

# SPONGES

**DOMAIN** Eucarya  
**KINGDOM** Animalia  
**PHYLUM** Porifera  
**CLASSES** 3  
**SPECIES** About 15,000

THIS ABUNDANT AND diverse group of often colorful invertebrates lives permanently attached to the sea floor. Naturalists once thought they were plants, but they are now known to be very simple animals with no close relatives. Sponges live by drawing

water into their bodies through tiny holes called pores, filtering it for food and oxygen and pushing it out again. Many species are found on coral reefs or rocks, and a few live in fresh water.

## HABITATS

Most sponges need a hard surface for attachment, but some can live in soft sediment; a few species are able to bore into rocks and shells. Sponges are common on rocky reefs, shipwrecks, and coral reefs in a wide range of temperatures and depths. The largest populations occur where there are strong tidal currents, which bring extra food. Animals such as crabs and worms sometimes live inside sponges, but little manages to settle and grow on their surface. This is because sponges produce chemicals to discourage predators.



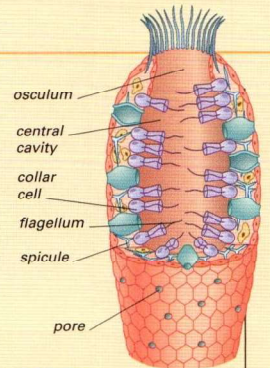
### CHANGING SHAPE

Many sponges grow different shapes in different habitats. This sponge develops fingers in strong currents (above), but has an encrusting form (right) when it grows in wave-exposed sites.



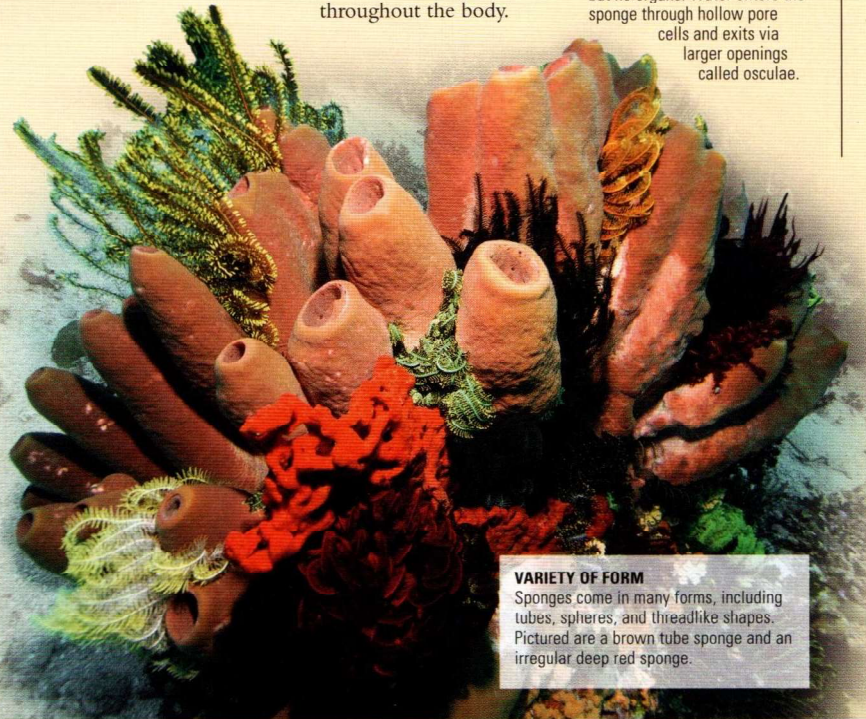
## ANATOMY

The body plan of a sponge is based on a system of water canals lined with special cells known as collar cells. Collar cells are unique to sponges. They draw water into the sponge through pores, by each beating a long, whip-like flagellum. A ring of tiny tentacles around the base of the flagellum traps food particles, and the water and waste material then flows out of the sponge through larger openings. Rigidity is provided by a skeleton made up of tiny splinters (spicules) of silicon dioxide or calcium carbonate scattered throughout the body.



### BODY SECTION

A sponge has specialized cells, but no organs. Water enters the sponge through hollow pore cells and exits via larger openings called osculae.



### VARIETY OF FORM

Sponges come in many forms, including tubes, spheres, and threadlike shapes. Pictured are a brown tube sponge and an irregular deep red sponge.



