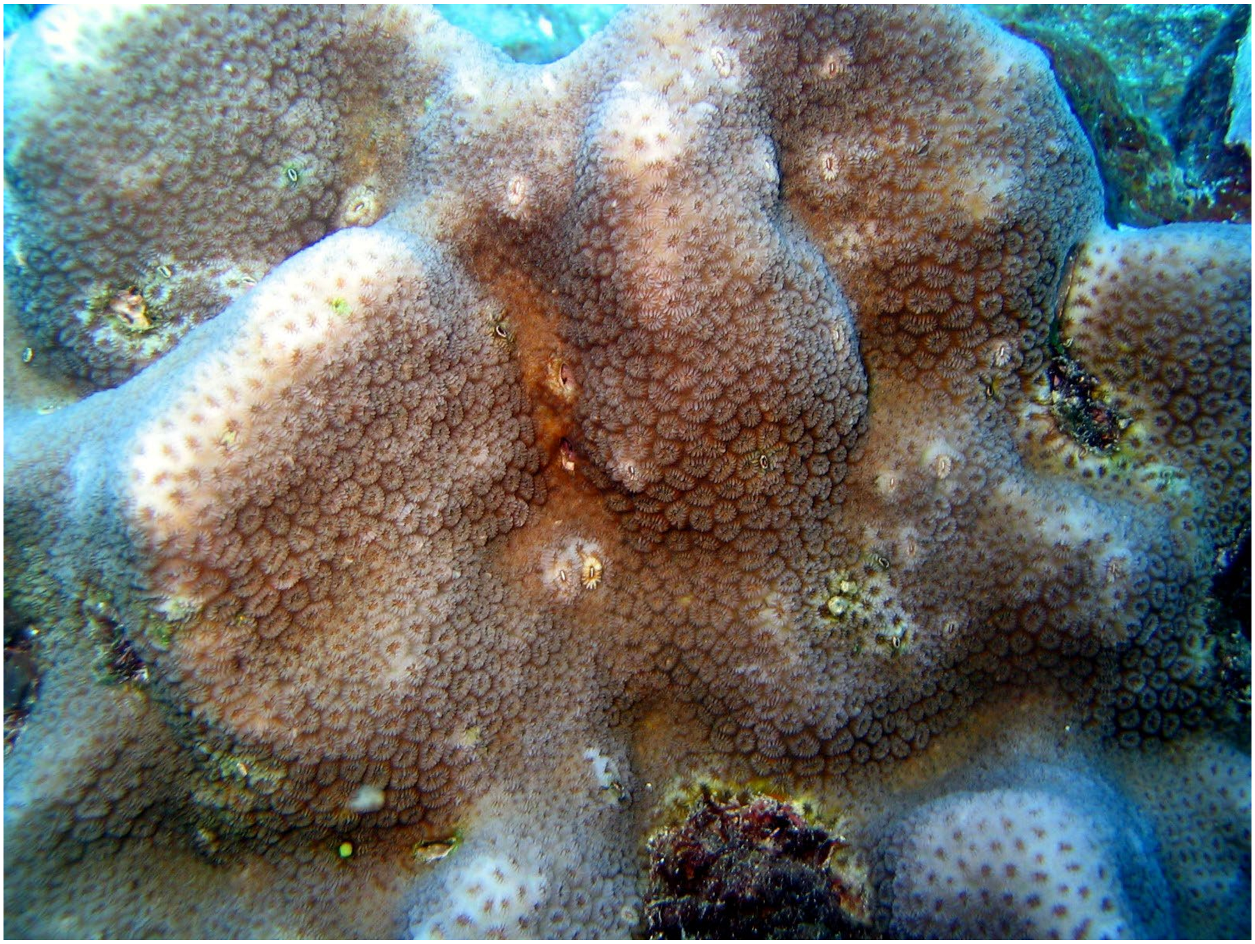
A colony of *Dipsastrea rotundata*.

A colony of *Dipsastrea rotundata*.

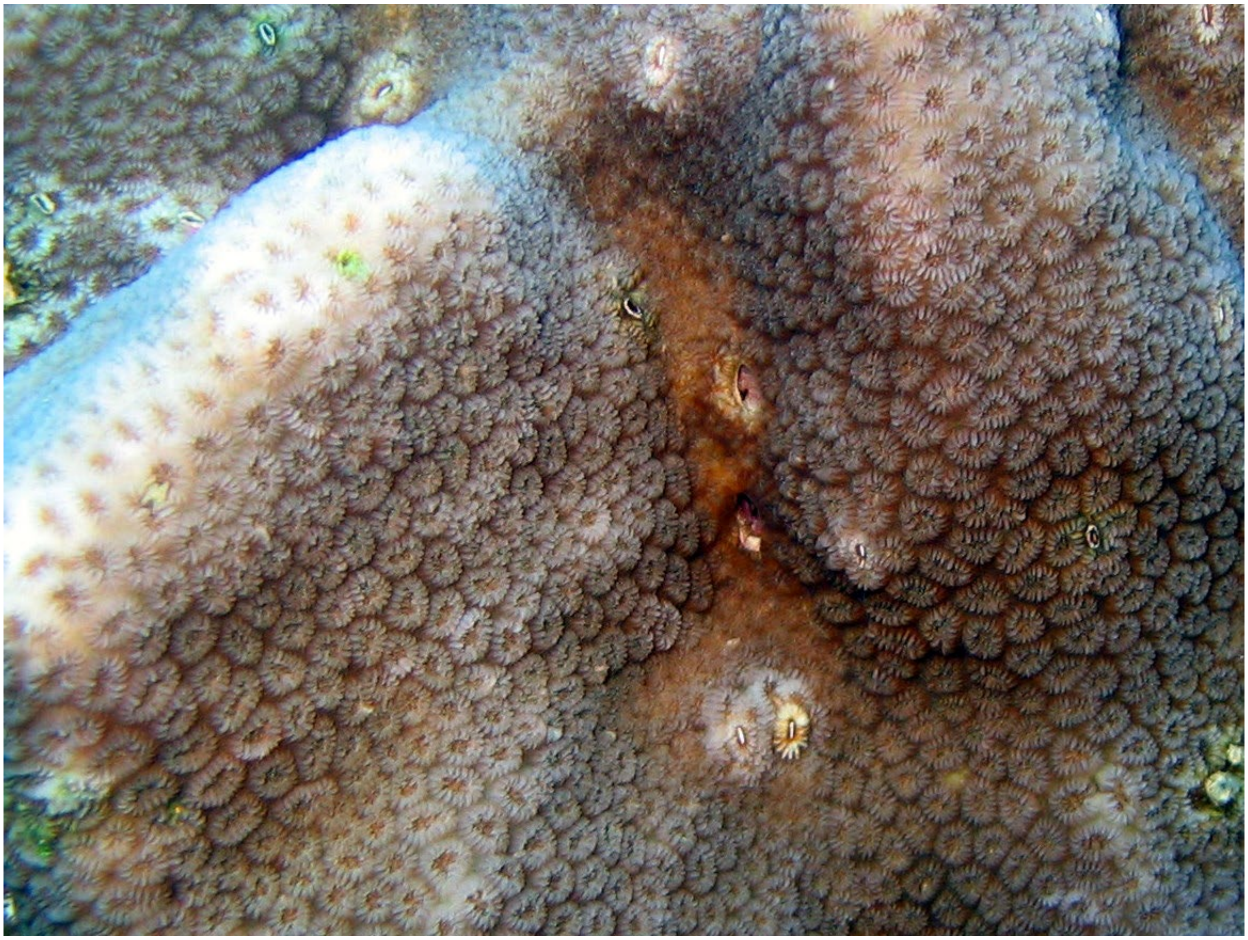
Goniastrea stelligera

This used to be in Favia.

Colonies are massive, lumpy, or columnar. The corallites are small, about 3-4 mm diameter. It has smaller corallites than any *Dipsastrea* species. It is presented here because it is most similar to *Dipsastrea*.



A colony of *Goniastrea stelligera*.



A closer photo of *Goniastrea stelligera*.

Astrea

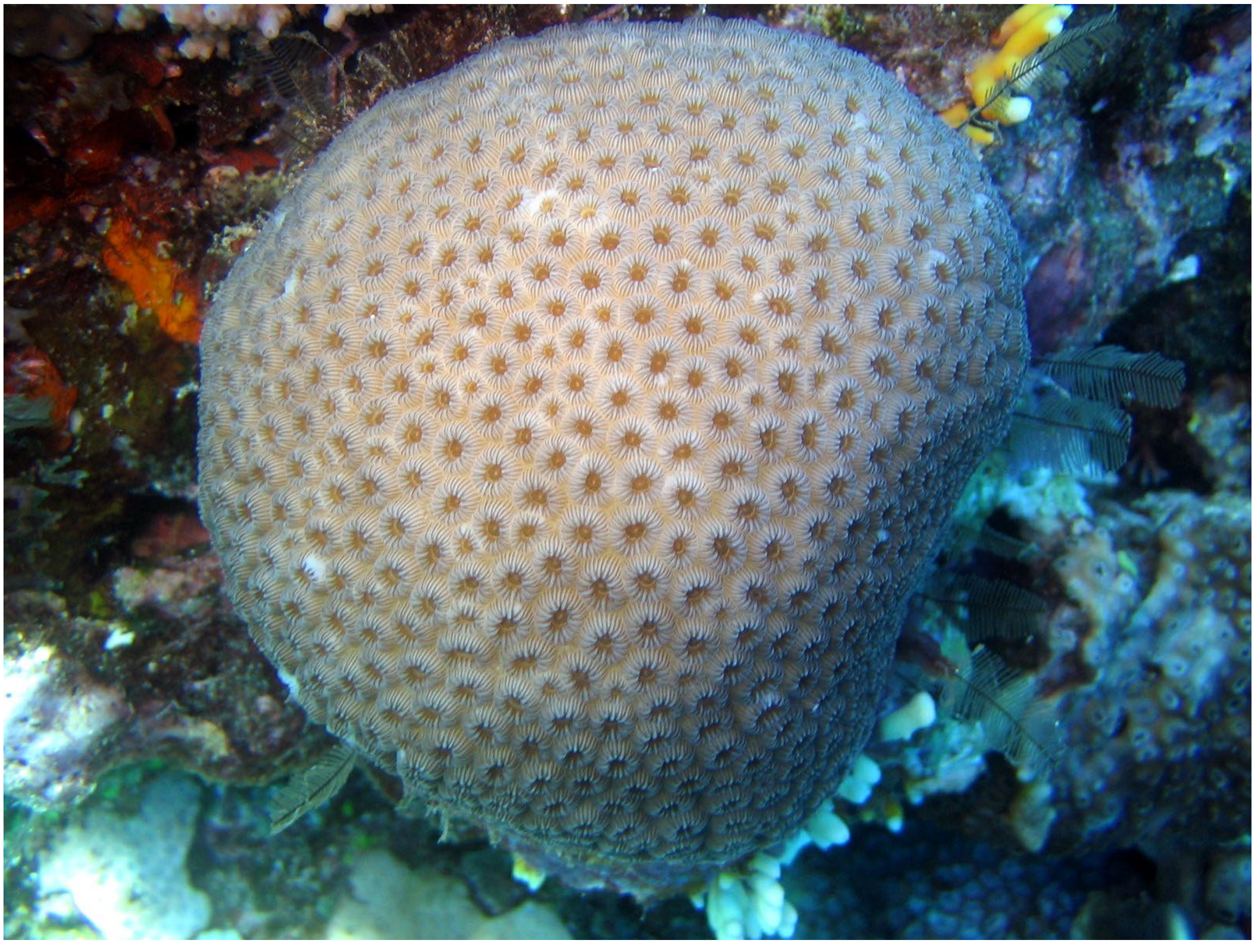
This genus used to be part of Montastraea.

Colonies are massive or encrusting. Corallites have separate walls which are thick. Corallites are usually close together, and are about the diameter of the tip of a small finger. *Dipsastrea* and *Phymastrea* are similar to *Astrea*, and it is necessary to identify the species to identify the genus.

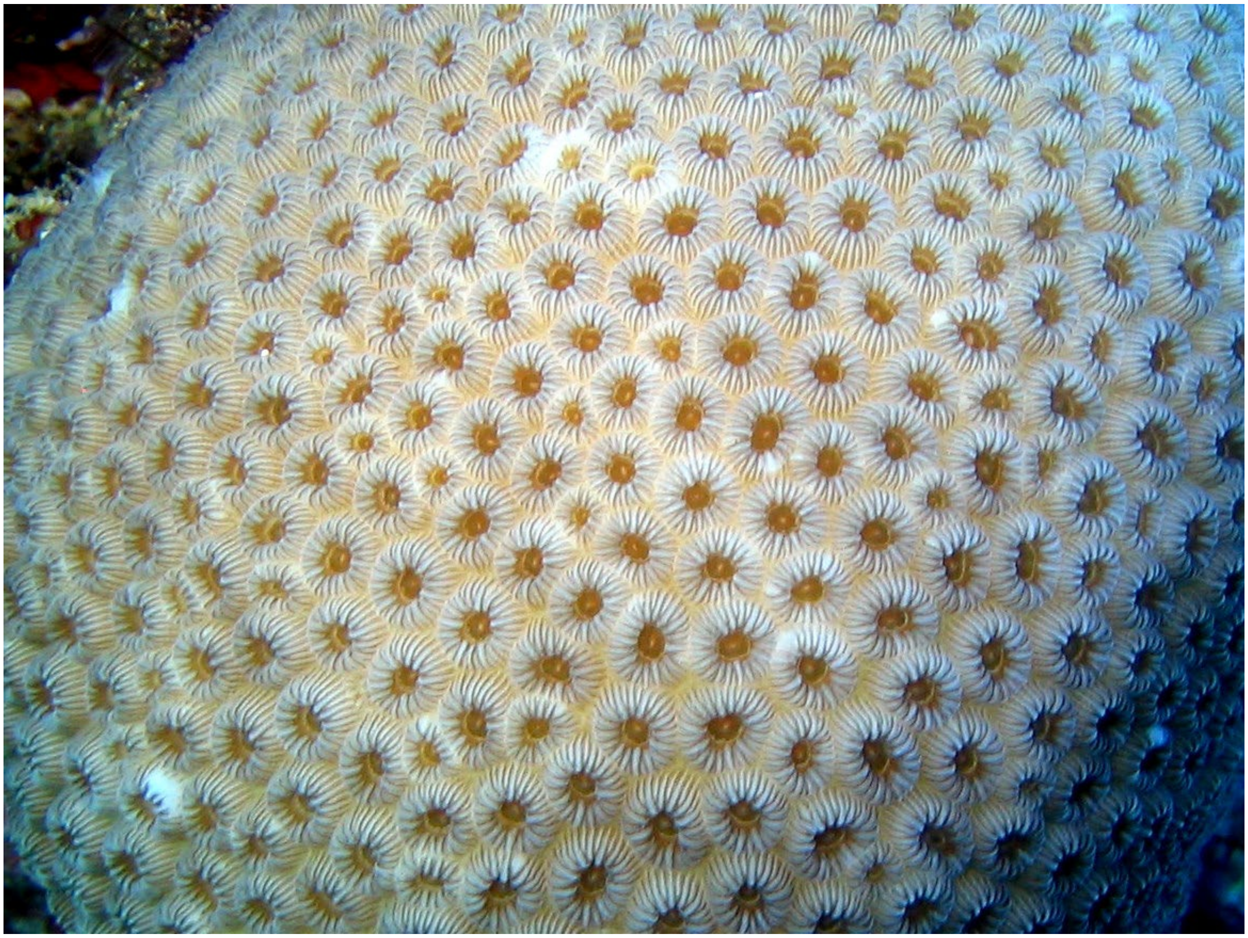
Astrea curta

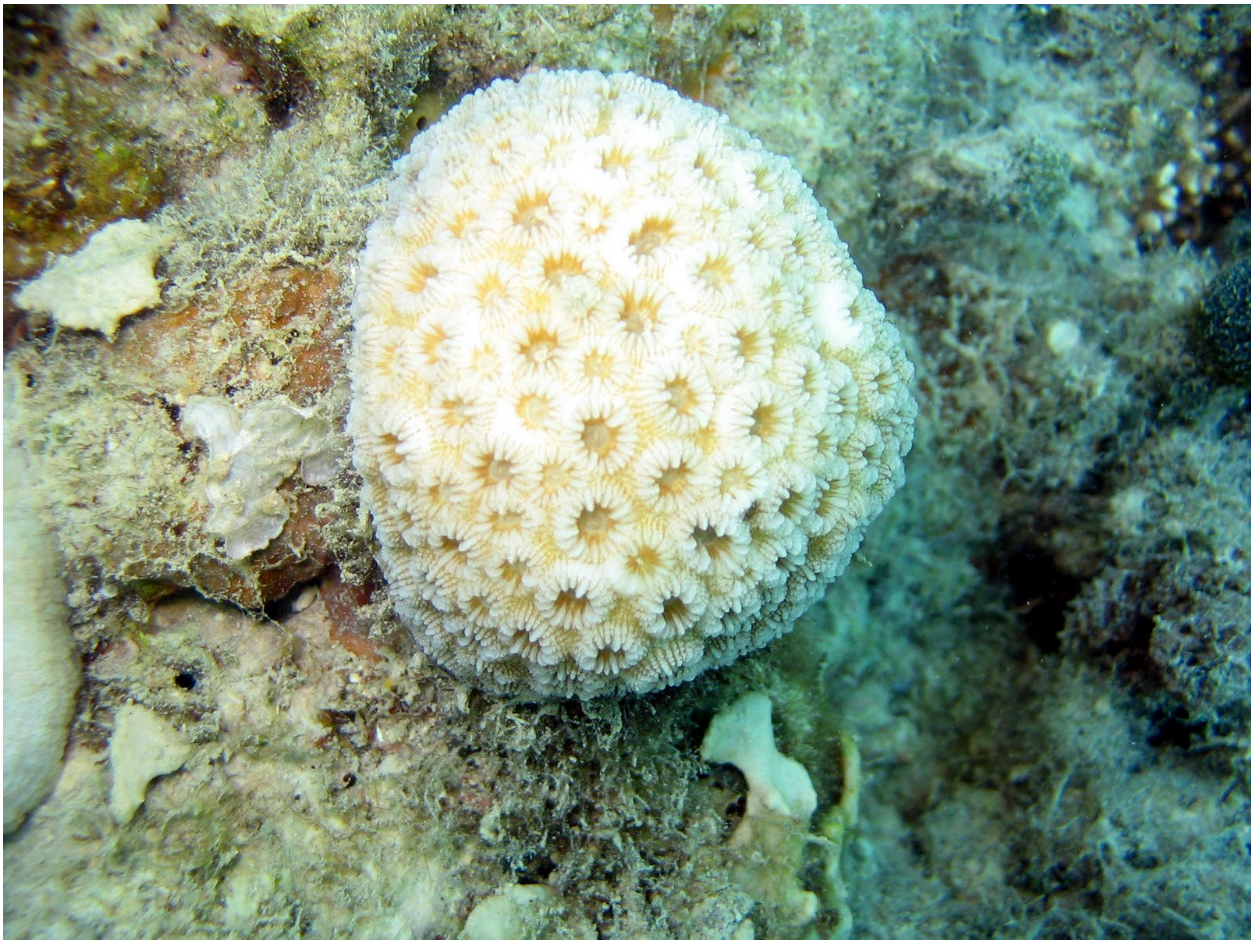
This used to be in *Montastrea*.

Colonies are massive and small. Corallites have thick walls, are close together, are very uniform, and septa are uniform. Most colonies are cream colored. *Astrea annuligera* is encrusting, with a few septa larger than others, and colonies are colored.



A colony of *Astrea curta*.


A close-up photo of *Astrea curta*.

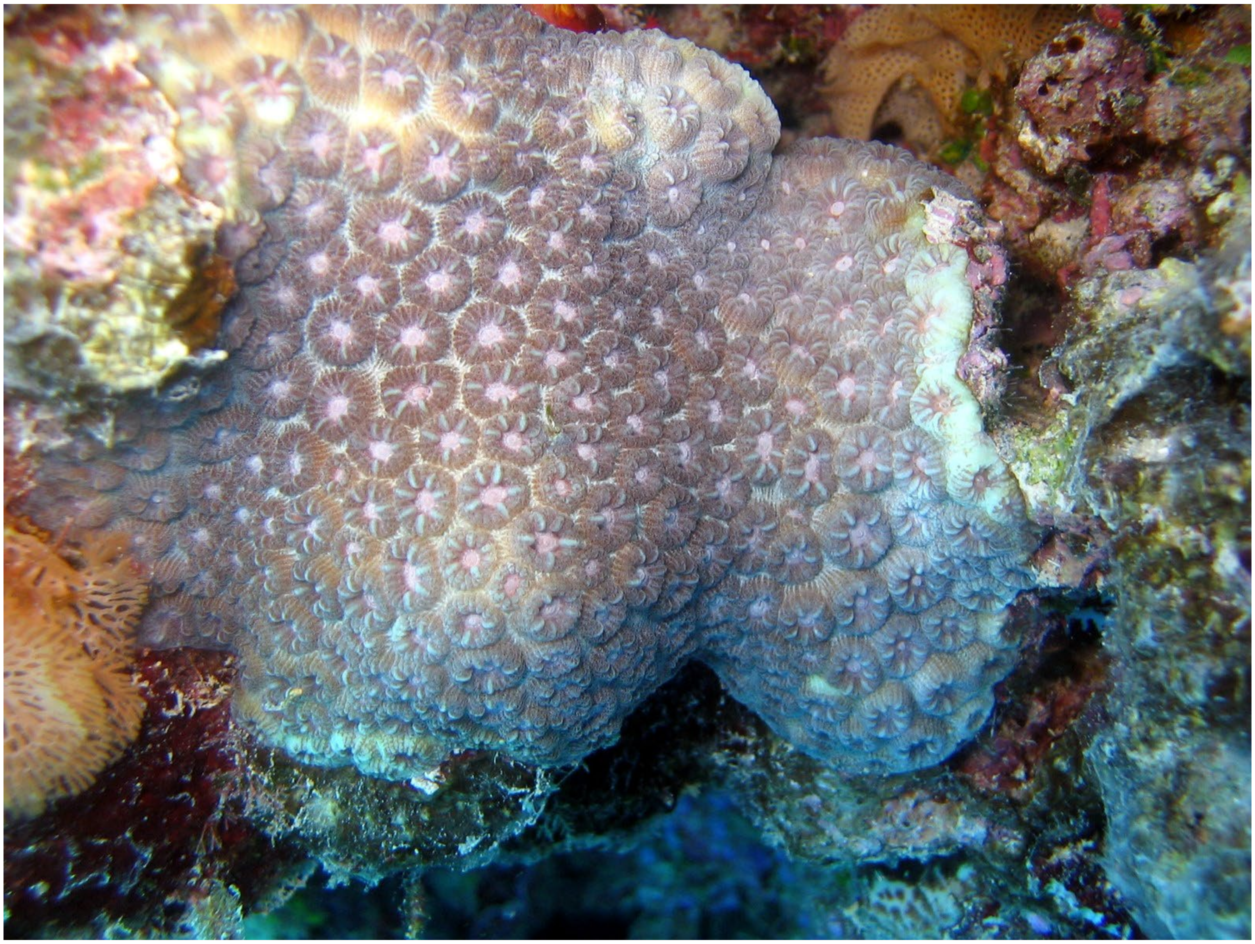


A colony of *Astrea curta*.

Astrea annuligera

This used to be in Montastrea.

Colonies are encrusting. Corallites have some septa which project farther than other septa, and which are usually white. Colonies usually have more color than the cream colored *Astrea curta* colonies. *Astrea curta* is massive, and large septa are less prominent.



A colony of *Astrea annuligera*.

A close-up photo of a colony of *Astrea annuligera*.

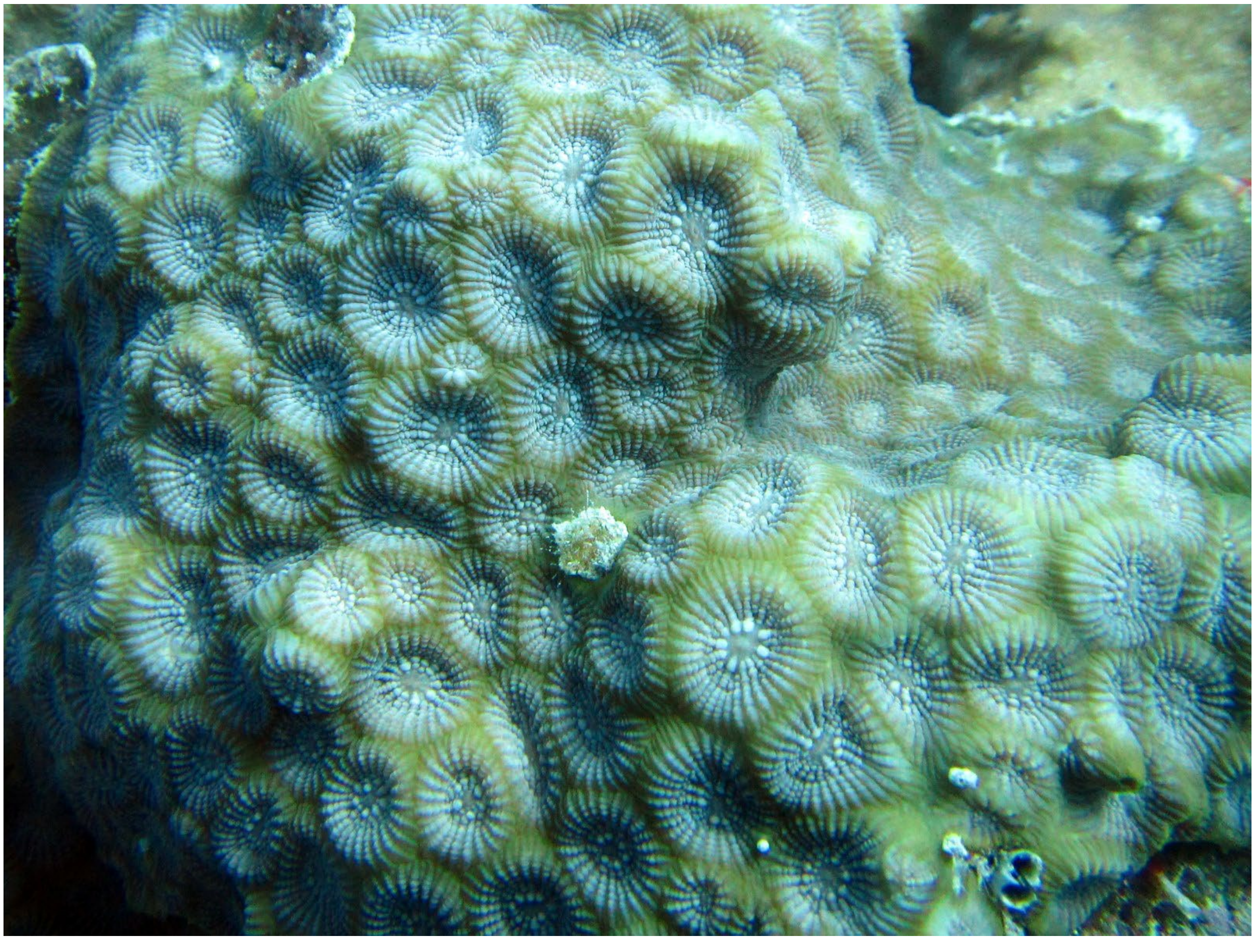
Phymastrea *This genus used to be in Montastraea*.

Corallites have separate walls, and are usually small. To distinguish this genus from *Astrea* and *Favia*, the species must be distinguished first which then tells you what the genus is.

Phymastrea magnistellata This used to be in Montastrea.

Corallites are only slightly indented in the center. The outer rim is wider than on most *Dipsastrea* species.

A colony of *Phymastrea magnistellata*.



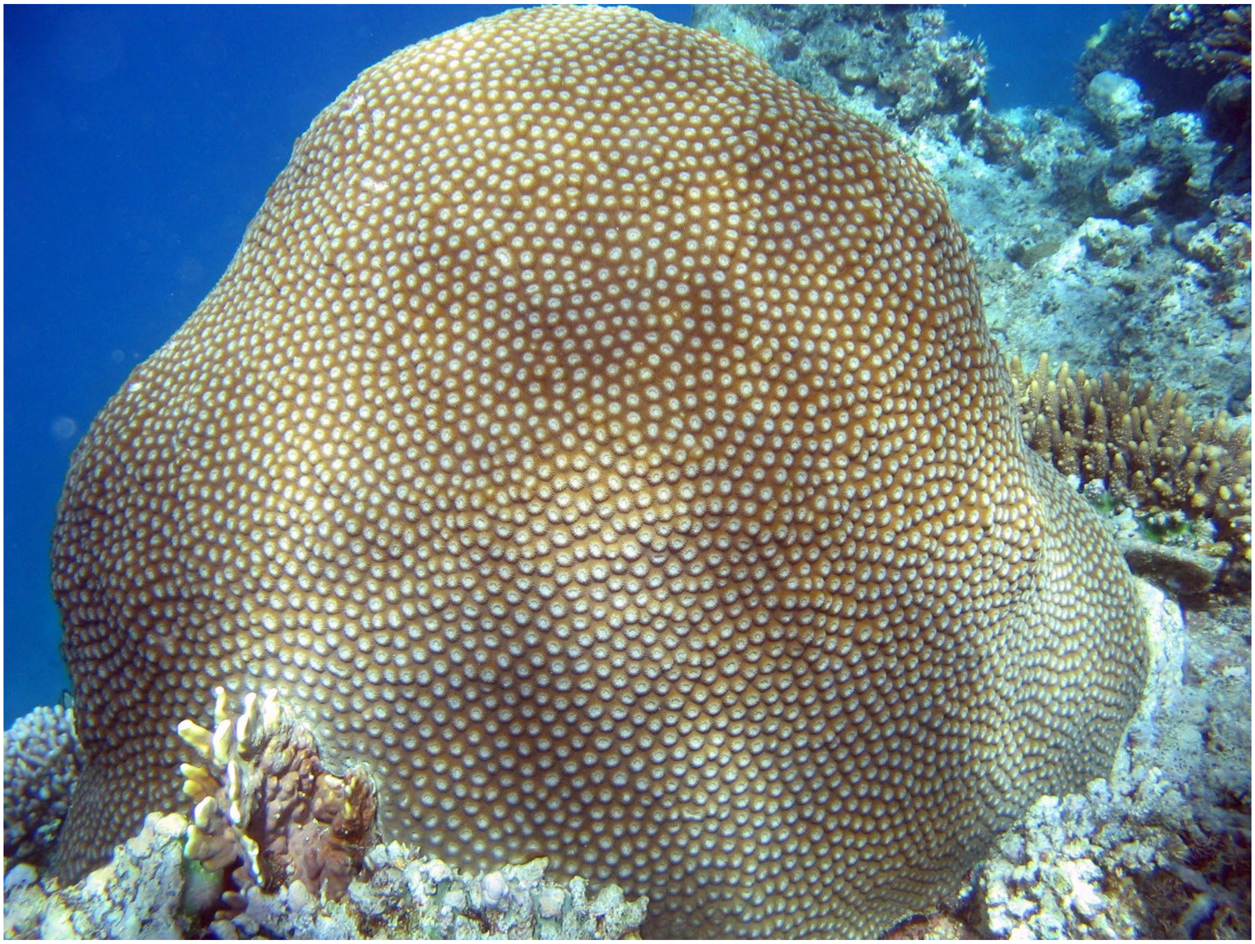
A close-up photo of *Phymastrea magnistellata*.

Diploastrea

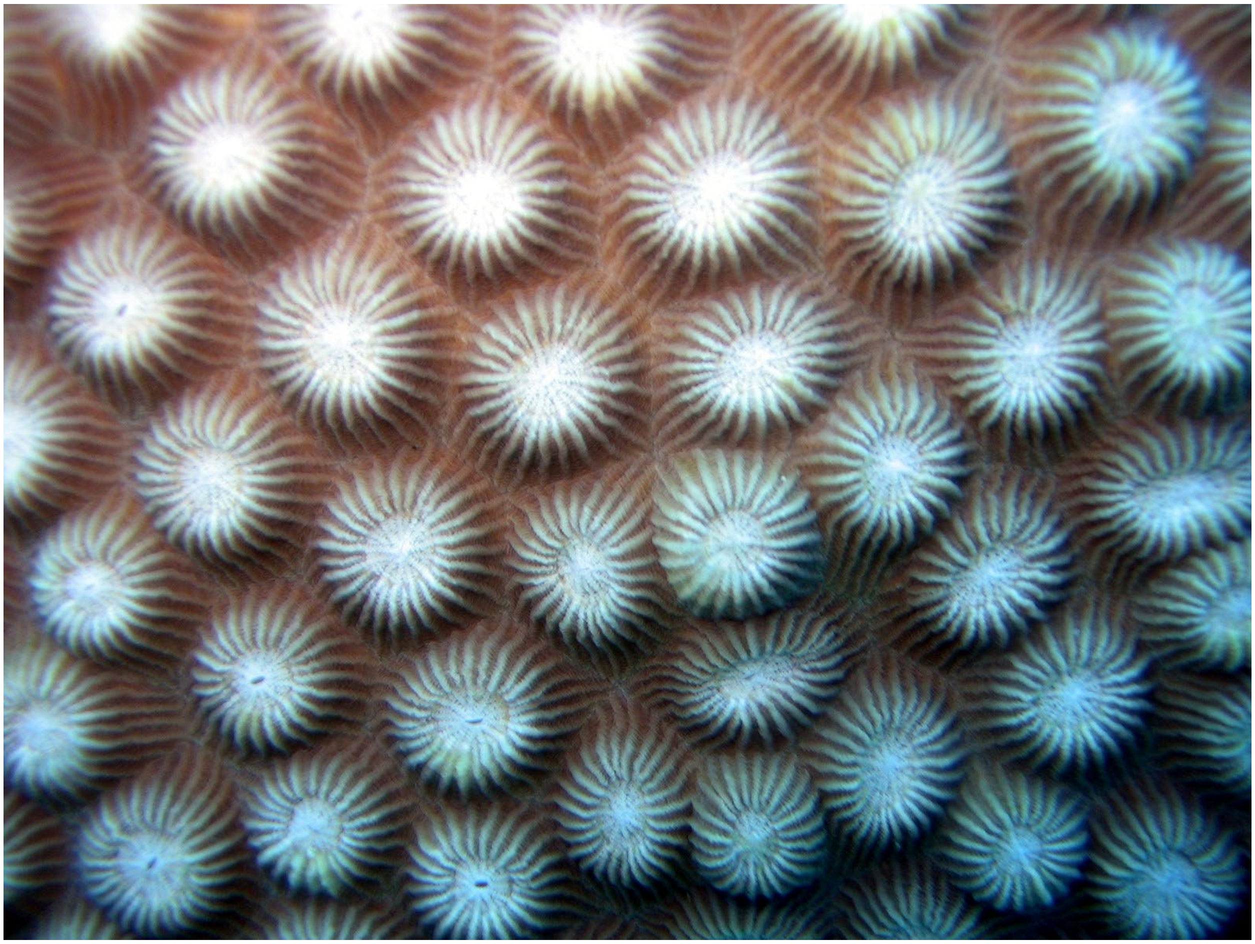
There is only one species in this genus, so the properties of the genus are that of the species.

Diploastrea heliopora

Colonies are usually massive and can be several meters in diameter. Corallites are shaped like little volcanoes and are about the diameter of a finger. Corallites are more volcano-shaped than other faviids.



A colony of *Diploastrea heliopora*.



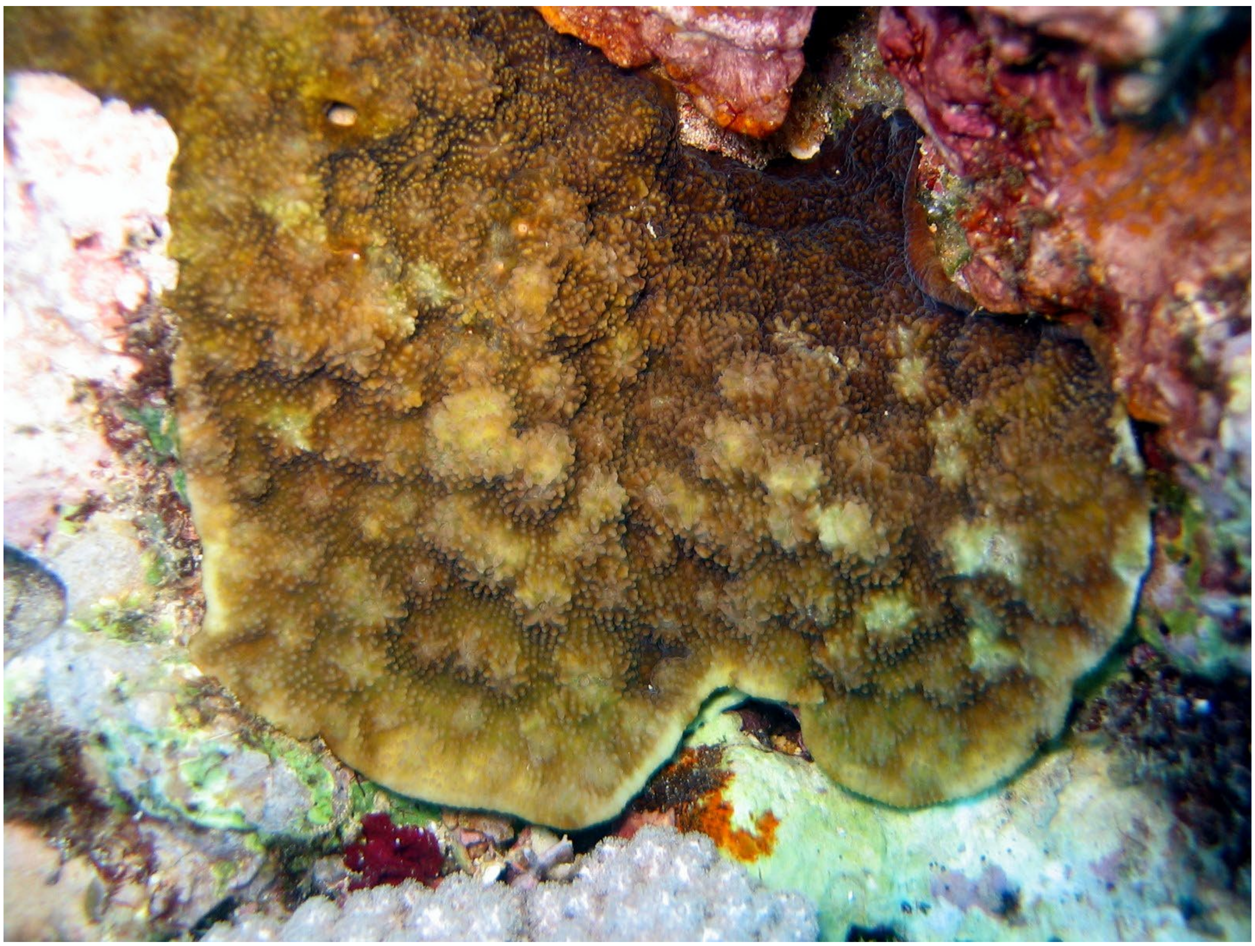
A close-up photo of *Diploastrea heliopora*.

