



THE ELEGANT RHODOPHYTA

Most underwater photographers, when snorkeling or diving tropical reefs, center their attention on reef animals, totally ignoring the equally beautiful, diverse, and colorful botanicals. Admittedly, we may be a bit biased on this topic, since we have studied seaweed ecology for the last twenty-five years or so. Our goal is to induce observers of the reef to take a closer look at the plant life, in this instance the red algae, which has spectacular colors, incredible forms, and often makes a very photogenic subject. Their extreme importance to the reef should also be taken into account, since such plants form the base of the food web, providing the initial source of energy (food) for the entire chain of diverse creatures which inhabit the reef ecosystem.

The red algae or Rhodophyta (Greek: *rhodon* = red rose, *phyton* = plant) is by far the largest and most diversified group of tropical reef plants, including more than 4,000 species, with many yet to be discovered. These spectacular plants are largely restricted to hard-bottom habitats in marine environments (green algae (Chlorophyta) and seagrasses (Magnoliophyta) dominate the sandy habitats). Furthermore, the Rhodophyta are the predominant macroscopic algae in virtually all tropical reef systems, equally abundant in the Atlantic, Pacific, and Indian Oceans. These adaptable plants occupy the entire range of depths inhabitable by photosynthetic organisms, from high-intertidal regions to depths as great as 900 feet (San Salvador Island, Bahamas, is the greatest depth for known plant life).



Generally found on the outer reef slopes, *Martensia pavonia*, opening page, is a delicate sheet-like membrane divided into zones of rectangular holes or mesh-like nets.

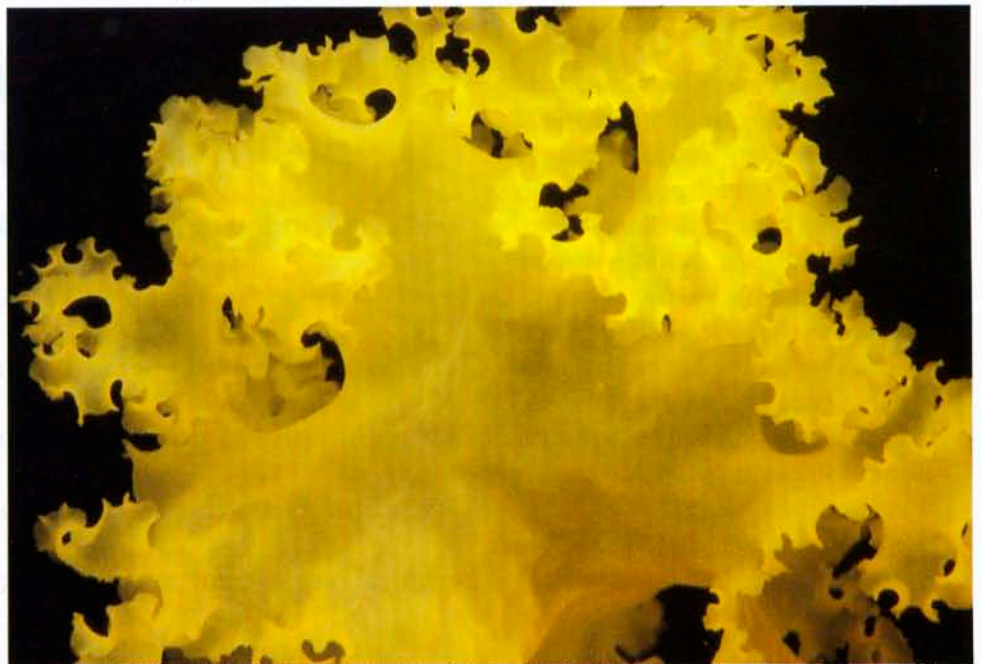
The undescribed *Predaea* at left is one of the 83 percent of marine plants that have not been officially described. Usually found growing on dead coral, it is highly gelatinous and extremely slippery.

Lacy and undulating, *Halymenia floridana*, below, has a gelatinous consistency and can range in color from bright red to yellow.