### CLASS HEXACTINELLIDA

## Reef-forming Sponge

*Heterochone calyx*



**HEIGHT** Up to 5 ft (1.5 m)  
**DEPTH** 300–800 ft (100–250 m)  
**HABITAT** Deep hard seabed

**DISTRIBUTION** Deep cold waters of north Pacific

The reef-forming sponge not only looks like a delicate glass vase, but its skeleton spicules are made from the same material as glass, silica. Each spicule has six rays, hence the Latin name of its class, *Hexactinellida*. Many glass sponges grow very large—off Canada's British Columbian coast, the reef-forming sponge forms huge mounds nearly 65 ft (20 m) high spread over several miles. Other members of their class also contribute to these reefs, which may have started forming nearly 9,000 years ago. Like coral reefs, sponge reefs provide a home for many other animals.

### CLASS DEMOSPONGIAE

## Barrel Sponge

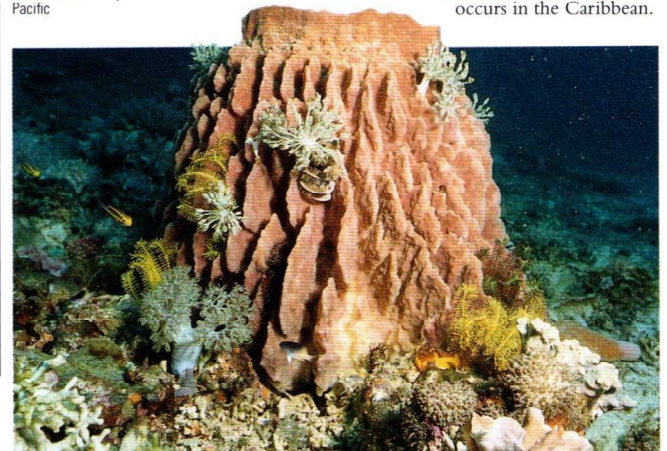
*Xestospongia testudinaria*

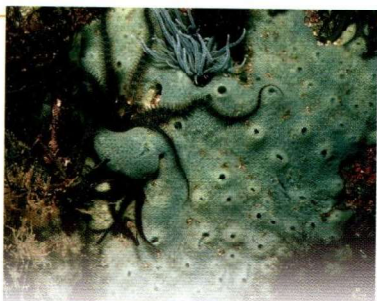


**HEIGHT** Up to 6 ft (2 m)  
**DEPTH** 6–165 ft (2–50 m)  
**HABITAT** Coral reefs

**DISTRIBUTION** Tropical waters of western Pacific

These gigantic sponges grow large enough to fit a person inside. Their hard surface is deeply ridged, but their rim is thin and delicate. The barrel sponge belongs to the *Demospongiae*, the largest class of sponges, containing about 95 percent of sponge species. The skeleton of sponges in this class is made from both scattered spicules of silica and organic collagen called spongin. An almost identical barrel sponge, *Xestospongia muta*, occurs in the Caribbean.





## CLASS DEMOSPONGIAE

## Breadcrumb Sponge

*Halichondria panicea***WIDTH** To more than 12 in (30 cm)**DEPTH** Shore to sublittoral zone**HABITAT** Hard surfaces**DISTRIBUTION** Temperate coastal waters of northeastern Atlantic and Mediterranean

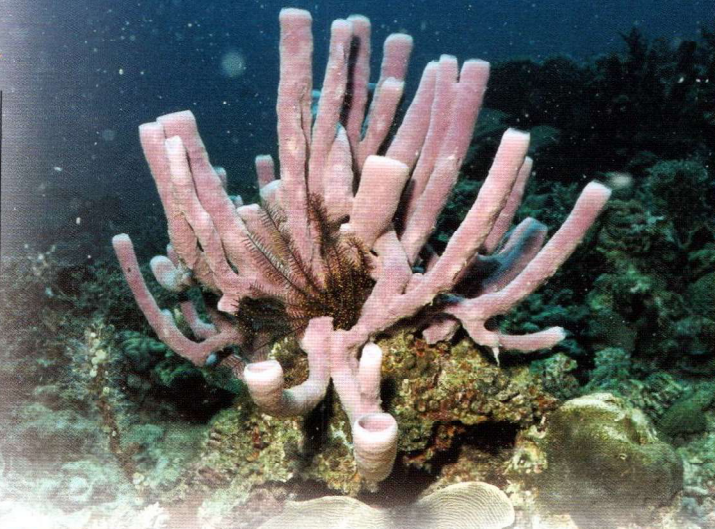
The appearance of this soft encrusting sponge varies from thin sheets to thick crusts and large lumps. On wave-exposed shores, it usually grows under ledges as a thin, green crust, its osculae opening at the tops of small mounds. Its green color is produced by photosynthetic pigments in symbiotic algae in the sponge's tissues. In deeper, shaded waters, the sponge is usually a creamy yellow. In waters with strong currents, this sponge may cover large rocky areas and kelp stems.