Echinopora

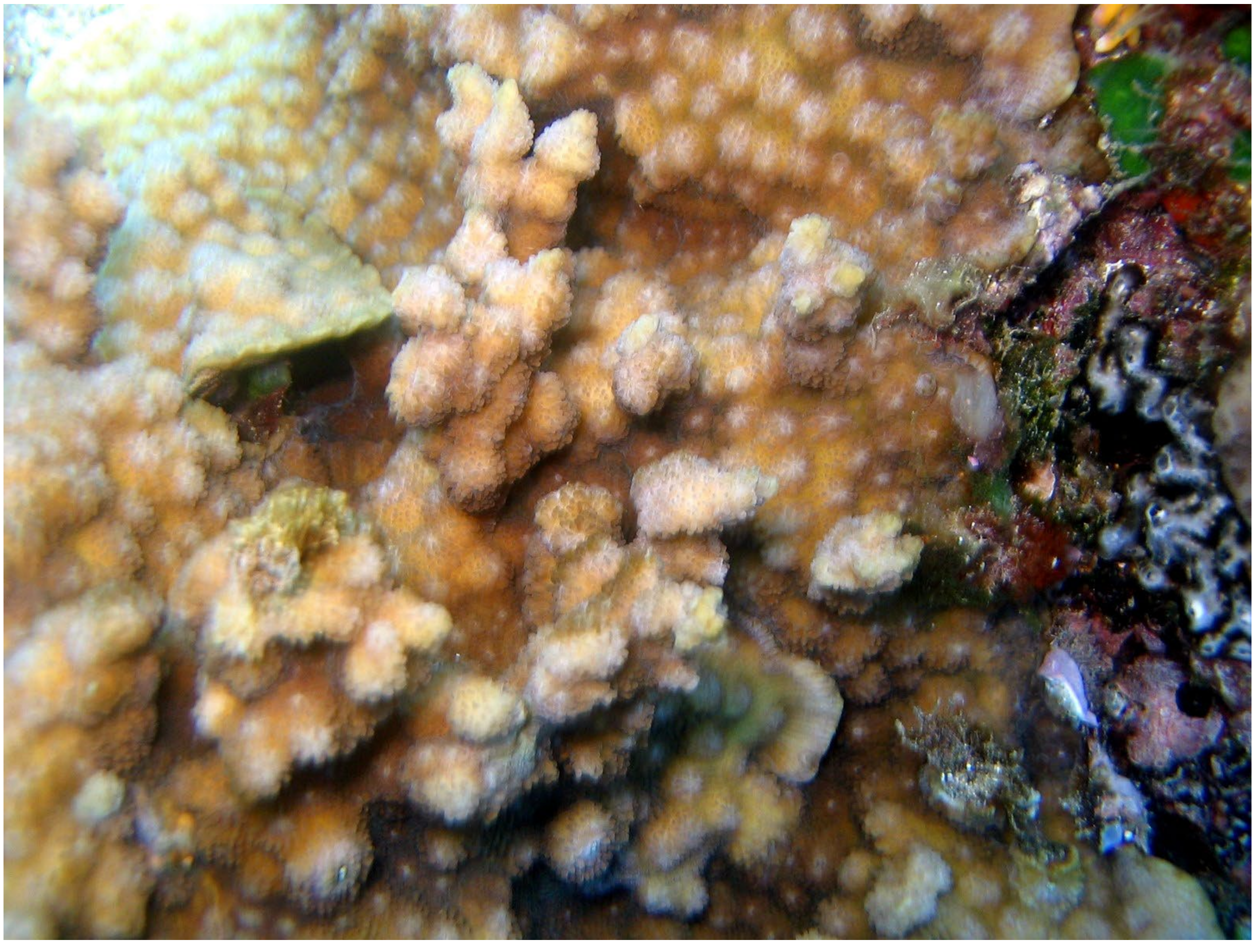
Colonies are thin plates, encrusting, or branching. Corallites are small, about 3-5 mm diameter, and usually project. Surfaces have tiny spines (the word "echino" means spiny). *Echinopora* has smaller corallites than *Favia* and *Diploastrea*, but larger corallites than *Cyphastrea*. *Echinopora* is also spiner than those genera.

Echinopora cf. hirsutissima

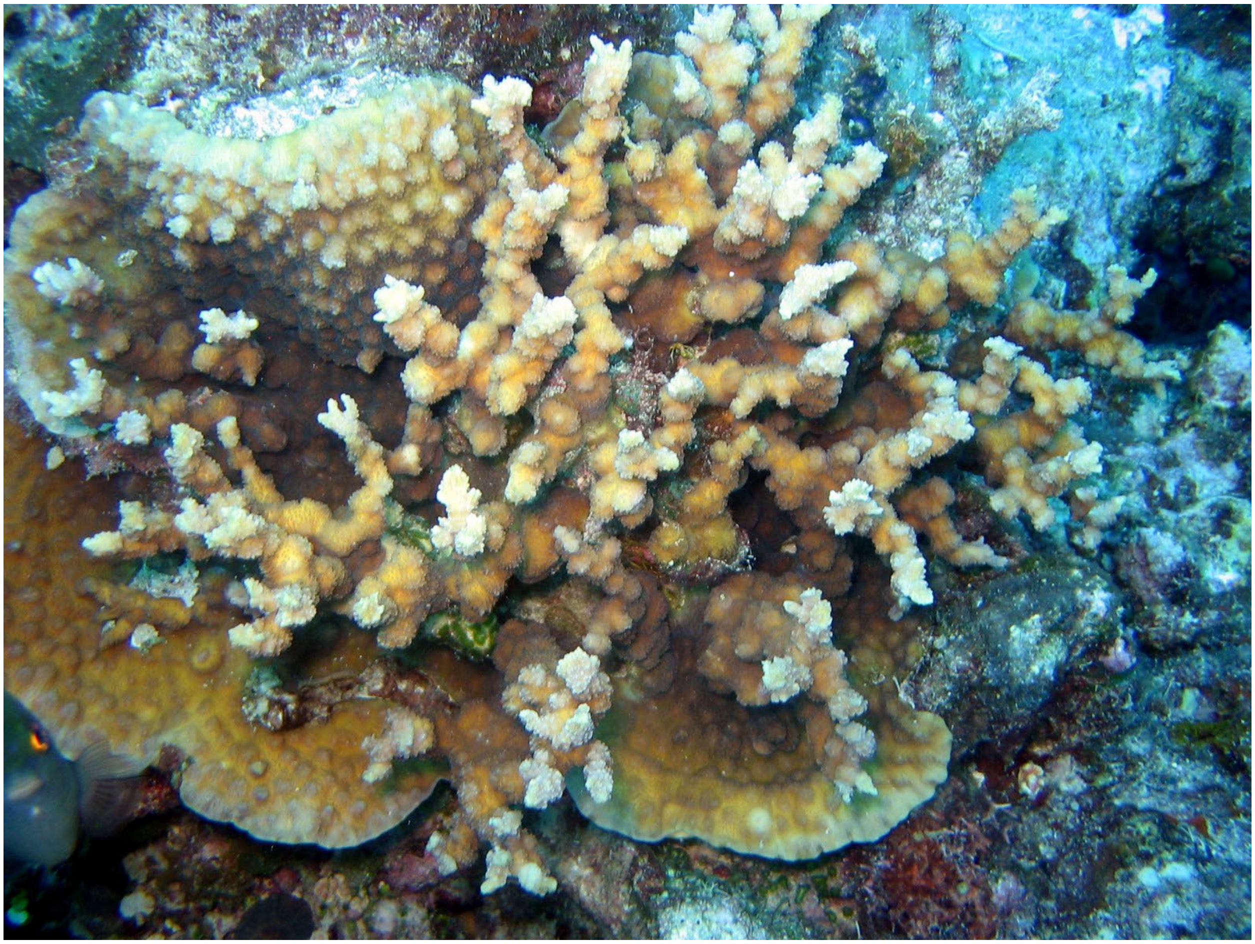
Colonies range from encrusting, encrusting with irregular lumps, columns or branches, branching with encrusting or plate base and branching without any plate. Corallites are rounded, spiny, and usually close together. Colonies often grow lumpy columns unlike plating *Echinopora* species, and corallites are spinier than on most *Echinopora* species. *Echinopora horrida* is completely branching.



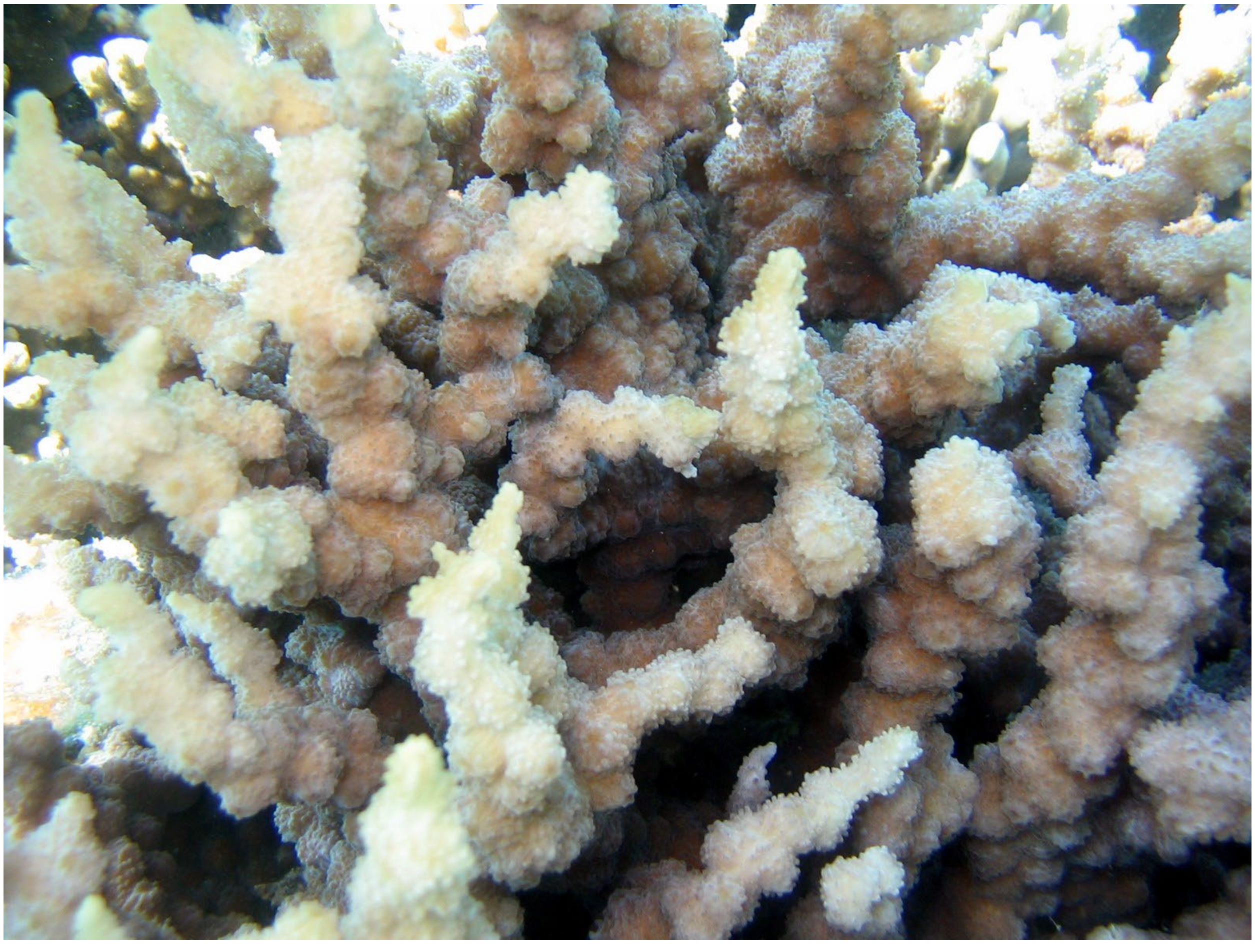
An encrusting colony of *Echinopora* cf. *hirsutissima*.



Lumps and columns on an *Echinopora* cf. *hirsutissima* plate.



A colony of branching *Echinopora* cf. *hirsutissima* with a plate base.



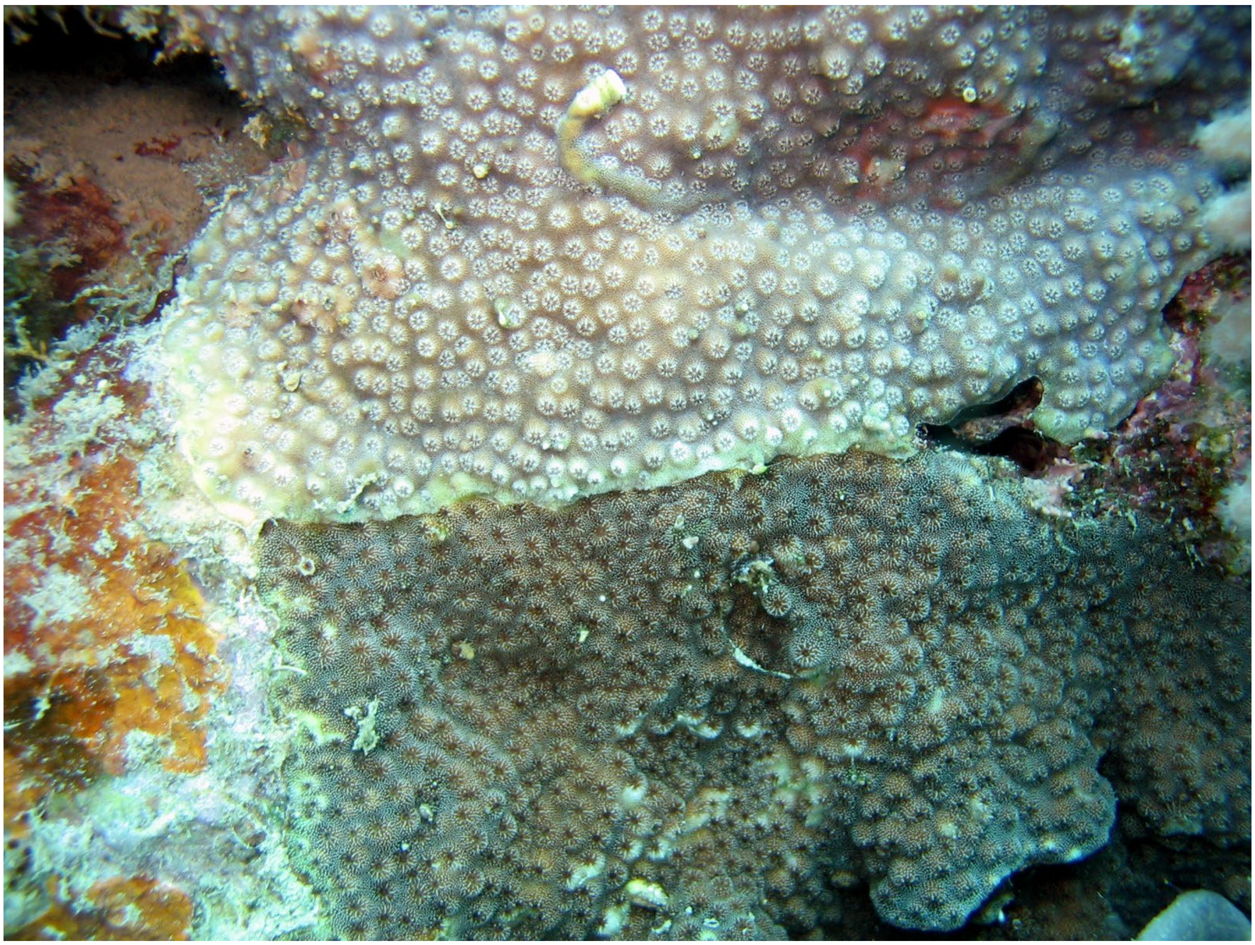
A close-up photo of *Echinopora* cf. *hirsutissima* branches.

Cyphastrea

Colonies are encrusting, massive, or branching. Corallites are tiny, about 2 mm diameter, and project. The corallites are smaller than on *Echinopora* and *Plesiastrea*.

Cyphastrea spp. encrusting

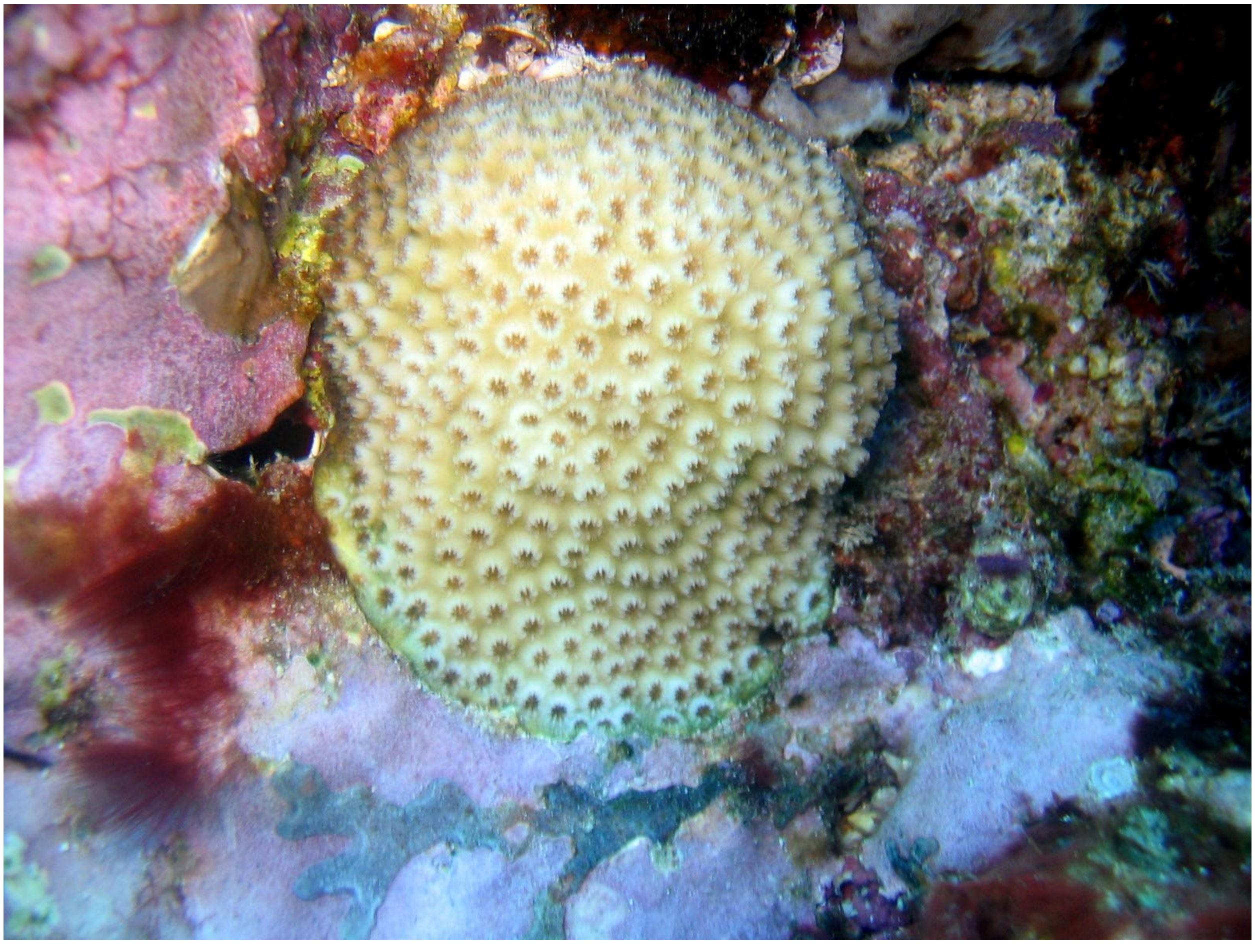
Encrusting is usually the most common lifeform in *Cyphastrea*., but colonies are difficult to identify, even in photos, because the corallites are so small that the features you need to see are too small to see. A couple speces are easy to identifiy in the water but others are difficult. *Pavona maldivensis* can look similar to a thick branching *Cyphastrea* but the septocostae extend from one corallite to another.



A close photo of two colonies of *Cyphastrea*.

Cyphastrea sp. "massive"

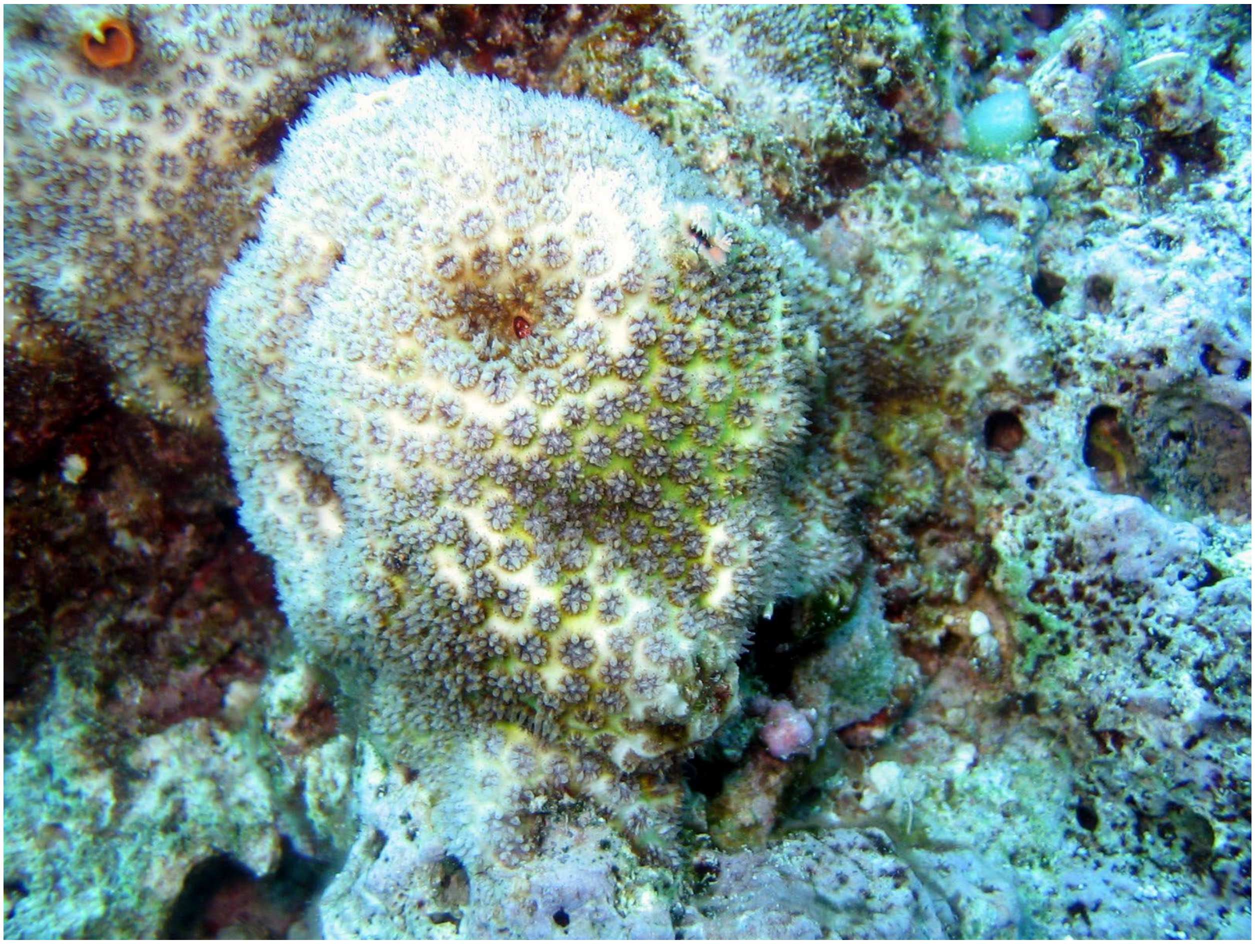
A massive colony of *Cyphastrea*.



A close-up photo of *Cyphastrea* sp.

Cyphastrea agassizi Vulnerable

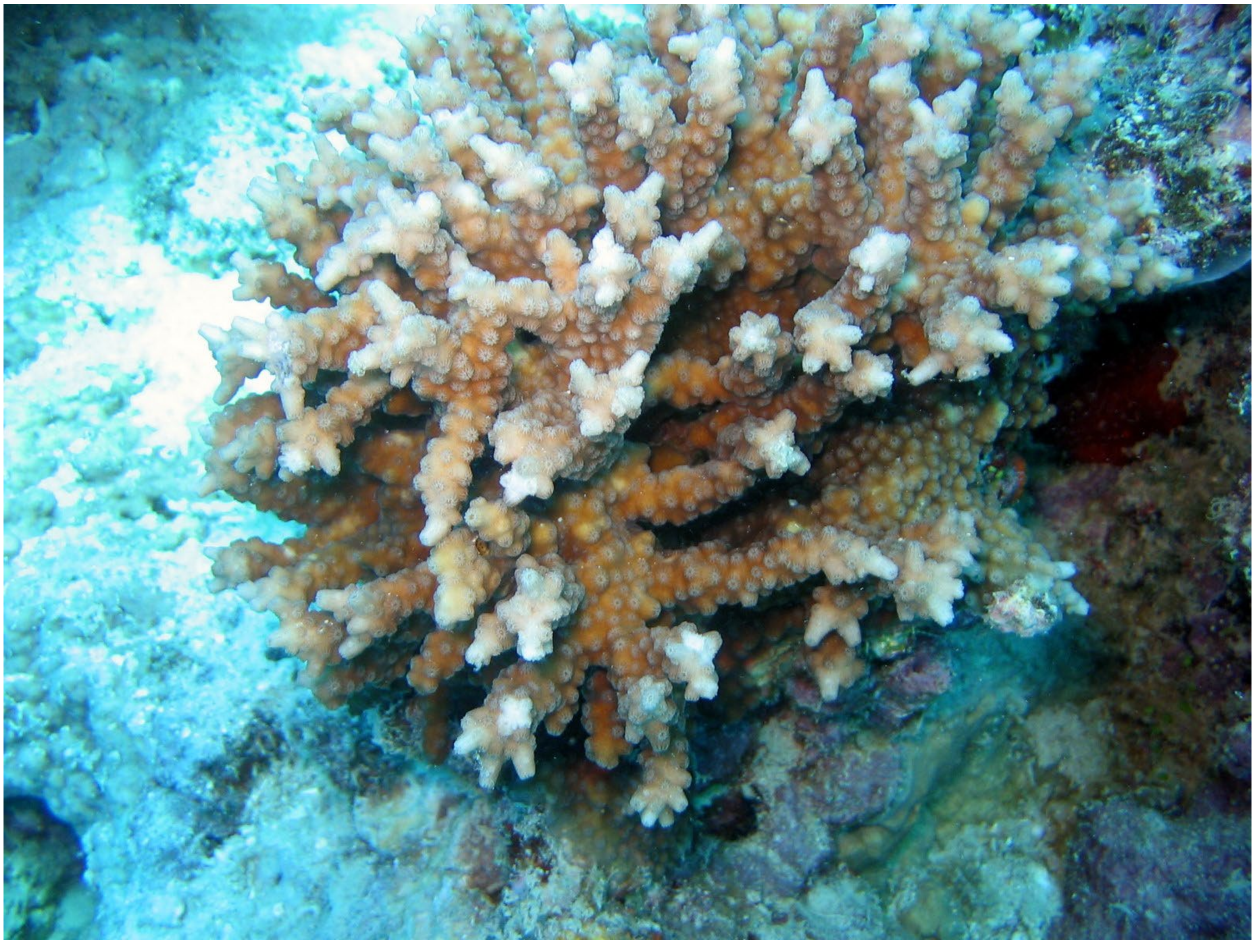
Colonies are massive and often small. Corallites have projecting septa. Corallites can be darker than the rest of the colony. Other *Cyphastrea* do not have projecting septa, or as widely spaced corallites.



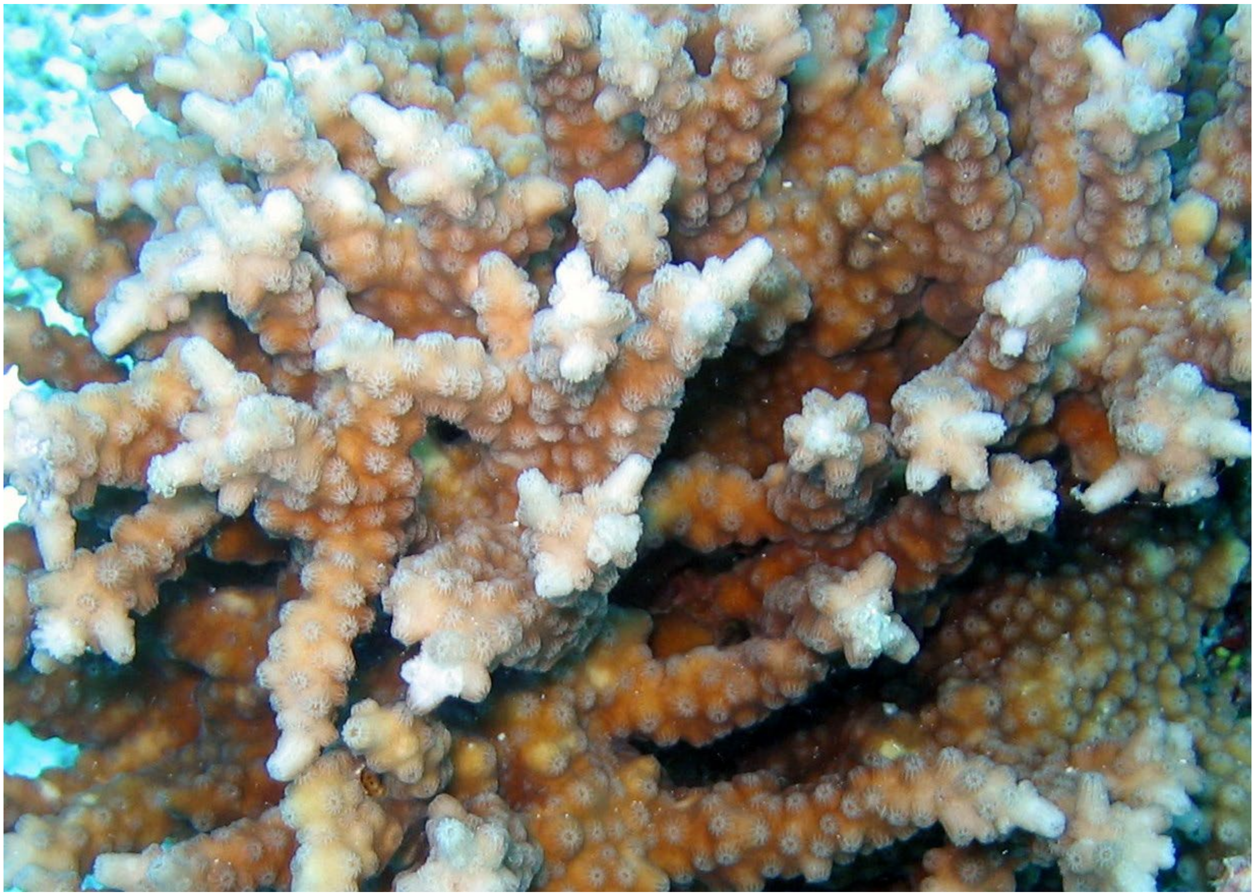
A close-up photo of a colony of *Cyphastrea agassizi*.

Cyphastrea decadia

Colonies are branching, with one corallite at the tip of a branch, much like *Acropora* (but the corallites are larger than on *Acropora* and are like on other *Cyphastrea*). Colonies differ in how thick the branches are.



A colony of *Cyphastrea decadia*.



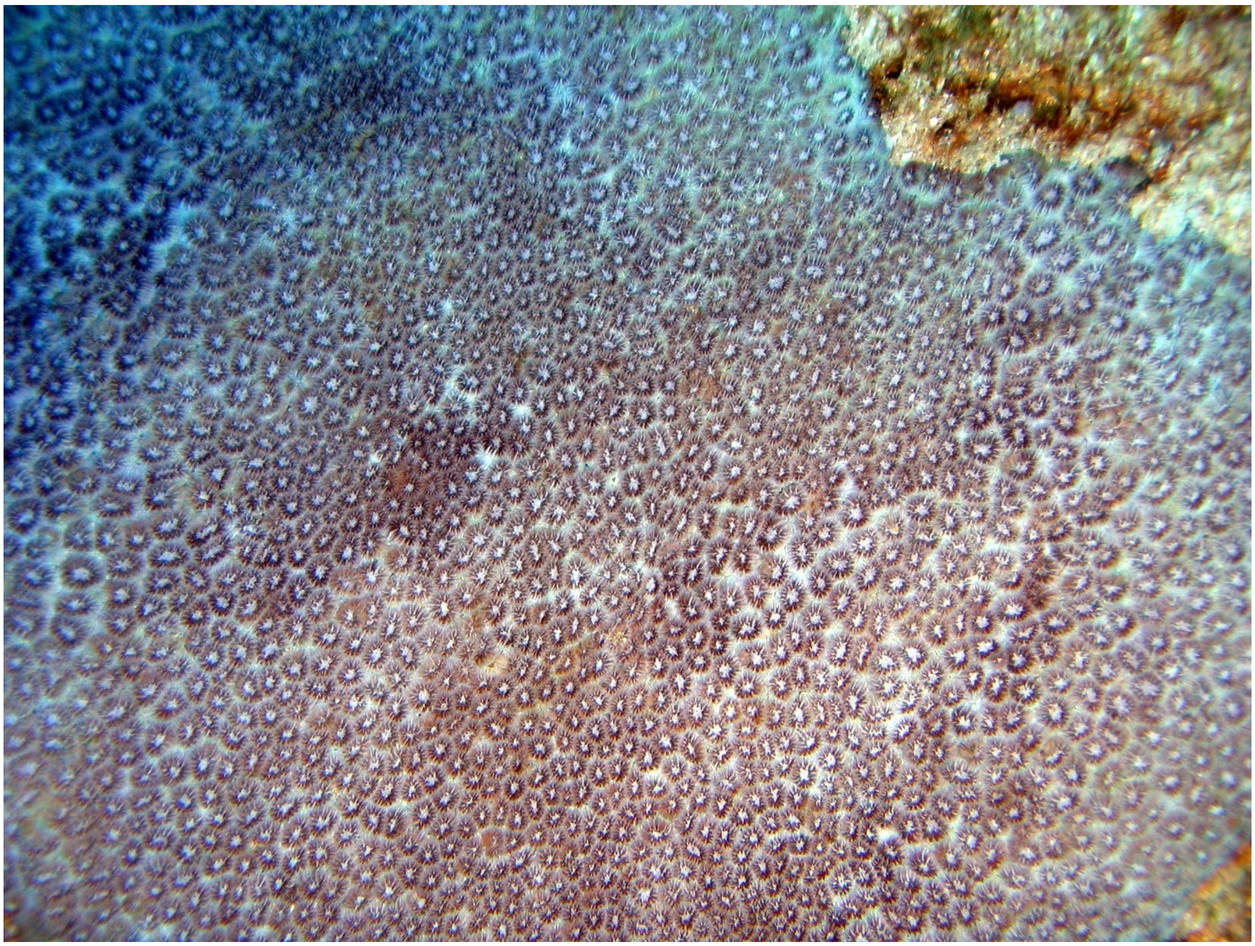
A close-up photo of a colony of *Cyphastrea decadia*.

Plesiastrea

Colonies are massive, and corallites are small and project. The corallites are larger than on *Cyphastrea*, but smaller than on *Echinopora*.

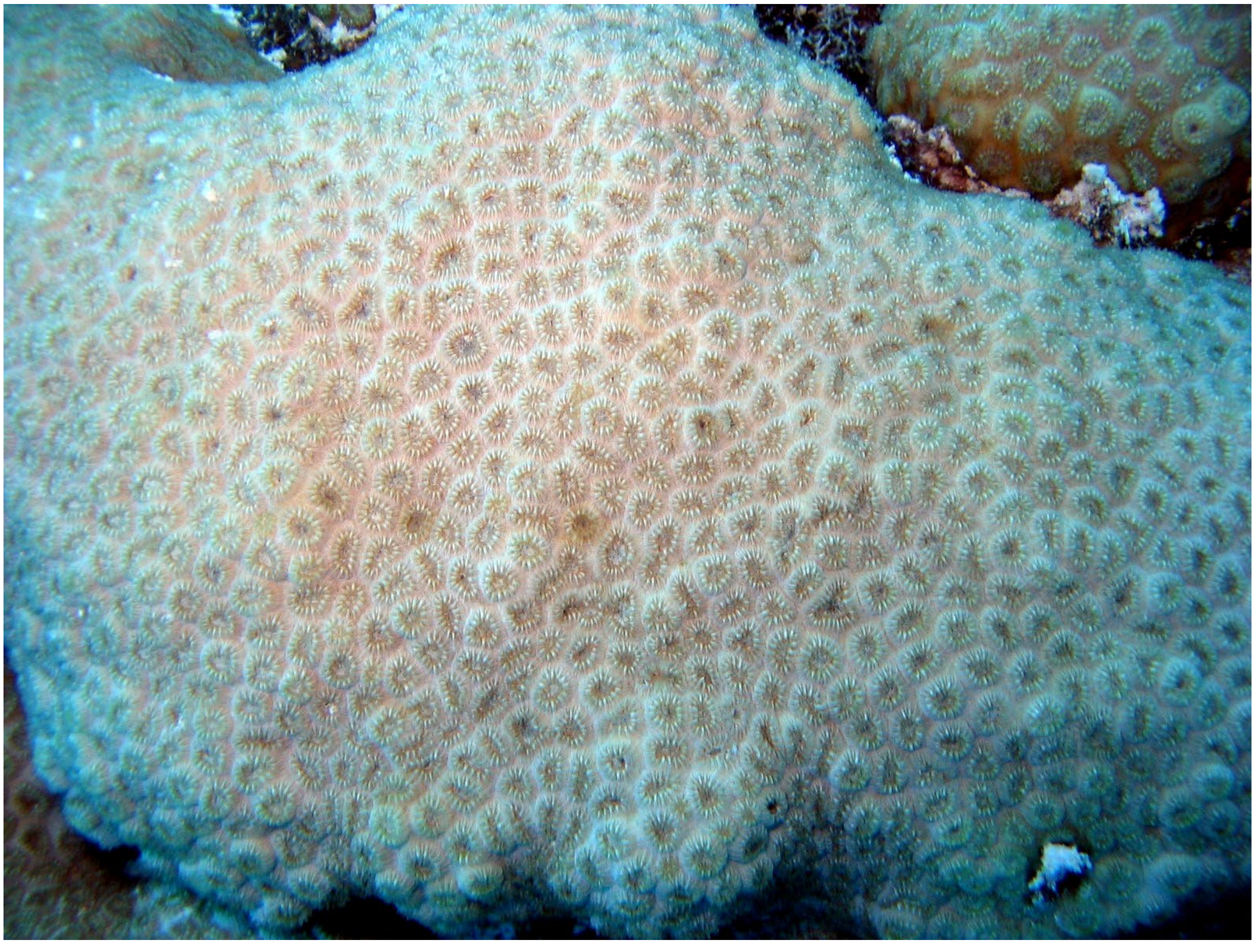
Plesiastrea versipora

Colonies are massive. Corallites are small, about 3-4 mm diameter, and project. When the polyp is retracted, corallites look a bit like miniature volcanoes, and radiating ridges called costae on the sloping sides of the corallites. When the polyps are extended, they can appear as a short tube of tissue with a ring of tentacles on the rim. All but one *Favia* species have larger corallites and that one species does not have fleshy polyps.