Although red algae occur at all latitudes from the Arctic to the Antarctic, there is a definite and obvious shift in their abundance and diversity as one moves to tropical waters. The word *algae* is plural, having a “soft” g, and is pronounced “al-gee”; *alga* is singular with a “hard,” g as in “gale.” Even though the Rhodophyta can grow to a height of three feet, they do not reach the enormous size of many brown algal species (Phaeophyta), such as the giant kelps, which generally dominate in colder waters. Most red algae average two to twelve inches. Many of the beautiful epiphytic red algae (delicate forms that live on other marine plants) are very small, often microscopic. Other forms are large and fleshy (even gooey), and stony species also are common. Their range of color is extraordinary, due to a combination of red, blue, green, and yellow pigments occurring in almost any color imaginable, which makes them the most beautiful and appealing of all algae. While all plants contain the green pigment chlorophyll, it is generally masked by the other pigments in the Rhodophyta. The typical and most characteristic color is some shade of red (hence the name of the group), the result of large quantities of the pigment phycoerythrin. The precise identification of many red algae depends upon microscopic reproductive features that are difficult to find and interpret. However, most common species

are easily identifiable from their characteristic growth forms or branching patterns, while others can always be identified by easily observed external features.

In reality, few reefs are dominated solely by corals, hence the term “coral” reef is often a misnomer. Corals are the organisms that are largest, most showy, most obvious, and easiest to identify on many reefs; however, few people realize that red algae generally exceed corals in importance as reef-building organisms.



Why has this fact been overlooked by so many people for so many years? Reef-building algae are not as large, not as conspicuous, and are exceedingly more difficult to identify; for these reasons, the algae have been

generally ignored by most reef-goers (unfortunately, this includes scientists as well). The fact is that without certain species of calcareous coralline red algae, most reefs would not exist. Therefore, instead of the term *coral reefs*, we prefer to use *tropical reefs* or *biotic reefs* when referring to these complex marine structures. For the record, reef-building corals contain large quantities of microscopic algae called zooxanthellae, and the role of corals is mainly photosynthetic as well as providing bulk materials, similar to bricks or blocks in construction. The cement, holding everything together, is actually what makes it all work — and the red calcareous algae are the principal cementing agents of nearly all tropical reefs. Many reefs, especially in the Pacific, are almost entirely formed by calcified plants. These plants, the coralline red algae, are harder than most corals, and this durability enables them to withstand the tremendous power of the huge breakers on oceanic islands. Within such extreme high-energy systems, coralline algae form an “algal ridge” that absorbs wave energy and hence protects the more delicate corals, fleshy algae, sponges, and other organisms that inhabit the protected lagoons and back-reef habitats.

Another problem in popularizing the algae has been the absence of common names. Occasionally a field guide (most reef guides have totally ignored the algae) will appear with made-up names treating a limited representation of algal species, but these names seldom become common, being generally superfluous and often a product of the author’s imagination. When dealing with the algae, Latin names are the norm. Now you’re going to think “Well, scientists are specialists, so speak for yourselves,” but consider the fact that people use Latin names every

Forming compact heads often confused with coral, Lithophyllum congestum, above, is quite stoney. As one of the major reef builders, these plants occur in areas with extremely heavy surf conditions on the reef crest where more delicate corals would be shattered.

Mesophyllum mesomorphum, right, is a reef-building alga consisting of brittle overlapping shelves or lobes. This species is most commonly found on vertical walls