## CLASS DEMOSPONGIAE

## Blue Sponge

*Adocia* species**SIZE (LENGTH)** Up to 3¼ ft (1 m)**DEPTH** Shallow water**HABITAT** Steep coral reefs**DISTRIBUTION** Tropical waters off coast of northern Borneo

The exact identity of this beautiful, bright blue sponge has not yet been ascertained. It is soft and spongy in texture and grows in irregular branches with a row of large, round osculae running along each branch. It is especially common on the tops of prominent corals and rocks and on steep, shaded reef areas. This and many other tropical sponges are recognized as distinct species but have not yet been formally described and named. The dorid sea slug (*Jorunna funebris*) feeds on this sponge.



## CLASS DEMOSPONGIAE

## Tube Sponge

*Kallypildion fascigera***HEIGHT** Up to 3 ft (1 m)**DEPTH** Below 33 ft (10 m)**HABITAT** Coral reefs**DISTRIBUTION** Tropical reef waters of western Pacific, likely to be more widespread than shown

The elegant, tubular branches of this beautiful sponge are easily torn, and so it occurs only on deeper reef slopes, where wave action is minimal.

It sometimes grows as a single tube, but it is more often seen as bunches of tubes joined at the base. The tips of the tubes are translucent and slightly rolled in. The color of this sponge is usually pinkish violet, although some specimens are pinkish blue. When this sponge releases sperm, it resembles smoking chimneys.

The taxonomic status of this species and its relationship to other species in the same family has not been fully determined, and it is listed under various names in different sources. Such uncertainties are not unusual in the study of sponges and mean that the exact distribution of this many other species is yet to be established.

## CLASS DEMOSPONGIAE

## Mediterranean Bath Sponge

*Spongia officinalis adriatica***WIDTH** Up to 14 in (35 cm)**DEPTH** 3–165 ft (1–50 m)**HABITAT** Rocks**DISTRIBUTION** Mediterranean, especially the eastern part

The Mediterranean bath sponge, as its name suggests, is collected and processed for use as a bath sponge. It grows as rounded cushions and mounds, and is usually dull gray to black outside but yellowish white inside. It can be used as a sponge because it has no sharp skeletal spicules, just a network of tough fibers made from an elastic material called spongin. Huge numbers were once harvested, but today they are rare.

## CLASS CALCAREA

## Lemon Sponge

*Leucetta chagosensis***WIDTH** Up to 8 in (20 cm)**DEPTH** Shallow**HABITAT** Steep coral reef and rock slopes**DISTRIBUTION** Tropical reef waters of western Pacific

The lemon sponge is a beautiful, bright yellow color and is easy to spot underwater. It grows in the form of sacs, which may have an irregular,

lobed shape. Each sac has a large opening—the osculum—through which used water flows out of the sponge. Through the osculum, entrances to the water-intake channels that run throughout the sponge can be seen. The lemon sponge belongs to a small class of sponges in which the mineral skeleton is composed entirely of calcium carbonate spicules, most of which have three or four rays. The densely packed spicules give the sponge a solid texture. Like all sponges, this sponge is hermaphroditic. It incubates its eggs inside and releases them as live larvae through the osculum. Each larva is a hollow ball of cells with flagellae for swimming.

## CLASS SCLEROSPONGIAE

## Coralline Sponge

*Vaceletia ospreyensis***SIZE** Not recorded**DEPTH** At least 65 ft (20 m)**HABITAT** Dark reef caves**DISTRIBUTION** Not fully known, but includes tropical waters of western Pacific

*Vaceletia ospreyensis* is a living member of the coralline sponges group, most of which are known only from fossils. Coralline sponges have a massive skeleton made of calcium carbonate, as well as silica spicules and organic fibers. They were the dominant reef-building organisms before the stony corals of modern reefs evolved. Although given a separate class here, the Sclerospongiae, it is quite possible that coralline sponges belong to the class Demospongiae.