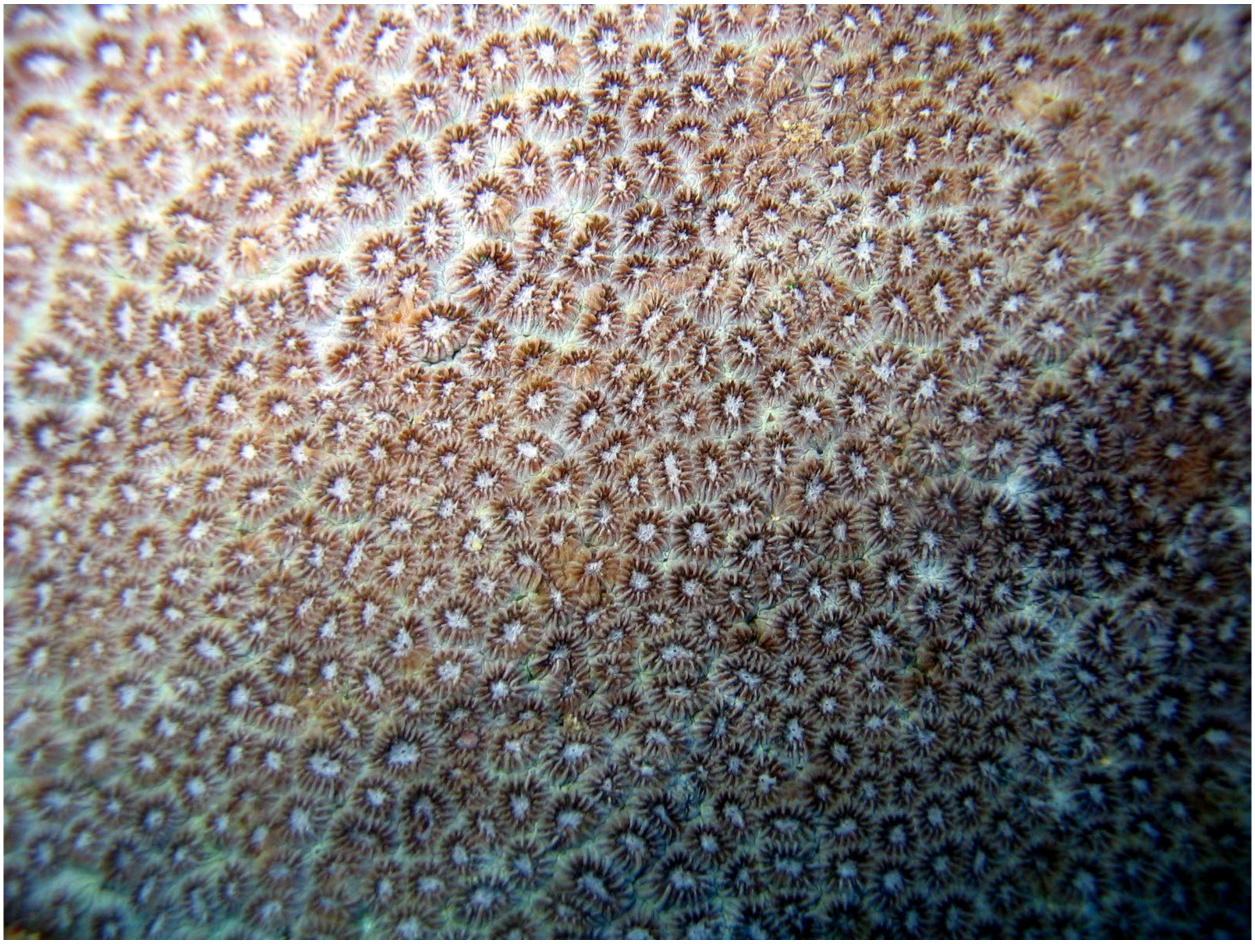


A close photo of a colony of *Plesiastrea versipora* with the polyps retracted.

A close-up photo of a small colony of *Plesiastrea versipora* with the polyps partway extended.



A close-up photo of a colony of *Plesiastrea versipora*.



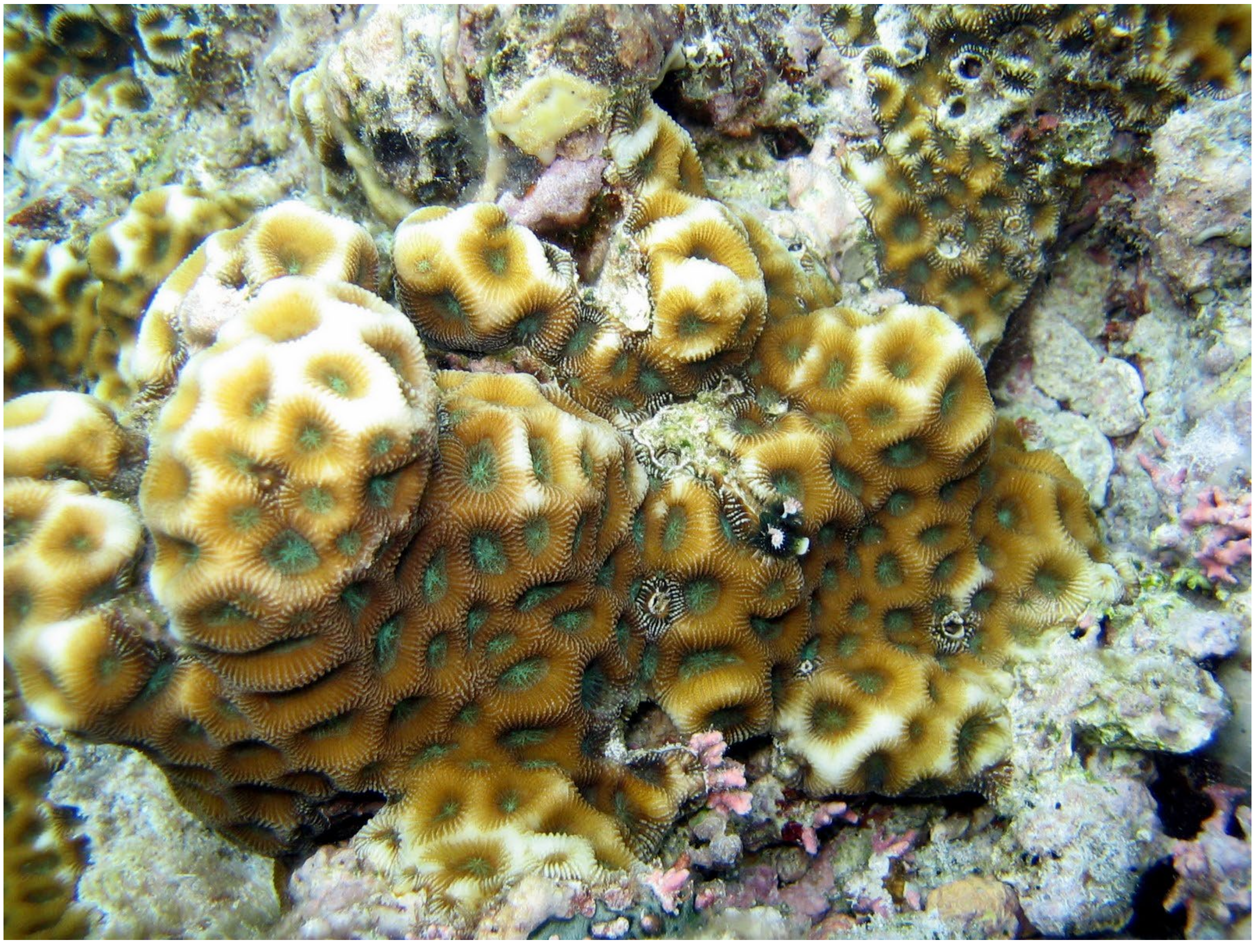
A close up photo of a colony of *Plesiastrea versipora*.

Favites

Colonies have corallites that are not separate, they share a single wall between them. There is no groove or crack between corallites. Corallites vary between about the diameter of a thumb and smaller than the diameter of a small finger. *Dipsastrea*, *Astrea*, *Phymastrea*, *Echinopora*, *Plesiastrea* and *Cyphastrea* all have separate corallties that do not share walls. *Leptastrea* has smaller corallites. *Goniastrea* sometimes has thinner walls, but not always. It is necessarily to learn species and they tell you which is *Goniastrea* and which *Favites*. One or two species of *Favia* have a very small crack line that separates corallties and look like they might be *Favites*.

Favites abdita

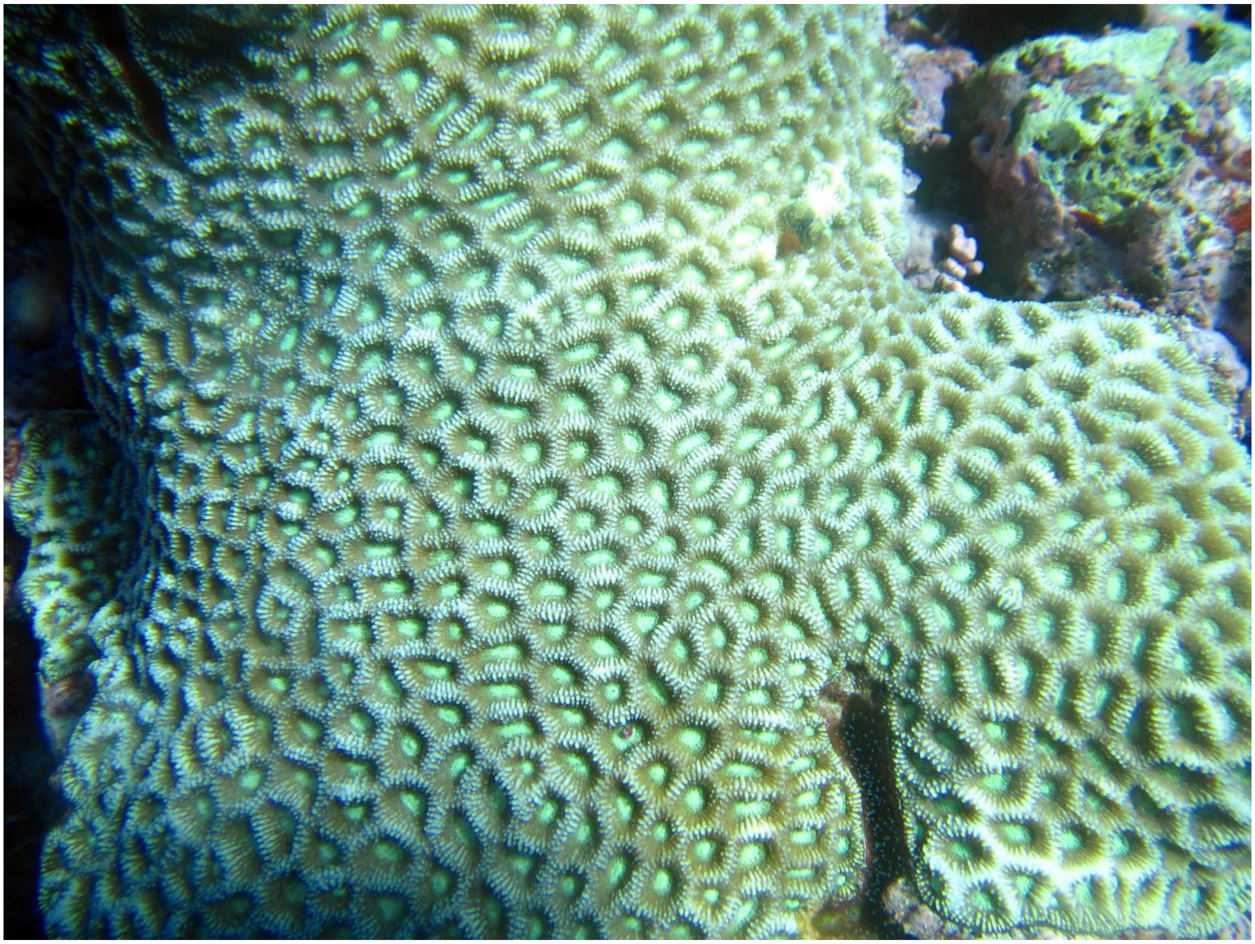
Colonies are massive and often lumpy. Corallites are about the size of a finger. The wall between two corallites has a sharp crest. Colonies are often yellow, sometimes with green polyp centers. *Favites halicora* is similar, but the walls between corallites are thicker and more rounded.



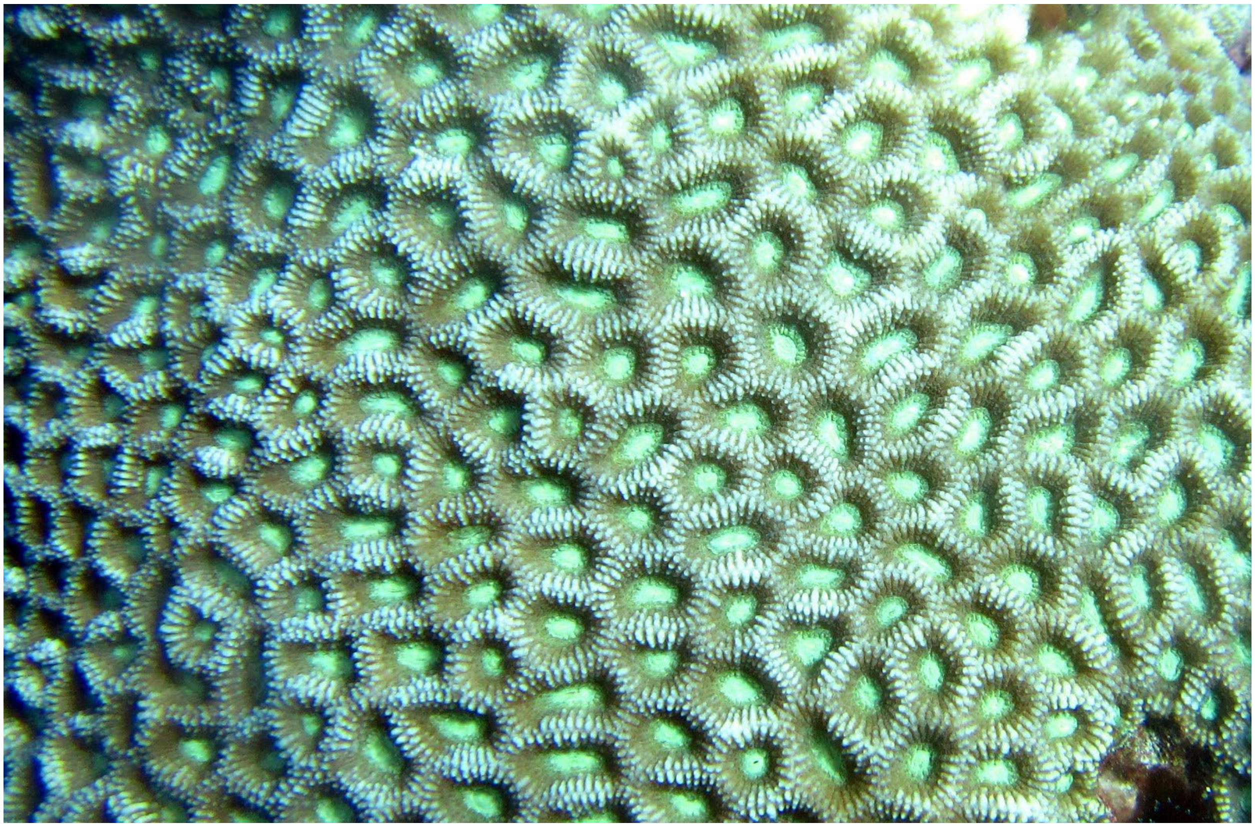
A colony of *Favites abdita*.

Favites cf. complanata

Colonies have rounded walls and smaller corallites with more visible septa than on *Favites paraflexuosa*. Walls are more rounded than on *Favites abdita*, and corallites are larger and walls thicker than on *Favites pentagona*.



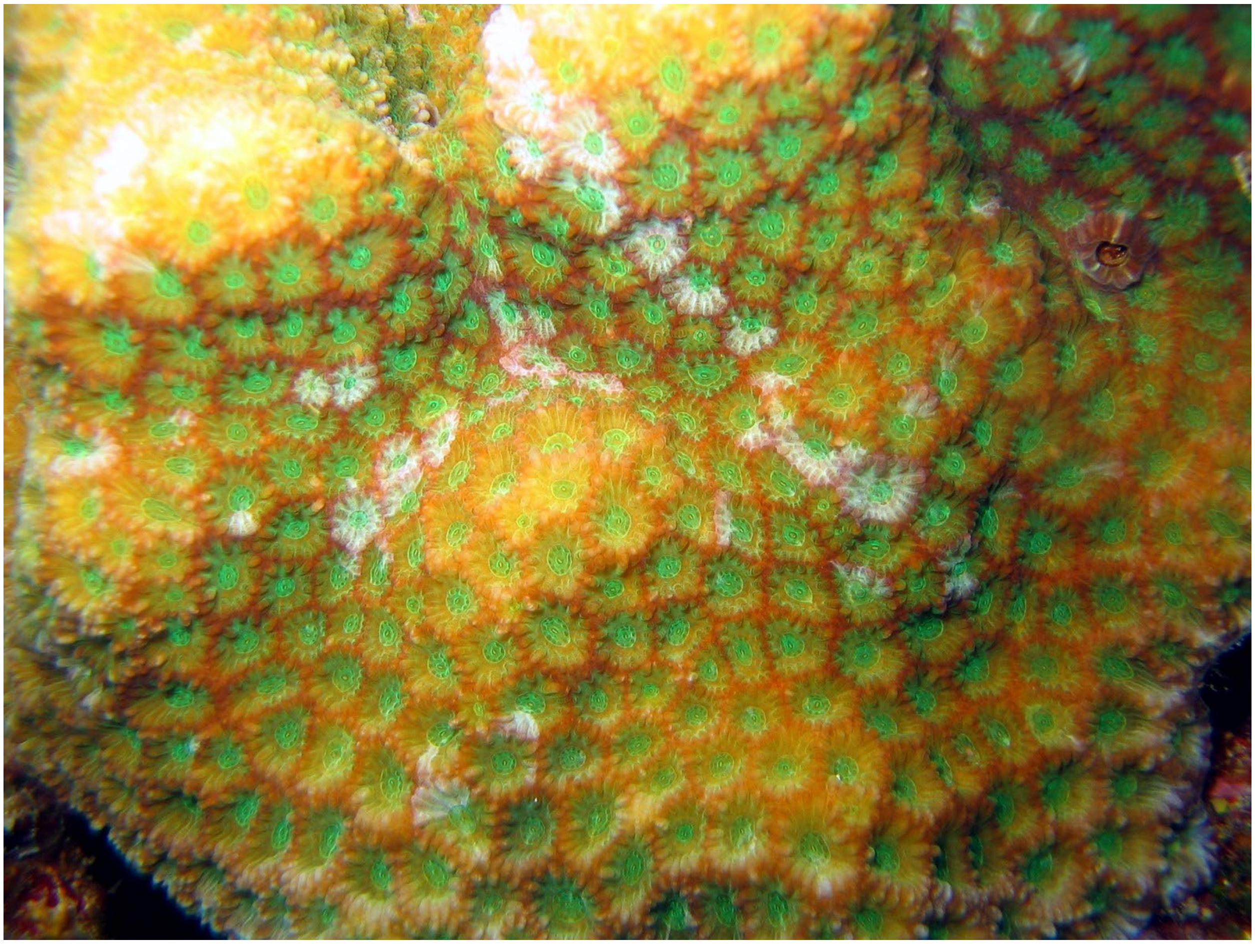
A colony of *Favites* cf. *complanata*.



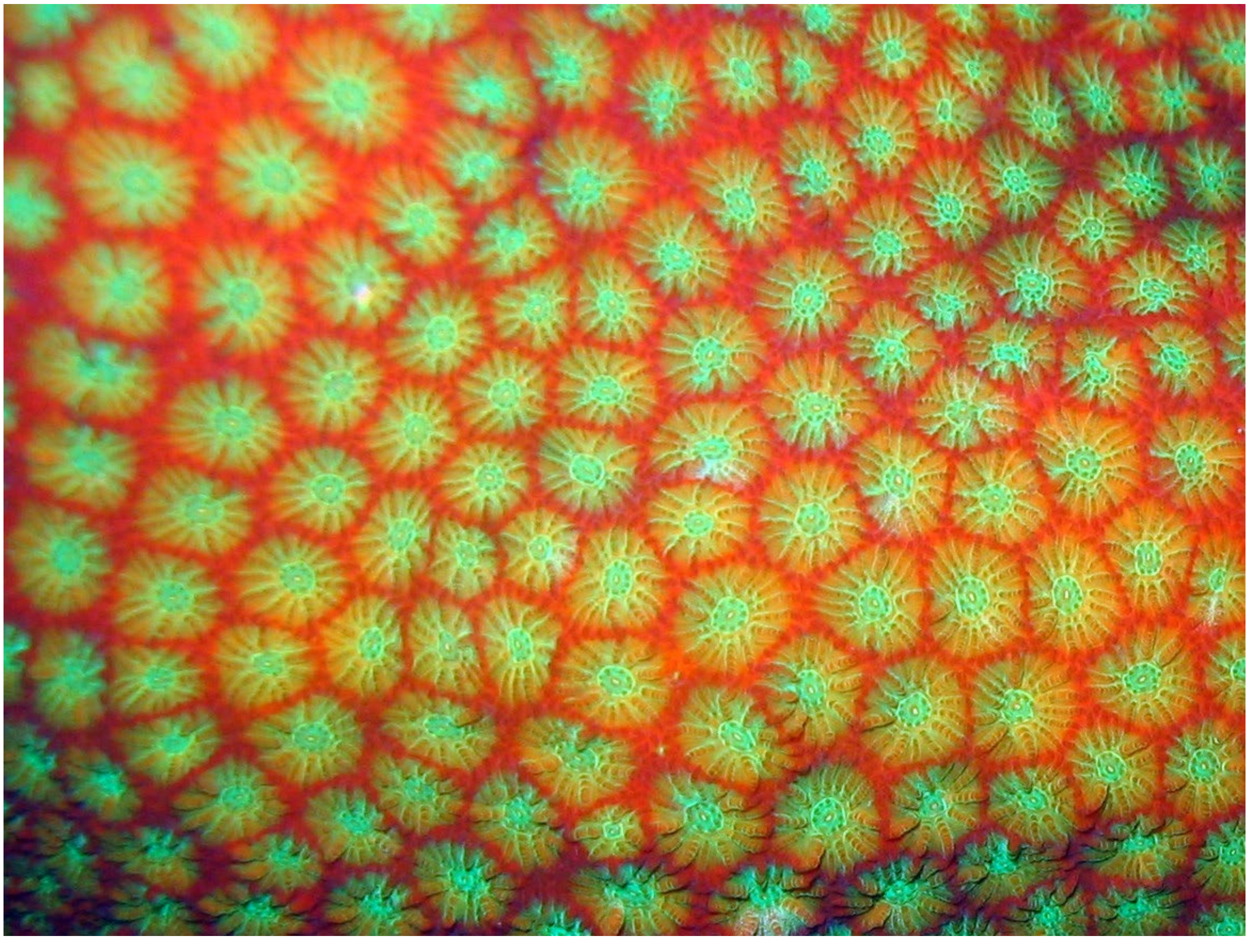
A close-up photo of *Favites* cf. *complanata*.

Favites pentagona

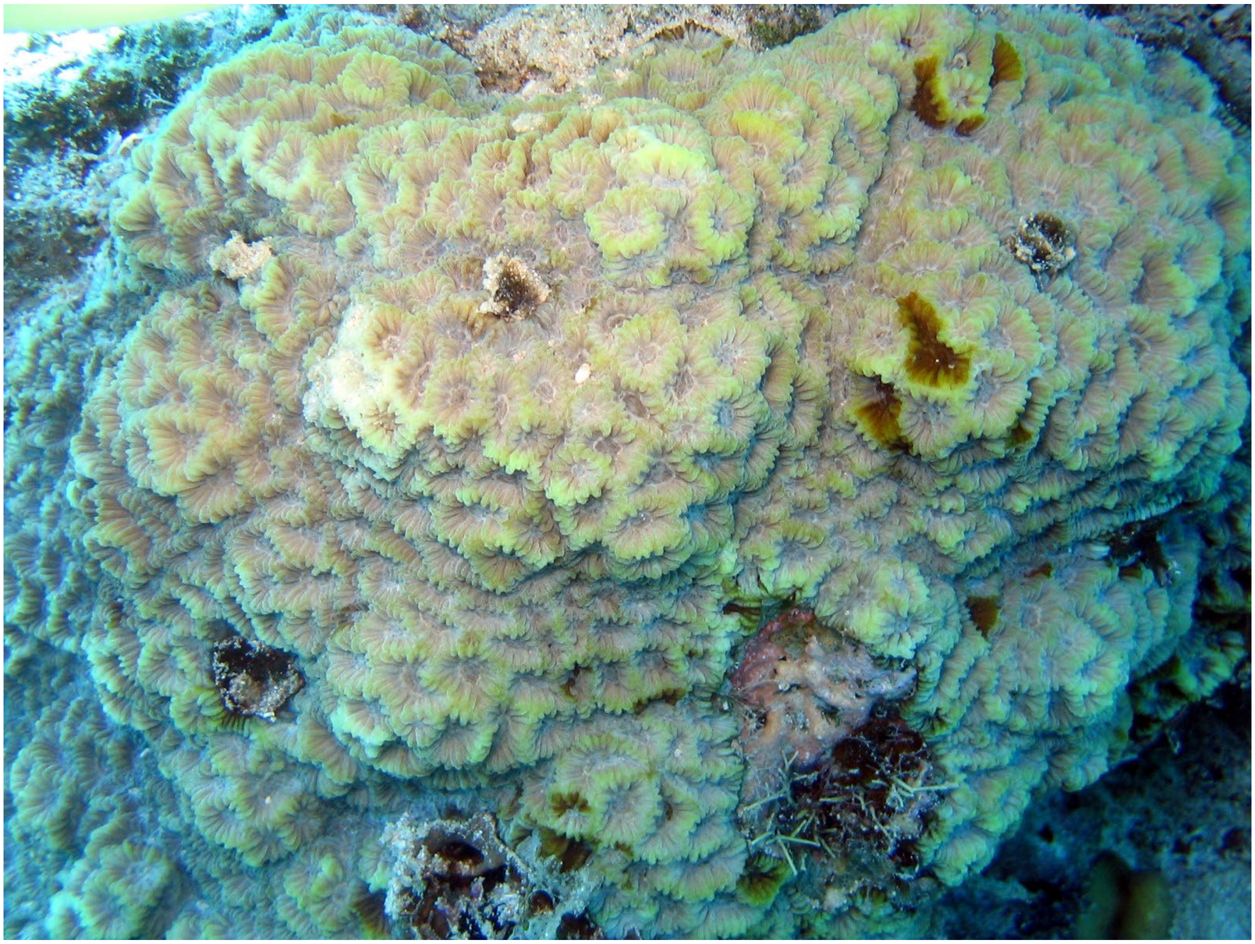
Colonies have smaller corallites, the size of a small finger or less, which have thin walls. Corallites are smaller than *Favites abdita* and *Favites complanata*, and the walls are thinner.



A colony of *Favites pentagona*.



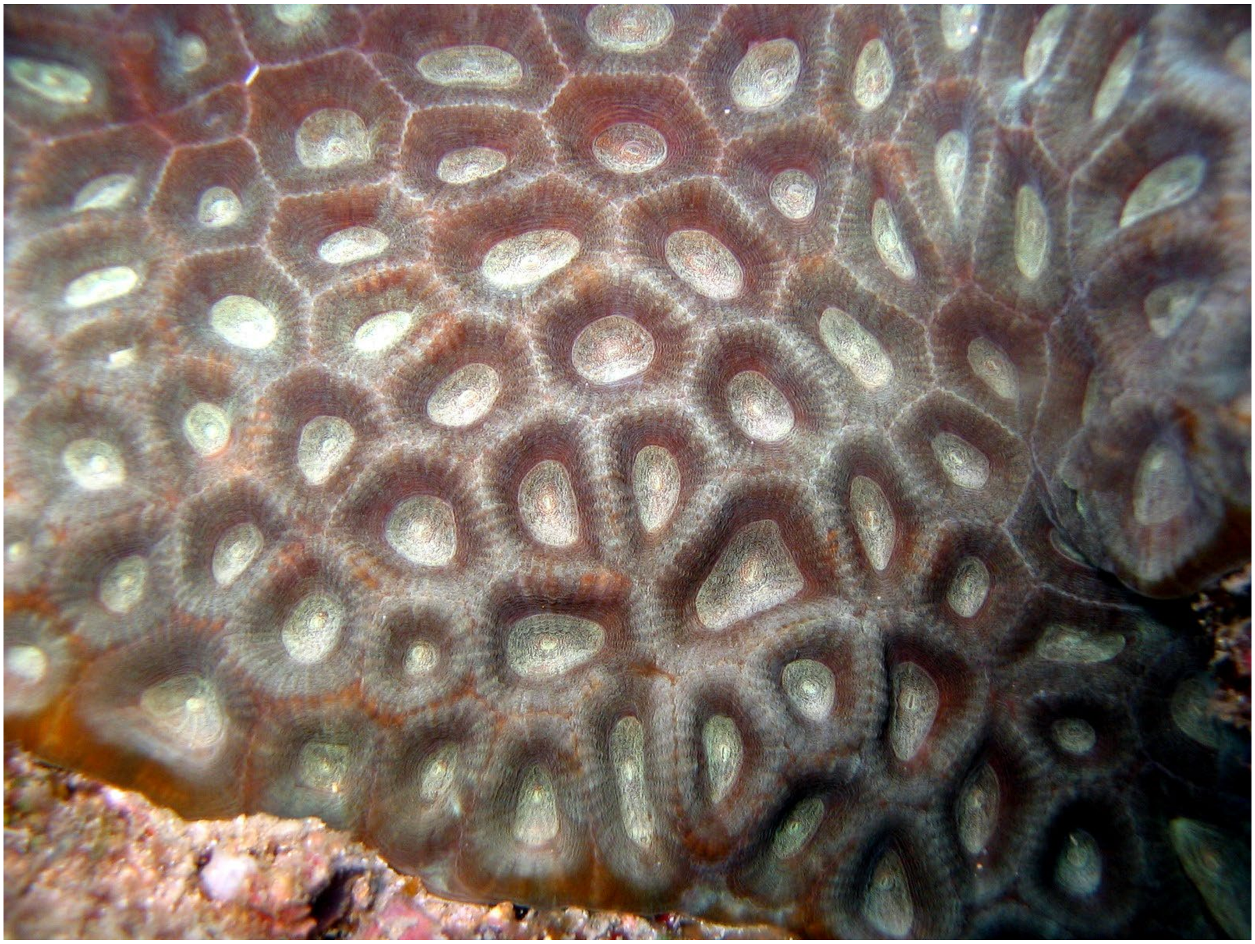
A close-up photo of *Favites pentagona*.



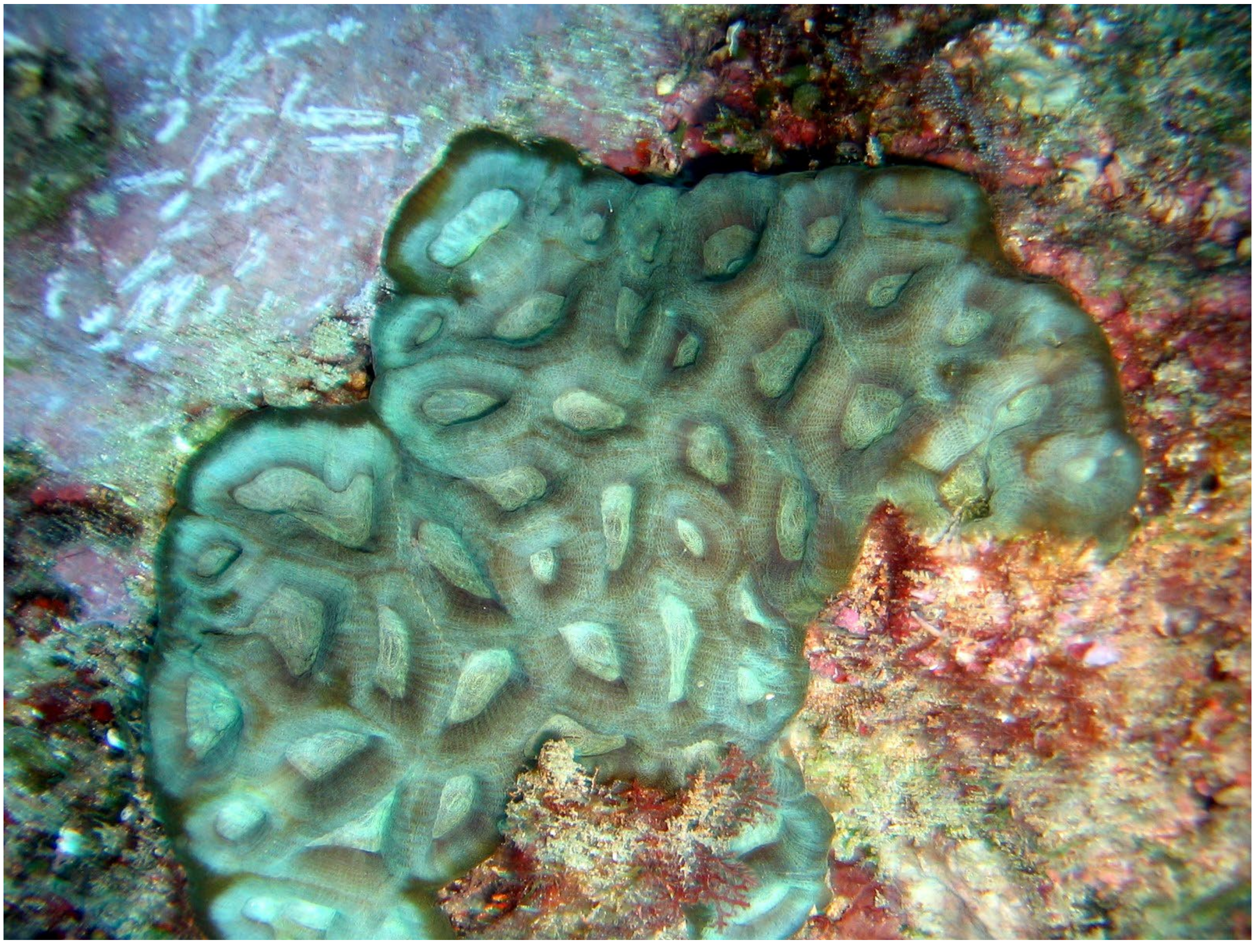
A colony of *Favites pentagona*.

Favites paraflexuosa

Colonies have relatively large corallites, about the diameter of a thumb, and very smooth ridges between corallites. Corallites are of a similar size in *Favites flexuosa* but are spinier. *Goniastrea palauensis* is similar but pali bumps are visible on the polyp floor next to the wall. *Favites flexuosa* is spinier.



A close photo of *Favites paraflexuosa*.



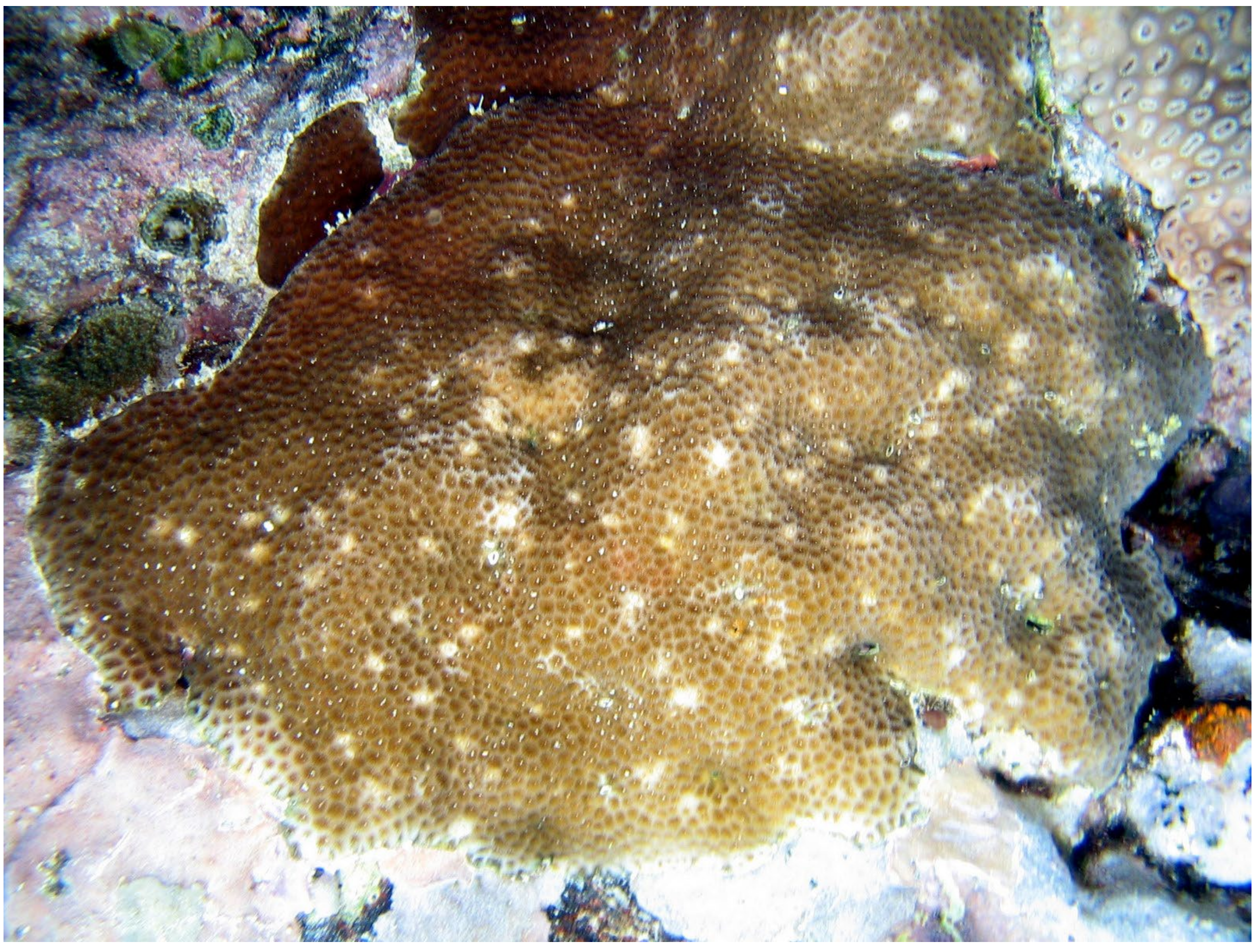
A colony of *Favites paraflexuosa*.