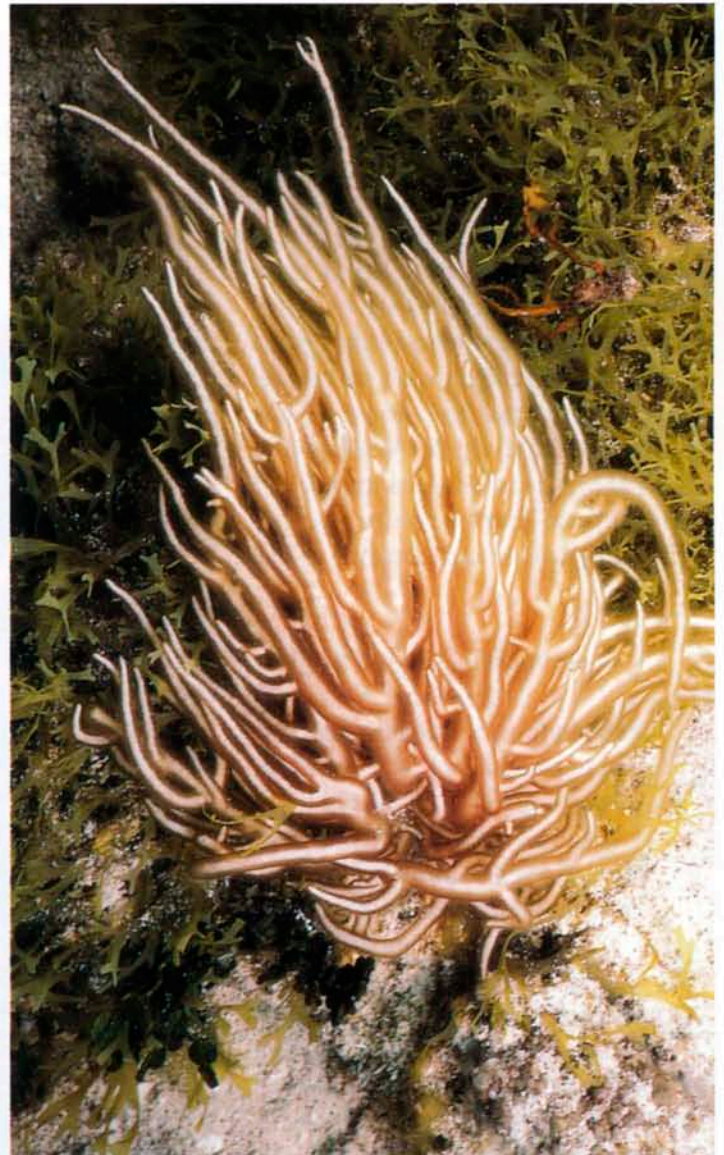


Ochtodes secundiramea, left, found just in front of the reef crest or on mangrove roots in pristine water, is usually small, bushy, and bright iridescent blue, purple, or red.

Uncommon, but abundant when found, *Trichogloea herveyi*, below, attaches to hard substrate or on large stones in open rubble areas from low tide mark to thirty feet deep.

day and, because they're familiar with them, don't encounter any difficulty (for example, *lynx*, *alligator*, *iris*, *geranium*, to name a few). Latin is used for scientific names because it is a "dead" language (not used by any group of people for their everyday activities); consequently, it is not subject to changes. An organism's scientific name is universal—only one scientific name per type of plant or animal. A specific plant or animal may have many common or popular names in various regions or countries, but anywhere in the world it will have only one scientific name. An organism's scientific name consists of the generic designation (genus, capitalized) and specific epithet (species, in lower case), and it is underlined or italicized to show that it is Latin. A generic name, indicating the group to which an organism belongs, can contain many species, all having certain characteristics that are common to every species in that genus. When getting to know the algae, rather than making up hokey common names, we would recommend starting by grouping them and using just the generic names such as *Mesophyllum* and *Ochtodes* as pictured here.

So when you next take to the water on a warm tropical reef, take note of the marine plants, especially the red ones, and check out their spectacular colors, interesting forms, and huge variety of species. Remember, unlike many animals of the deep, there are no marine plants that are poisonous to the touch or that sting or bite. They don't run for cover or "turn-tail" to the camera when photographed. Algae are held captive by their holdfasts (root-like attachment structures) and cannot avoid the bracket of a framer. Once you develop a botanical search image, seaweeds will astound you with their diversity and abundance. Marine plants are truly the user-friendly organisms of the reef. □



Littler, D.S. and M.M. Littler. 1995. Botanical Briefs: The Elegant Rhodophyta. *Ocean Realm*, 1995 (April): 19-22, 7 photographs.