Goniastrea

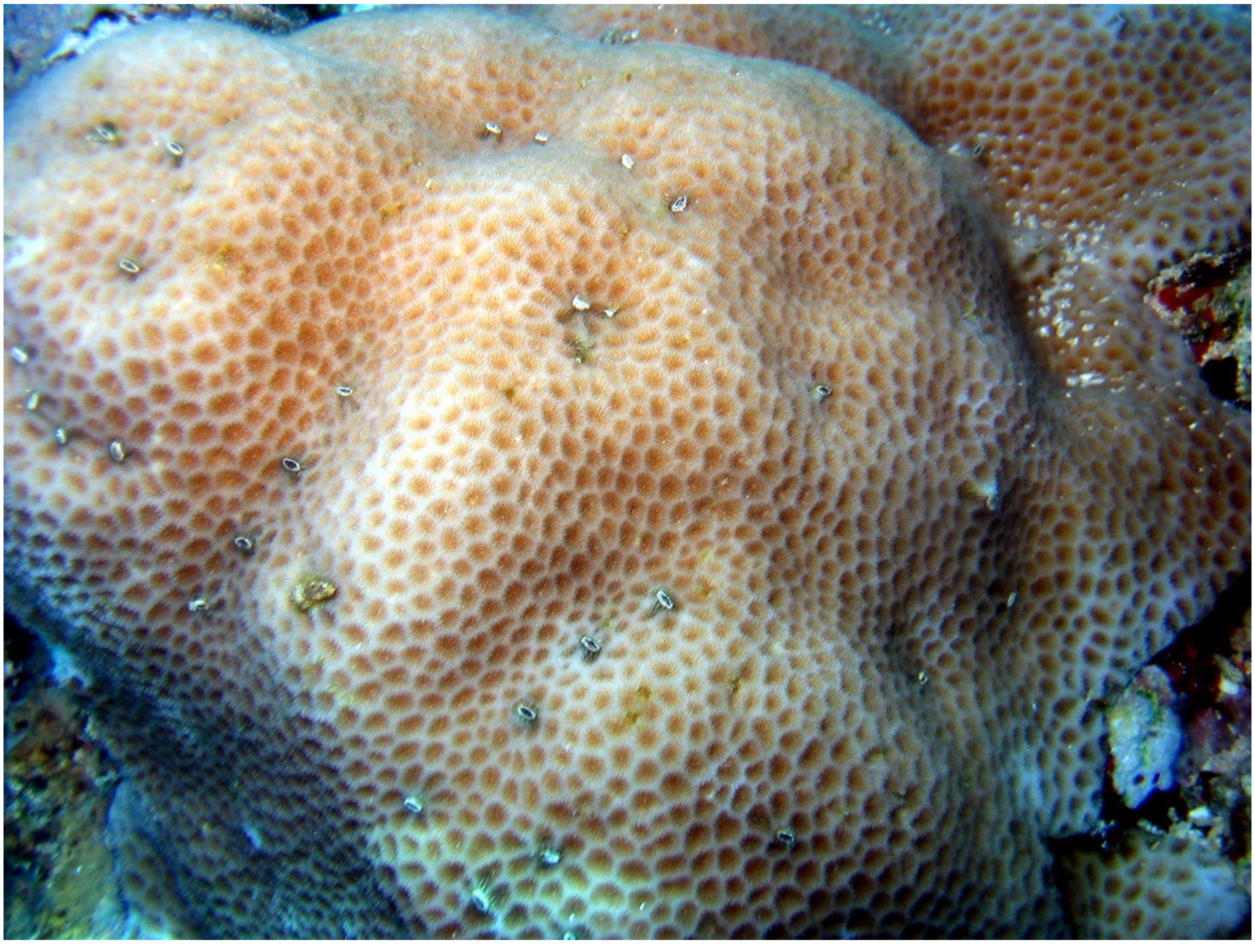
Colonies have corallites with a single wall separating adjacent corallites. Septa are uniform. In a few species, tiny bumps can be seen on the corallite floor near the base of the wall, which are from extensions of the septa called "pali." Most species have polygonal corallites, but at least one has some elongated corallites, and one is fully meandroid. Species differ in the size of the corallites. Some species often have a rusty color. *Goniastrea* is similar to *Favites*, but corallites are smaller in some *Goniastrea* species and/or the walls are thinner. But for some species you have to learn the species and that tells you whether they are *Goniastrea* or *Favites*.

Goniastrea minuta

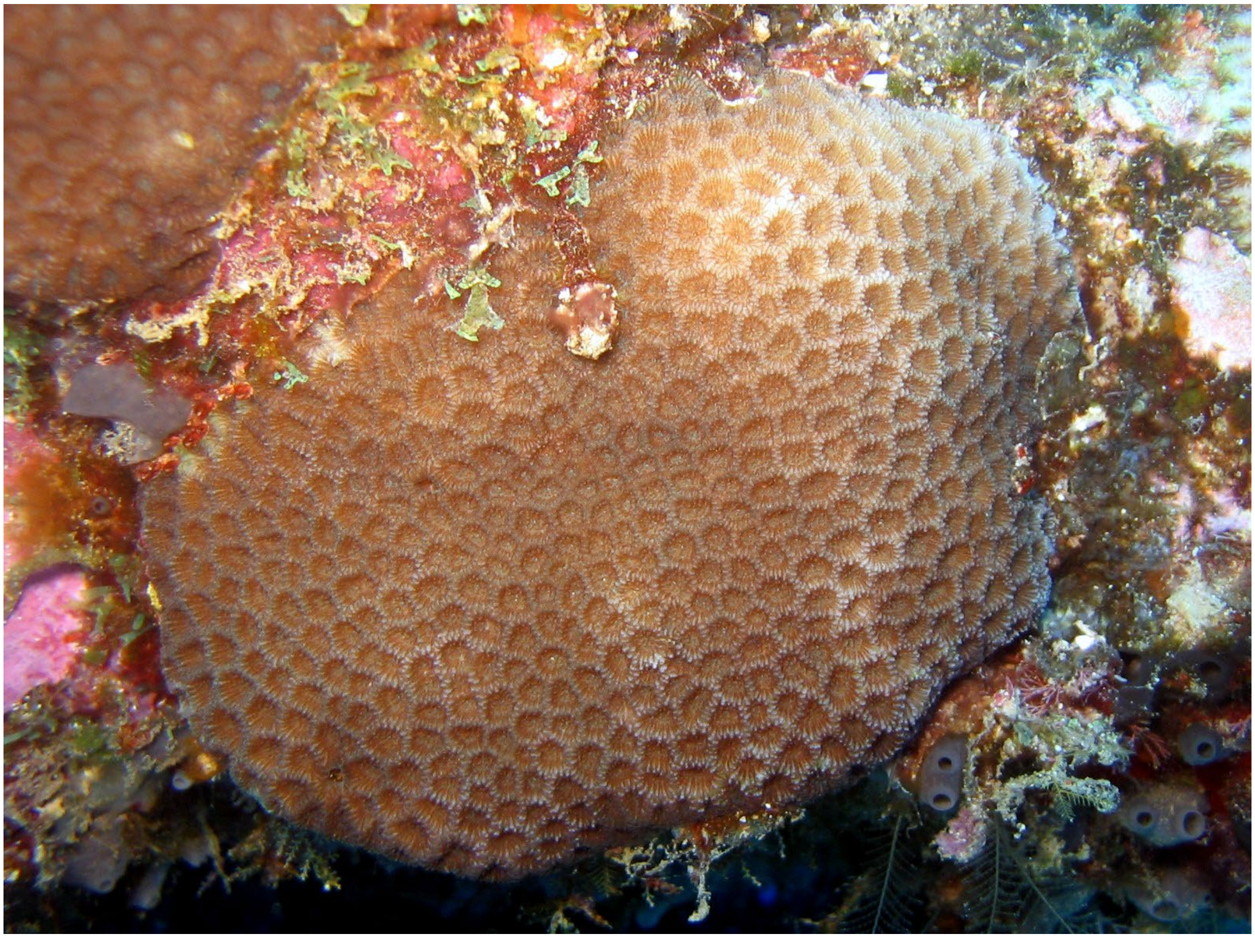
Colonies are encrusting or lumpy. Corallites are polygonal with thin walls, and are the smallest in this genus, only about 2-3 mm diameter. Colonies often have white spots which are barnacles. This species is usually most common in shallow exposed locations.



A colony of *Goniastrea minuta*.



A closer photo of *Goniastrea minuta*.



A close-up photo of *Goniastrea minuta*.

Goniastrea edwardsi

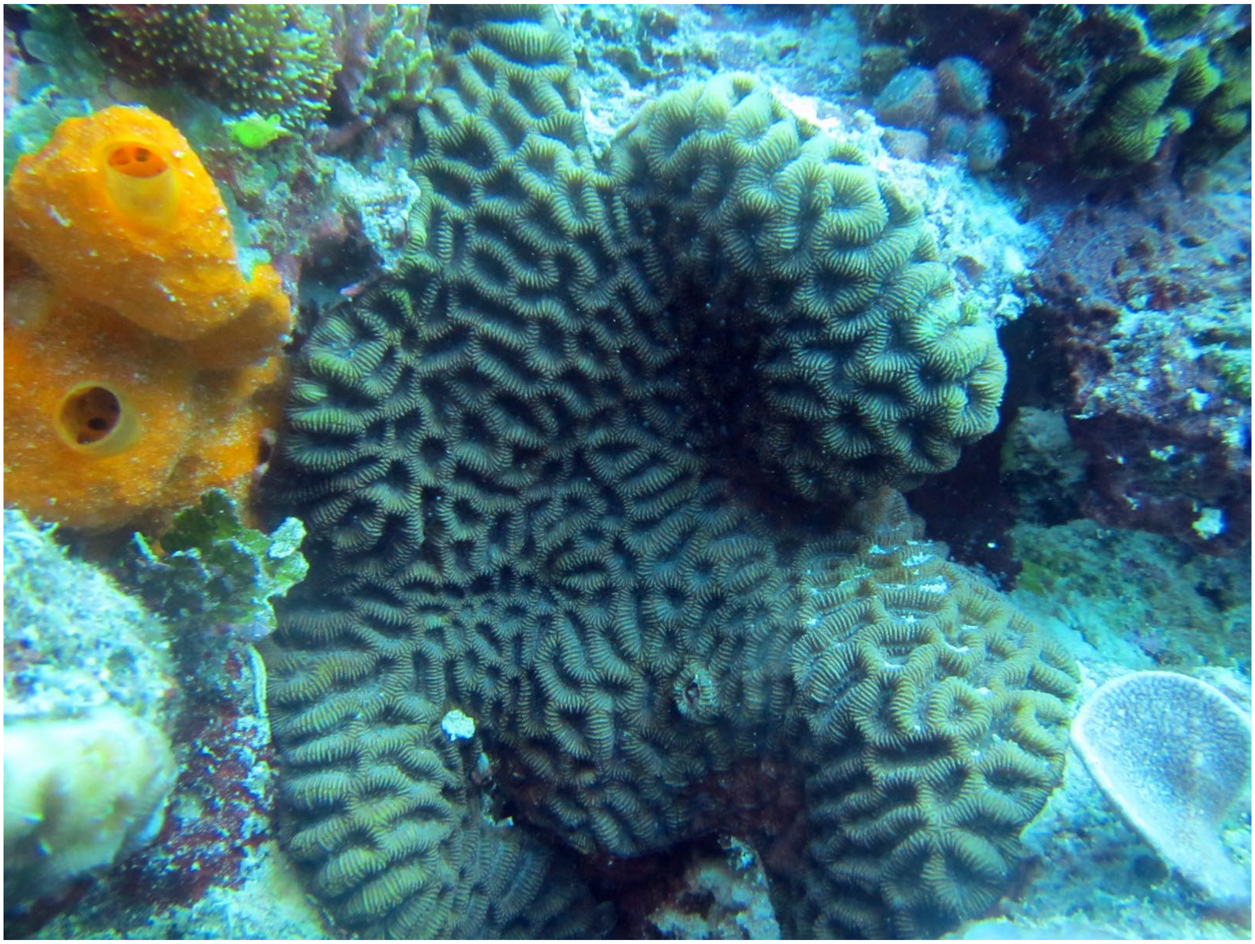
Colonies are massive, with small corallites. Corallite walls are thicker than on *Goniastrea retiformis*, larger than on *Goniastrea minuta*.

A colony of *Goniastrea edwardsi*.

A close-up photo of *Goniastrea edwardsi*.

Goniastrea pectinata

Colonies are usually lumpy. Corallites have fairly thick, high walls, and vary from polygonal to elongated. Sometimes pali can be seen inside the corallites. There are elongated corallites unlike on *Goniastrea retiformis*, *Goniastrea edwardsi*, and *Goniastrea aspera*. Walls are taller and thicker than on *Goniastrea favulus*, and colonies are not meandroid as on *Goniastrea australiensis*.



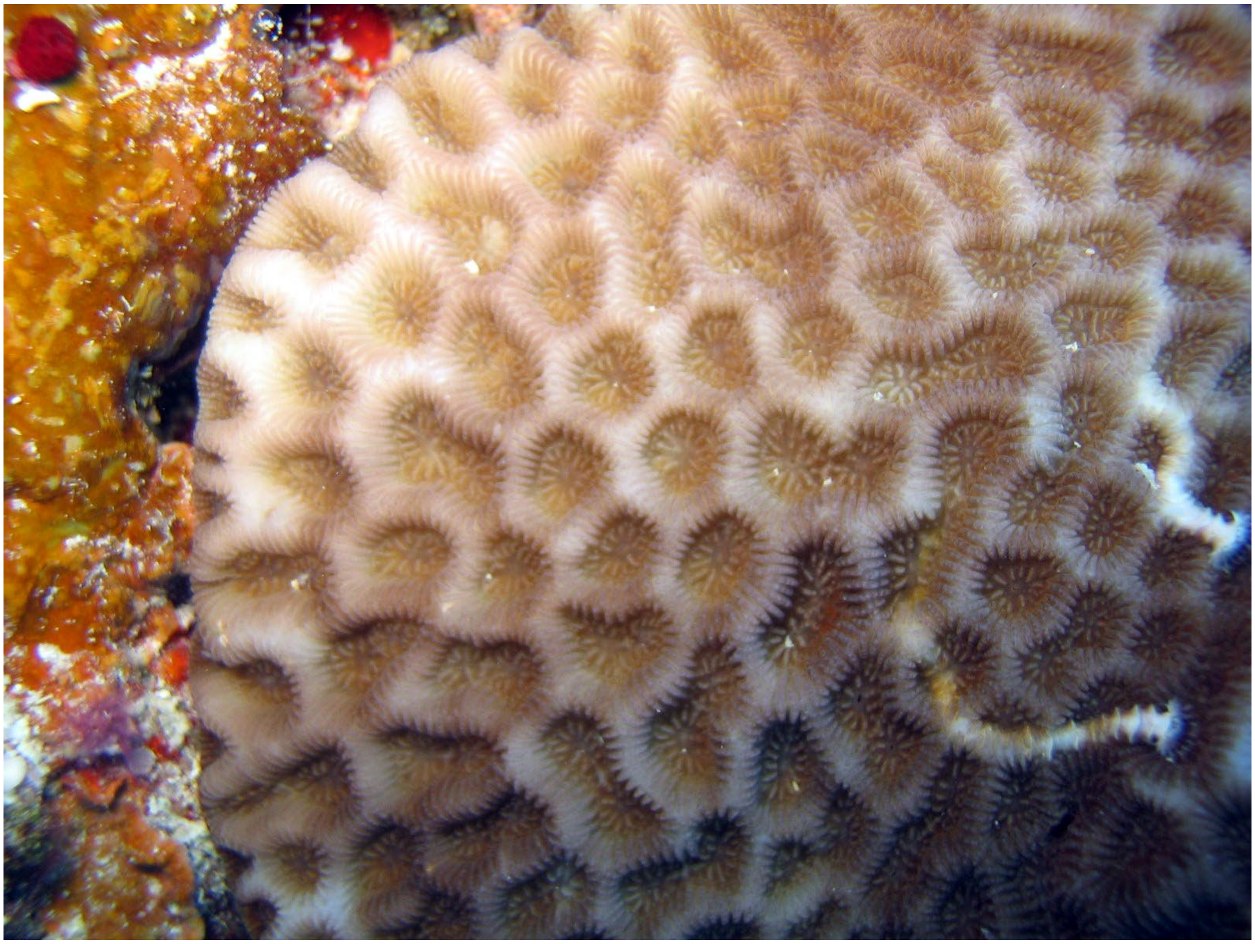
A colony of *Goniastrea pectinata*.

A colony of *Goniastrea pectinata*.

A close-up photo of *Goniastrea pectinata* with pali visible.

Goniastrea favulus

Colonies are often encrusting. Corallites are about the size of a small finger or perhaps other finger. Corallites vary from polygonal to elongated. Walls between corallites are relatively low and thin, and pali may be visible. Corallites have lower, thinner walls than *Goniastrea pectinata* and colonies are usually not lumpy. Colonies have larger corallites than *Goniastrea retiformis* and *Goniastrea edwardsi*, and colonies are not meandroid as on *Goniastrea australiensis*.



A close-up photo of *Goniastrea favulus*.

Goniastrea australensis meandroid or “brain coral”

Colonies are encrusting or massive, and meandroid, with long winding ridges and valleys. Pali may be visible on the valley floor, and mouths may be visible. This is the only meandroid *Goniastrea*. The ridges are larger than on *Platygyra* except for *Platygyra lamellina*, the valleys are wider, and pali or mouths may be visible.

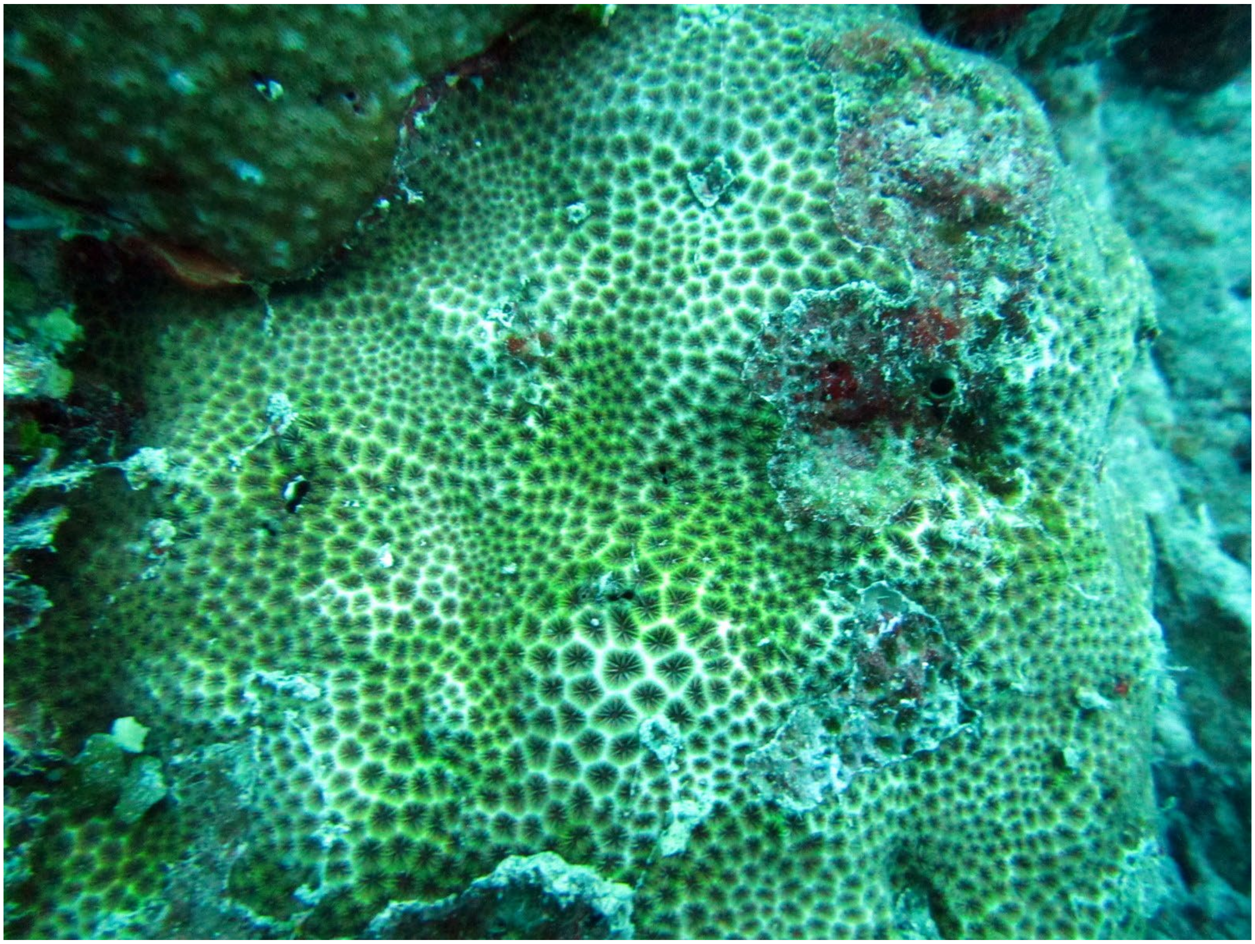
A colony of *Goniastrea australensis*.

A close-up photo of *Goniastrea australensis*.

A close-up photo of a small colony of *Goniastrea austalensis*.

Leptastrea
Colonies are encrusting, with small corallites that have a single wall between adjacent corallites. Corallites may be polygonal, and are usually smaller than the tip of a finger. Similar to *Favites*, but the corallites are smaller. The walls are often thicker than on *Goniastrea*.

Leptastrea purpurea
Colonies are up to a foot diameter, and usually have polygonal corallites with thin walls between adjacent corallites. Corallites commonly vary greatly in size from one part of the colony to another. One morph has small colonies and more space between corallites and in some locations colonies may be numerous. Corallites vary in size within colonies more than on other *Leptastrea* species.

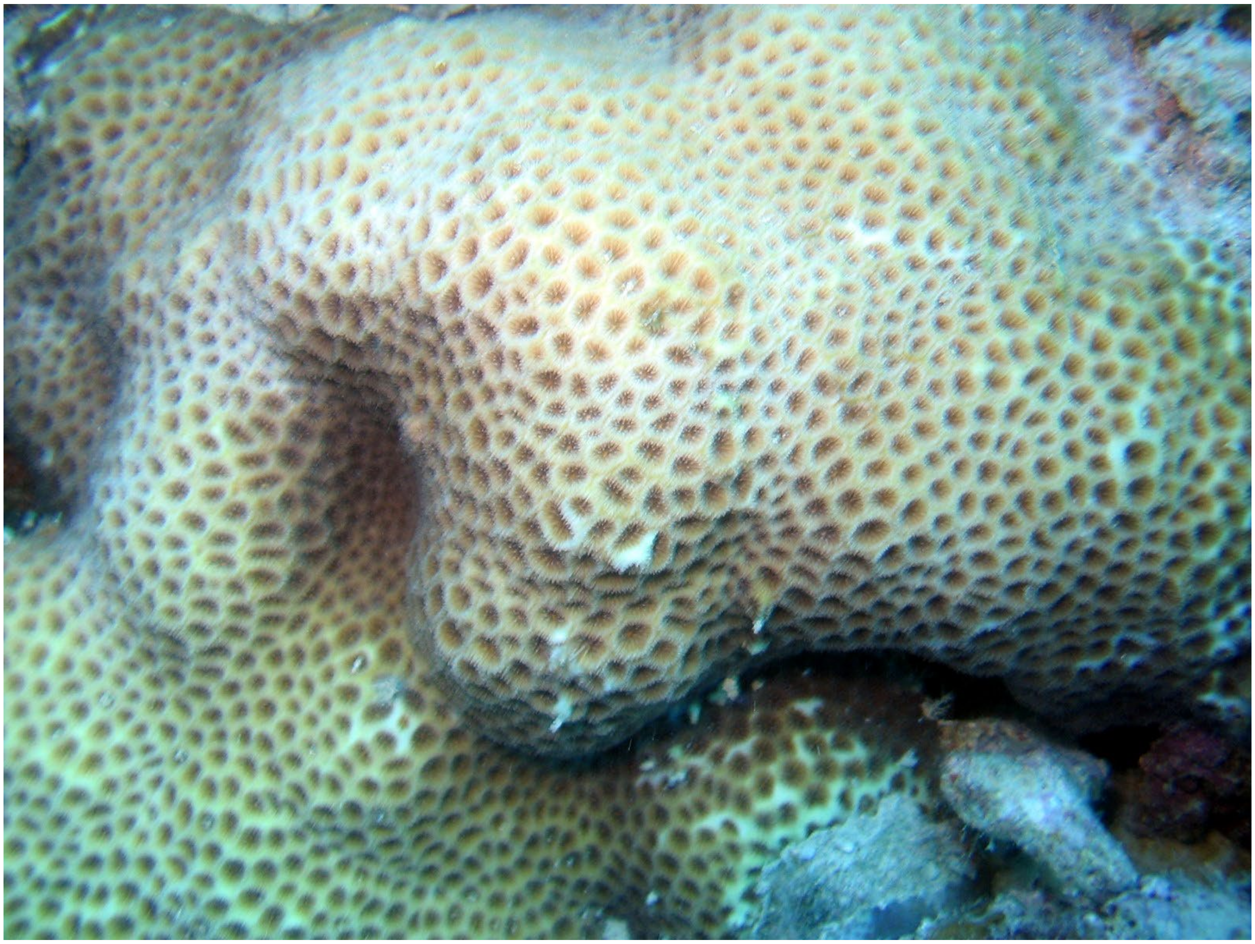


A colony of *Leptastrea purpurea*.

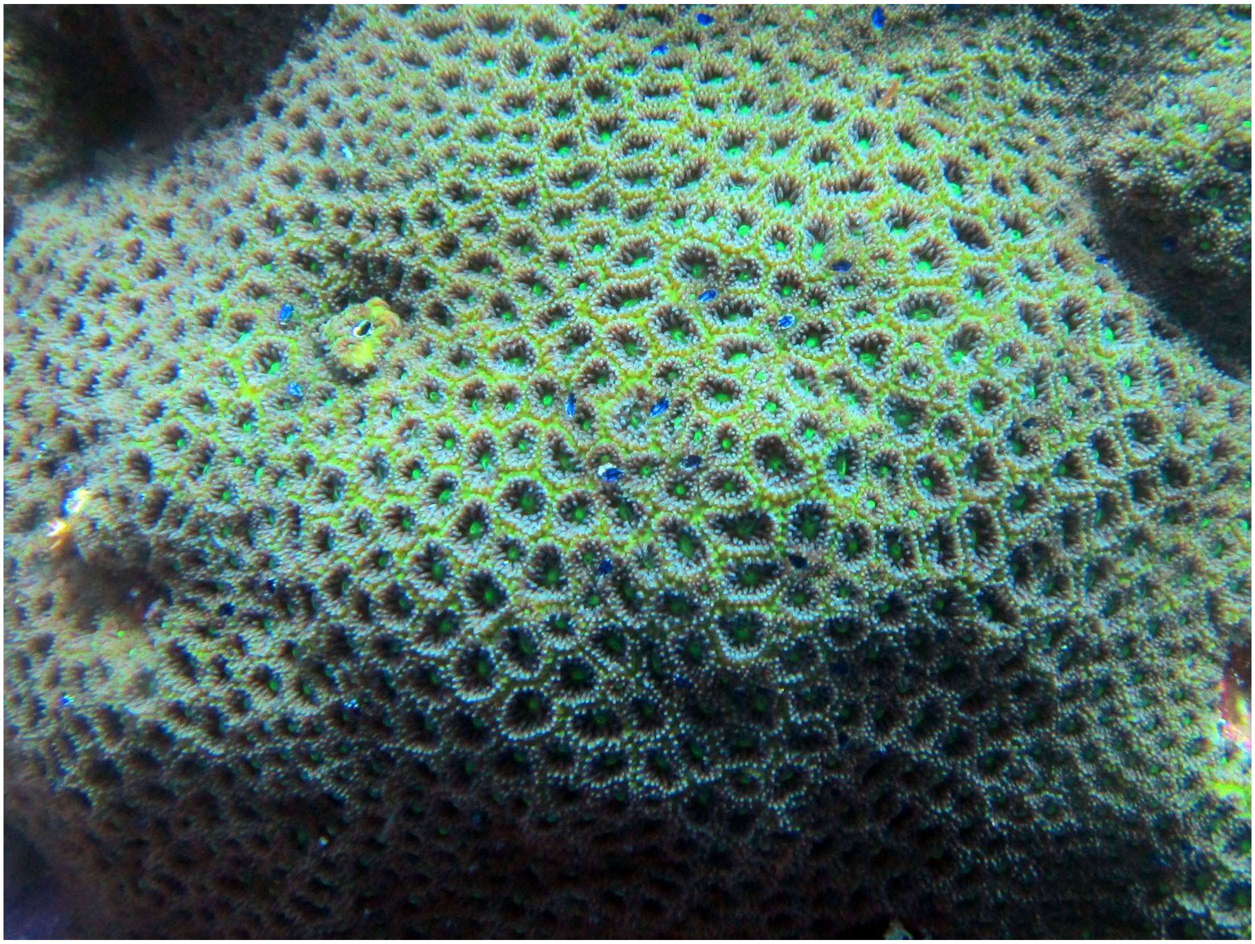
A closer photo of a colony of *Leptastrea purpurea*.

Leptastrea transversa

Colonies can get to a meter diameter but most are much smaller. Corallites are relatively uniform in size. The walls between corallites are not narrow. In some colonies, a tiny groove can be seen between corallites, which is formed by the septa from both corallites extending slightly above the rim of the corallites. Other species of *Leptastrea* do not have the tiny groove.



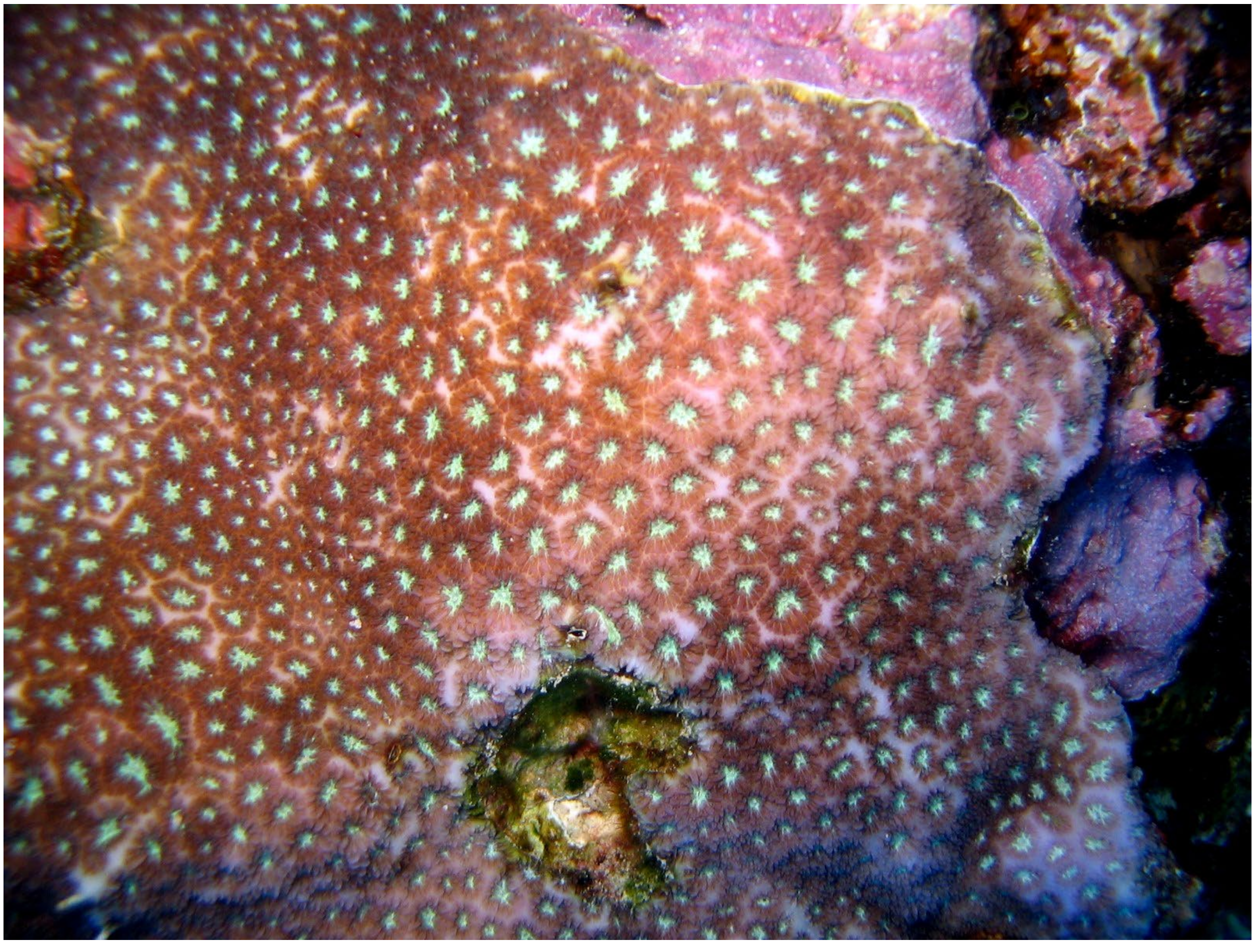
A photo of *Leptastrea transversa*.



A close-up photo of *Leptastrea transversa*.

Lepastrea pruinosa

Colonies are encrusting and usually small. Corallites do not vary in size much. Corallites and the space between them usually have contrasting colors. Polyps are slightly fleshy, but that is usually hard to detect. Contrasting colors not present in most other species.

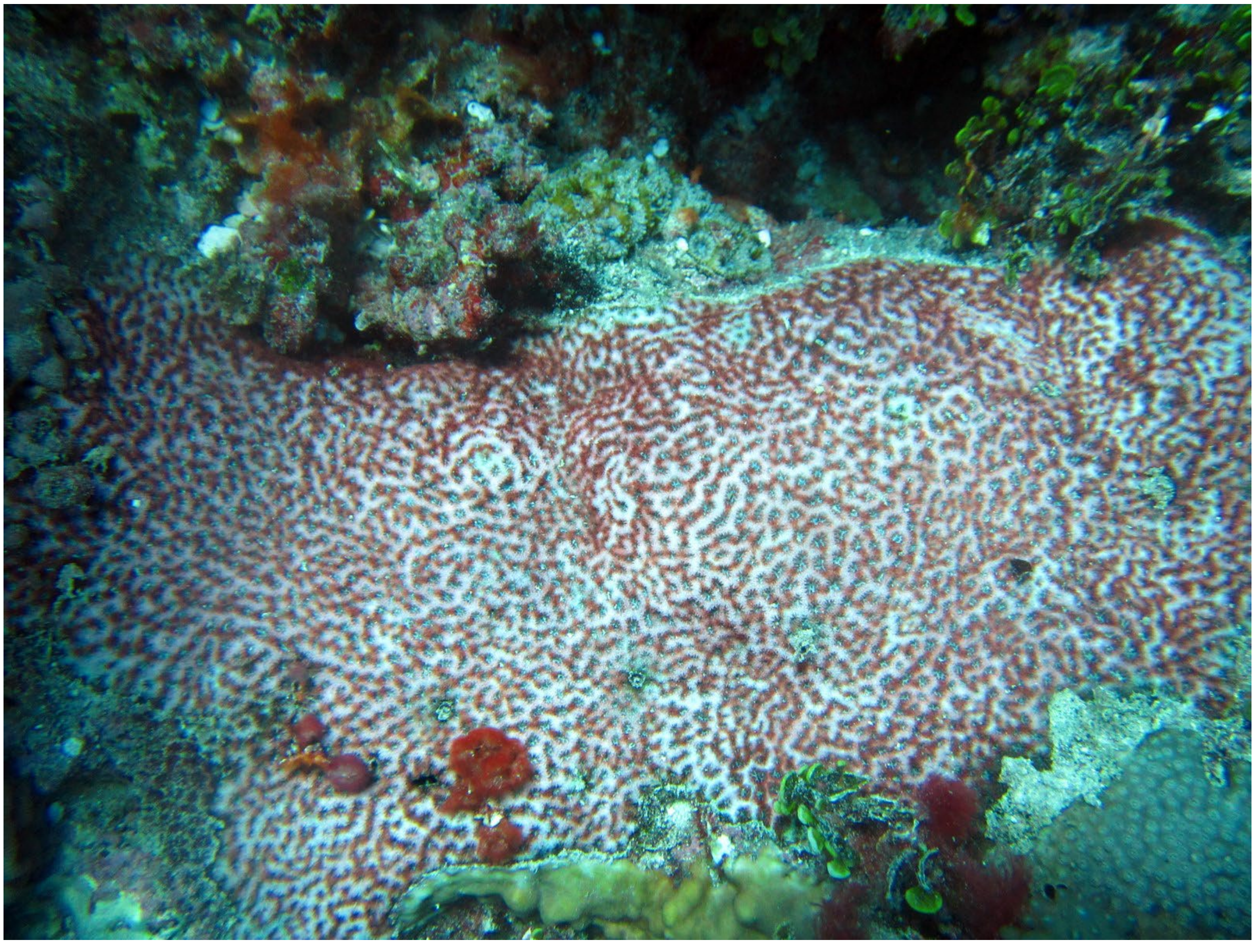


A colony of *Leptastrea pruinosa*.

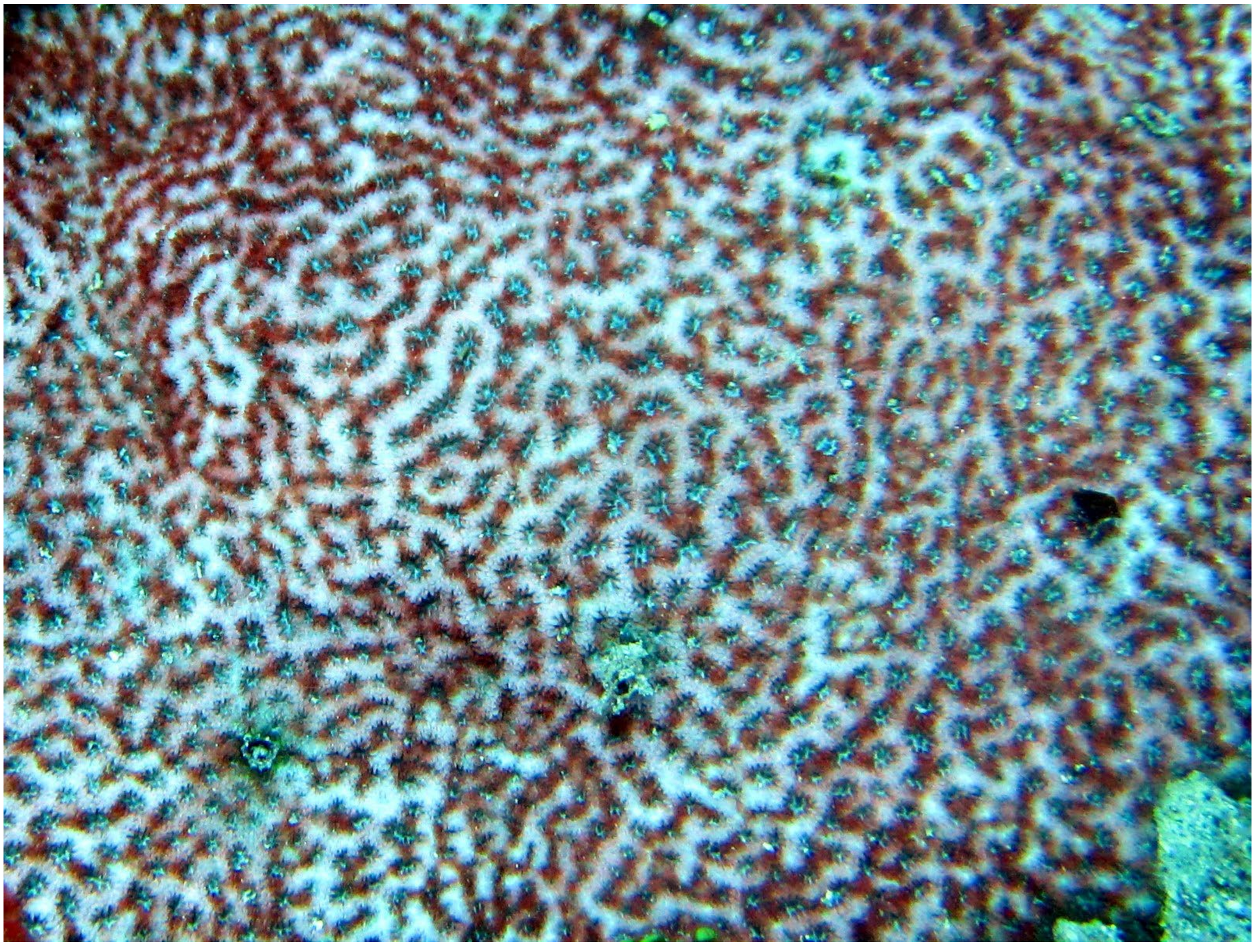
A close-up photo of *Leptastrea pruinosa*.

Leptastrea bewickensis

Colonies are encrusting and have a mottled color pattern that usually connects corallites. The pattern is usually brown and usually only connects a few corallites. Other *Leptastrea* species do not have this color pattern.



A colony of *Leptastrea bewickensis*.



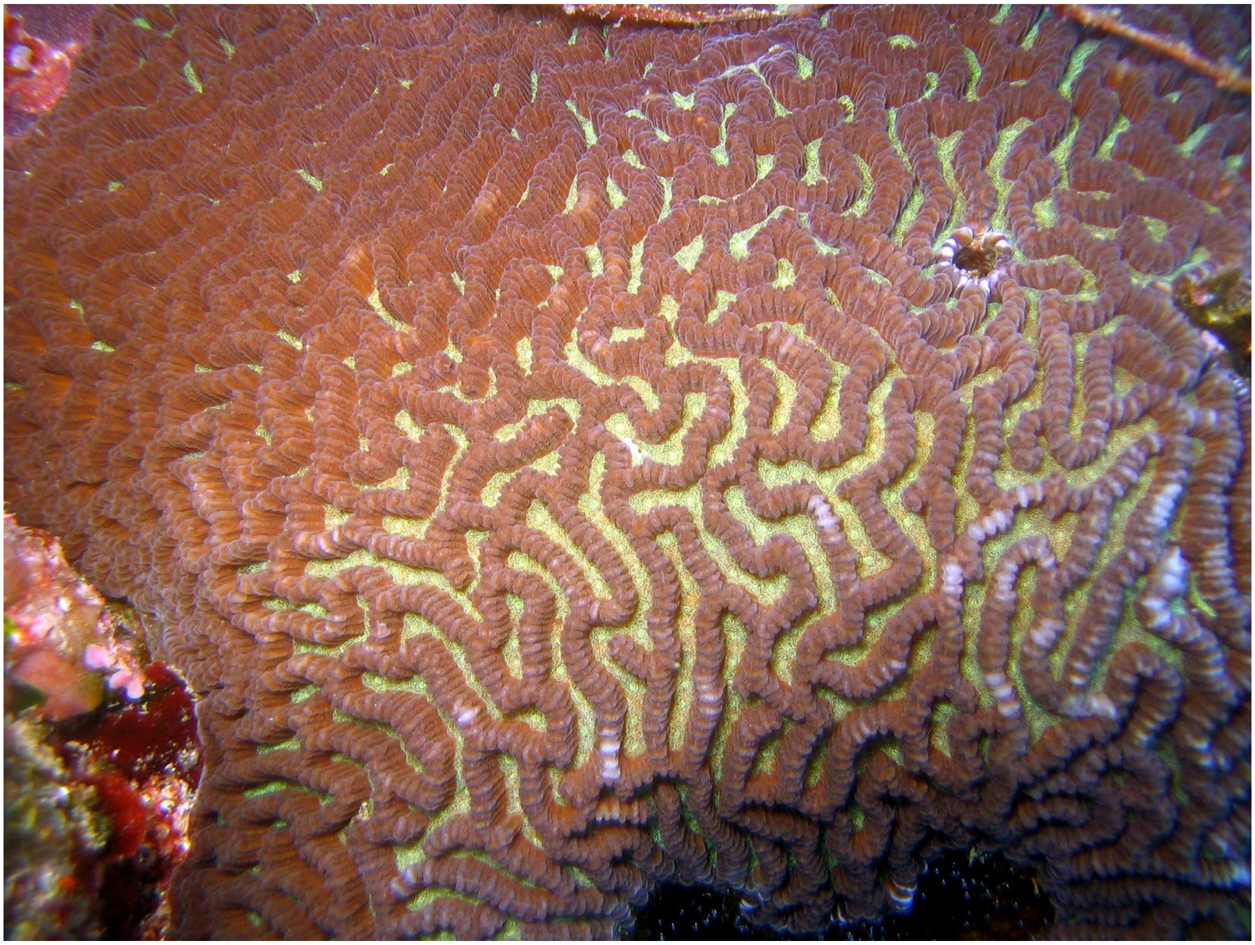
A close-up photo of *Leptastrea bewickensis*.

Platygyra

Colonies are usually massive but can be encrusting. Colonies have small ridges on their surface that either meander (and thus they can be called "brain corals") or enclose corallites (and thus are not meandroid). The ridges are smaller than on massive *Lobophyllia* and *Goniastrea australiensis*, except for *Platygyra lamellina* which has ridges the same size as *Goniastrea australiensis*.

Platygyra daedalea meandroid or "brain coral"

Colonies have meandering ridges that are neither thick nor narrow. *Platygyra lamellina* has ridges that are thicker and *Platygyra sinensis* has ridges that are more narrow.

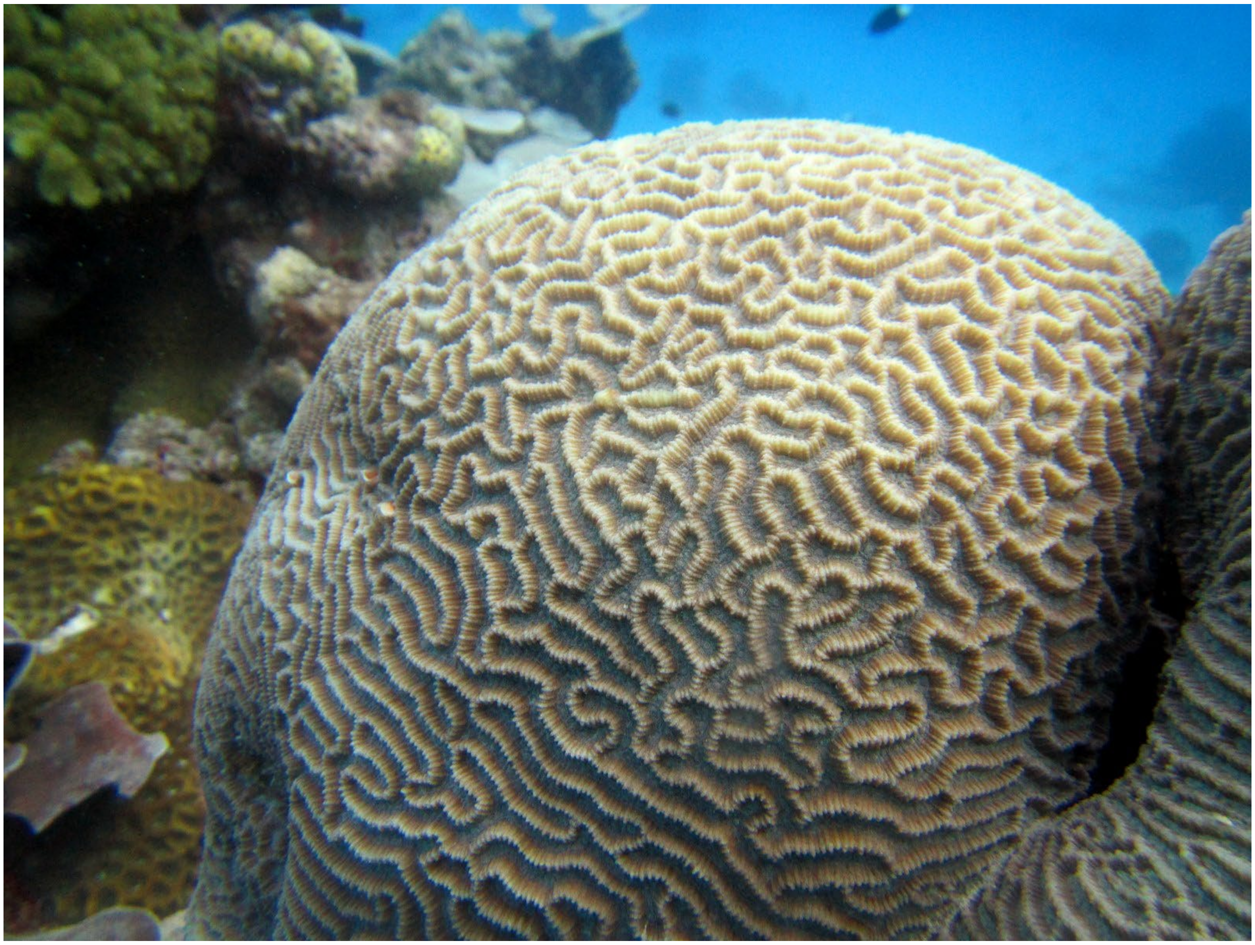


A colony of *Platygyra daedelea*.

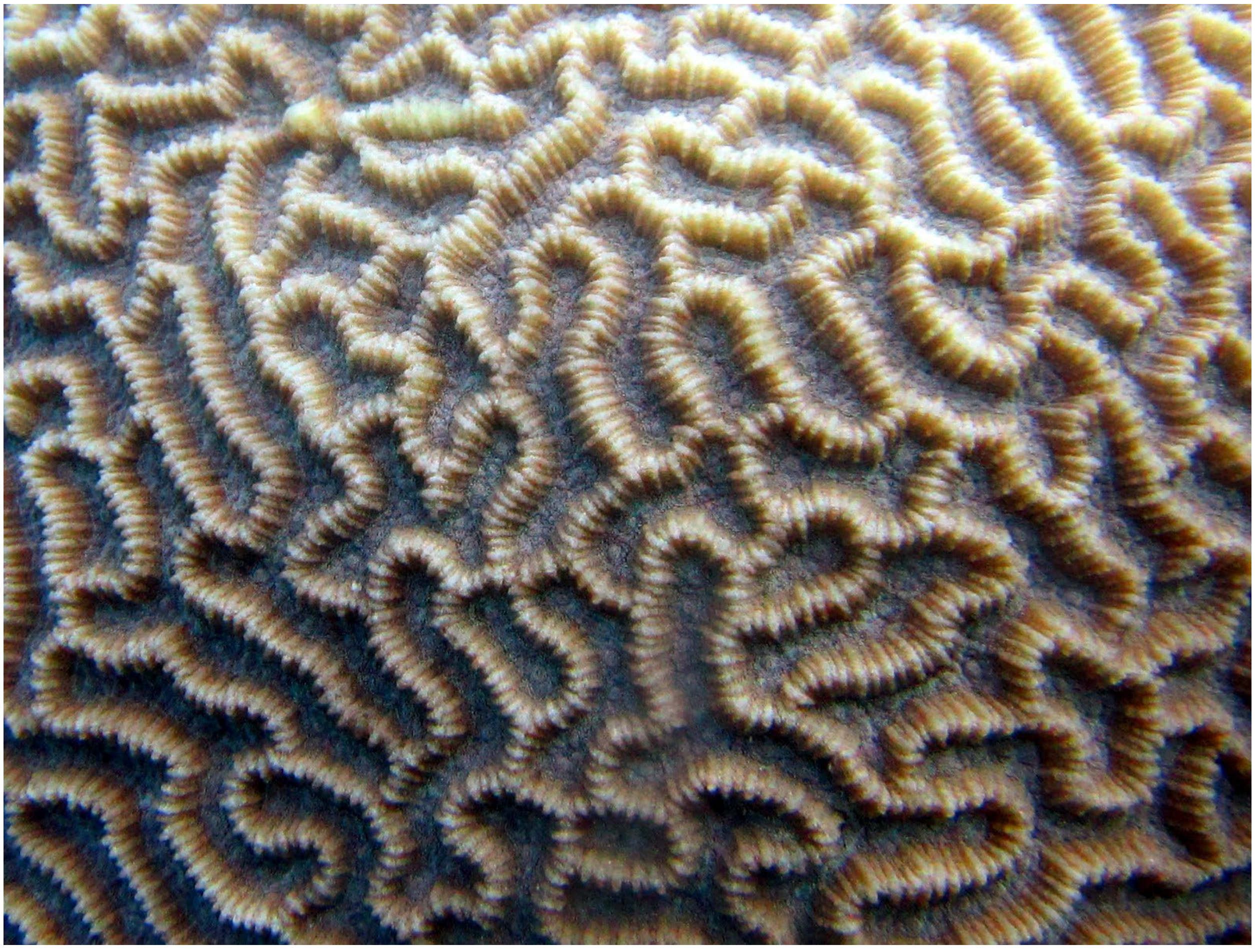
A close-up photo of *Platygyra daedalea*.

Platygyra sinensis meandroid or "brain coral"

Colonies have meandering ridges which are thin. The ridges are thinner than on *Platygyra daedalea*. *Platygyra ryukyuensis* has even thinner ridges but they are not meandroid, they enclose corallites.



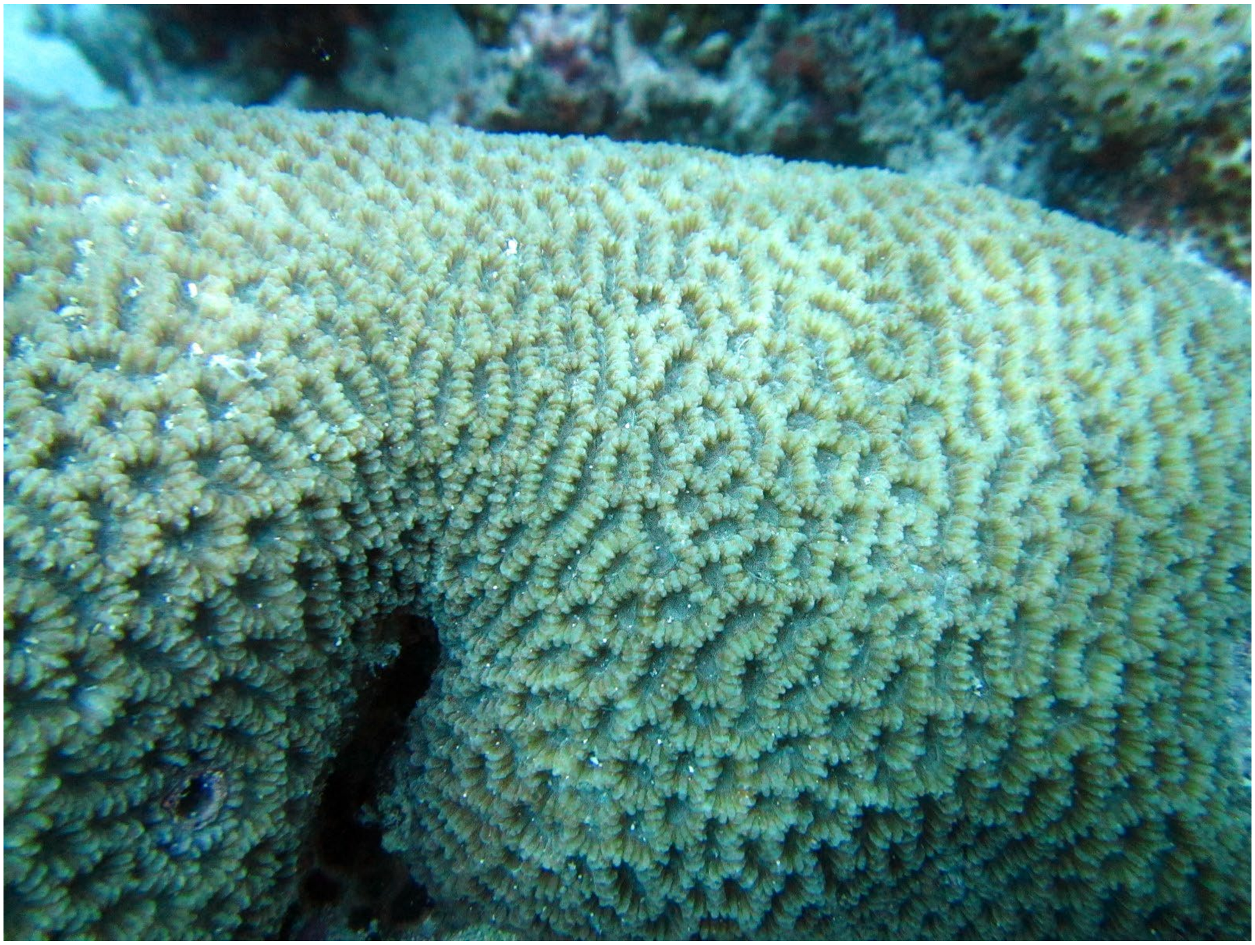
A colony of *Platygyra sinensis*.



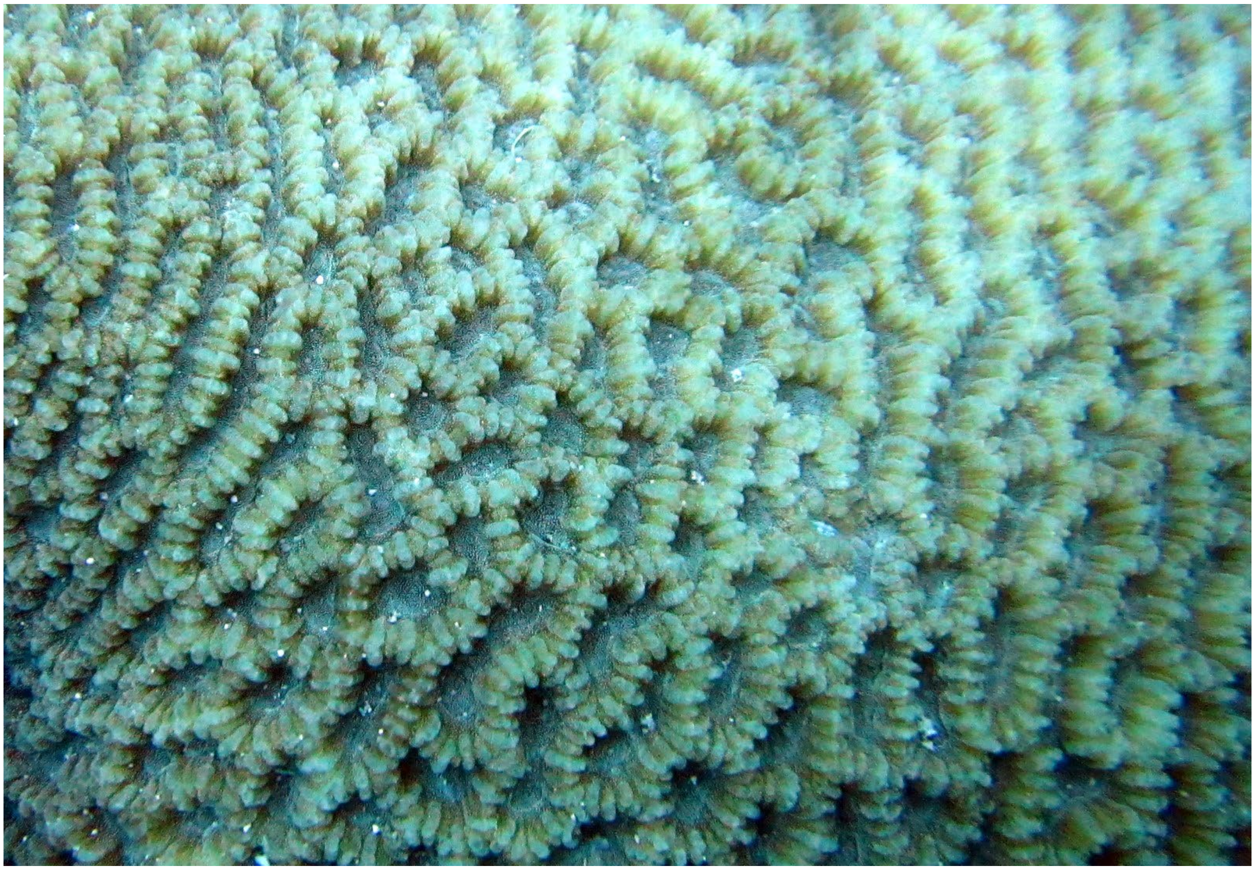
A close-up photo of *Platygyra sinensis*.

Platygyra pini

Colonies are massive or encrusting. Ridges enclose corallites. Colonies are not meandroid like *Platygyra daedalea* and *Platygyra sinensis*.



A colony of *Platygyra pini*.



A close-up photo of *Platygyra pini*.

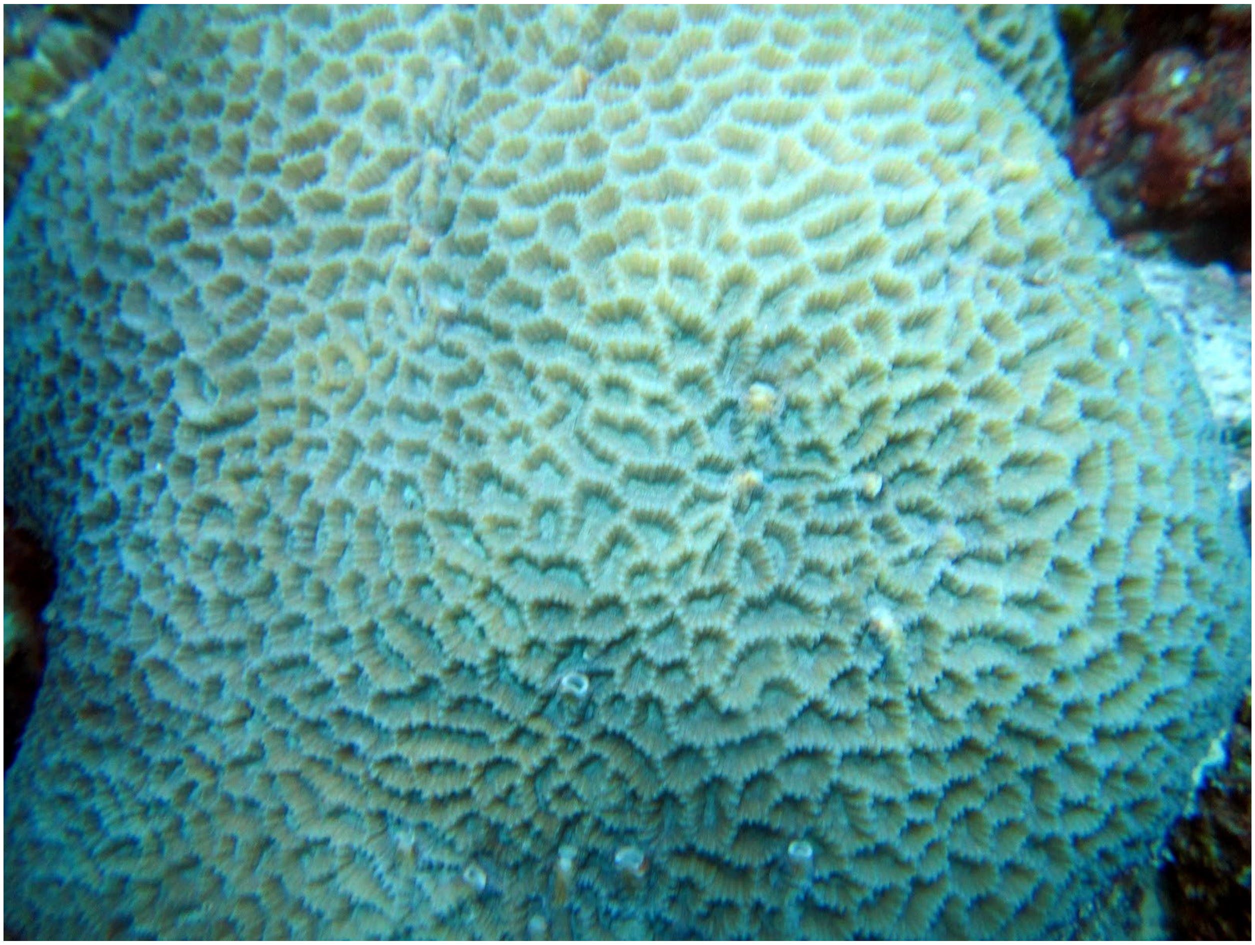
Platygyra yaeyamaensis Vulnerable

Colonies have ridges that usually enclose single corallites. The septa are variable and ragged, giving the ridges a rough appearance.

A close photo of *Platygyra yaeyamaensis*.

Platygyra verweyi

Colonies have ridges that enclose corallites. The walls between corallites can be thin or morderate thickness. Features are fairly uniform. The walls between corallites are thicker on *Platygyra pini*.

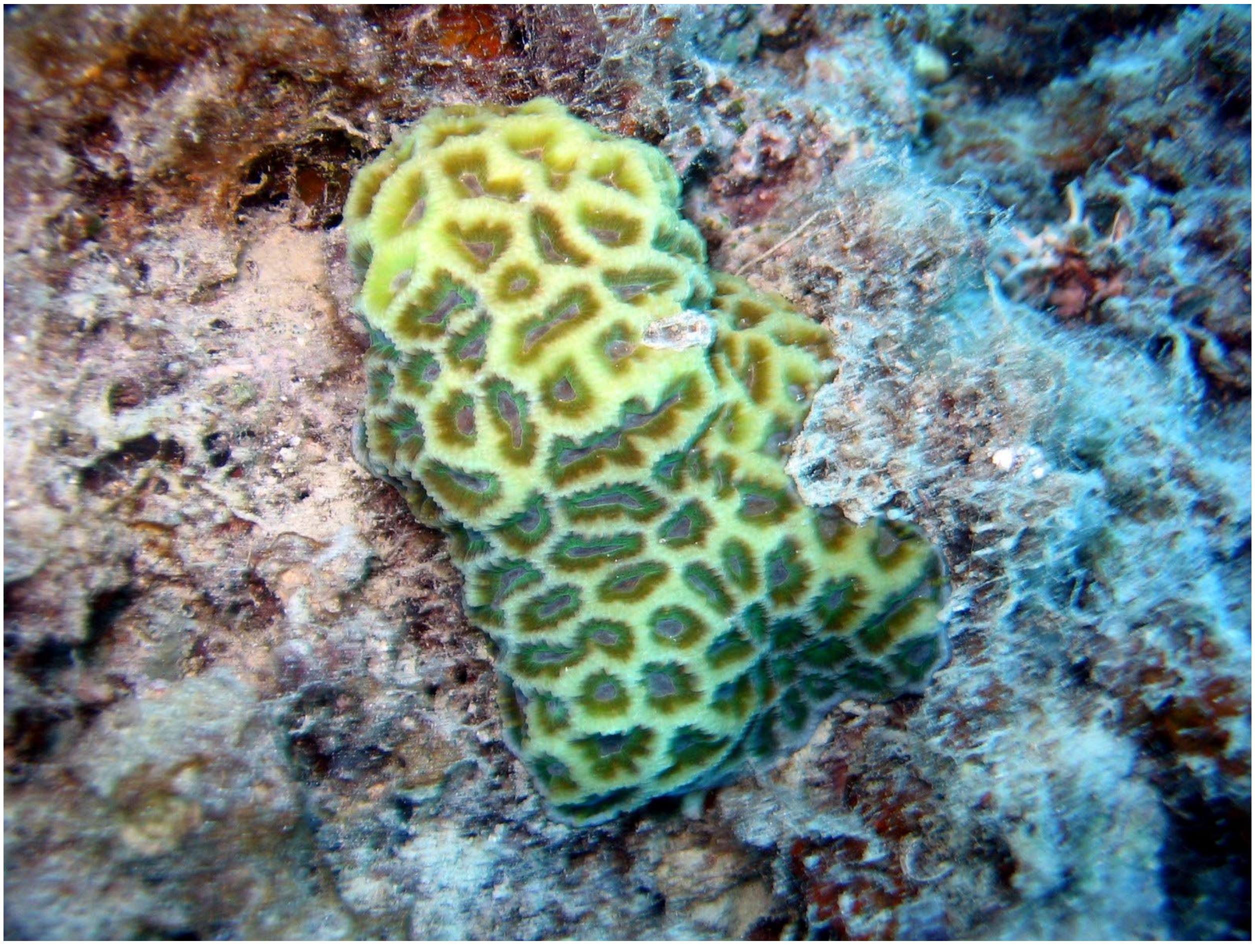


A colony of *Platygyra verweyi*.

A colony of *Platygyra verweyi*.

Platygyra contorta

Colonies have highly variable width walls. Colonies may not be meandroid. Ridges are more variable in width than other *Platygyra*.



A colony of *Platygyra contorta*.

A close photo of *Platygyra contorta*.

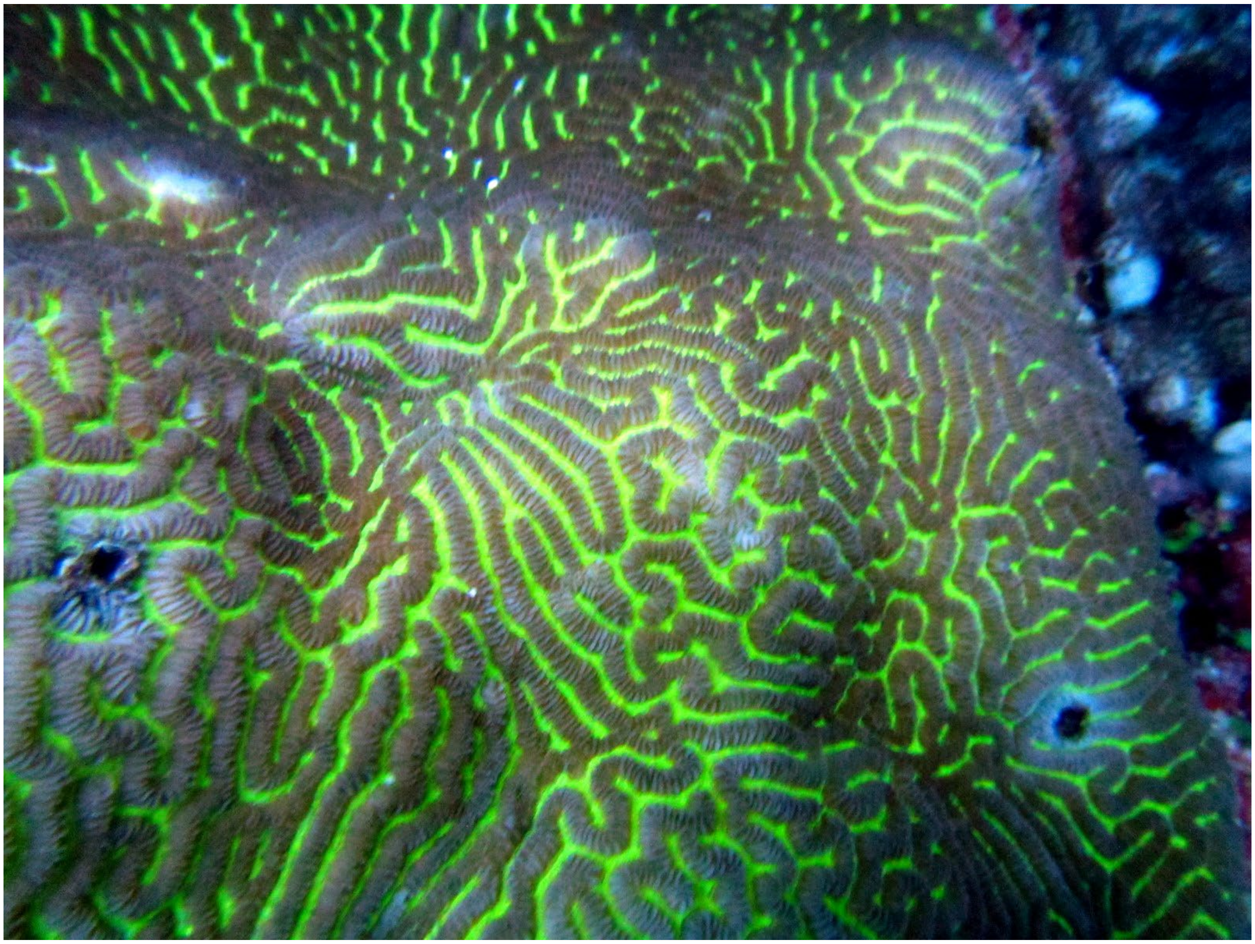
Leptoria *meandroid or "brain coral"*

Colonies are massive and may be lumpy. Colonies are meandroid. Ridges on the surface are tiny, about 2 mm wide and tall, and usually close together. The ridges are the smallest of all meandroid corals.

Leptoria phrygia

The ridges and the minute septa on them are very uniform. I a few colonies the ridges may vary in width from one area to another. Rarely, valleys may be fluorescent green.

A colony of *Leptoria phrygia* with fluorescent green valleys.



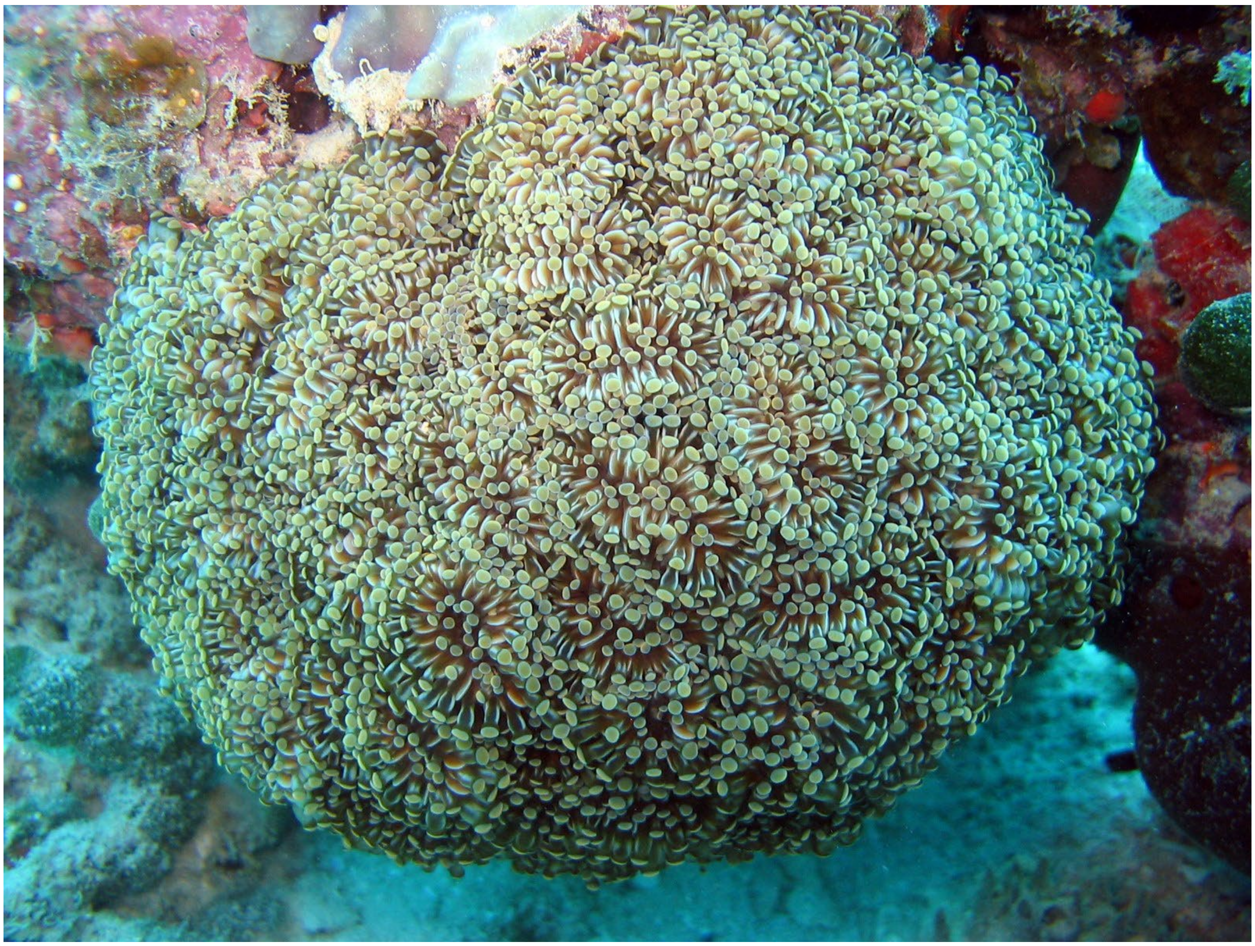
A close-up photo of *Leptoria phrygia* with fluorescent green valleys.

Fimbriaphyllia

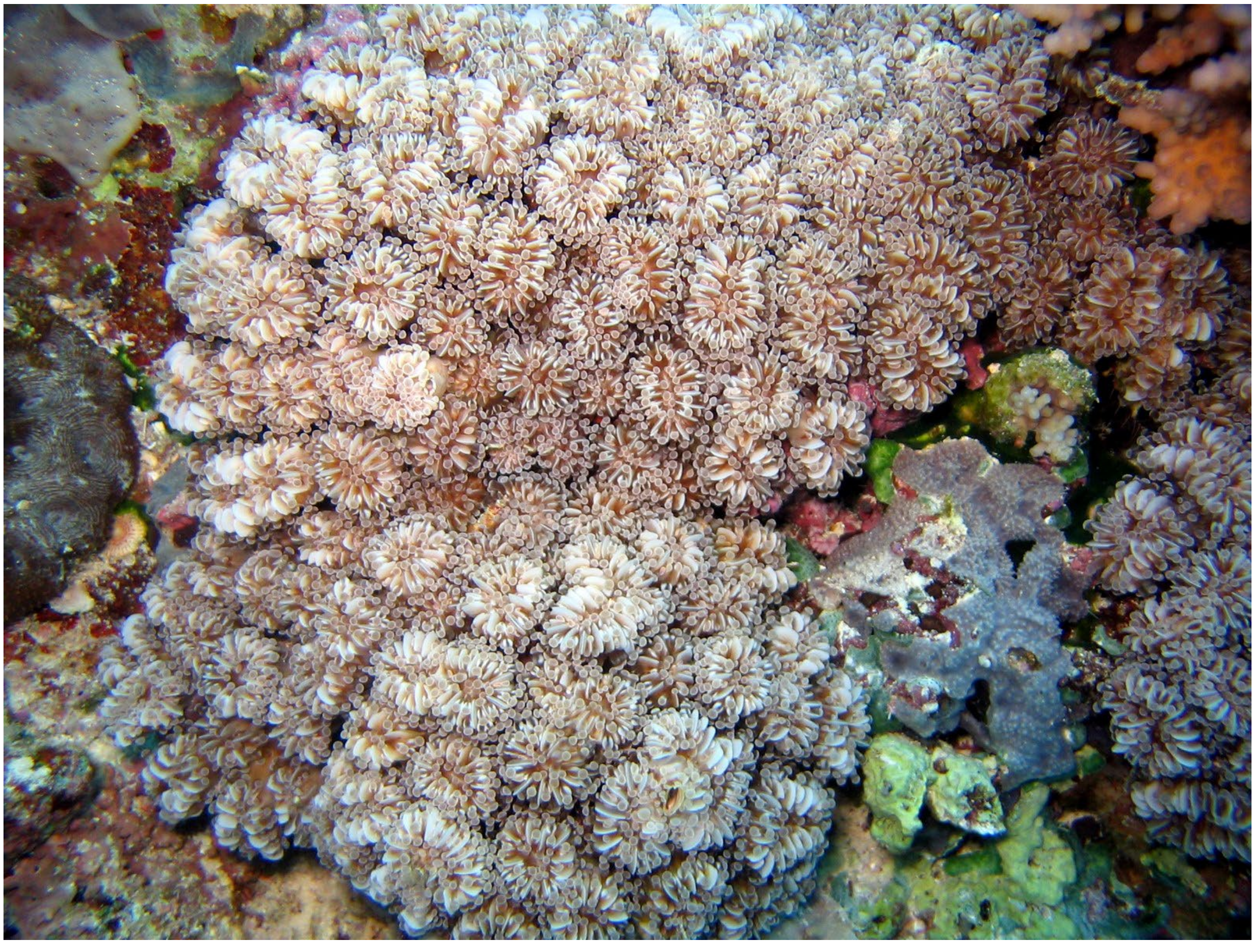
Corals have large fleshy tentacles and appear to be massive when tentacles are extended, but are actually branching (submassive) or flabello-meandroid (meandering thick walls with polyps on their top edge. Thus they are submassive. Some species have simple tentacles like an anemone, others have semicircles at the end of the tentacles, still others have branching tentacles. Few other corals have tentacles this big, but it would be easy to confuse these corals with some anemones.

Fimbriaphyllia cristata — Vulnerable

Colonies reach at least 5-10 cm diameter and are branching with small branches that are about one centimeter diameter. Branches are close together. The tentacles are simple. Septa extend out from the corallite and can sometimes be seen among the tentacles. Branches are smaller and closer together than most other *Fimbriaphyllia* species and only a few other *Fimbriaphyllia* have simple tentacles.



A colony of *Fimbriaphyllia cristata* with tentacles extended.

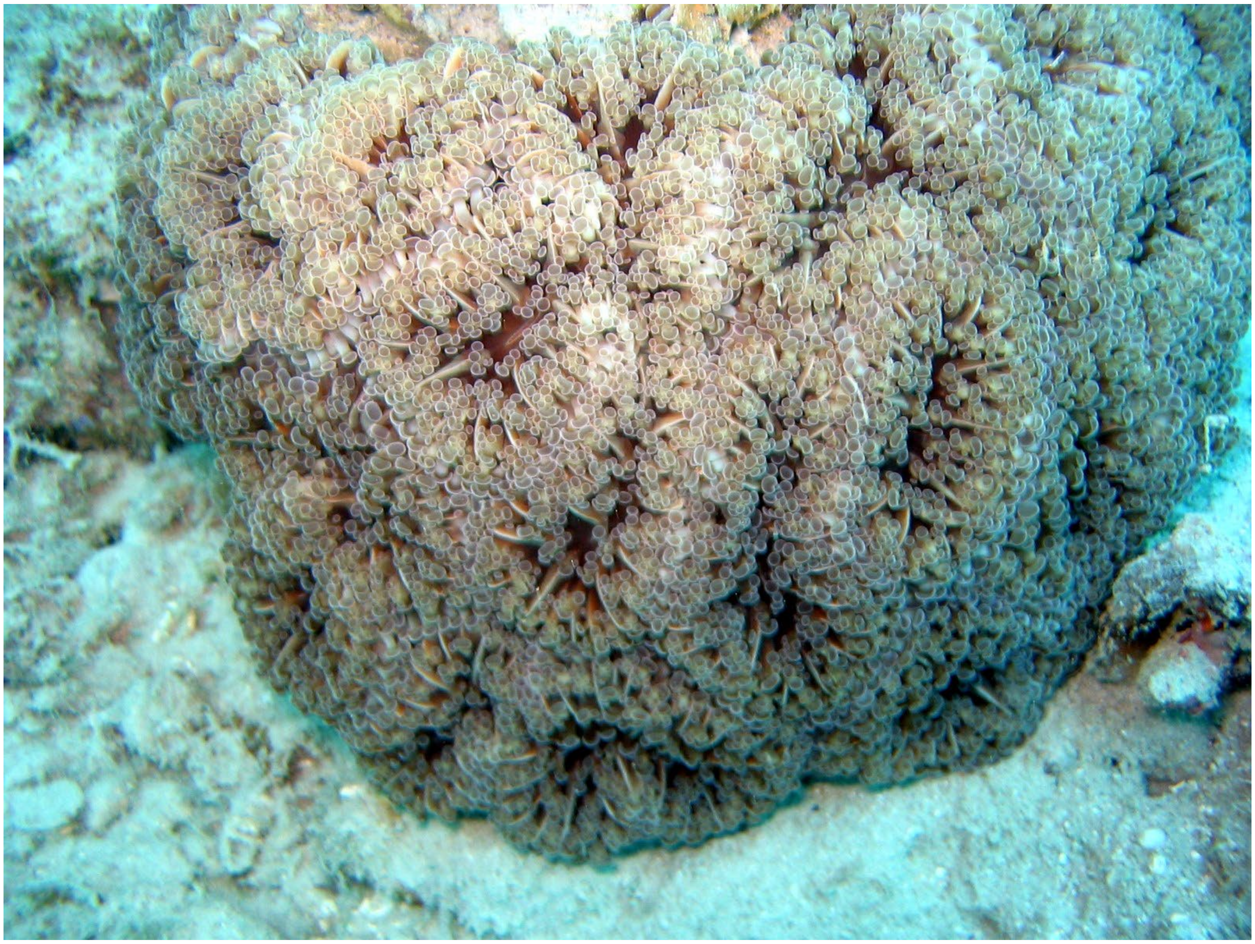


A colony of *Fimbriaphyllia cristata* with tentacles partway attracted, revealing the septa.

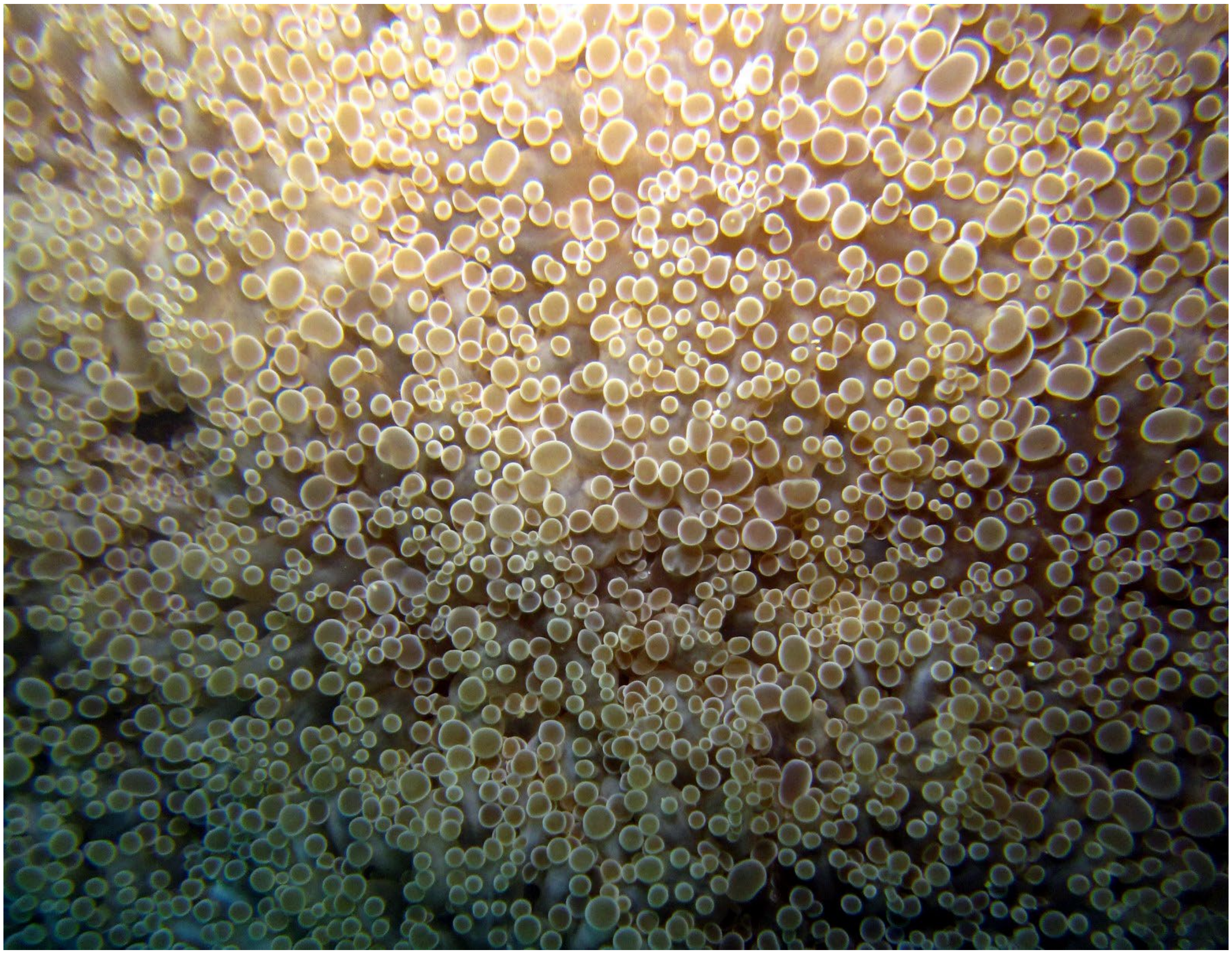
Fimbriaphyllia paradivisa Vulnerable Threatened

Colonies reach at least 40 cm diameter. Colonies are branching with circular or oval branches about 2-3 cm diameter. The tentacles branch but have rounded tips. It is easier to see the branching tentacles when they are extended than when they are retracted. *Fimbriaphyllia divisa* has similar tentacles but a flabello-meandroid skeleton.

A colony of *Fimbriaphyllia paradivisa* with tentacles part way retracted.



A colony of *Fimbriaphyllia paradivisa* with tentacles retracted most of the way.



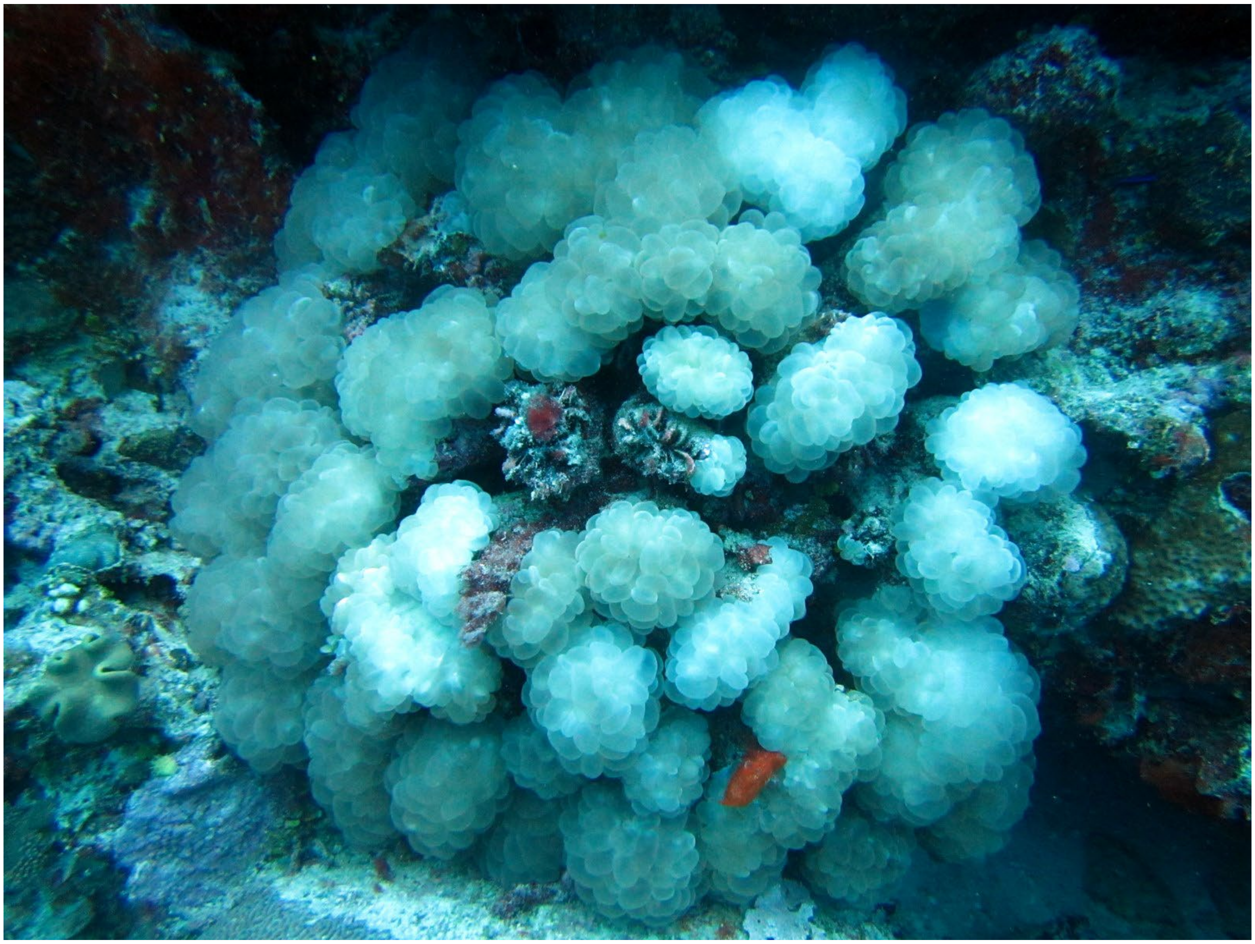
A close-up photo of *Fimbriaphyllia paradivisa* with tentacles partway extended.

Plerogyra *"bubble coral"*

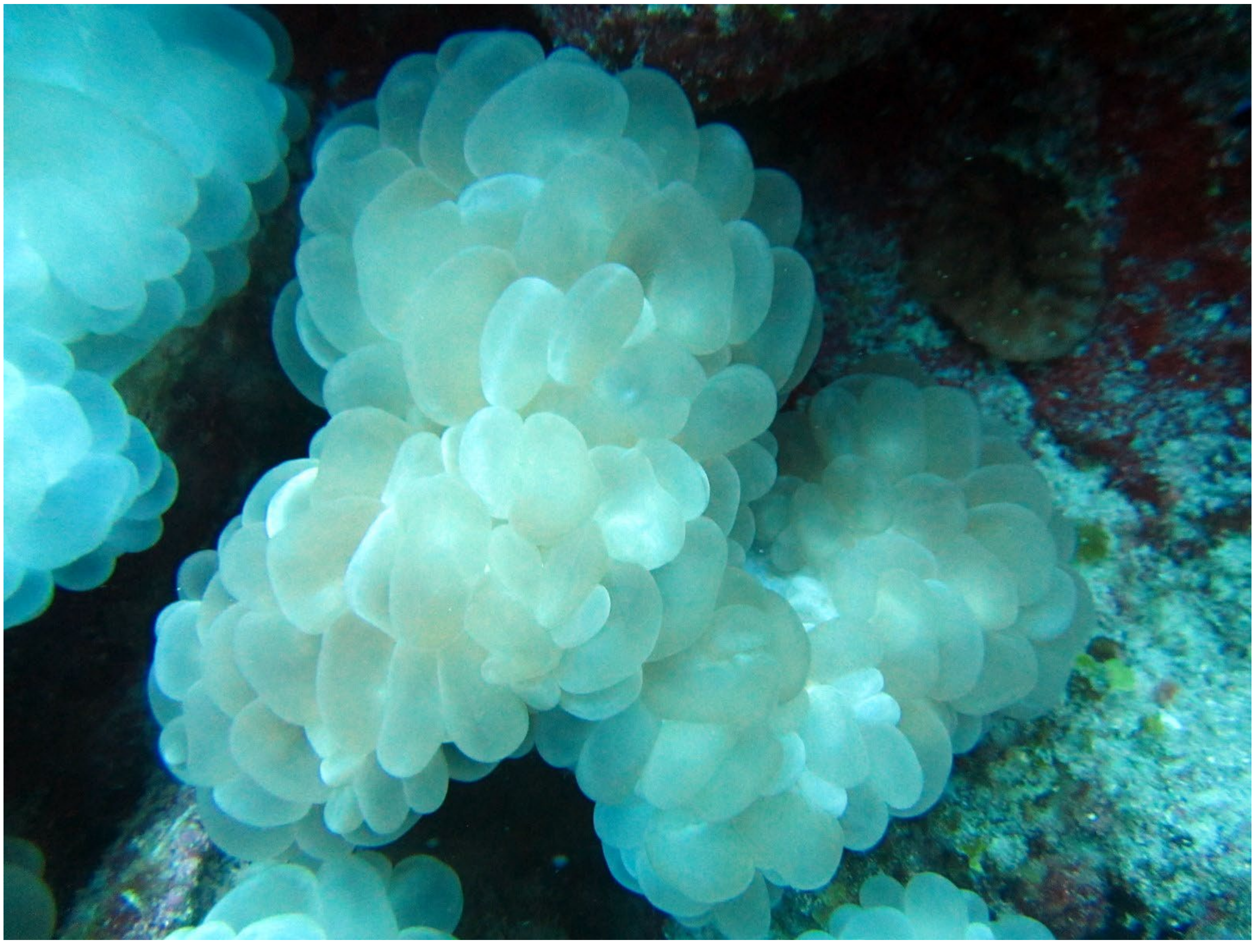
Colonies are fleshy. Most species have large "bubbles" of tissue that expose the zooxanthellae algae in them to the sun. Species can be massive or branching. No other corals have "bubbles".

Plerogyra simplex

Colonies are branching, with the polyps (bubbles) only on the ends of branches. The bubbles (vesicles) can be about the size of grapes. *Plerogyra sinuosa* is massive and doesn't have branches.



A colony of *Plerogyra simplex*. The dead branches show the shape of the branches which have polyps on the ends of branches only.



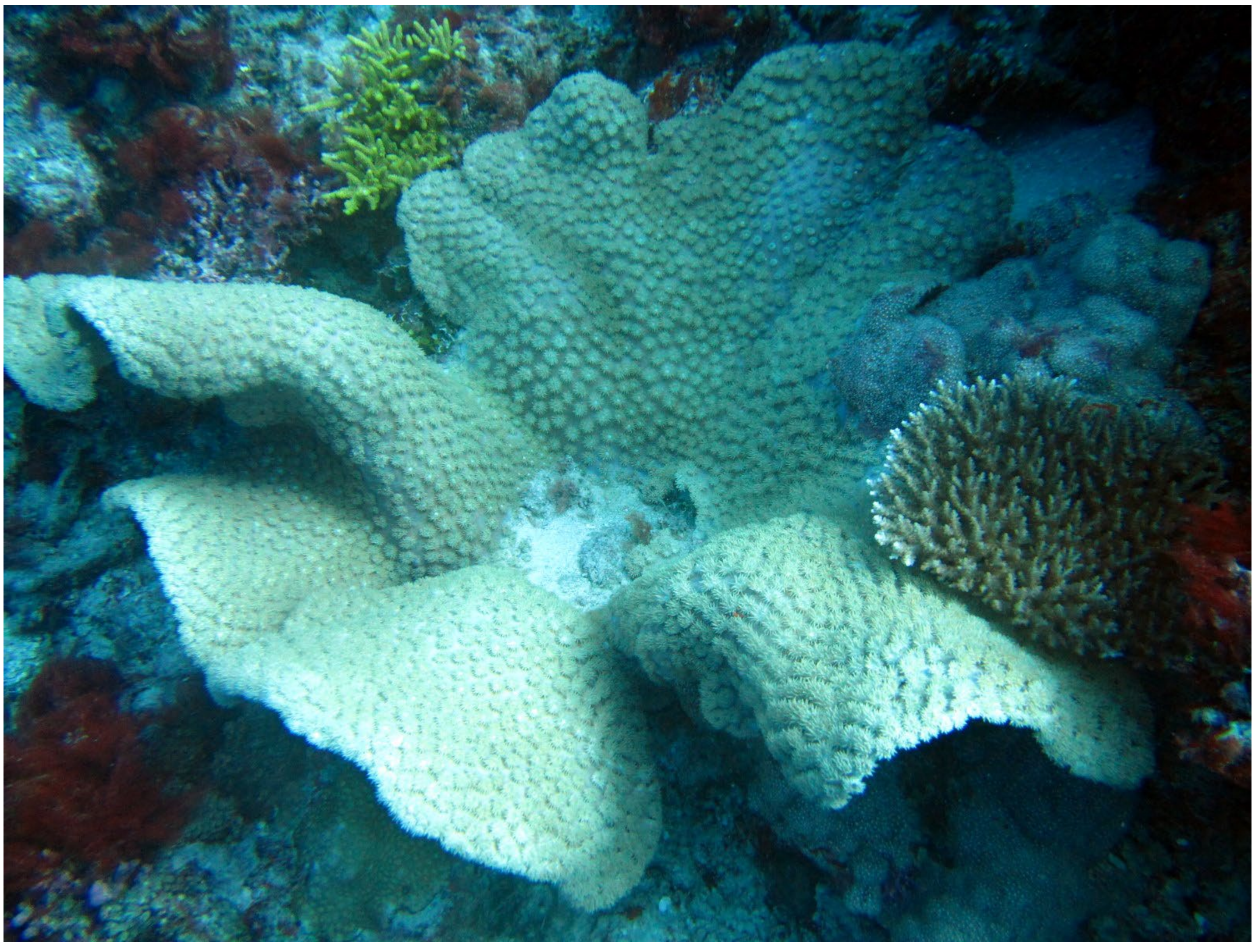
A close-up photo of *Plerogyra simplex*, showing the bubbles.

Turbinaria

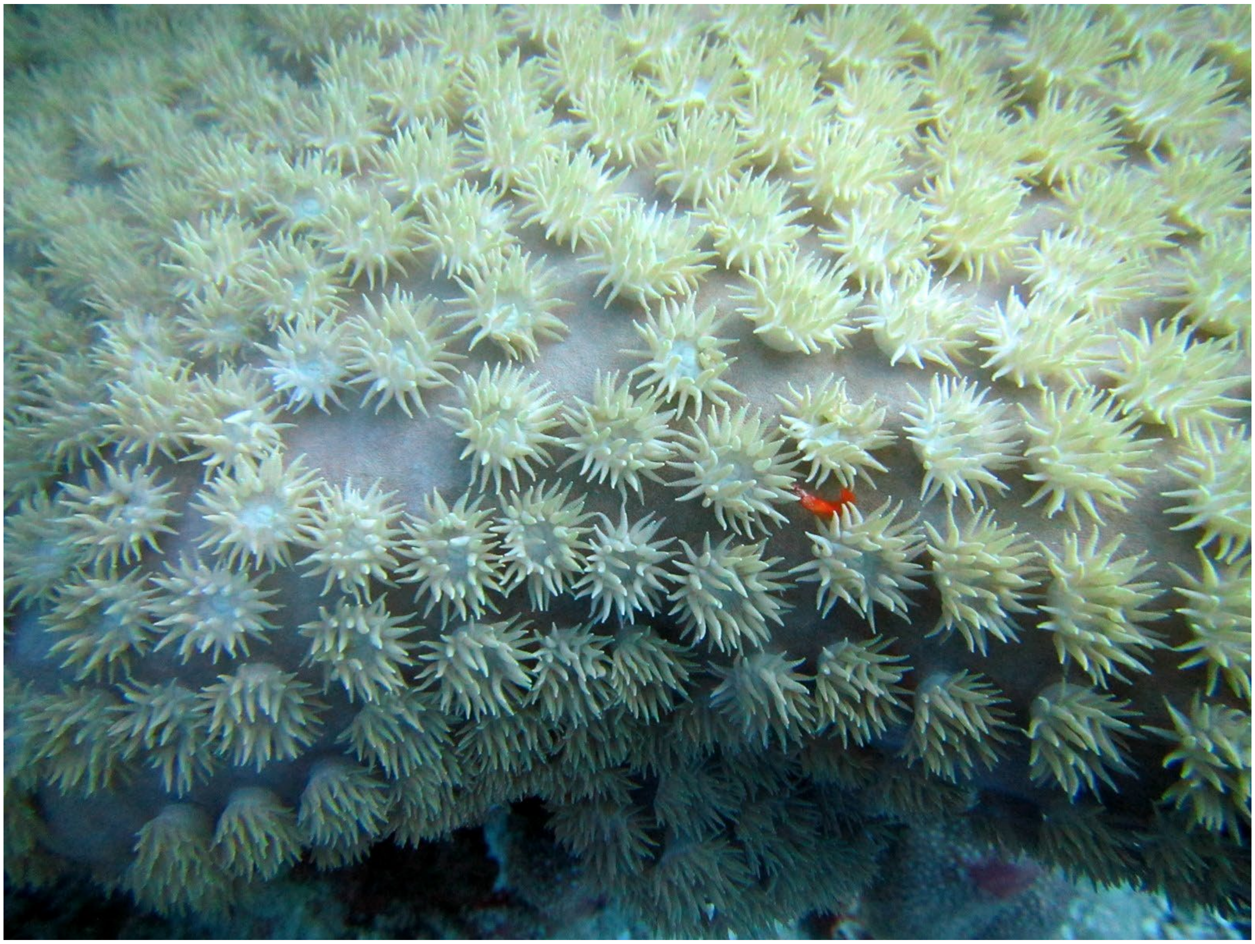
Colonies are most often foliose with thin plates, but also can be encrusting or branching. Corallites project. Both the outsides of corallites and the colony surface between them are smooth. Corallites are further apart and/or project farther, and have a smoother surface between them than other corals.

Turbinaria peltata Vulnerable

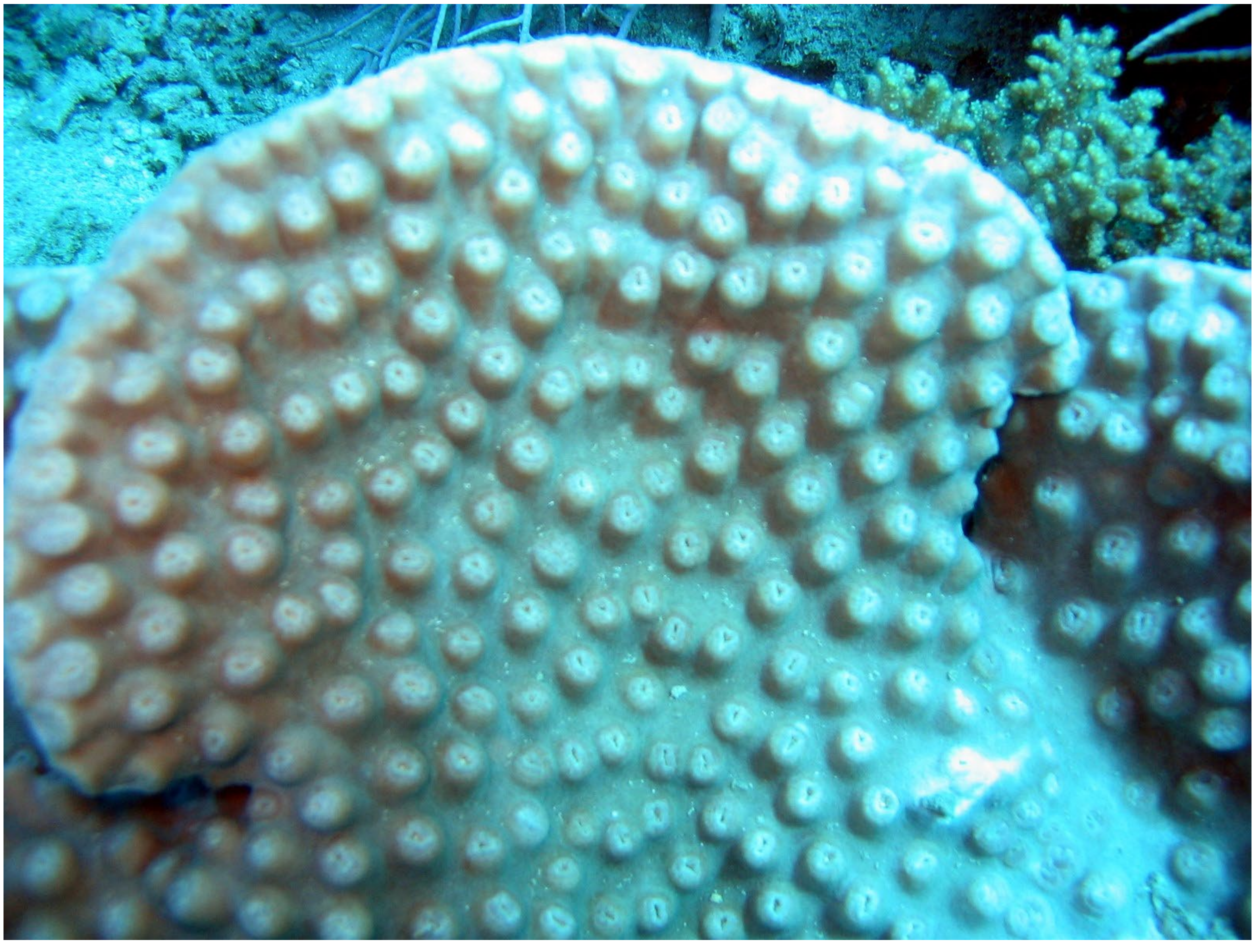
Colonies form thick plates that usually are vase shaped or may be folded in various ways. Colonies reach at least a meter in diameter and rarely can form small fields of plates. Pates are around one centimeter thick. The polyps are about one centimeter in diameter and can vary between colonies in how close together they are. Tentacles can be extended or retracted. Colonies are usually gray. All other species of *Turbinaria* have smaller corallites.



A colony of *Turbinaria peltata*.



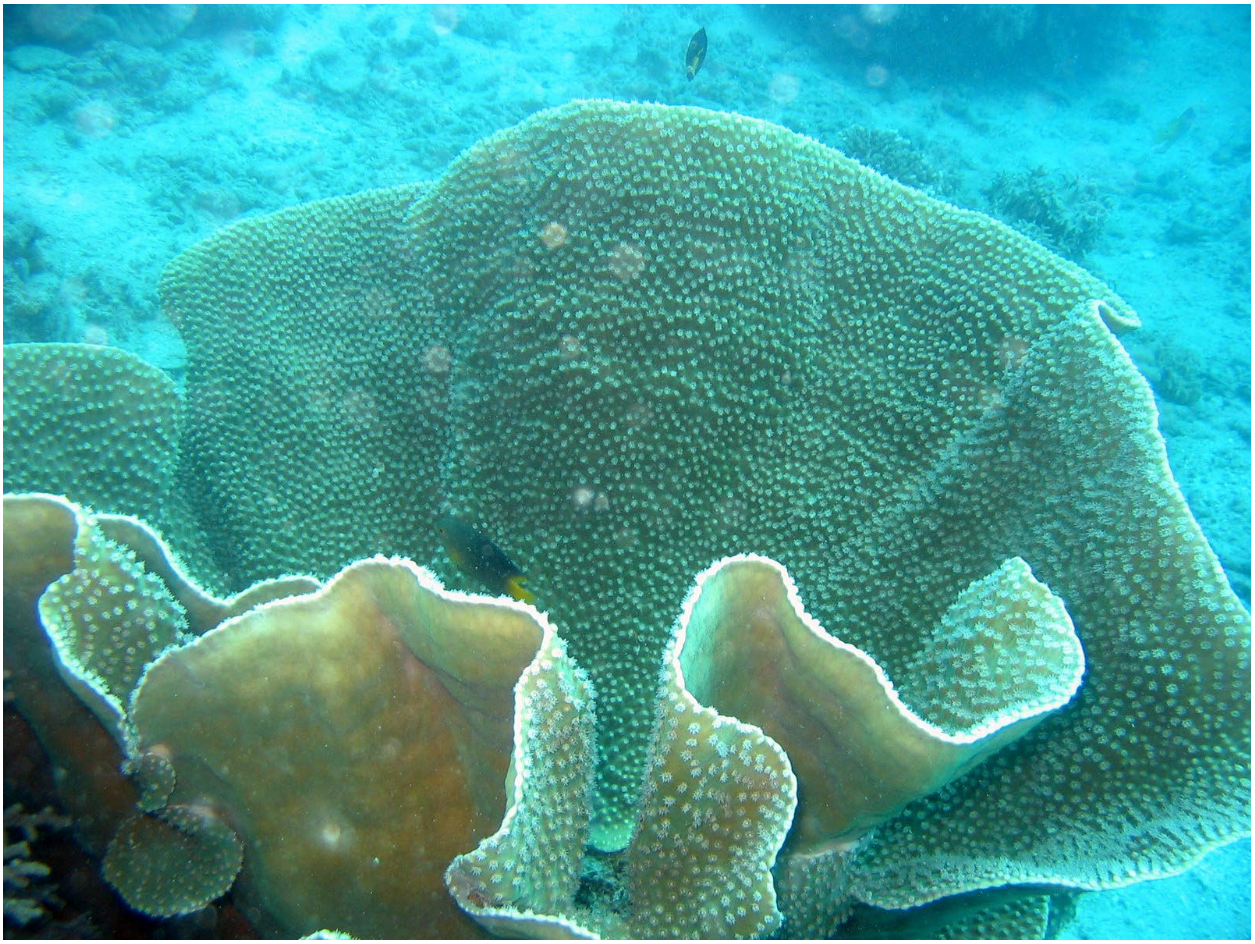
A close-up photo of the polyps and their tentacles on *Turbinaria peltata*.



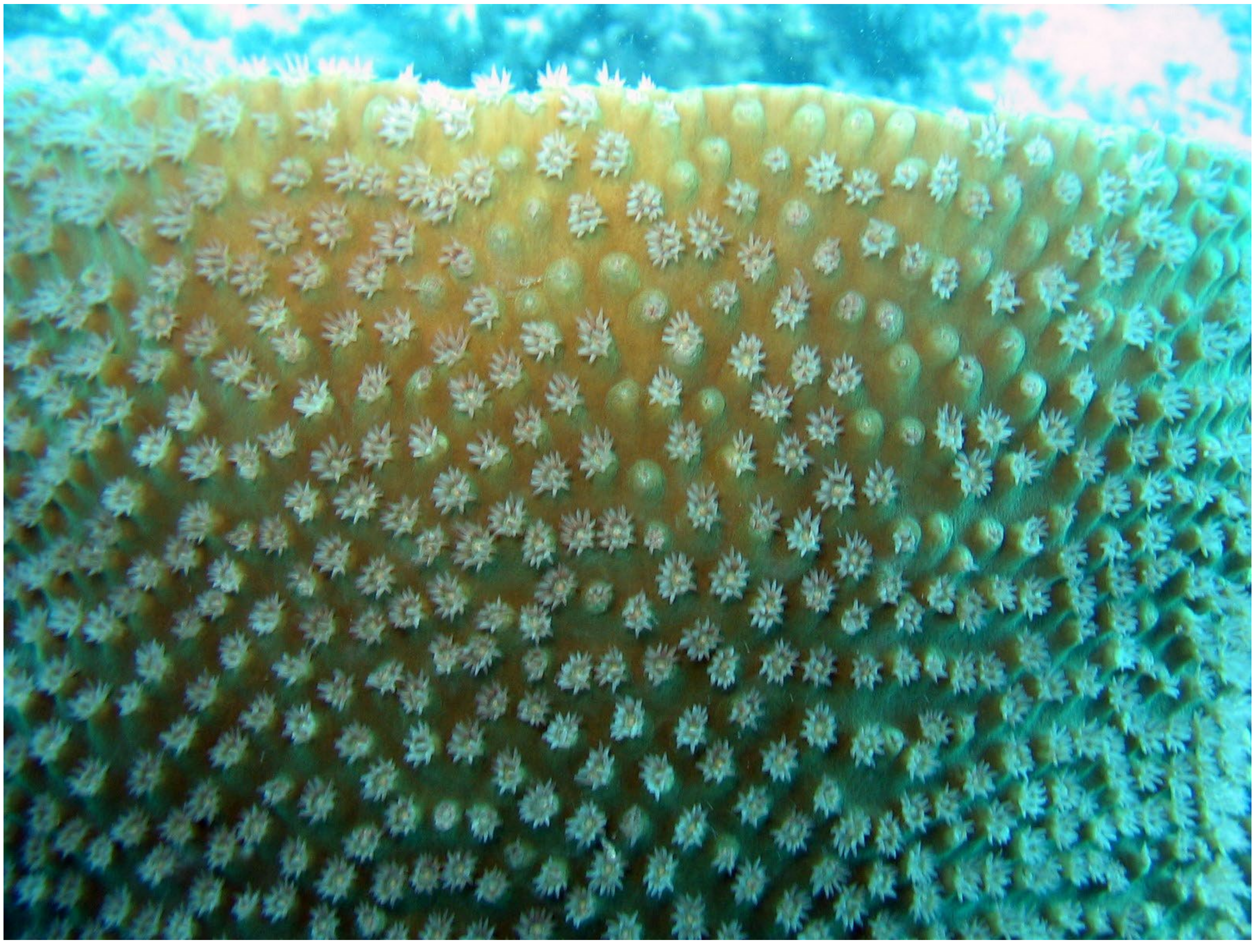
A close-up photo of a colony of *Turbinaria peltata* with the tentacles pulled in.

Turbinaria frondens

Colonies form foliose colonies with moderately thin plates that can be vase or funnel shaped or folded or other shapes. The corallites are about 3 mm diameter, slightly larger than on most of the other species of *Turbinaria*. Corallites vary more than on other species, with some corallites projecting farther than others.



A colony of *Turbinaria frondens*.

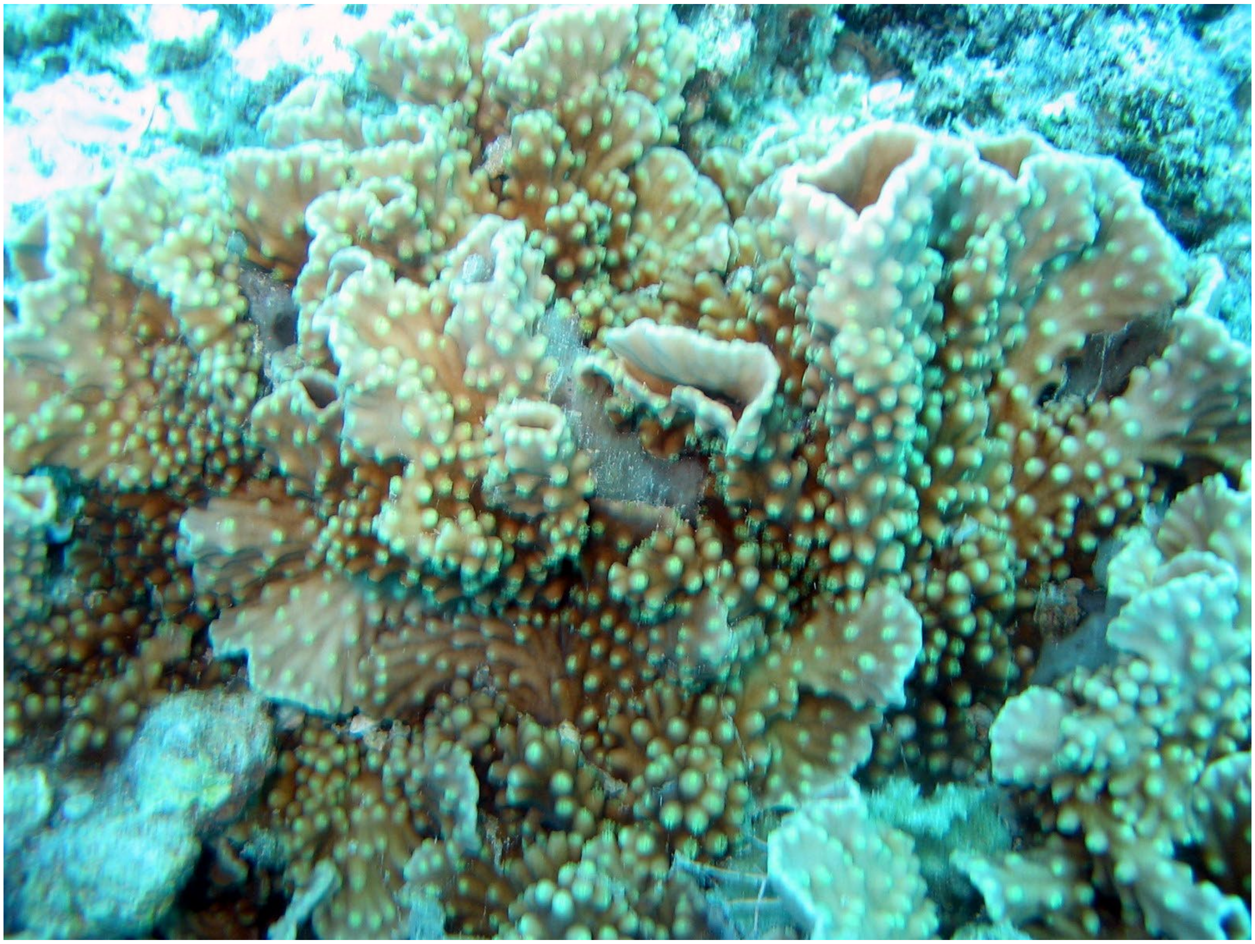


A close up photo of extended polyps on *Turbinaria frondens*.

Turbinaria mesenterina Vulnerable

Colonies can form funnel shaped colonies, nearly flat plates and a wide variety of other shapes. The corallites are quite small, only 2-3 mm diameter. Corallites are smaller than on most *Turbinaria* species, and lack the yellow coloration on *Turbinaria reniformis*.

A plate colony of *Turbinaria mesenterina* with the polyps retracted.

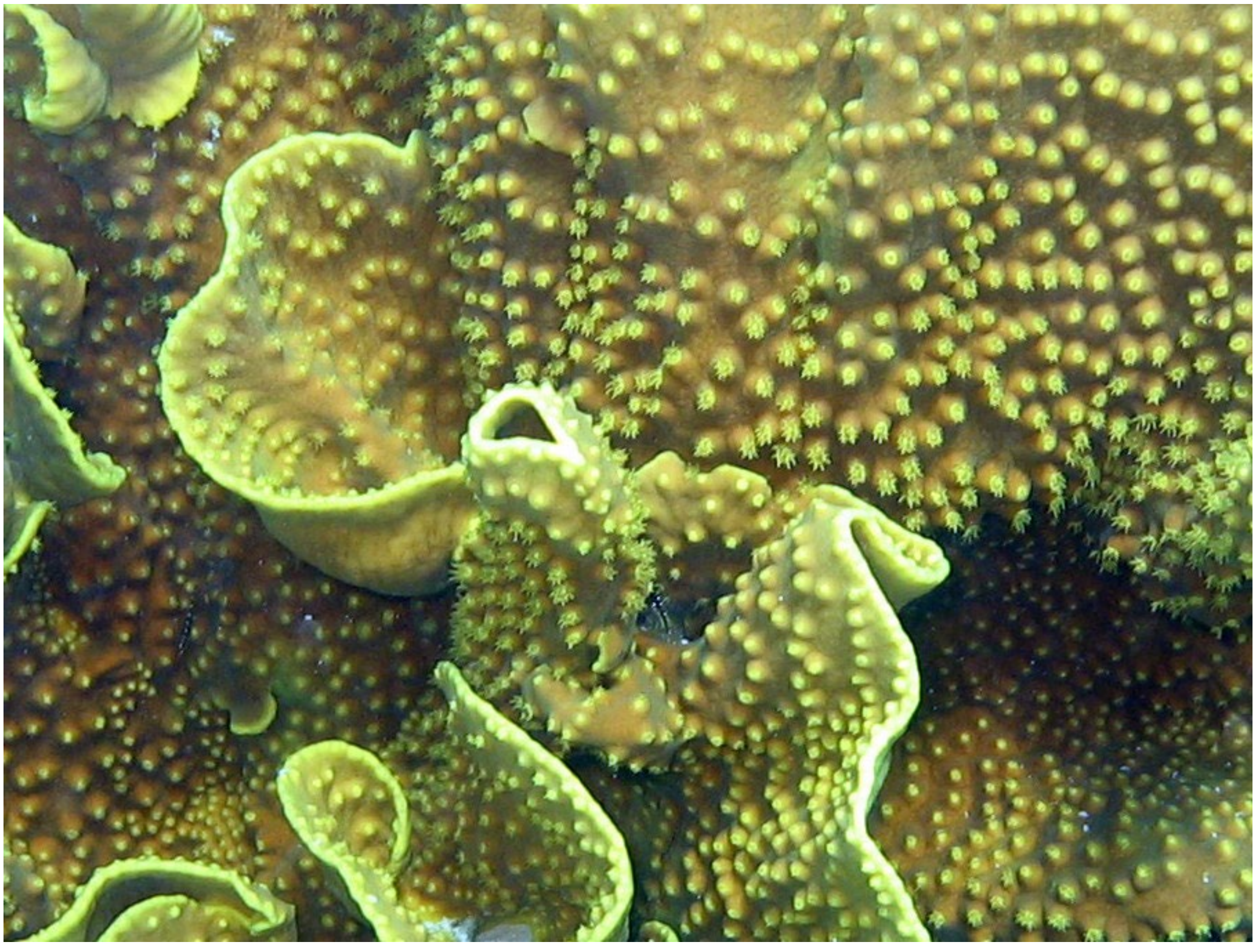


A tightly and irregularly folded colony of *Turbinaria mesenterina*.

Turbinaria reniformis Vulnerable

Colonies are thin plates that can be any angle between flat and verticle, can form whorls or be tightly folded and vertical. The corallites are 2-3 mm diameter and very similar to those on Turbinaria mesenterina. However, colonies always have some yellow on them, from being all yellow to just yellow edges and corallites. *Turbinaria mesenterina* is very similar but not yellow.

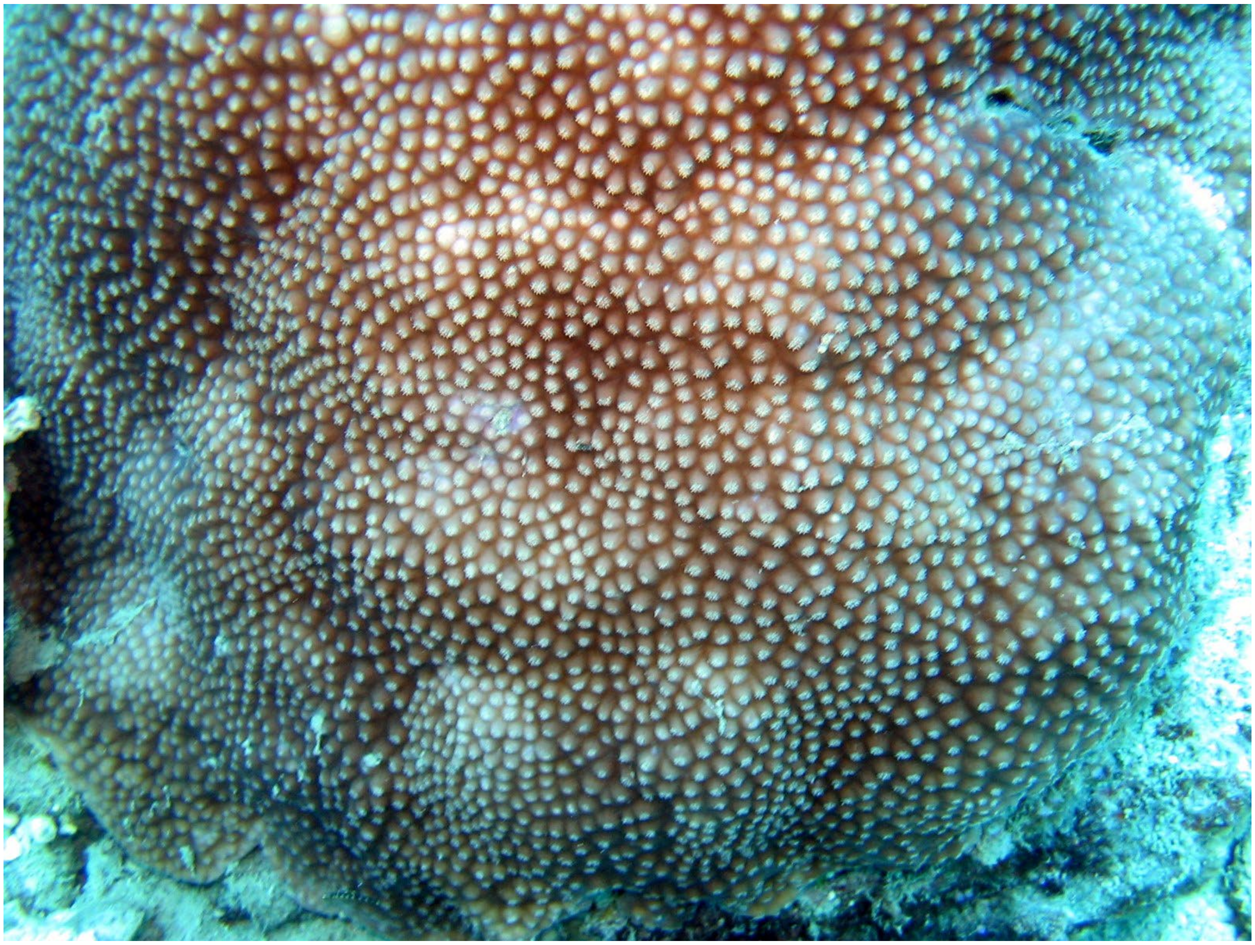
A colony of *Turbinaria reniformis*.



A closer photo of Turbinaria reniformis.

Turbinaria stellulata Vulnerable

Colonies are encrusting. Corallites are small. Occasionally a colony may have yellow polyps. Most other *Turbinaria* species are foliose.



A *Turbinaria stellulata* colony.

Tubastraea

Colonies have corallites that are about the diameter of the tip of a small finter, at the ends of branch tips. Colonies can be small orange massives with projecting corallites or green and tree shaped. Colonies do not have zooxanthellae.

Tubastraea coccinea

Colonies are small massives with projecting tube corallites, and are bright orange. Colonies live under overhangs and on artificial structures. Colonies can be found in clusters. Another genus without zooxanthellae (*Dendrophyllia*) also has branching orange colonies, but does not have a massive base. *Rhizopsammia* can have orange single tubes which branch, but do not form a massive base.

Colonies of *Tubastraea coccinea* of various sizes under an overhang.

A close-up photo of a colony of *Tubastraea coccinea*.

Tubastraea micranthus

Colonies are branching and can reach very large sizes, rarely reaching 2 meters tall and a 30 cm diameter base. Branches can go any direction and are commonly about 2 cm diameter making it one of the largest if not the largest discrete azooxanthellate coral in the world. Some colonies are fan shaped. Colonies are usually a dark, velvety green, but can be black. Colonies are usually out in the light.

A colony of *Tubastraea micranthus*. Use of a flash can bring out reddish tints that are not seen without the flash.

Class Octocorallia or Alcyonaria

Octocorals have exactly eight tentacles, and each tentacle has small regular side branches called "pini". Some, called "soft corals," are very fleshy and can form at least some external skeleton below them that is solid, without corallites. Some (gorgonians) do not form calcium skeletons. The octocorals include all of the soft corals, gorgonians, and sea pens, plus a couple of hard corals, *Heliopora* and *Tubipora*. Both of these have the zooxanthellae single-cell algae in their cells just like the Scleractinia. Many soft corals and gorgonia also have zooxanthellae, but many others do not. *Heliopora* and *Tubipora* do form skeletons of calcium carbonate (aragonite) with a thin tissue layer over them, much like Scleractinia. Soft corals are much fleshier than Scleractinia, but some do produce hard calcium underneath their tissues. They produce tiny knobs of calcium carbonate (aragonite) called "sclerites" in their tissues and move them down slowly and then extrude them beneath them and glue them to what is already there. Many species thus build an undulating smooth platform beneath them, which is as hard as the skeleton of Scleractinia. One species of *Sinularia* builds it in the shape of thick branches that can be up to at least 2 meters tall, and there are a few places in reefs where the reef is made more of this material (called "spiculite") than skeletons of Scleractinia. Most gorgonians are branching and have a flexible rod in the center of the branch under the thin layer of tissue.

Order Alcyonacea — Soft corals, gorgonians, and organ pipe coral

The Stolonifera Group

Family Tubiporidae

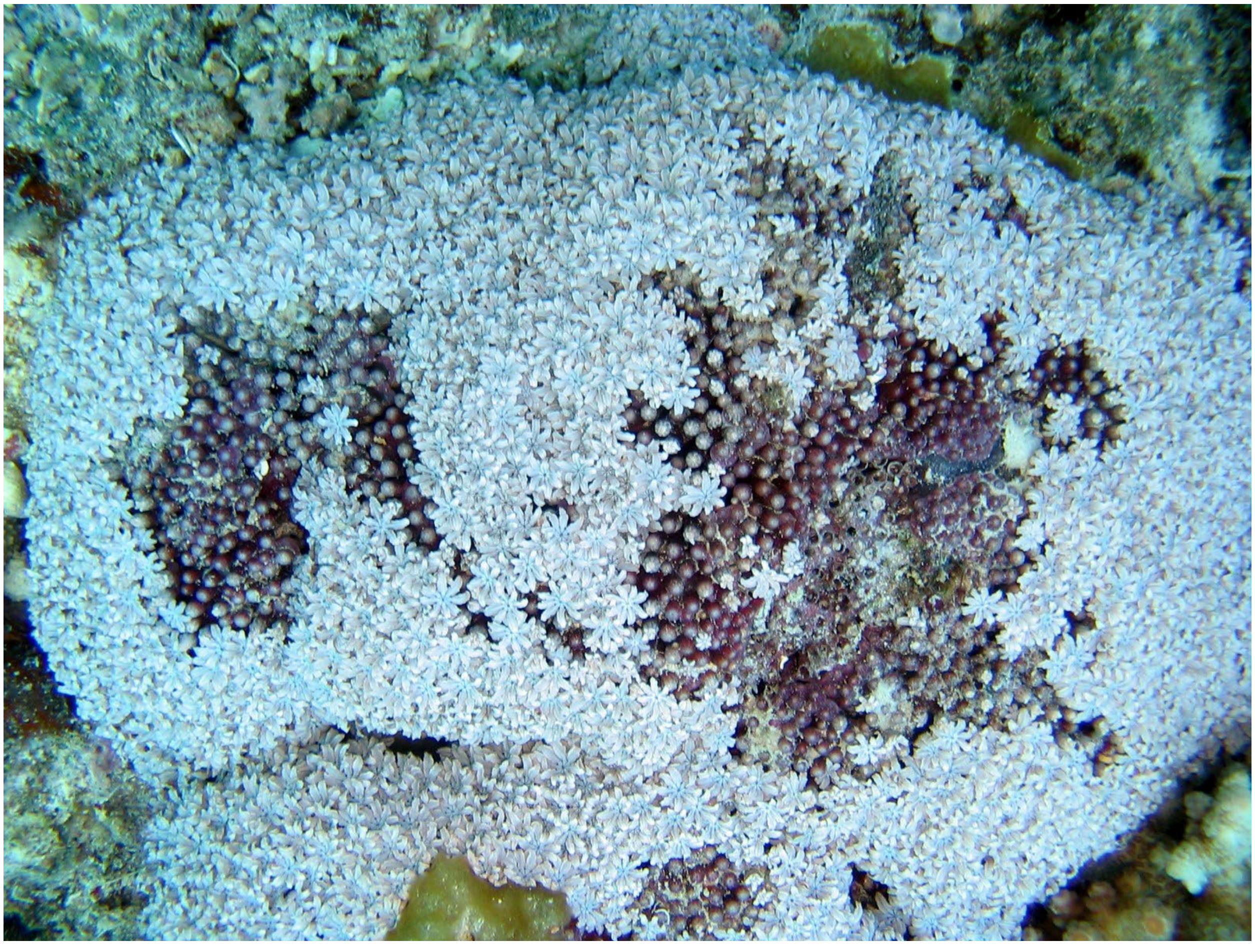
This family has only one genus:

Tubipora — *"organ pipe coral"*

Colonies form massive shaped colonies that have very porous bright red skeletons. The skeletons consist of parallel vertical tubes which the polyps are in, joined together by horizontal plates with space between them. When the polyps are extended, the tentacles make small green fans, and when the polyps are retracted they form a rounded bump over the tube the polyp lives in. The tubes and thus the polyp columns are about 2 mm thick. This genus is called "organ pipe coral" because of the shape of the tubes the polyps live in. Colonies are zooxanthellate.

Tubipora musica

Colonies make masses that are usually small, most often about 10 cm diameter or less, but can get significantly larger. Each polyp's set of tentacles is about 5 mm diameter.



A colony of *Tubipora musica* showing light colored areas where the polyps are extended, and red areas with many small knobs, where the polyps are retracted. Sometimes the polyps are light green.

Subphylum Medusozoa

These alternate between polyps and medusa.

Class Hydrozoa

Class Hydrozoa contains hydroids, some small jellyfish, and several genera that produce hard skeletons, including the last genus presented here. All hydrozoans alternate generations between small polyps which asexually produce medusa (jellyfish), which in turn produce eggs and sperm which when fertilized grow into polyps. The stage that produces the skeletons we see in the next three genera are all colonial polyp stages and produce tiny medusa (about 1 mm diameter or less) that then release eggs and sperm. In some hydrozoa the polyp stage is obvious and the medusa stage less so and in others it is the other way around. The stage that produces the skeletons we see in the next three genera are all colonial polyp stages and produce and release tiny medusa (about 1 mm diameter or less) that then release eggs and sperm.

Order Hydrocorallina "Hydrocorals"

This order contains the forms that produce calcium carbonate (aragonite) skeletons, suborders Milleporina and Stylasterina. One genus (*Millepora*) is zooxanthellate and a common contributor to coral reefs, and several genera are azooxanthellate, only two of which are on coral reefs (*Distichopora* and *Stylaster*).

Suborder Milleporina

This suborder has only one and family and genus:

Family Milleporidae

Millepora *"Fire coral"*

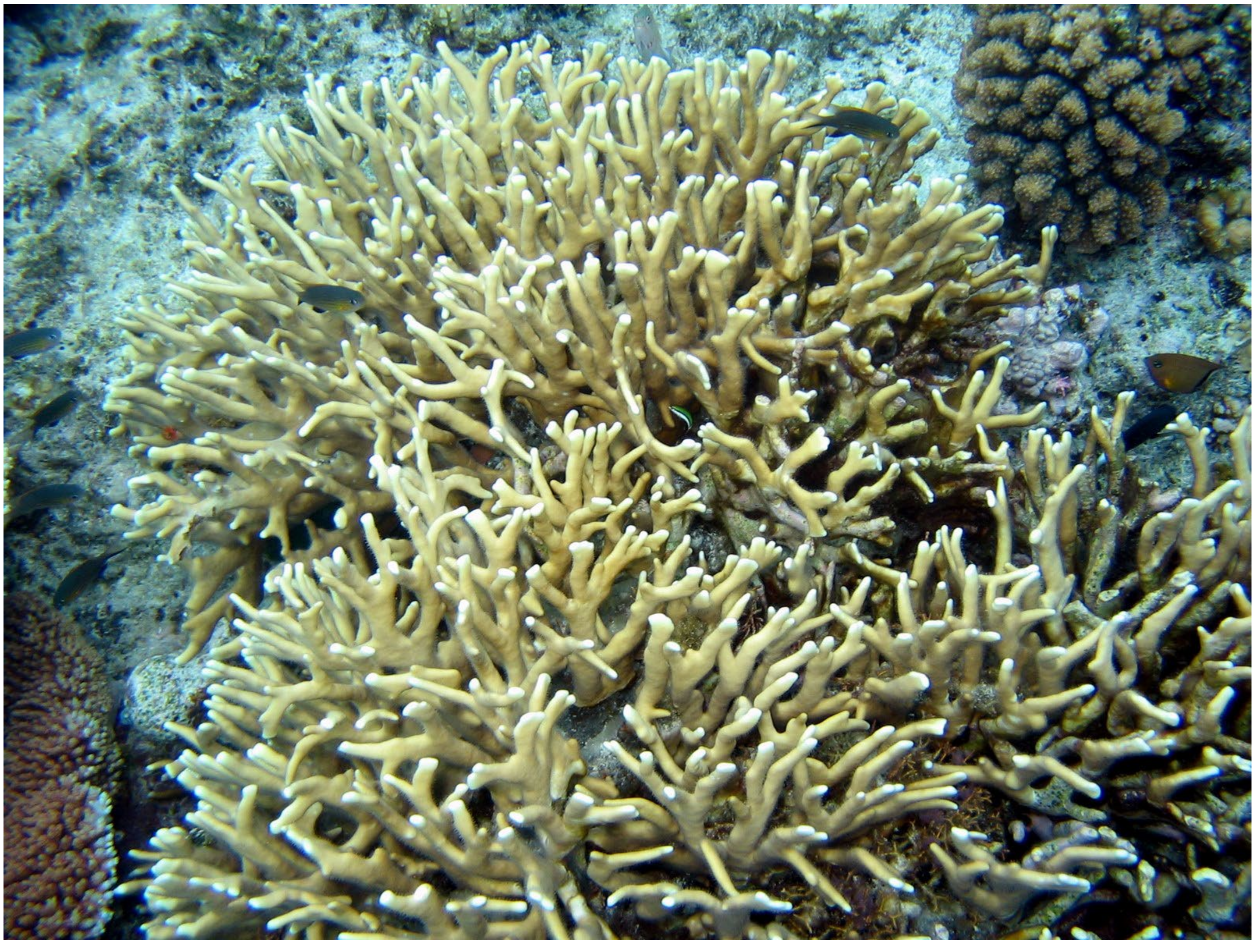
This genus produces a hard skeleton. The living tissue forms tiny, hair-like polyps that sit in tiny pores in the skeleton. The word "millepora" means "thousands of pores" in Latin, which is what the skeleton has, one for each polyp. There are long thin polyps with no mouths for stinging, and short thicker polyps with tiny mouths for eating. *Millepora* species all have the zooxanthellae single-cell algae in their cells and they are found in the light. They evolved the symbiotic relationship with the algae independently of the Scleractinia.

Millepora species are fairly fast growing. Branching species are also some of the most sensitive to mass coral bleaching.

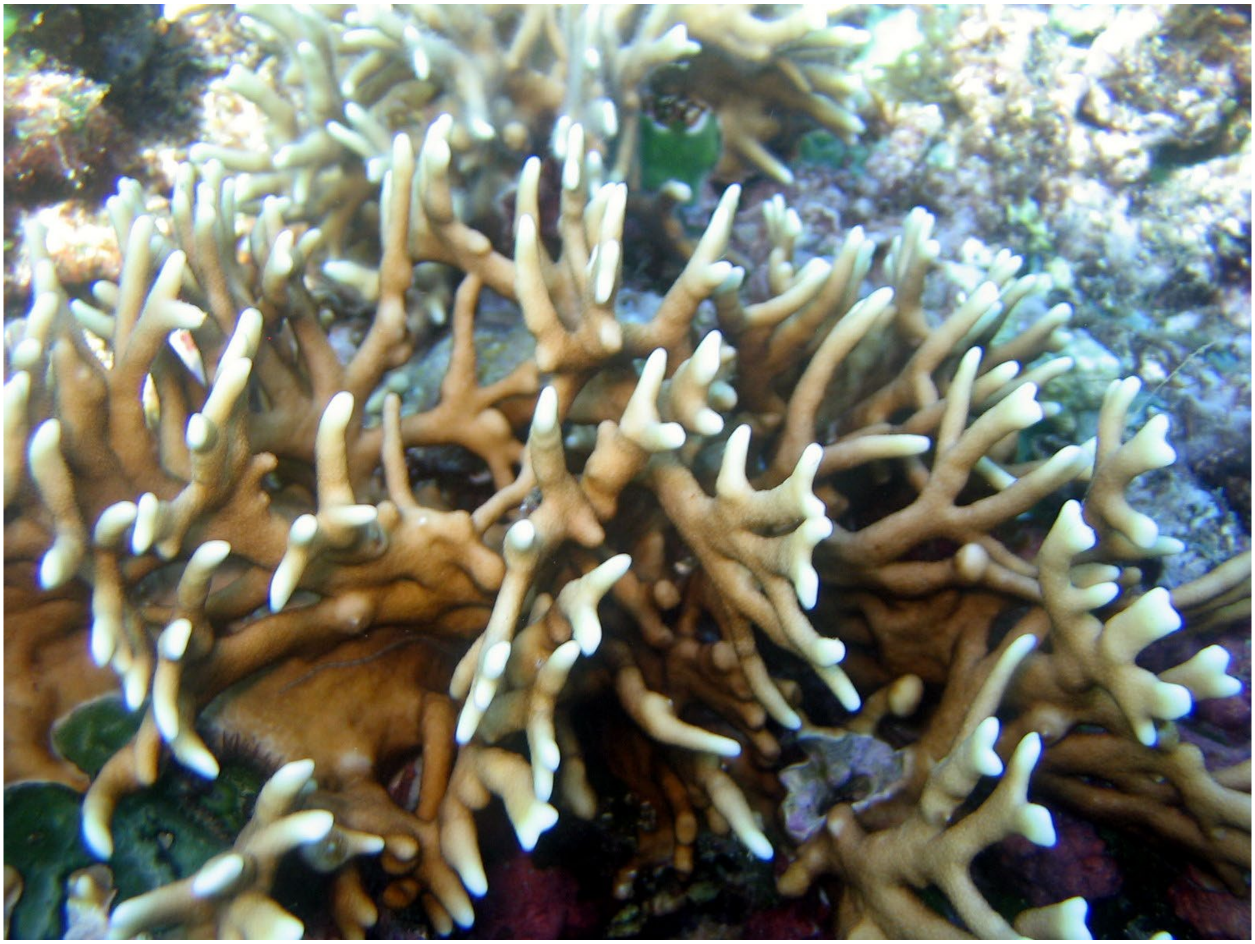
Millepora can be encrusting, encrusting base with vertical paddles, or branching. Surfaces may be smooth or bumpy. Colony shapes are highly variable. It is most often yellow or brown, but can be light green, pink, or dark reddish-purple. They have zooxanthellae and are found in light. Touching it with anything but your finger tips will likely give a sting, and it is the only coral that can sting humans. The stings are a brief burning sensation but not serious. They are called "fire corals" because of their sting. Other hydrozoans like the feathery hydroids can sting as well, but they do not have skeleton. The smooth yellow-brown colonies are distinct, and no other hard coral can sting humans.

Millepora intricata

Colonies are finely branching, with thin, smooth, nearly cylindrical, non-tapering branches growing in many directions. Branches have rounded tips. Branches are thinner than on *Millepora dichotoma* and do not form two dimensional anastomosing fans. Branches do not curve downward in an "ogive" and give off sub-branches on their upper surface like *Millepora murrayi*.



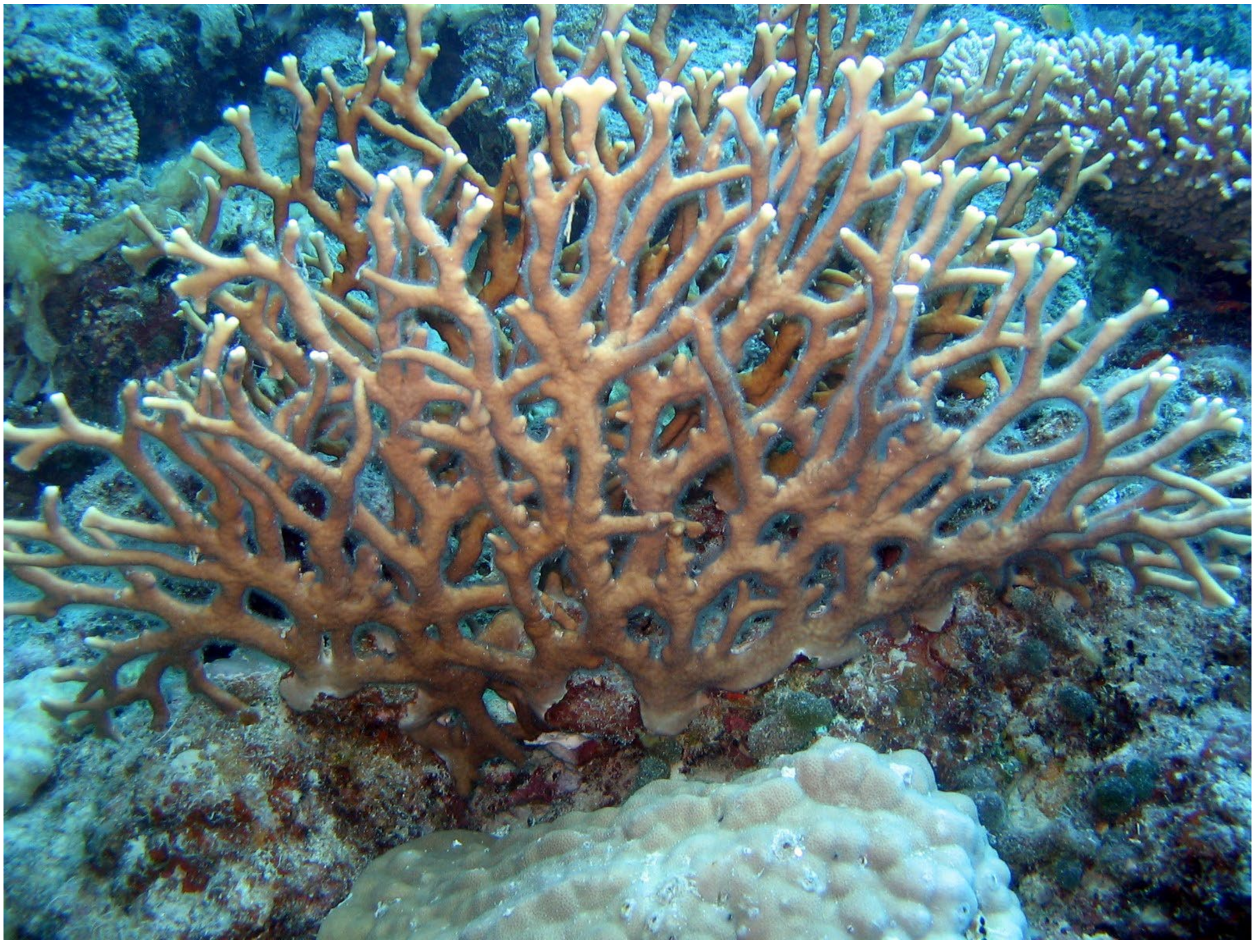
A colony of *Millepora intricata*.



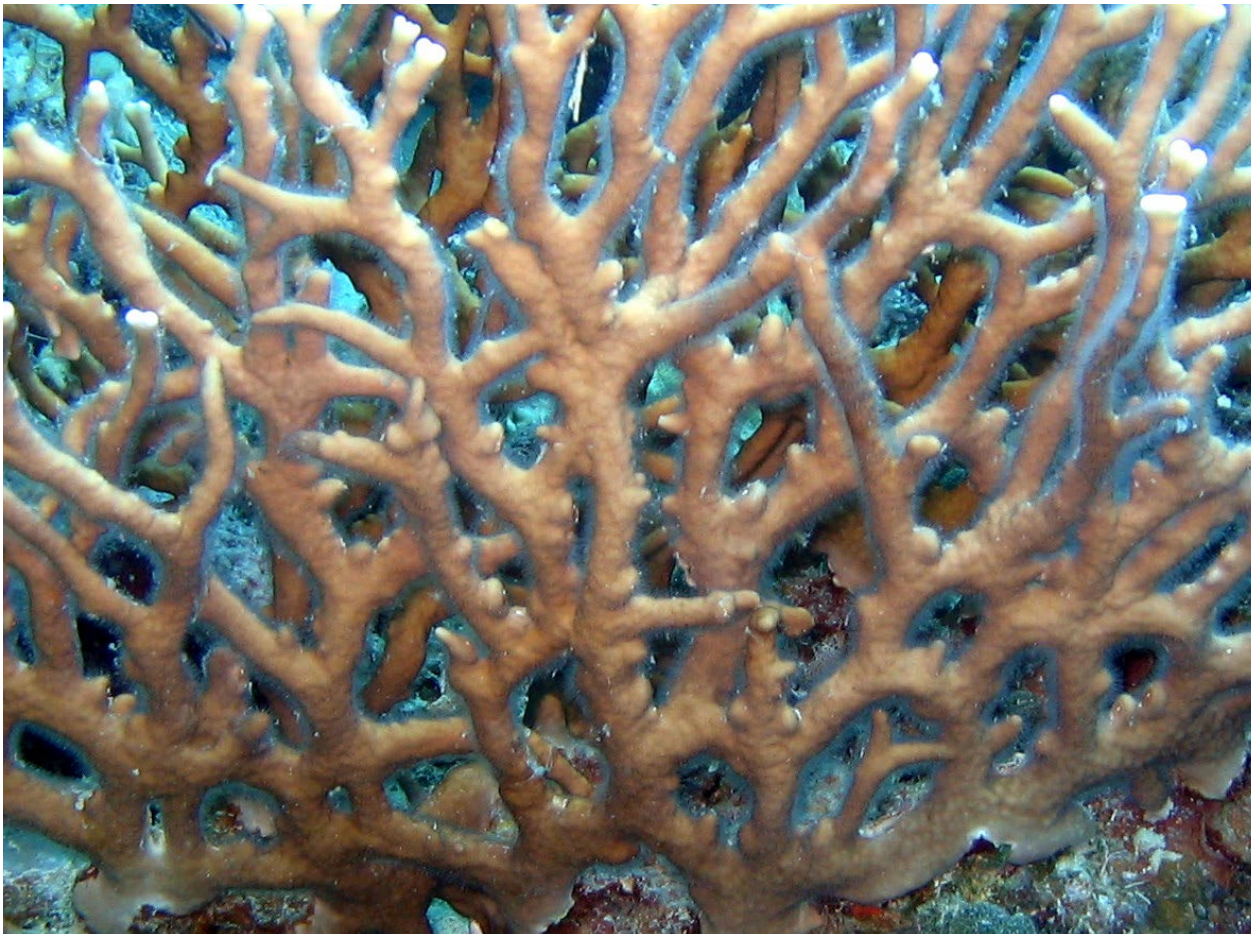
A close-up photo of *Millepora intricata*.

Millepora dichotoma

Colonies are branching, with cylindrical, smooth branches that form two dimensional, anastomosing fans. In some cases, branches may be parallel and vertical forming a two dimensional fence-like structure. Branches range from the same diameter as *Millepora intricata* to thicker. *Millepora intricata* branches go in all directions, forming a three dimensional thicket instead of two dimensional fans.



A colony of *Millepora dichotoma*.



A close-up photo of a *Millepora dichotoma* colony.

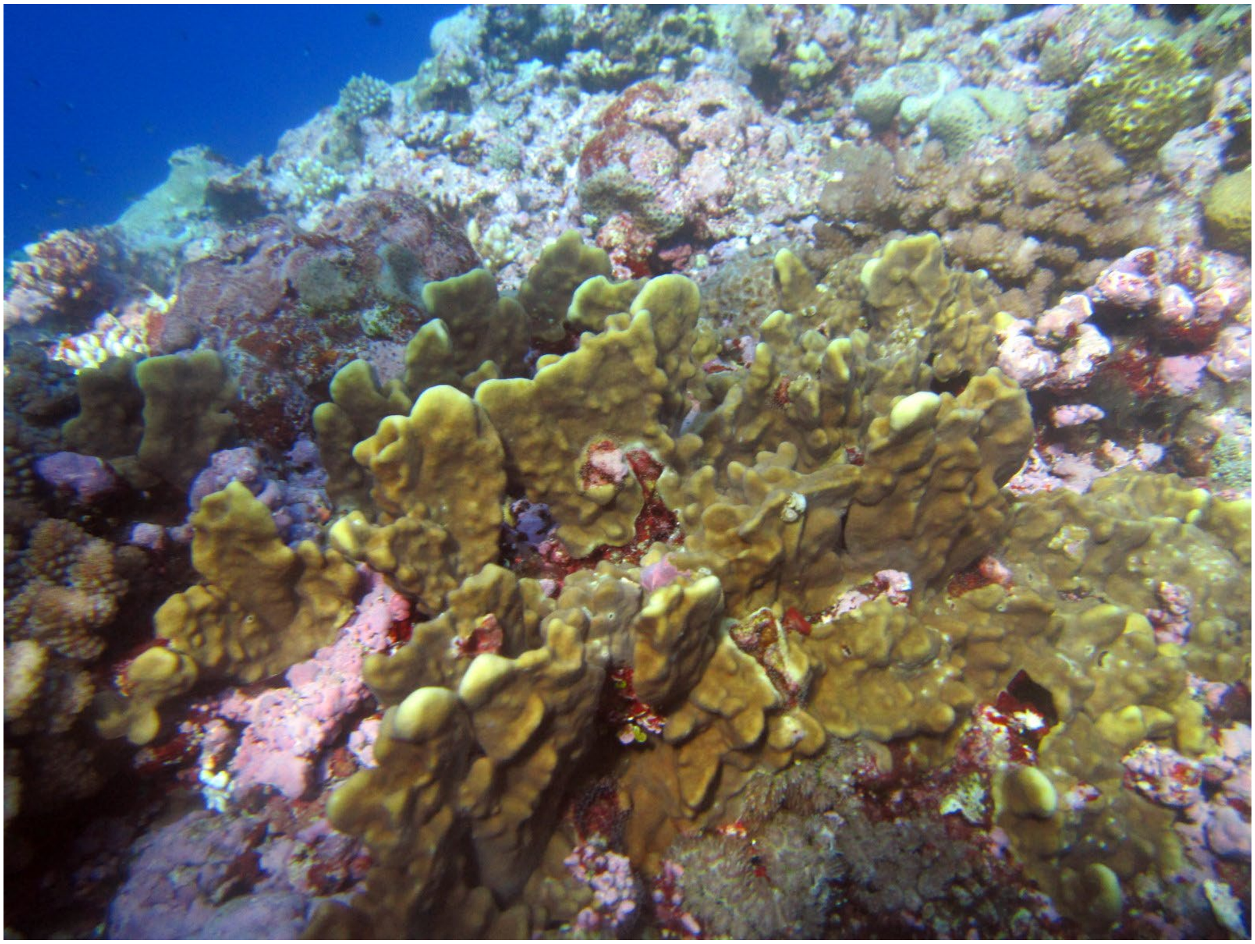
Millepora tenera or latifolia Vulnerable

Colonies have large, laterally flattened branches that divide in two dimensions but may be partly fused. Branches are much thicker than *Millepora dichotoma*.

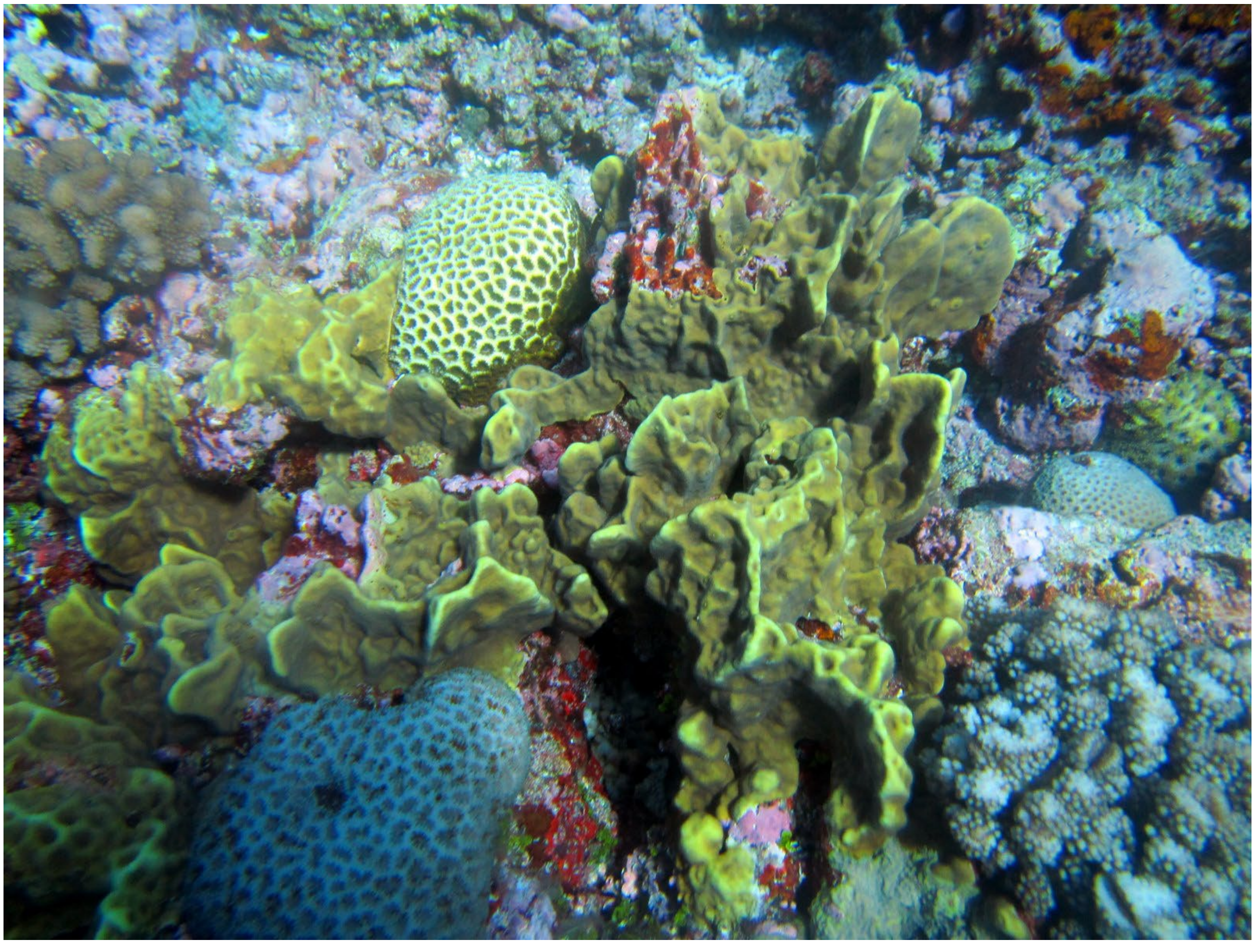
A colony of *Millepora tenera* or *latifolia.*

Millepora platyphylla

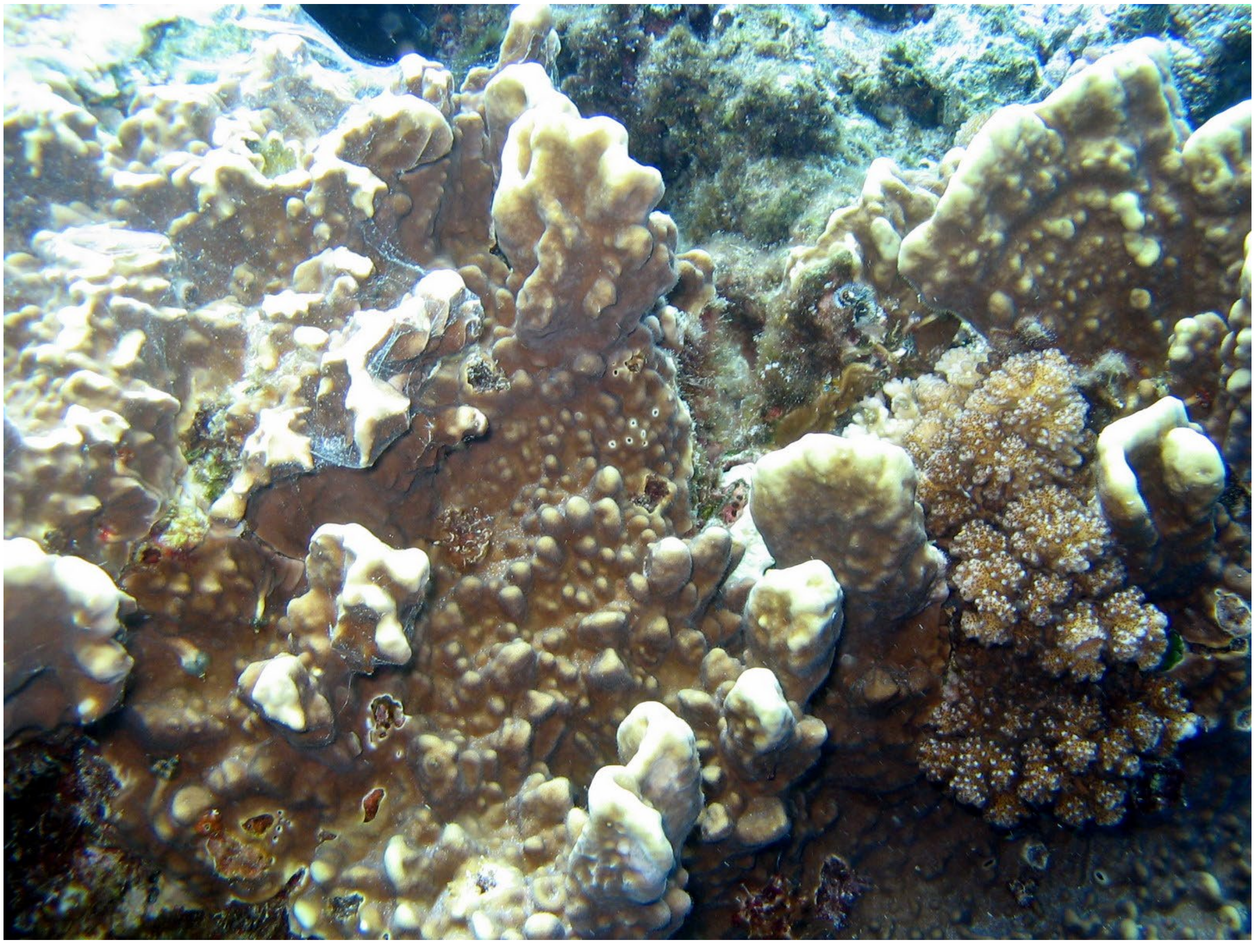
Colonies have a wide variety of shapes. Some are entirely encrusting, others have encrusting bases with ridges, vertical paddles, vertical columns, or vertical thin plates, or those forms without an obvious encrusting base. Colonies with the same shapes can vary in how thick those shapes are. Colonies side by side commonly have consistent different morphology. No other *Millepora* forms vertical plates or paddles.



A colony of *Millepora platyphylla* with an encrusting base and vertical wall-like or paddle like structures.



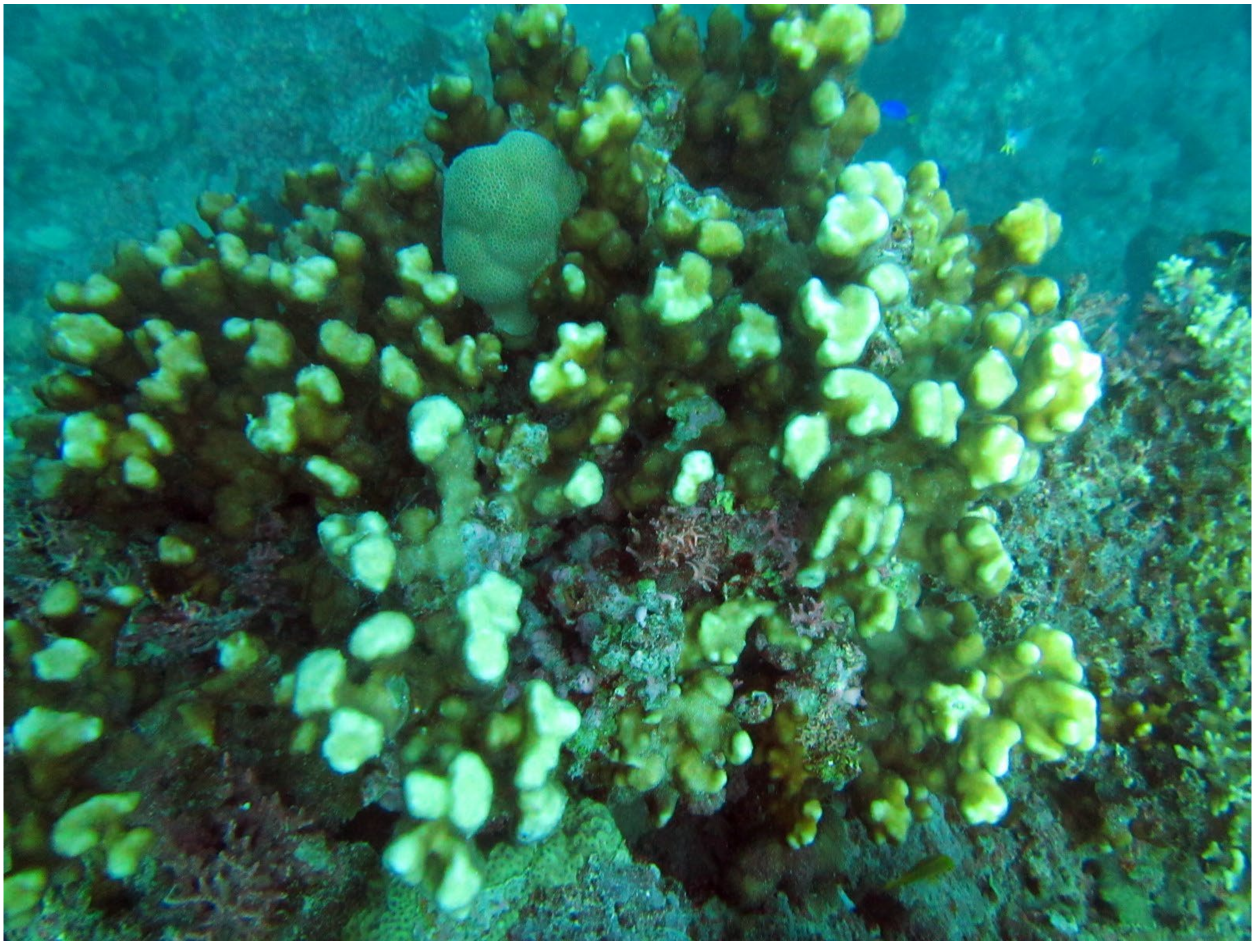
A colony of *Millepora platyphylla* with intersecting vertical wall-like structures.



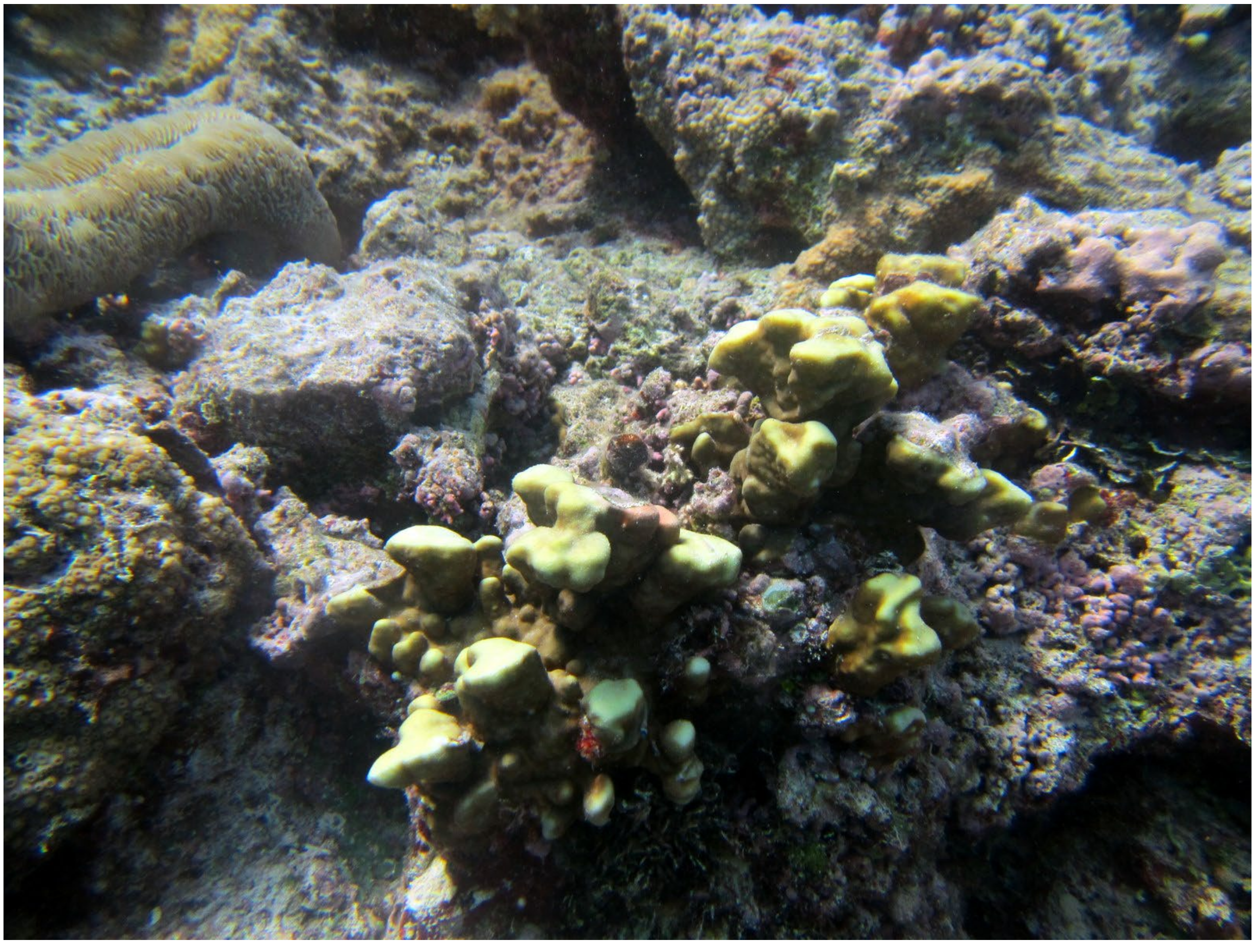
A colony of *Millepora platyphylla* with a bumpy encrusting base and thick, irregular upward growths.

Millepora cf. platyphylla

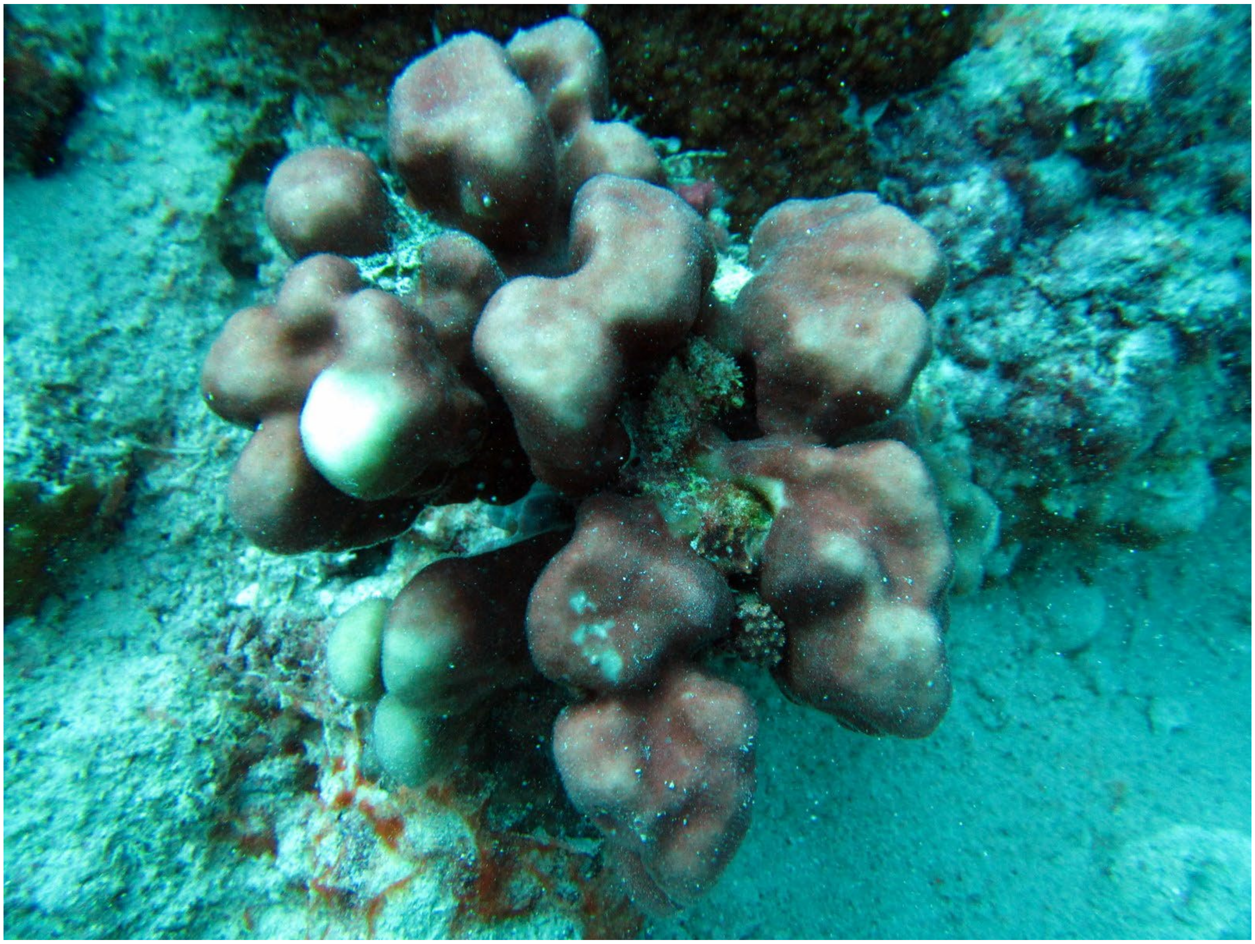
Colonies are clusters of knobs and short columns growing upward, with flat tops. This may be a variation of *Millepora platyphylla* or something else.



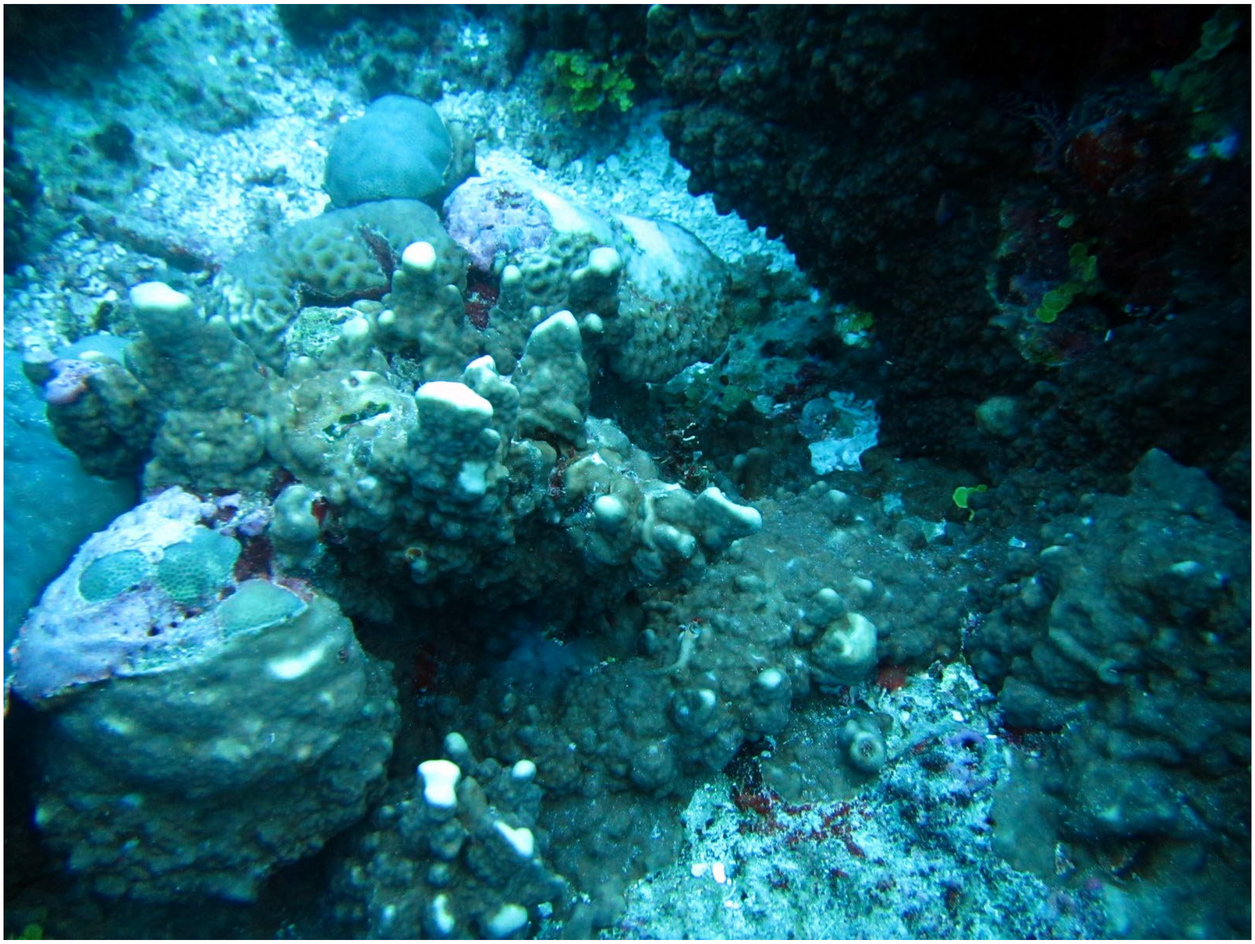
A large colony of *Millepora* cf. *platyphylla*.



A colony of *Millepora* cf. *platyphylla*.



A colony of *Millepora* cf. *platyphylla* with red tints.



A colony of *Millepora* cf. *platyphylla* with an encrusting base and upward knob growths.

Stylasteridae

These corals are hydrocorals, but do not have zooxanthellae like Millepora has. There are several genera, only two of which live on coral reefs, *Distichopora* and *Stylaster*. They occur in reduced-light habitats.

Distichopora

Colonies are branching, forming two-dimensional fans. Branches are smooth. Corallites are tiny and are in short rows along the edges of oval branches, but are too small to see under water. Colonies do not have zooxanthellae and live in shaded locations. Colonies usually have bright colors. *Sytlaster* has branches that look bumpy or zig-zag and have thinner branch tips.

Distichopora violacea

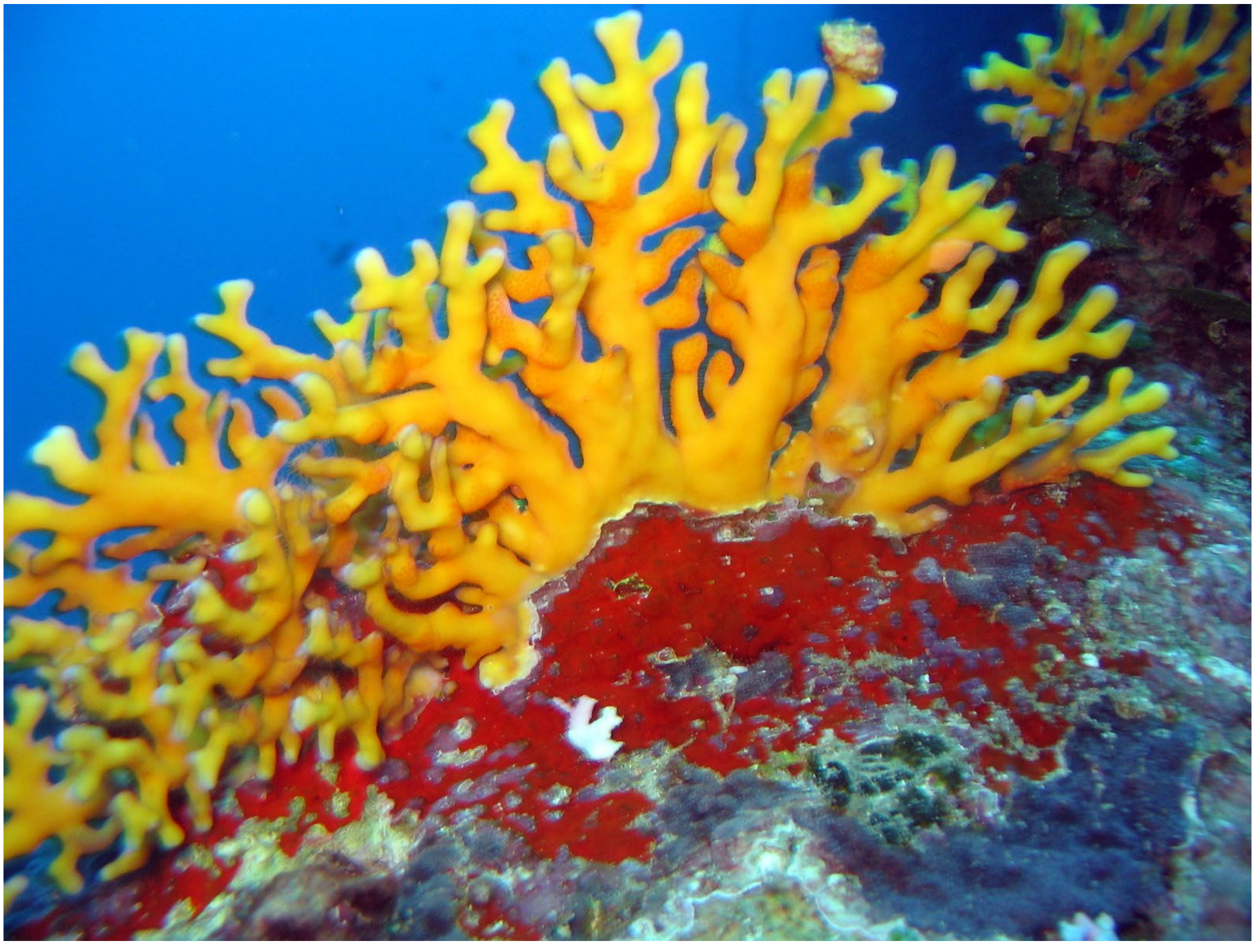
Colonies are small, with branches thinner than the spaces between them. Colonies are purple, from which the name comes from.

A colony of *Distichopora violacea*.

A colony of *Distichopora violacea*.

Distichopora nitida

Colonies are most often yellow. Branches are a bit thicker than on *DIstichopora violacea*, and are thicker than the spaces between them, the branches fitting together a bit like puzzle pieces.



A colony of *Distichopora nitida*.

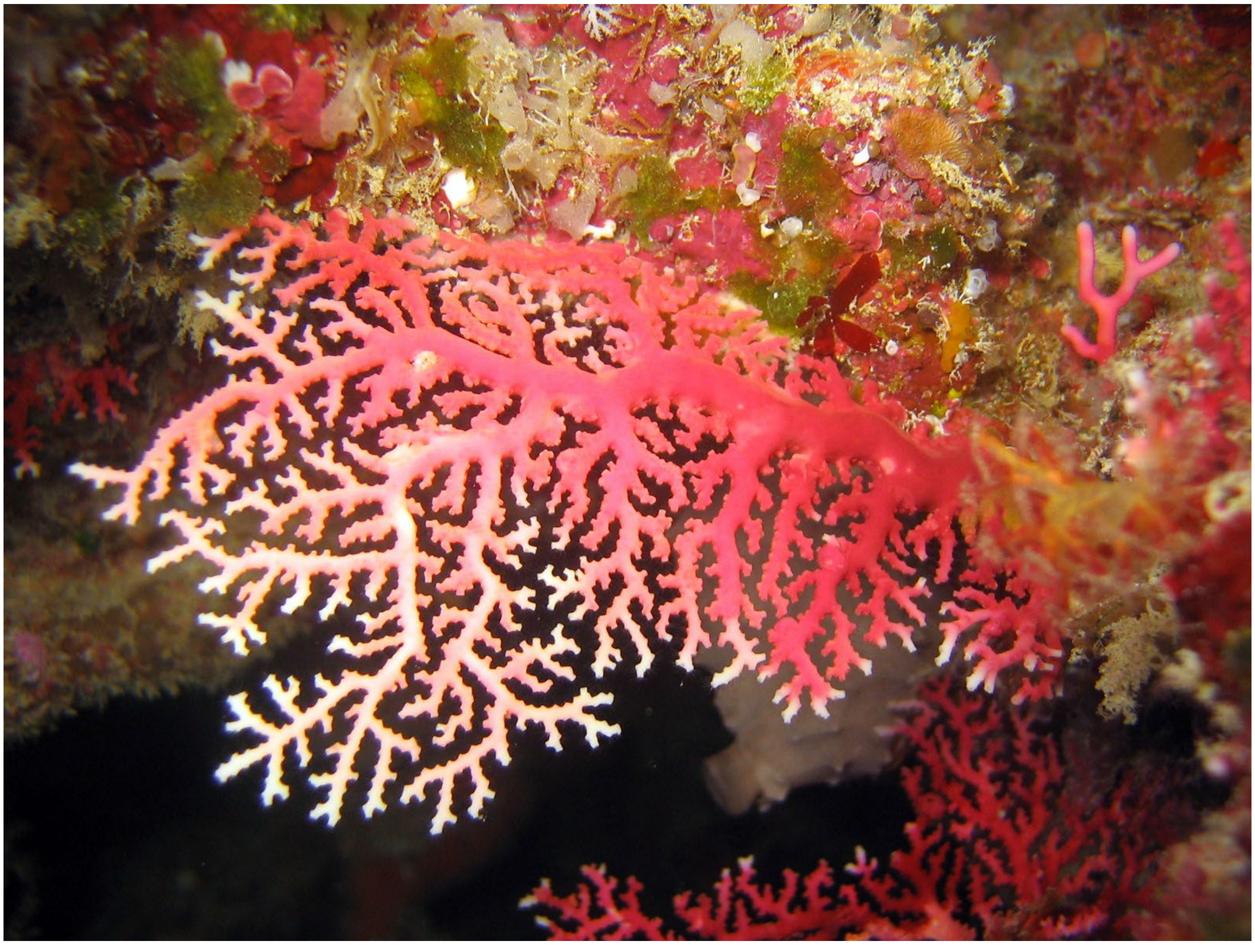
A red colony of *Distichopora nitida*.

Stylaster

Colonies form two dimensional fans, with a lacy look on their smaller branches. Branches have a bumpy or zig-zag look to them and are thin near the branch tips. Common colors are red, pink, and white. Colonies are azooxanthellae and live in shaded locations like under overhangs. *Distichopora* has smoother branches with thicker branch tips.

Stylaster sp.

It is not possible to identify Indo-Pacific shallow *Stylaster* to species yet, especially in the field. There may be many cryptic species that can only be identified under the microscope.



A colony of *Stylaster* sp.

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The Author

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Born in Michigan, USA, the author has lived in a variety of places in the states, including Florida during his high school years, which stimulated an interest in tropical marine life. During his years at Reed College in Portland, Oregon, he was introduced to biology, including invertebrate biology, studied sea urchin tube feet and respiration for his thesis and spent two summers in Hawaii studying fish behavior with his professors. Once graduated he attended the summer invertebrate zoology course at the Marine Biological Laboratory at Woods Hole, Massachusetts and then another summer was a course assistant for that course. Snorkeling trips to the Caribbean (including to Jamaica just before Hurricane Allen) during graduate school at the University of Pennsylvania were followed by scuba trips to the Caribbean. His coral reef research and publications began with surveys and description of reefs in the Caribbean, including Cozumel, Roatan, Cayman Brac, Little Cayman, and St. Lucia. It became clear that to do benthic transects you need to know your corals, and existing guides were inadequate, so Caribbean coral identification and taxonomy were next to be studied. By this time the author lived in Seattle, Washington. Then the author began to study corals in Hawaii, which led to his identification book for Hawaiian corals. Following that, he worked in the Philippines for two years, learning many coral species in that area of high diversity. This was followed by six years of working with Dr. "Charlie" J.E.N. Veron at the Australian Institute of Marine Science on the "Coral ID" electronic key to corals of the world. At that time, the author began to be invited to study and record corals during Rapid Assessment Programs in a variety of places around the Indo-Pacific. In November, 2003, the author began work at the Dept. Marine & Wildlife Resources, in American Samoa. He began working on coral reef monitoring there a year later and continued with that, and continued to make trips to study corals around the Indo-Pacific. Currently, the author has studied coral at 14 islands in the Caribbean and 14 areas of the Indo-Pacific, plus southern Italy in the Mediterranean. He is an author of 17 book chapters and 46 peer-reviewed articles in scientific journals. He has worked as a contractor for NOAA NMFS Protected Species on the threatened coral species since 2013. That work has taken him around the Pacific each year to study corals and teach people how to identify corals. That effort includes photographing corals, writing field guides and building "practice modules" for teaching coral ID and people to practice with. He also works on describing new corals species and diseases and a variety of other coral reef topics. He continues to be based in American Samoa.